Report:
Vegetation Survey and Mapping of the McArthur River Catchment, Northern Territory.

Nick Cuff, Tahnee Thompson, Ben Sparrow & Peter Brocklehurst.
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March 2008 to February 2009

The views and opinions expressed in this report are those of the Authors and do not necessarily represent the views or policies of the Northern Territory Government.

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Cover Photograph – Pseudo-karstically weathered coarse grained quartz sandstones forming ‘lost cities’ are a prominent feature of the Bukalara Range and support a range of distinct vegetation associations characterised by Corymbia dichromophloia, Eucalyptus phoenicea and E. miniata with a well developed shrub flora.
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Preface

Context
The Vegetation Survey and Mapping of the McArthur River Catchment, which includes portions of the Gulf Fall and Uplands, Gulf Coastal and Sturt Plateau Bioregions, Northern Territory was instigated as a pilot study for the NT RIS 2007/167 project titled “A Strategy to refine and regionalise Northern Territory vegetation mapping.”

Summary
Work began in April 2008 to improve mapping over the Mc Arthur River catchment area, encompassing sections of the Gulf Coastal, Gulf Fall and Uplands and Sturt Plateau Bioregions with the aim of trialling robust methods for improving the resolution of vegetation mapping in savanna lands. The improvement from the current 1:1m scale mapping will be of significant benefit for a range of purposes relating to land resource planning, assessment and management.
Acknowledgements

The Mc Arthur River Catchment Vegetation Survey and Mapping was made possible through the efforts of many people including staff in the Land Sciences Branch of the Department of Natural Resources, Environment, the Arts and Sport.

Numerous pastoralists and traditional owners within the study area are recognised for their cooperation and assistance during field surveys conducted within the catchment area and for allowing access to their land.

We wish to thank the pastoralists Jan, Chris, Kerry, Bill and Jan Snr. Darcy (Mallapunyah Station), Steven and Bridget Gaff (Kiana Station), Kathy Per and the Mawsons (Spring Creek) and David and Margaret Daniels (McArthur River Station) for generous assistance with the project.

Jack Green of the Northern Land Council and Frazer Baker of the Mabunji Resource Centre are thanked greatly for organising and allowing access to traditional lands within the study area for the purposes of field survey. We also like to thank the traditional owners who participated in field survey. These include Rodwell Walden, Chris Green, Casey Davey, Daniel Wesley, Leslie Hogan, Josie Davey, Norman Kingsley, William Coolwell, Valerie Raggett, Wallo Timothy, Lester Timothy and John Pluto.

We would also like to thank Tony and Tahnee in the NLC Borroloola office and Briony in the Katherine NLC office for assistance with the logistics and permits for the survey.

Staff of the NT Parks and Wildlife Service, particularly Ben and Shaun at the Borroloola Ranger Station are thanked for kindly providing accommodation, logistic and field assistance during field surveys.

Employees (Bruce and Ron) of Merline Mine (North Australian Diamonds) are thanked for their assistance in facilitating access to the mine lease area.

Colleagues from the Land Science Branch, Natural Resources Division are thanked for their assistance in the performance of field surveys and plant identification; Mani Berghout, Dominique Lynch, Chris Mangion and Graeme Owen.

Chris Mangion, Brian Lynch and Jason Hill provided invaluable assistance and comment on the soil, landform and landsystem information contained within this report.

Many thanks also to Bruce Wilson of the Queensland Herbarium, Luke Peel (Land Science branch, NRETAS) and Emrys Leitch (Bio-diversity South) for participating in a workshop held in the McArthur region.

Many thanks go to the staff of both the Darwin (Ian Cowie, Nez Lewis, Donna Lewis, Phil Short, Ben Stuckey, John Westaway & Glen Wightman) and Alice Springs (Hilary Coulson) Herbaria for assistance with the processing, identification and lodgement of plant specimens collected in association with this project.

We would also particularly like to thank John Westaway who participated in a number of the field trips over the length of the project.

Thanks also to Kristen Metcalfe for providing field data from her McArthur River mine site survey and Sam Chen in Alice Springs for data entry tasks.

Staff of the Department of Natural Resources, Environment, the Arts and Sport (Alice Central Plaza), Alice Springs are thanked for accommodating and assisting a number of the authors whilst working in Southern Region.
1.0 Introduction/Overview

Vegetation survey and mapping has long been recognised and utilised as an essential source of information for the purposes of landscape assessment, evaluation, planning and management within Australia. As a consequence, there is a long history of both independent and integrated (most typically as part of various land system surveys) survey and mapping throughout Australia. These projects have been conducted for various purposes, and have consequently employed a range of techniques and methods to achieve the aims of the individual projects. It is generally accepted that vegetation communities (at NVIS levels IV to VI) provide the most user-friendly and recognisable units for the description of vegetation diversity within a study area.

The incorporation of structural and floristic attributes (NVIS level V) into the mapping of vegetation communities allows for a broad range of useful applications. Structural attributes, including height, canopy cover, and growth form are important for informing community descriptions, while floristic attributes provide the baseline information for the classification of floristic groupings. Mapping these attributes as vegetation units allows for the final product to be utilised in a range of applications including land and conservation management and planning.

Vegetation communities have been extensively utilised as biodiversity, land utilisation and resource surrogates, and in the development of planning and assessment systems for the purposes of resource management (e.g. JANIS 1997, Queensland Government, 1999 & 2004).

More recently, knowledge of vegetation communities has formed an integral level in the development of integrated, hierarchical landscape classification approaches (e.g. regional ecosystems or their equivalents) for the purposes of biodiversity description, planning, management and conservation on an operational level (Sattler and Williams, 1999). Such approaches to the development of synthetic landscape classification schemes rely on both biotic and abiotic inputs to a classification hierarchy that account for both abiotic and biotic elements at the ecosystem level, in turn providing distinct classification units incorporating ecological processes. Such classification units are likely to provide a robust surrogate for the description of biodiversity at higher levels in the hierarchy (e.g. the landscape and ecosystem levels), and act as an essential tool in the planning and management of biodiversity conservation over large areas where detailed information at larger scales (e.g. species or genotype level) are deficient.

Traditionally, stereoscopic Aerial Photograph Interpretation (API) has been employed as the primary remotely sensed tool for the interpretation and delineation of recognisable and repeatable landscape/vegetation patterns (Photopatterns). This technique relies heavily on the skills and knowledge of the individual operator in the recognition and synthesis of ‘meaningful’ Photopatterns for the purposes of the mapping exercise. A variety of techniques have been employed (e.g. both intuitive/operator and numerical classification) to then ‘classify’ these Photopatterns into recognisable and definable Vegetation Mapping Units (VMU’s) through the utilisation of detailed site based floristic, structural and environmental data. In effect, site data is used to extrapolate beyond the bounds of the ‘site’ to describe the physical, structural and floristic attributes of a Photopattern. This method has been employed to great effect in the development of broadscale mapping programs for a multitude of purposes (e.g. vegetation, landsystem/unit, soil, regolith and geology mapping) across all jurisdictional levels within Australia. However, the cost involved in the capture of contemporary data and staff resourcing makes the process inherently costly per unit area of mapping produced.

Recent advances in the availability of computing power and mathematical algorithms utilised to process satellite imagery have allowed the refinement and more importantly operationalisation of techniques for image classification targeting vegetation communities.

The advent of satellite based platforms for the capture of land survey data has facilitated significant reductions in cost factors, associated with the capture of land information over large spatial areas, whilst also presenting a range of different approaches to the recognition and delineation of landscape pattern. The cost of Landsat image acquisition over large areas is significantly less than the capture of aerial photography and is less reliant on prevailing meteorological conditions for the timing of data capture given the cyclic passes of the satellites on pre-defined, standardized paths. This ‘systematic,
repetitive observation of the earth’s land areas’ (Campbell 2002, p.9) ensures the availability of contemporary land information as well as allowing the opportunity for more frequent time-series analysis of trend and change in land resources.

This study was instigated by the Northern Territory Natural Resource Management Board as part of a National Heritage Trust to investigate the options for operationalisation of rapid mapping techniques across a number of bioregions and methodological platforms. Given the inherent diversity and variability of vegetation communities encountered within the Northern Territory, this program endeavoured to develop a suite of complementary methodological approaches that could be used to account for this variation. This particular study was aimed at developing and trialling techniques for the rapid assessment, mapping and classification of vegetation communities within the ‘Gulf Bioregions’, an area with a high degree of floristic and structural diversity characteristic of the savannah (wet/dry tropics) ecosystems of Northern Australia.

1.1 Objectives
The principal aims of the Mc Arthur River Catchment Vegetation Survey and Mapping (MRCVSM) project were as follows:

a. To trial a methodology for the rapid survey and mapping of vegetation communities within semi-arid savanna regions of the Northern Territory with a view to updating the existing 1:1 000 000 scale vegetation mapping to 1:100 000 scale.

b. Provide land managers, developers and planning agencies with baseline environmental information at a regional scale.

c. Provide the opportunity for further development of data for use at the property scale.

d. Provide inputs to National initiatives regarding vegetation information (e.g. NVIS, ESCAVI)
2.0 The Mc Arthur River Catchment

2.1 Study Area
The Mc Arthur River catchment is situated in the south western portion of the Gulf of Carpentaria covering approximately 1959674.4704 Ha (19 596.7447 04 Square Kilometres) between approximate latitudes $17^\circ 24' 45''$ and $15^\circ 41' 03''$ south and approximate longitudes $135^\circ 00' 41''$ and $136^\circ 40' 37''$ east. The area is sparsely populated with the major centre of inhabitation being Borroloola, which has a population of approximately 950 (ABS for yr 2007), and is located on the Mc Arthur River, approximately 50km inland from the Western Gulf of Carpentaria coast. Land tenure within the catchment is predominantly Aboriginal Land Trust, and pastoral lease, with the major industries being centred on the Mc Arthur River mine (Lead, Silver and Zinc) and cattle grazing.

2.2 Bioregional Setting
The study area encompasses significant variation in both climatic and broad scale environmental (structural geology in particular) factors. Hence major changes in floristic and faunistic assemblages are to be expected along these gradients. Consequently, the catchment area contains portions of 3 distinct biogeographic regions (bioregions) as recognised under the Interim Biogeographic Regionalisation for Australia (IBRA) framework (Environment Australia 2000). These bioregions not only provide some contextual setting and framework for the land—units and vegetation communities described within the study area to sit, they also allow for future, more wide scale analysis and planning programs across broadly similar landscapes within the Northern Territory.

<table>
<thead>
<tr>
<th>Bioregion</th>
<th>Typical Landscapes</th>
<th>Typical Vegetation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gulf Fall &amp; Uplands</strong></td>
<td>Undulating terrain with scattered low, steep hills on Proterozoic and Palaeozoic sedimentary rocks, often overlain by lateritised Tertiary material; skeletal soils and shallow sands. Mean annual rainfall 500 – 900mm.</td>
<td>Darwin Box (<em>Eucalyptus tectifica</em>) and Variable-barked Bloodwood (<em>Corymbia dichromophloia</em>) woodland to low open woodland with Spinifex (<em>Triodia</em> spp.) understory</td>
<td>1518265Ha</td>
</tr>
<tr>
<td><strong>Gulf Coastal</strong></td>
<td>Gently undulating plains with scattered rugged areas on Proterozoic sandstones and Tertiary sediments; sandy red earths and shallow gravelly, sandy soils. Mean annual rainfall 700 – 1000mm.</td>
<td>Darwin Stringybark (<em>Eucalyptus tetradonta</em>) woodlands with Spinifex (<em>Triodia</em> spp.) understory.</td>
<td>230641Ha</td>
</tr>
<tr>
<td><strong>Sturt Plateau</strong></td>
<td>Gently undulating plains on lateritised Cretaceous sandstones; neutral sandy red and yellow earths. Mean annual rainfall 500 – 900mm.</td>
<td>Variable-barked Bloodwood (<em>Corymbia dichromophloia</em>) woodlands with Spinifex (<em>Triodia</em> spp.) understory.</td>
<td>209485Ha</td>
</tr>
</tbody>
</table>
2.3 Climate

The study area falls across two broadly different Australian climate zones (derived from a modified Köppen classification; Stern et. al. 2008). The northern, coastal portion of the basin is situated within the Tropical Savanna Climate Class which is typified by a strongly seasonal summer rainfall pattern with an average daily temperature \(((\text{Max} + \text{Min})/2)\) of greater than 18ºC. Mean monthly maximum temperatures ranges between approximately 29ºC and 39ºC with minimum temperature ranging from...
12ºC to 25ºC. Mean recorded monthly rainfall ranges from 0mm in the winter months to 231mm during February at Borroloola. This strongly seasonal summer rainfall pattern, with precipitation greatly exceeding (> 10 times) those of the winter months exerts a strong influence upon patterns of productivity, growth and reproduction of biotic systems as well as on abiotic landscape processes within the study area.

The remainder of the catchment area falls within the Hot Grassland (Winter Drought) Climate Class, being characterised by a mean temperature greater than or equal to 18ºC in all months, mean minimum rainfall in the winter months less than or equal to 30mm, the mean maximum rainfall in the summer months greater than 30mm and the mean relative humidity less than or equal to 70%. Additionally, the mean summer maximum rainfall must be greater than or equal to 10 times the mean minimum monthly rainfall and the mean maximum winter rainfall must not be greater than or equal to 3 times the mean minimum summer rainfall and the mean monthly rainfall must be less than 20 times 14 plus the mean monthly temperature. Typically, this results in warm dry winter months with the majority of the rainfall occurring with the wetter summer months, a characteristic climatic regime for much of the remainder of northern half of the Northern Territory and indeed much of inland northern Australia. Of particular note is the pronounced seasonal precipitation deficit evident in winter months (June, July and August). Average precipitation during these months inferred from the climate stations located within the study area is likely to be less than 10mm and in many years is nil, with mean summer (November, December and January) rainfall well exceeding the required order of magnitude difference from the winter values to place it within this climate zone.

A brief summary of the climate for the meteorological stations situated within the study area are provided in Figures 2 to 5 below.

Figures 2a and 2b: Borroloola Mean Maximum and Minimum Monthly Temperatures.
Figure 3: Borroloola Mean Monthly Rainfall.
Figures 4a and 4b: Mc Arthur River Mine Mean Maximum and Minimum Temperatures.

Location: 014704 MCARTHUR RIVER MINE

Mean maximum temperature (°C)

Created on Tue 16 Dec 2008 14:50 PM EST

Location: 014704 MCARTHUR RIVER MINE

Mean minimum temperature (°C)

Created on Tue 16 Dec 2008 14:51 PM EST

Bureau of Meteorology, 2008
Nominally, the meteorological stations located within the study area would appear to fall within both the Hot Grassland (Mc Arthur River Mine) and the Tropical Savanna climate classes (Borroloola). Average annual rainfall at the Mc Arthur River Mine (014704) and Borroloola (014710 and 014723) meteorological stations ranges from approximately 768.1mm (1969 to 2008) to 788.2mm (1889 to 1978) to 912.3mm (1987 to 2008) respectively with greater than 60% of this occurring between December and February. Such strongly seasonal rainfall regimes are typical of much of the northern half of the Northern Territory and significantly influence both the landscape and ecological processes operating within the catchment area.

2.4 Geology
The Mc Arthur River catchment lies within a geologically complex, and economically important part of the North Australian Craton. Consequently, the geology of the study area has been extensively investigated and documented as part of the Northern Territory Geological Survey and the stratigraphic relationships of the major groups and units are well documented (see Pietsch et. al. 1991 a & b; Haines et. al. 1993). The Proterozoic McArthur River Basin sequence dominates much of the study area and is underlain by an early Proterozoic basement of felsic volcanic and minor interbedded sedimentary rocks (Scrutton Volcanics). This is unconformably overlain by a number of unmetamorphosed and relatively undeformed Proterozoic sedimentary and minor volcanic units thought to have been deposited in cyclic marine, lacustrine and fluvial environments (Tawallah, Mc Arthur, Nathan and Roper Groups from oldest to youngest respectively). Generally, many of the units represented in these groups are comprised of clastic (primarily sandstones with minor mudstones and conglomerates) and carbonate (dolostones) sediments with minor areas of interbedded volcanics (basalts, rhyolites) and some intrusive igneous units (dolerite and gabbro sills/dykes). Generally each of these major groups within the Mc Arthur basin sequence is separated by a distinct disconformity from those overlying it, however the boundaries and relationships between some formations are complex and uncertain (e.g. the Tawallah Group, Nyanantu Formation and the overlying McArthur Group) and consequently some formations remain unassigned at present.
Portions of the study area are overlain by flat lying, largely undeformed Palaeozoic and Mesozoic rocks (primarily clastic sediments), that are thought to represent the remnants of previous land surfaces primarily associated with the Georgina and Dunnmarra/Carpentaria basins respectively (Haines et al. 1993). Cambrian sedimentary deposits of the Bukalarra Sandstone represent the north eastern extremity of the Georgina Basin and are generally arenaceous in composition and are prominent in the Abner Range. This unit is conformably overlain by the generally finer grained Cox Formation of sandstones, siltstones and shales, typically forming low rubbly plateaux (Pietsch et al. 1991).

Mesozoic sediments are generally thin reaching a maximum thickness of 30 to 40 metres, with lithology’s displaying a high degree of size variation, ranging from conglomerates to mudstones (Pietsch et al. 1991). In many instances, these formations are associated with the distinct ‘caps’ of the low ranges common in the southern and western sections of the study area.

Intact Cainozoic land surfaces are a prominent feature of much of the catchment area and are highly variable in the extent of their preservation. The sub-coastal and coastal plains, seaward of the major range formations exhibit the best development of Cainozoic landforms with the removal of restrictions of seaward sediment movement, low relief, gentle slope and young drainage patterns contributing to the preservation of the Cainozoic land surfaces. This area was identified by Aldrick & Wilson (1990) as 2 separate geomorphic provinces (G5 and G6) based on the distinctly different geomorphic processes operating in these areas. Both historic sea-level changes and the deposition of sediments mobilised higher in the catchment have played important roles in the development of landforms and regolith within this area (see Section 2.6 for further discussion), however a number of younger consolidated sedimentary units (e.g. Cze – Beatrice Island Limestone) are found within these areas and are thought to be related to periods of deposition during the higher sea levels of the Neogene or Pleistocene. Large areas of the coastal plain are typically soils and landforms related to extensive and intense chemical weathering under predominantly terrestrial conditions during the Tertiary. These weathering events have resulted in the formation of pisolitic ferricrete and lateritic profiles as well as some calcrete deposits. Closer to the coast extensive sand deposits parcelling the present day coastline are evident and are hypothesised to represent Chenier ridges associated with previous shorelines during the eustatial highs of the Pleistocene or Neogene. Seaward of these deposits are active and stabilising strandplain deposits (generally sandy chenier formations) as well as extensive tidal and supratidal flats associated with the McArthur River and minor coastal streams all of Quaternary age.

2.5 Soils

Previous land system/unit surveys in the study area have described the soils in detail (e.g. Christian et al., 1954; Day, 1985; Aldrick and Wilson, 1990). Rudosols and tenosols shallow, skeletal, stony or rocky soils of variable colour (generally yellow, red or drown) developed over different parent materials are the dominant soil types throughout much of the study area with other shallow and rocky soils types being prevalent (Aldrick and Wilson, 1990). Other common soil types found within the study area are siliceous sands, yellow earths, earthy sands and grey clays (kandosols, chromosols, hydrosols, and vertosols).

These soils types (and the parent materials from which they are derived) exert a strong influence on the vegetation types found within the study area and are a primary determinant of many of the floristics and structure of many of the vegetation associations found within the catchment. Many of the factors important for plant establishment and growth, including, nutrient status/availability, substrate depth, water holding capacity/availability and permeability are directly influenced by soil processes, development and history over various temporal and spatial scales and it is hypothesised that the present day distribution of vegetation associations within the study area would correlate strongly with variation in soil characteristics.

2.6 Geomorphology, Landforms and Landsystems

The study area has been divided into six geomorphic provinces, representing broad landscape process zones, representing different zones or erosion and sediment transport, and which have been
described as part of land system/unit mapping programs active within the catchment and its surrounds (Aldrick and Wilson, 1990). These geomorphic provinces broadly correlate with the major geological ‘zones’ evident in the available geological information and consequently also correlate strongly with the land systems, land units and vegetation communities found within the study area. They broadly discriminate the major landform types evident within different portions of the catchment. Table 2 gives details of these geomorphic provinces and the major landform patterns associated with these provinces.

The drainage patterns evident within the catchment are largely a result of a major erosional cycle initiated in the post-Mesozoic (Miocene?) which ultimately resulted in the incision of the historic lateritised erosion surface to the Proterozoic basement rocks, which subsequently imposed significant influence on drainage pattern development (Yates, 1963; Aldrick and Wilson, 1990).

2.7 Vegetation

The vegetation communities of the Southern Gulf region (including the study area) have been previously documented as part of Land Systems surveys (Christian et al. 1954; Aldrick and Wilson, 1990) and the Territory-wide 1:1 000 000 Vegetation Survey (Wilson et al., 1990). Many of these studies operated at a scale which resulted in much of the complexity of vegetation communities Wilson et al. (1990) identified a total of 21 vegetation mapping units (Table 3) and 13 Broad Floristic Groups within the study area.

Of the previous studies, Aldrick and Wilson (1990) describe the vegetation in the most detail (at approximately 1:250 000 scale), detailing 35 communities based on structural and floristic classification of 604 sites within the Southern Gulf Region. Of these types, 27 Vegetation Communities were mapped as part of Landsystems (generally associated with specific Land Units within these) within the study area. A brief description of these vegetation communities and their Land System relationships are provided in Table 4.

As illustrated in Tables 3 and 4, the catchment is dominated by a number of open woodland structural formations with Eucalypts (Eucalyptus spp. and Corymbia spp.) being the most common tree species in the dominant strata. A number of other broad floristic formations, Melaleuca spp. woodlands, Acacia spp. woodlands and open-forests, shrublands and grasslands are also found within the catchment and may be the dominant vegetation types associated with particular geomorphic provinces and/or landsystems within the study area.

Much of the existing data available in both integrated (landsystem) and pure vegetation formats have been combined in the development of the National Vegetation Information System (NVIS) dataset for the Northern Territory (Figure 6) and The Vegetation of the Australian Tropical Savannas (Fox et al., 2001) map series. This system of vegetation classification utilised by NVIS and the requirements of appropriately scaled data at the national level have provided the primary impetus for the development of the current project.

In addition to the information available across the catchment, detailed floristic survey and vegetation mapping has been conducted as part of the legislative and regulatory processes associated with the development of the Mc Arthur River mining operations. These studies have identified in the order of 7 upland Eucalyptus spp./Corymbia spp. dominated mapping units on the upland Permian sediments of the plains, hills and ranges and 2 riparian vegetation mapping units within the catchment of the Glyde River system.
Table 2: Geomorphic provinces and major landform patterns of the Mc Arthur River catchment.

<table>
<thead>
<tr>
<th>Geomorphic Province</th>
<th>Erosion/Sediment Removal Regime</th>
<th>Main Characteristics of the Geomorphic Province</th>
<th>Main Landform Patterns of the Geomorphic Province</th>
<th>Major landsystems associated with Geomorphic Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1(a) &amp; G1(b)</td>
<td>Very Slow</td>
<td>Mature laterite and clay plains associated with the Barkley Tableland and Sturt Plateau.</td>
<td>Plains, undulating plains, low rises.</td>
<td>Cresswell, Lancewood.</td>
</tr>
<tr>
<td>G3</td>
<td>Slow/Rapid</td>
<td>High level, rocky, resistant sandstone/igneous</td>
<td>Plateau, escarpment, hills.</td>
<td>Bukalara, Emmerugga, Glyde, Horse Creek, Running.</td>
</tr>
<tr>
<td>G4</td>
<td>Slow to Moderate</td>
<td>Ridges and ranges perpendicular to the drainage pattern. Variably bedded and grain sized sediments predominate.</td>
<td>Hills, low hills, plateau, escarpment, plains.</td>
<td>Abner, Emmerugga, Favenc, O'Keefe.</td>
</tr>
<tr>
<td>G6</td>
<td>Very Slow</td>
<td>Level coastal terraces</td>
<td>Alluvial plains, tidal flats, plains, low rises.</td>
<td>Littoral, Spillen, Rosie, Tawarilla, Mc Arthur, Batten, Fletcher, Horse Creek.</td>
</tr>
</tbody>
</table>
Table 3: Map units of the Mc Arthur River catchment derived from Wilson et al. (1990).

<table>
<thead>
<tr>
<th>Mapping Unit (Wilson et al., 1990)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td><em>E. tetradonta, Callitris intratropica</em> woodland with <em>Plectranche pungens</em> open-grassland understorey.</td>
</tr>
<tr>
<td>8</td>
<td><em>E. tetradonta, E. miniata, E. ferruginea</em> woodland with Sorghum grassland understorey.</td>
</tr>
<tr>
<td>10</td>
<td><em>E. tetradonta</em> woodland with <em>Plectranche pungens</em> open-grassland understorey.</td>
</tr>
<tr>
<td>16</td>
<td><em>E. tectifica, E. terminalis</em> woodland with <em>Sehima nervosum, Chrysopogon fallax</em> grassland understorey.</td>
</tr>
<tr>
<td>20</td>
<td><em>E. dichromophloia</em> low woodland with <em>Chrysopogon fallax, Plectranche pungens</em> grassland.</td>
</tr>
<tr>
<td>22</td>
<td><em>E. terminalis, E. chlorophylla</em> low woodland with <em>Sehima nervosum, Chrysopogon fallax</em> grassland understorey.</td>
</tr>
<tr>
<td>23</td>
<td><em>E. pruinosa</em> low woodland with <em>Sehima nervosum, Chrysopogon fallax</em> grassland understorey.</td>
</tr>
<tr>
<td>25</td>
<td><em>E. microtheca</em> low open-woodland with <em>Eulalia aurea, Dichanthium grassland</em> understorey.</td>
</tr>
<tr>
<td>26</td>
<td><em>E. microtheca</em> low open-woodland with <em>Eulalia aurea Astreblia</em> grassland understorey.</td>
</tr>
<tr>
<td>31</td>
<td><em>E. dichromophloia, E. tetradonta</em> low-open woodland with <em>Plectranche pungens</em> open-hummock grassland understorey.</td>
</tr>
<tr>
<td>32</td>
<td><em>E. dichromophloia, E. miniata</em> low open-woodland with <em>Plectranche pungens</em> open-hummock grassland understorey.</td>
</tr>
<tr>
<td>33</td>
<td><em>E. dichromophloia</em> low open-woodland with <em>Plectranche pungens</em> open-hummock grassland understorey.</td>
</tr>
<tr>
<td>35</td>
<td><em>E. leucophloia</em> low open-woodland with <em>Plectranche pungens</em> hummock grassland understorey.</td>
</tr>
<tr>
<td>36</td>
<td><em>E. leucophloia</em> low open-woodland with <em>Triodia pungens, Plectranche pungens</em> open-hummock grassland understorey.</td>
</tr>
<tr>
<td>49</td>
<td><em>Melaleuca citrolens</em> low woodland with <em>Chrysopogon fallax</em> open-grassland understorey.</td>
</tr>
<tr>
<td>51</td>
<td><em>Melaleuca viridiflora, Eucalyptus</em> low open-woodland with <em>Chrysopogon fallax</em> grassland understorey.</td>
</tr>
<tr>
<td>55</td>
<td><em>A. shirleyi</em> open-forest with open-grassland understorey.</td>
</tr>
<tr>
<td>98</td>
<td><em>Chrysopogon fallax, Dichanthium fecundum</em> grassland.</td>
</tr>
<tr>
<td>103</td>
<td><em>Vetiveria elongata</em> grassland.</td>
</tr>
<tr>
<td>105</td>
<td>Mangal low closed-forest.</td>
</tr>
<tr>
<td>106</td>
<td>Saline tidal flats with scattered chenopod low shrubland (Samphire).</td>
</tr>
</tbody>
</table>
Table 4: Vegetation Communities and Landsystem Relationships within the Mc Arthur River Catchment (after Aldrick and Wilson, 1990).

<table>
<thead>
<tr>
<th>Vegetation Community</th>
<th>Vegetation Description</th>
<th>Major Landsystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mid-high Open Forest to Low Isolated Clumps of Shrubs Mangroves.</td>
<td>Tol, Tos</td>
</tr>
<tr>
<td>2</td>
<td>Tall open Woodland of <em>Casuarina equisetifolia.</em></td>
<td>Tos(m)</td>
</tr>
<tr>
<td>3</td>
<td>Mid-high Closed Forest of <em>Diospyros humilis, Canarium australianum, Strychnos lucida</em> and <em>Ficus</em> spp.</td>
<td>Tos(m)</td>
</tr>
<tr>
<td>4</td>
<td>Tall Grassland of <em>Chrysopogon elongatus.</em></td>
<td>Tos</td>
</tr>
<tr>
<td>5</td>
<td>Mid-high Open Woodland of <em>Eucalyptus microtheca.</em></td>
<td>Tab, Tac, Tcj, Tam</td>
</tr>
<tr>
<td>6</td>
<td>Mid-high Open Woodland of <em>Bauhinia cunninghamii.</em></td>
<td>Rle, All</td>
</tr>
<tr>
<td>7</td>
<td>Tall Open Grassland of <em>Chrysopogon fallax, Panicum mindanaense, Eulalia aurea</em> and <em>Brachyachne convergens.</em></td>
<td>Tac, Lwl</td>
</tr>
<tr>
<td>8</td>
<td>Mid-high Woodland of <em>Melaleuca nervosa.</em></td>
<td>Ald, Lwf, Tol, Tor, Tpw</td>
</tr>
<tr>
<td>9</td>
<td>Mid-high Woodland of <em>Melaleuca viridiflora.</em></td>
<td>Ald, Lwf, Tcw</td>
</tr>
<tr>
<td>10</td>
<td>Mid-high Woodland of <em>Melaleuca viridiflora</em> and <em>Asteromyrtus symphyocarpa</em></td>
<td>Tor</td>
</tr>
<tr>
<td>11</td>
<td>Tall Open Woodland of <em>Corymbia bella.</em></td>
<td>Tab, Taf, Tam, Tos</td>
</tr>
<tr>
<td>12</td>
<td>Tall Open Woodland <em>Corymbia polycarpa.</em></td>
<td>Alh, Tam, Alt</td>
</tr>
<tr>
<td>13</td>
<td>Tall Open Woodland of <em>Banksia dentata, Corymbia ptychocarpa</em> and <em>Grevillea pteridifolia.</em></td>
<td>Aso</td>
</tr>
<tr>
<td>14</td>
<td>Tall Open Woodland of <em>Eucalyptus tetradorata</em> with <em>Callitris intratropica.</em></td>
<td>Ala, Lwf, Alh, Tam, Tor, Lwr, Tct</td>
</tr>
<tr>
<td>15</td>
<td>Tall Open Woodland of <em>Eucalyptus tetradonta.</em></td>
<td>Lwb, Lwf, Alh, Tam, Alm</td>
</tr>
<tr>
<td>16</td>
<td>Mid-high Open Woodland of <em>Eucalyptus tectiflua, Corymbia terminalis</em> and <em>Erythrophleum chlorostachys.</em></td>
<td>Tab, Rle, Rsf, Asf, Taf, Rlk, Rll, Tam, Tan, Tcw</td>
</tr>
<tr>
<td>17</td>
<td>Mid-high Woodland of <em>Eucalyptus phoenicea.</em></td>
<td>Alt</td>
</tr>
<tr>
<td>18</td>
<td>Mid-high Woodland of <em>Eucalyptus leucophloia.</em></td>
<td>Asb, Rle, Asf, Als</td>
</tr>
<tr>
<td>19</td>
<td>Mid-high Open Woodland of <em>Corymbia dichromophloia, Eucalyptus miniata, Eucalyptus tetradorata</em> and <em>Corymbia ferruginea.</em></td>
<td>Aab, Alg, Alh, Aso, Als</td>
</tr>
</tbody>
</table>
Figure 6: NVIS level 3 vegetation communities of the Mc Arthur River catchment.
3.0 Methods

3.1 Existing Data

**Site Data**

Data from a variety of historical surveys was also utilised in the floristic analysis of the vegetation communities within the study area. A total of 310 sites were extracted from the following data sets and incorporated into the compiled data:

**Table 5: Additional site data sourced for use in the analysis of vegetation communities within the Mc Arthur River catchment.**

<table>
<thead>
<tr>
<th>Survey</th>
<th>Sites</th>
<th>Site Prefix</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT Vegetation Survey</td>
<td>43</td>
<td>DOCx, BARK</td>
<td>1988</td>
<td>Data extracted from the Biodiversity Conservation branch ‘VEGMERGE’ database.</td>
</tr>
<tr>
<td>Gulf</td>
<td>8</td>
<td>GULF</td>
<td>1986</td>
<td>Land systems of the Southern Gulf</td>
</tr>
<tr>
<td>Lancewood</td>
<td>8</td>
<td>LANCEWOOD</td>
<td>1991</td>
<td>Data extracted from the Biodiversity Conservation branch ‘VEGMERGE’ database.</td>
</tr>
<tr>
<td>McArthur/Glyde Rivers</td>
<td>23</td>
<td>MacarthurR_Glyde</td>
<td>2003</td>
<td>Surveys conducted for the purposes of filling deficiencies in data for sandstone and riparian areas in the central catchment.</td>
</tr>
<tr>
<td>McArthur River</td>
<td>22</td>
<td>MacarthurR</td>
<td>2003</td>
<td>Surveys conducted for the purposes of filling deficiencies in data for sandstone and riparian areas in the central catchment.</td>
</tr>
<tr>
<td>McArthur River</td>
<td>149</td>
<td>MCAR</td>
<td>1981</td>
<td>Sites from ‘Land Units of the Upper McArthur Catchment’ survey</td>
</tr>
<tr>
<td>Melaleuca survey</td>
<td>9</td>
<td>MELA</td>
<td>1993</td>
<td>Data extracted from the Biodiversity Conservation branch ‘VEGMERGE’ database.</td>
</tr>
<tr>
<td>Riparian Survey</td>
<td>13</td>
<td>RI</td>
<td>2001</td>
<td>Data extracted from the Biodiversity Conservation branch ‘VEGMERGE’ database.</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>35</td>
<td>SPAR</td>
<td>Various</td>
<td>Includes sites collected during initial reconnaissance trip to Mc Arthur River catchment (August 2008)</td>
</tr>
</tbody>
</table>

**Spatial Data**

In addition to the ancillary site data, the existing mangrove and saltmarsh vegetation community mapping undertaken as part of the project titled: Methods for monitoring the abundance and habitat of northern Australian mud crab, *Scylla serrata* (de Vries *et al.* 2002) was incorporated. This data was used as the basis for the discrimination of community boundaries within the estuarine zone as this area was inaccessible during our survey. These vegetation communities were delineated and described using a number of methods described in de Vries *et al.* (2002). The descriptions provided for these communities (refer to Section 4) are taken from the NVIS 2004 reporting.

**Imagery**

A scene in April was selected in order to minimise cloud cover and fire scarring, as it would be expected that increasingly more area of the catchment would be burnt as the dry season proceeds. 2004 imagery was acquired for the purpose of retaining consistency with Commonwealth benchmarking which utilises data from this period.
Table 6: Technical specifications of LANDSAT 5 TM data used in image classification and vegetation mapping of the Mc Arthur River catchment.

<table>
<thead>
<tr>
<th>Scene Designation</th>
<th>102/71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>30/04/2004</td>
</tr>
<tr>
<td>Sensor</td>
<td>Landsat 5 TM</td>
</tr>
<tr>
<td>Scene Size</td>
<td>Triple Scene</td>
</tr>
<tr>
<td>Scene Centre Lat</td>
<td>-15.95011</td>
</tr>
<tr>
<td>Scene Centre Long</td>
<td>135.90001</td>
</tr>
<tr>
<td>Geometric correction</td>
<td>Level 10 - Orthocorrected Image</td>
</tr>
<tr>
<td>Geometric accuracy (X,Y,Z combined)</td>
<td>19.43 m RMS</td>
</tr>
<tr>
<td>Radiometric calibration</td>
<td>To radiance at sensor</td>
</tr>
</tbody>
</table>

- **Image rectification and calibration**
  The scenes were ortho-rectified by ACRES in accordance with ACRES standards prior to purchase. The data was also radiometrically calibrated to radiance at sensor by ACRES.

- **Unsupervised classification**
  Prior to commencement of field data collection, the image was run through a 150 class unsupervised classification. This to provide an indication of the different patterns to be sampled whilst in the field.

### 3.2 Field Survey

The field survey work for this project was undertaken from August to December 2008. The methodology trialled was designed to permit rapid assessment of vegetation communities, whilst also providing appropriate data to allow for a meaningful vegetation map at a scale of 1:100 000 to be produced.

### 3.3 Site Selection

A total of 489 sites were sampled during this time. Once merged with ancillary data sets, the total site density was 799 or approximately 0.25sites/Ha. The data parameters collected in the field were selected on the basis that they would be sufficient to inform the mapping, whilst maximising time efficiency.

**Site pre-selection**

Prior to each field trip site locations were pre-selected for the areas in which sampling was to be undertaken, through visual interpretation of the natural colour image alongside the classified image. The main criteria for site pre-selection included ensuring that sites were selected in all patterns present on the image, and that pre-selected sites were placed in the most homogenous incidences of these patterns, whilst also being logistically sensible. Alternative site locations with the same patterns were selected when a particular pre-selected site was deemed unsuitable in the field.

**Field site selection**

Alongside visual interpretation of image pattern, there were a number of other factors which influenced site location selection whilst in the field. These included community homogeneity, fire, disturbance, accessibility, and spatial variability. Representative, homogenous communities were selected, and eco-tones avoided in order avoid difficulties in image interpretation and classification (Brocklehurst et al. 2007).

**Fire**

Due to the hindrance in accurate estimation of covers and species identification caused by fire, recently burnt areas were avoided whenever possible, although in some circumstances were required to be sampled. This was particularly applicable in the northern component of the catchment where significant dry season burning had occurred.
Disturbance
Areas with apparent disturbances including high presence of weeds and/or grazing by feral animals or stock were also avoided where possible.

Access
A majority of sites were accessed in a four wheel drive vehicle using existing track access. Sites that required sampling and were within 2 kilometres of tracks were accessed by foot. A helicopter was used to gain access to areas that were otherwise inaccessible. These areas included parts of the Abner and Bukalara ranges in the Eastern portion of the catchment, and also some sections of the Sturt plateau bioregion at the southern and western extremities of the catchment.

Spatial variability
The method adopted for this project required large quantities of field data, which was to have high spatial coverage. Hence this factor also influenced site selection, as it was required that the full spatial variability of the different community types was collected. Prior to each field trip, the spatial and spectral coverage of site data was assessed against road notes and previously collected data in order to target areas deficient in site data. This allowed field staff to target areas in order to obtain a more comprehensive and thus representative set of site data for use in both floristic and image classifications.

Site Data Collection
During the survey, two different types of sites were used to access vegetation, these included rapid sites and road notes.

Road notes
Road notes were recorded on the laptop whilst travelling in the vehicle. These generally included dominant species information for all strata, and on occasions also included visual estimations of average height and canopy cover.

Rapid sites
For the purpose of increasing time efficiency through elimination of office data entry, data collected in the field was entered directly into Personal Digital Assistants (PDA’s). Uploaded onto the PDA was a purpose written Cybertracker sequence that consisted of two data components that contained general site information data and species data respectively.

Site data
Multiple GPS locations in WGS84 Datum were recorded for each site using an inbuilt GPS in the PDA’s, which recorded a location each time the environmental/structural data component of the sequence was completed, and also each time a species record was entered. A minimum of 3 photos were taken for each site, the numbers of which were entered into the photo number field of the Cybertracker sequence.

Environmental data
Environmental attributes including landform pattern and element, homogeneity, and ground cover estimates were recorded at each site in accordance with the ‘Australian soil and land survey field handbook’ (McDonald et al. 1998).

A measure of site vegetation association spatial ‘homogeneity’ was recorded at each site to aid in the information of satellite image classification. This involved a visual estimation of the radial distance in which the vegetation community being sampled was representative of the vegetation surrounding the point location at which sampling occurred. The minimum radius for homogeneity was set at 30m and the maximum at 150m, with the exception of sites accessed by helicopter where the maximum was increased to 200m due to aerial visibility.

Ground cover (both biotic and abiotic), were recorded at each site, totalling to 100%. Ground cover was estimated for bare ground, crust (cryptograms), stone/gravel (<60cm diameter), rock (>60cm
If disturbance was evident at a site, the extent and type was recorded in the comments field. Broad soil surface characteristics were also recorded for most sites, however ancillary data from previous surveys conducted in the study area were relied upon for more detailed and accurate soil information.

**Structural Information**
A stratum summary was recorded for each site. This included:

*Crown cover*
Total opaque crown cover for the upper and mid stratum was visually estimated. Total projective foliage cover was visually estimated for the ground stratum.

*Height*
A direct reading clinometer was used to measure average height for the upper stratum, whilst average heights were visually estimated for the mid and ground stratum.

*Canopy density*
Average canopy density was visually estimated for the upper and mid stratum.

*Growthform*
The dominant growth form was recorded for each stratum in accordance with the National Vegetation Information System (NVIS) guidelines.

**Species data**
Due to the time constraints, requirements for the mapping, and time of year that the sampling occurred, the floristic information collected was generally restricted to the dominant species (>2% cover) in each stratum. If a species was unable to be identified in the field, a specimen was collected and given a unique voucher number for identification in the NT herbarium. For each species the following was documented:

* Crown cover/ Foliage Projective Cover (FPC)*
For each species documented in the upper and mid strata, crown cover was visually estimated. It was decided that species with less than 2% cover were not to be utilised as part of the floristic analysis, and hence recording these were optional. If recorded, they were attributed with actual percent cover with trace occurrences of taxa within the site attributed with 0.1% cover. Similar measures were taken using FPC for the ground layer.

* Height*
Average height was measured using a direct reading clinometer for species in the upper stratum, or visually estimated for species in the remaining stratum.

* Basal area*
A basal count was recorded for each woody species recorded using a basal area factor gauge. Appropriate basal area factors for use in the sweep were determined at each individual site based on the requirement for a minimum number of approximately 10 basal area ‘hits’ per sweep for accurate determination of overall basal area in ‘wooded communities’. Dead trees were excluded in the basal sweep due to the inability for accurate identification.

* Growthform*
Growth form for each individual species was also recorded.

**3.4 Floristic Analysis**
Taxa not identifiable in the field by the officers performing the survey were collected and electronically vouchered for later identification at the Northern Territory Herbarium. All nomenclature follows Kerrigan & Albrecht (2007).
Classification of the site based field data was performed using a custom written hierarchical clustering program in the Matlab software package (Mathworks 2008; Barnetson, upubl.). Data preparation and pre-processing involved the removal of all species records of less than 2% cover and indeterminate taxa as well as the removal of sites from the data set which were dominated (crown coverage) by indeterminate taxa. Additionally, individual crown cover measurements were not recorded for all taxa in some of the pre-existing survey information. These surveys recorded basal area by species within strata, and these measurements were converted to approximate opaque crown cover values based on the stand basal area and the typical crown density characteristics of the individual species involved by conversion to Foliage Projected Cover (FPC = (1.896+(2.674*Basal Area @ 1.3m))-0.16*(Basal Area @ 1.3m) (Kuhnell et al. 1998)) and then Crown Cover (CC = FPC/Crown Density (Walker & Hopkins, 1990)) for use in the floristic analysis.

Sub-specific taxa were amalgamated at the species level for the purposes of analysis. The floristic analyses were run based on the actual measured cover values for each taxon (Opaque Crown and FPC for upper/mid and ground strata respectively), excepting graminoids (see below for further discussion).

Classification was performed using a cosine dissimilarity index and a hierarchical clustering technique on an initial number of groupings equal to the square root of the number of sites in the analysis (799 Sites; SQRT approx. 28 initial groups) and rerun to produce 100 groupings. This allowed the exploration of broad patterns within the data at the larger group level (‘mapping classes’) and within these groupings using the larger number of classes produced from the 100 class clustering (‘floristic groups’). Dendrograms and group membership tables were produced for each clustering procedure to aid in the discrimination of mapping classes and floristic groups from the site based analysis.

In the initial analyses, the vegetation groups were being highly influenced based on the presence and cover of different grass species, which often due to their high covers were outweighing the influence of dominant woody species upon which it was anticipated most floristic groups would be based. As a consequence, Graminoids were amalgamated based on broad life-form characteristics (i.e. Hummock Grass and Tussock Grass) and categorised into presence/absence data for the purposes of most effectively accounting for perceived differences in the structural/physiognomic characteristics of communities observed to occur within the study area. This allowed the discrimination of patterns in understorey structure and floristics to be most efficiently revealed within the data. This resulted in a more meaningful outcome for the floristic groupings, of which there were 50 but were reduced to 46 upon further interpretation.

3.5 Image Analysis

For the purpose of this project a stepwise supervised classification approach was utilised to rapidly categorise the imagery based on the similarity of groups of pixels based on the spectral properties of individual pixels.

This involved the initial conversion of point-based floristic sites, allocated to preliminary mapping classes, to polygons by buffering the field sampling location using the homogeneity measure. This resulted in the creation of ‘regions of interest’ (ROI) in which the floristic data (and thus preliminary mapping class) was deemed to adequately describe the vegetation community. These ROI's were then clipped or expanded (via a minimum distance rule) to the boundary of the nearest adjacent pixel.

The total number of pixels falling within each mapping class ROI was then appraised to determine if they adequately characterised the total extent of the class. Classes deemed to be under represented in the number of pixels in the ROI were then ‘ROI region-grown’ in ENVI. This was only conducted where there were very few sites to represent a mapping class. These few sites were enlarged by the Grow function that included similar contiguous pixels to increase the number of pixels representing that class. This was done interpretatively over the image to assess if each grow result remained within that vegetation class – It was assessed as a good result before this was committed to the ROI coverage.
These pixel-based ROI’s were analysed to determine statistics to define each mapping class based on the spectral properties of pixels assigned to that class. These class statistics were then used in a maximum likelihood supervised image classification to produce a preliminary classification result where each pixel was assigned to a mapping class to which it had the highest probability of being a member. We also output a “rule image” at this stage of the processing. This was a multi-band image where each band represented a mapping class and the pixel values in the image corresponded to the probability that that pixel should be a member of that mapping class. This rule image could then be re-combined using different probability thresholds for each mapping class depending on the over or under classified in the default 60% probability threshold image. Thresholds were increased (a greater probability required before that class was assigned to a particular pixel) or decreased (a lower probability required before that class was assigned to a particular pixel) on a class by class basis depending if that class were deemed to be over classifying or under classifying in the resultant combined classification compared to field data sites and field knowledge of the area. This process was conducted iteratively until a result was obtained that could not be improved upon by image processing.

This draft, classified raster image of the study area was then ‘smoothed’ using a majority filtering process (9x9 pixel moving kernel window) to remove noise and generalise the raster product before conversion to vector format. The final draft raster image was converted to EVF format in ENVI before export as both individual class and amalgamated format shapefiles.

**3.6 Post Processing**

Vectorised preliminary mapping classes (PMC’s) derived from the image classification process were converted to ARCINFO coverage format for further evaluation and editing. Each individual PMC was assessed against road notes and site data for the adequacy of its representation of the vegetation community within the catchment. GIS ‘masks’ were constructed to reallocate individual mapping classes based on field data in order to more accurately define the distribution of the PMC’s within the catchment. After the manipulation of each individual class, the data were reassembled and combined with the existing mangrove, samphire and saltpan vegetation mapping (NVIS, 2004) to produce a single data set of final Vegetation Mapping Units (VMU’s). This layer was again assessed against the site data and individual polygons manually edited or reallocated based on the interpretation of ancillary information. This included the addition of ‘mosaic’ polygons and percentage occurrence of individual VMU’s based on their relative dominance within these mosaiced polygons.

At the final stage, null polygons (resulting from areas unable to be classified in raster format) and polygons below the minimum mapping size of 4 hectares were eliminated in the GIS environment and these null pixels in-filled with the values of the neighbouring polygons sharing the largest common boundary to produce the final VMU’s for the study area.
4.0 Results
4.1 Broad Vegetation Group Summary

Table 7: Broad Vegetation Group (BVG) summary for the Mc Arthur River catchment.

<table>
<thead>
<tr>
<th>BVG Sub-unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAINFORESTS, SCRUBS, CLOSED FORESTS</td>
<td></td>
</tr>
<tr>
<td>1 Coastal vine-forest/thicket</td>
<td></td>
</tr>
<tr>
<td>1 Evergreen to semi-evergreen, notophyll to microphyll vine forest/thicket on beach ridges and coastal dunes (VMU 60)</td>
<td></td>
</tr>
<tr>
<td>2 Semi-evergreen to deciduous microphyll vine thicket</td>
<td></td>
</tr>
<tr>
<td>2a Semi-evergreen vine thickets on wide range of substrates (VMU 46)</td>
<td></td>
</tr>
<tr>
<td>2b Deciduous microphyll vine thicket on ranges and heavy clay alluvia (VMU 27)</td>
<td></td>
</tr>
<tr>
<td>EUCLAYPT WOODLANDS TO OPEN-FORESTS</td>
<td></td>
</tr>
<tr>
<td>3 Dry to moist eucalypt woodlands and open forests, mainly on undulating to hilly terrain of deeply weathered and Proterozoic sedimentary landscapes.</td>
<td></td>
</tr>
<tr>
<td>3 Woodlands and open-woodlands dominated by stringybarks such as E. miniata, E. phoenicea and E. tetradaonta with bloodwoods such as Corymbia dichromophloia and C. ferruginea (VMU 14, 15 &amp; 16)</td>
<td></td>
</tr>
<tr>
<td>4 Woodlands and tall woodlands dominated by Eucalyptus tetrodonta, and/or E. miniata and/or E. phoenicea</td>
<td></td>
</tr>
<tr>
<td>4a Woodlands and tall woodlands dominated by Eucalyptus tetrodonta. Occasionally E. miniata, on deeply weathered plateaus and remnants. (VMU 23).</td>
<td></td>
</tr>
<tr>
<td>4b Woodlands dominated by Eucalyptus tetrodonta or E. miniata, with Corymbia ferruginea on erosional surfaces, residual sands and occasionally alluvial plains (VMU 24 &amp; 23(in part))</td>
<td></td>
</tr>
<tr>
<td>4c Woodlands dominated by Eucalyptus miniata, E. tetrodonta, Corymbia dichromophloia and C. ferruginea on sandstone, metamorphic and ironstone ranges (VMU 16(in part) &amp; 24(in part))</td>
<td></td>
</tr>
<tr>
<td>EUCLAYPT WOODLANDS TO OPEN-FOREST ON FLOODPLAINS</td>
<td></td>
</tr>
<tr>
<td>5 Eucalyptus spp. dominated open-forest and woodlands drainage lines and alluvial plains.</td>
<td></td>
</tr>
<tr>
<td>5a Open-forest and woodlands dominated by E. camaldulensis and/or E. microtheca fringing drainage lines. Associated species may include Casuarina cunninghamiana, Melaleuca spp. and C. bella. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (VMU 4, 11 &amp; 42).</td>
<td></td>
</tr>
<tr>
<td>5b Woodlands dominated by Corymbia polycarpa, C. bella with Erythrophleum chlorostachys and Eucalyptus tetrodonta. On sandy levees. (VMU 44).</td>
<td></td>
</tr>
<tr>
<td>5c Woodlands and open-woodlands dominated by Eucalyptus microtheca (or C. bella or E. chlorophylla) on floodplains. (VMU 20 &amp; 31).</td>
<td></td>
</tr>
<tr>
<td>EUCLAYPT DRY WOODLANDS</td>
<td></td>
</tr>
<tr>
<td>6 Eucalyptus tectifica (or E. chlorophylla) and Erythrophleum chlorostachys dry woodlands to open-woodlands on sandplains or depositional plains.</td>
<td></td>
</tr>
<tr>
<td>6a Woodlands to open-woodlands dominated by Erythrophleum chlorostachys and Eucalyptus chlorophylla (or E. tectifica) on sand plains and footslopes of hills and ranges. (VMU 2)</td>
<td></td>
</tr>
<tr>
<td>6b Woodlands to open-woodlands dominated by Eucalyptus tectifica (or E. chlorophylla) on sand plains and footslopes of hills and ranges. (VMU 5, 6 &amp; 17(in part))</td>
<td></td>
</tr>
<tr>
<td>EUCLAYPT WOODLANDS TO OPEN-FOREST</td>
<td></td>
</tr>
<tr>
<td>7 Dry eucalypt woodlands to open-woodlands primarily on sandplains or depositional plains.</td>
<td></td>
</tr>
<tr>
<td>7a Dry woodlands to open-woodlands, dominated by Corymbia terminalis or inland boxes (E. chlorophylla or E. tectifica), often with Erythrophleum chlorostachys on sandy plateaus and plains (VMU 7, 17, 19 &amp; 18(in part))</td>
<td></td>
</tr>
</tbody>
</table>
| 7b Woodlands and open-woodlands dominated by Eucalyptus chlorophylla (or E.
leptophleba on heavy soils) frequently with Corymbia spp. (VMU 22 & 18 in part)

EUCALYPT LOW OPEN-WOODLANDS USUALLY WITH SPINIFEX UNDERSTOREY

8 Eucalyptus leucophloia or Corymbia dichromophloia low open-woodlands often with Triodia dominated ground layer

8a Low open-woodlands dominated by Eucalyptus leucophloia with tussock grass dominated ground layer, mainly on hills and ranges (VMU 8, 9 & 10).

8b Low open-woodlands dominated by Corymbia terminalis or Eucalyptus chlorophylla low-open-woodlands and related associations, mainly lower slopes and valleys. (VMU 17 in part), 18 (in part) & 19 (in part)).

8c Low open-woodlands dominated by Eucalyptus pruinosa low-open-woodlands on sandplains and outwash areas. (VMU 3)

8d Low open-woodlands dominated by bloodwoods such as Corymbia dichromophloia and C. ferruginea with Triodia spp. dominated ground layer; mainly on hills and ranges (VMU 12, 13 & 33)

CALLITRIS WOODLAND TO OPEN-FORESTS

9 Callitris intratropica woodland to open-forests

9 Woodlands dominated by Callitris intratropica and Melaleuca acacioides on near-coastal depositional plains (VMU 25).

MELALEUCA OPEN-WOODLANDS ON DEPOSITIONAL PLAINS

10 Melaleuca spp. dry woodlands to open-woodlands on sandplains or depositional plains.

10a Low woodlands and low open-woodlands dominated by Melaleuca viridiflora on depositional plains (VMU 29)

10b Low open-woodlands and tall shrublands of Melaleuca citriolens or M. stenostachya or Asteromyrtus symphyocarpa and other Melaleuca spp. (VMU 26, 30, 36, 39 & 43)

11 Melaleuca spp. on seasonally inundated open-forests and woodlands of lowland coastal swamps and fringing lines. (Palustrine wetlands)

11a Open-forests and low open-forests dominated by Melaleuca spp. (M. viridiflora, M. leucadendra & M. dealbata) in seasonally inundated swamps (VMU 40 & 41 in part).

11b Open-forests dominated by Melaleuca spp. (M. argentea, M. leucadendra or M. dealbata), fringing streams. (VMU 37, 38 & 40 in part).

ACACIA DOMINATED WOODLANDS TO OPEN-FORESTS

12 Acacia spp. on residuals. Species include A. shirleyi.

12 Low woodlands to low open-forests dominated by Acacia shirleyi on residuals (VMU 1).

MIXED SPECIES OPEN-WOODLANDS TO WOODLANDS

13 Mixed species woodlands to open woodlands (Bauhinia cunninghamii, Terminalia spp., Atalaya hemiglauca, Acacia spp.)

13a Low open woodlands dominated by a variety of species including Acacia tephrina, Atalaya hemiglauca, Ventilago viminalis and Lysiphyllum spp. (VMU 21 & 28 in part)

13b Low open woodlands dominated by a variety of species including Grevillea striata, Acacia spp., Terminalia spp, or Cochlospermum spp. (VMU 28)

SHRUBLANDS

14 Heathlands and associated scrubs and shrublands on coastal dunefields and inland/montane locations.

14 Open-shrublands to open-heaths on plateaus and escarpments, frequently rocky locations.

GRASSLANDS

15 Tussock Grasslands

15a Tussock grasslands dominated by Astrebla spp. or Dichanthium spp. often with Eulalia aurea on alluvia (VMU 35 in part)

15b Tussock grasslands dominated by Astrebla spp. or Dichanthium spp. often with Iseilema spp. on undulating downs or clay plains. (VMU 35 in part)

16 Hummock Grasslands
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>16</strong></td>
<td>Hummock grasslands dominated by <em>Triodia pungens</em> or <em>T. longiceps</em> or <em>T. mitchellii</em> sandplains. (VMU 34)</td>
</tr>
<tr>
<td><strong>WETLANDS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>17</strong></td>
<td>Wetlands associated with permanent lakes and swamps, as well as ephemeral lakes, claypans and swamps. Includes fringing woodlands and shrublands.</td>
</tr>
<tr>
<td></td>
<td>17a Palustrine wetlands. Freshwater swamps on coastal plains dominated by sedges and grasses such as <em>Oryza spp.</em>, <em>Cyperus spp.</em>, <em>Eleocharis spp.</em> or <em>Dapsilanthus spp.</em> often with emergent <em>Melaleuca spp.</em> or <em>Eucalyptus spp.</em> (VMU 41).</td>
</tr>
<tr>
<td></td>
<td>17b Palustrine wetlands. Freshwater swamps/springs/billabongs that range from permanent and semi-permanent to ephemeral often with a fringe of <em>Eucalyptus microtheca</em> and/or <em>E. camaldulensis</em>. (VMU 45 &amp; 41 (in part)).</td>
</tr>
<tr>
<td><strong>MANGROVES AND TIDAL SALTMARSHES</strong></td>
<td></td>
</tr>
<tr>
<td><strong>18</strong></td>
<td>Mangroves and tidal saltmarshes</td>
</tr>
<tr>
<td></td>
<td>18a Closed-forests and low closed-forests dominated by mangroves (VMU 61, 62, 63, 64, 65 &amp; 66).</td>
</tr>
<tr>
<td></td>
<td>18b Bare saltpans ± areas of <em>Halosarcia spp.</em> sparse-forbland &amp;/or <em>Xerochloa imberbis</em> or <em>Sporobolus virginicus</em> tussock grassland (VMU 88 &amp; 89).</td>
</tr>
</tbody>
</table>
### 4.2 Vegetation Mapping Unit Summary

**Table 8: Mc Arthur River catchment Vegetation Mapping Unit (VMU) Summary Table.**

<table>
<thead>
<tr>
<th>VMU</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Acacia shirleyi</em> low open forest over a mixed species low sparse tussock grassland with occasional mixed sedge and forb species.</td>
</tr>
<tr>
<td>2</td>
<td><em>Erythrophleum chlorostachys</em> +/- <em>Bauhinia cunninghamii</em> low open woodland to woodland with an open mid stratum of mixed tree species over a low tussock grassland that often includes <em>Aristida spp.</em>, <em>Sehima nervosum</em>, <em>Sorghum plumosum</em> and <em>Triodia bitextura</em>.</td>
</tr>
<tr>
<td>3</td>
<td><em>Eucalyptus pruinosa</em> low open woodland with +/- low sparse shrubland of <em>Carissa lanceolata</em>, <em>Atalaya hemiglauca</em> over a mixed species low open tussock grassland.</td>
</tr>
<tr>
<td>4</td>
<td><em>Eucalyptus camaldulensis</em> +/- <em>Lophostemon grandiflorus</em> mid woodland with an open mid stratum of trees generally including <em>Melaleuca viridiflora</em>, <em>Terminalia bursaria</em>, and <em>Acacia spp.</em> over a low sparse tussock grassland often including <em>Heteropogon contortus</em>, <em>Chrysopogon spp.</em> and <em>Acanthospermum hispidum</em>.</td>
</tr>
<tr>
<td>5</td>
<td><em>Eucalyptus tectifica</em> +/- <em>Corymbia spp.</em> low open woodland to woodland with a sparse to open mixed tree understorey predominately including <em>Terminalia canescens</em> over mixed species low open tussock grassland.</td>
</tr>
<tr>
<td>6</td>
<td><em>Eucalyptus tectifica</em> and <em>Erythrophleum chlorostachys</em> mid open woodland to woodland with a sparse to open shrubland frequently including <em>Carissa lanceolata</em>, <em>Grewia retusifolia</em> and <em>Alphitonia excelsa</em> over a mixed species low open tussock grassland.</td>
</tr>
<tr>
<td>7</td>
<td><em>Corymbia grandifolia</em> +/- <em>Eucalyptus tectifica</em> low open woodland to woodland with an open mid stratum of mixed trees over a low open hummock grassland to grassland generally including <em>Triodia bitextura</em>, <em>Eulalia aurea</em>, <em>Sehima nervosum</em>, <em>Sorghum plumosum</em> and <em>Petalostigma quadriloculare</em>.</td>
</tr>
<tr>
<td>8</td>
<td><em>Eucalyptus leucophloia</em> +/- <em>Corymbia terminalis</em> low woodland to open forest generally with an isolated to sparse shrubland over a low open tussock grassland dominated by <em>Eulalia aurea</em>, and commonly including <em>Triodia bitextura</em>.</td>
</tr>
<tr>
<td>9</td>
<td><em>Eucalyptus leucophloia</em> +/- <em>Corymbia spp.</em>, <em>Erythrophleum chlorostachys</em> low open woodland to woodland with a sparse to open tall shrubland of species such as <em>Terminalia canescens</em> and <em>Carissa lanceolata</em>, over a low open hummock grassland dominated by <em>Triodia bitextura</em>, with tussock grasses commonly including <em>Eulalia aurea</em> and <em>Heteropogon contortus</em>.</td>
</tr>
<tr>
<td>10</td>
<td><em>Eucalyptus leucophloia</em> +/- <em>Eucalyptus chlorophylla</em> and <em>Corymbia spp.</em> low open woodland over a mixed low hummock grassland with species including <em>Triodia bitextura</em>, <em>Eulalia aurea</em>, <em>Petalostigma quadriloculare</em>, <em>Heteropogon contortus</em> and <em>Triodia pungens</em>.</td>
</tr>
<tr>
<td>11</td>
<td><em>Lophostemon grandiflorus</em> +/- <em>Eucalyptus camaldulensis</em>, <em>Nauclea orientalis</em> mid open forest with a prominent mixed species mid stratum often including species such as <em>Ficus sp.</em>, <em>carpentariensis</em>, <em>Barringtonia acutangula</em> and <em>Atalaya hemiglauca</em> generally over a low sparse tussock grassland of <em>Chrysopogon elongatus</em>.</td>
</tr>
<tr>
<td>12</td>
<td><em>Corymbia dichromophloia</em> +/- <em>Erythrophleum chlorostachys</em> low open woodland with a mixed species mid stratum over a <em>Triodia bitextura</em> low open hummock grassland with +/- <em>Petalostigma quadrioculare</em>.</td>
</tr>
<tr>
<td>13</td>
<td><em>Corymbia dichromophloia</em> and <em>C. ferruginea</em> low open woodland to woodland with a low sparse mixed species shrubland over a <em>Triodia bitextura</em> low open hummock grassland with +/- <em>Petalostigma quadriloculare</em>.</td>
</tr>
<tr>
<td>14</td>
<td><em>Eucalyptus phoenicea</em> and <em>E. miniata</em> mid woodland on sandy soils on sandstone escarpment with a prominent low shrubland or open shrubland understorey of mixed species often including <em>Jacksonia vernicosa</em>, <em>Grevillea refracta</em> and <em>Acacia platycarpa</em> over a <em>Triodia bitextura</em> dominated low open hummock grassland.</td>
</tr>
</tbody>
</table>
| 15  | *Eucalyptus phoenicea* +/- *Corymbia spp.*, *Eucalyptus spp.* low open woodland to woodland on sandy soils on sandstone escarpment with a low open mid stratum of mixed tree and shrub species often including *Grevillea refracta*, *Buchanania obovata*, *Acacia latifolia* and *A. alleniana* over a low open hummock grassland of *Triodia bitextura*, *T. burridgeana* and +/- *
VMU Description

Petalostigma quadriloculare.

17 Corymbia terminalis and Eucalyptus tectifica +/- Erythrophleum chlorostachys mid woodland to open woodland with a mixed tree species low open mid stratum over a mixed species low open tussock grassland.

18 Corymbia terminalis and Eucalyptus chlorophylla low open woodland to woodland with a low open understorey commonly consisting of Terminalia canescens, Hakea arborescens and Bauhinia cunninghamii over a mixed species open tussock grassland.

19 Corymbia terminalis +/- Eucalyptus spp. low open woodland to woodland with a prominent to sparse mid stratum often including Terminalia canescens, Hakea arborescens and Bauhinia cunninghamii over a mixed species low open tussock grassland.

20 Eucalyptus microtheca +/- Eucalyptus camaldulensis woodland to open woodland with a sparse shrubland often including species such as Bauhinia cunninghamii and Hakea arborescens over a mixed species tussock grassland, occasionally dominated by Astrebla squarrosa on heavier clay soils.

21 Bauhinia cunninghamii +/- Erythrophleum chlorostachys, Corymbia terminalis low woodland with a low open mid stratum of mixed tree species typically including Bauhinia cunninghamii, Hakea arborescens, and Atalaya hemiglauca over a mixed species low open tussock grassland.

22 Eucalyptus chlorophylla +/- Erythrophleum chlorostachys low woodland with a shrubland to sparse shrubland typically consisting of species often including Terminalia canescens, Flueggea virosa, Petalostigma pubescens and Dodonaea physocarpa over mixed species open tussock grassland.

23 Eucalyptus tetrodonta +/- E. miniata, Corymbia polycarpa mid open forest to mid open woodland with a prominent to sparse mid layer generally consisting of species such as Melaleuca viridiflora, Bossiaea bossiaeoides and Petalostigma banksii over a mixed species open tussock grassland.

24 Eucalyptus tetrodonta +/- Corymbia ferruginea, E. miniata mid woodland to mid woodland with an open mid stratum of mixed tree and shrub species such as Terminalia canescens, Erythrophleum chlorostachys and Bossiaea bossiaeoides, over a open hummock grassland dominated by Triodia bitextura.

25 Callitris intratropica and Petalostigma pubescens low woodland generally with an open shrubland mid stratum including Terminalia canescens, Calytrix exstipulata and +/- Melaleuca acacioides over a mixed open tussock grassland.

26 Melaleuca acacioides low woodland with a mixed shrub dominated mid stratum of isolated plants and a mixed isolated tussock grass ground layer.

27 Low woodland of mixed deciduous tree species -Deciduous Microphyll Vine Forest (DMVT), commonly including Bauhinia cunninghamii, Cochlospermum spp., Hakea arborescens, Gyrocarpus americanus, Brachychiton diversifolius, and Grevillea mimosoides. A prominent mid layer of mixed shrubs is often present with species Terminalia canescens generally prominent over a tussock grassland of Sehima nervosum, Chrysopogon fallax, Enneapogon spp. and Aristida spp.

28 Terminalia canescens low woodland with a mixed low open tussock grassland of Schizachyrium fragile, Heteropogon contortus, Triodia bitextura and Aristida spp.

29 Melaleuca viridiflora +/- Corymbia spp. and Petalostigma pubescens low open woodland to woodland with a sparse shrub layer of Melaleuca spp., Acacia spp. and Grevillea pteridifolia over a mixed low tussock grassland of species including Chrysopogon fallax, Schizachyrium fragile, Aristida spp., Enriachne spp. and Eulalia aurea.

30 Melaleuca nervosa +/- Melaleuca viridiflora and Asteromyrtus symphyocarpa low open woodland over a mixed low hummock or tussock grassland of species including Triodia bitextura, Bossiaea bossiaeoides and Chrysopogon spp.

31 Corymbia bella mid woodland on alluvial flats and terraces with an open mid stratum of Bauhinia cunninghamii, Erythrophleum chlorostachys, Hakea arborescens and a mixed mid tussock grassland of species such as Chrysopogon fallax, Heteropogon contortus, Dichanthium fecundum and Sehima nervosum.

32 Mixed species shrublands on various geologies.
<table>
<thead>
<tr>
<th>VMU</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>Corymbia ferruginea low open woodland with a sparse tall shrub layer of Terminalia canecens +/- Calytix extispulata, Acacia hammondi, Petalostigma pubescens and Bossiaea bossiaeoides over a low hummock grassland of Tridioda bitextura, Aristida spp., Enneapogon spp. and Schizachyrium fragile.</td>
</tr>
<tr>
<td>34</td>
<td>Open hummock grassland of Tridioda bitextura, Tridioda microstachya, Schizachyrium fragile, Enneapogon spp. and Aristida spp. +/- emergent shrubs and Corymbia spp.</td>
</tr>
<tr>
<td>35</td>
<td>Low tussock grassland of mixed species including Eulalia aurea, Chrysopogon fallax, Aristida spp., Sorghum plumosum and Dianthus sp. +/- emergent shrubs and trees.</td>
</tr>
<tr>
<td>36</td>
<td>Melaleuca citriens low woodland with mixed low open tussock grassland of Chrysopogon fallax, Eulalia aurea, Sehima nervosum, Sorghum plumosum and Aristida spp.</td>
</tr>
<tr>
<td>37</td>
<td>Melaleuca argentea +/- Melaleuca leucadendra, Corymbia bella, Casuarina cunninghamiana, Lophostemon grandiflorus, Eucalyptus camaldulensis mid open forest fringing sandy stream channels. Variable mid-stratum low tree layer of species such as Barringtonia acutangula, Acacia hemsleyi, Brachychiton multicaulis and Glochidion disparipes over a low tussock grassland of Chrysopogon spp. and Heteropogon contortus.</td>
</tr>
<tr>
<td>38</td>
<td>Melaleuca leucadendra and/or Melaleuca argentea +/- Eucalyptus camaldulensis, Nauclea orientalis, Casuarina cunninghamiana mid woodland with a lower tree stratum of species such as Ficus coronulata, Acacia hemsleyi, Barringtonia acutangula, Pandanus spiralis and Lophostemon grandiflorus over a mid tussock grassland of Chrysopogon elongatus, Ectrosis leporina, Echinochloa colona, Eriachne mucronata and Paspalidium jubilorum.</td>
</tr>
<tr>
<td>39</td>
<td>Asteromyrtus symphyocarpa low open woodland +/- Melaleuca viridiflora and Corymbia polycarpa with an open shrubby mid-stratum of Asteromyrtus symphyocarpa, Melaleuca spp. and Acacia spp. The open ground stratum is dominated by Tridioda microstachya and a mix of tussock grasses.</td>
</tr>
<tr>
<td>40</td>
<td>Melaleuca dealbata woodland with a mid tussock grassland dominated by Panicum mindanaense, Oryza rufipogon, Eragrostis spp. and Cyperus vaginatus.</td>
</tr>
<tr>
<td>41</td>
<td>Palustrine wetlands associated with the coastal plain. Variable in floristics and structure but common species include Eleocharis dulcis, Oryza spp., Cyperus spp. +/- emergent Melaleuca spp. Structurally these communities may vary from a closed sedgeland to open-forest.</td>
</tr>
<tr>
<td>42</td>
<td>Casuarina cunninghamiana +/- Eucalyptus camaldulensis, Melaleuca leucadendra, Eucalyptus microtheca mid open forest with a mixed species sparse shrubland including Pandanus aquaticus, Excoecaria parvifolia and Atalaya hemiglaucu. The ground layer consists of a mixed species low tussock grassland/or woodland.</td>
</tr>
<tr>
<td>43</td>
<td>Melaleuca stenostachya woodland +/- emergent Corymbia spp. with a tall sparse shrub dominated mid-stratum of Melaleuca spp. and Acacia spp. Ground stratum of mixed low sparse tussock grasses.</td>
</tr>
<tr>
<td>44</td>
<td>Corymbia polycarpa +/- Erythropleum chlorostachys, Eucalyptus tetradonta, Melaleuca sp. (Red Bark), Corymbia bella mid woodland on sandy levees and terraces associated with major streams.</td>
</tr>
<tr>
<td>45</td>
<td>Eucalyptus microtheca Palustrine wetlands. Generally with closed ground stratum of tall woody forbs including Sesbania spp., Aeschynomene spp. and large tussock grasses such as Leptochloa fusca.</td>
</tr>
<tr>
<td>46</td>
<td>Simple Evergreen Notophyll Vine Forest (SENVF) associated with sandstone springs (Spring Jungles). Characteristic species include Syzygium angophoroides, Alstonia actinophylla, Melaleuca argentea, Melicope elleryana and Ficus vires in the upper tree stratum with a well developed sub-canopy tree stratum of species such as Cupaniopsis anacardioides, Celtis philippensis, Diospyros humilis and Timonius timon. A low sparse shrub layer may be present.</td>
</tr>
<tr>
<td>60</td>
<td>Dry microphyll semi deciduous to deciduous monsoon vine forest</td>
</tr>
<tr>
<td>61</td>
<td>Low closed forest of Rhizophora stylosa, Bruguiera spp., and Xylocarpus moluccensis with a secondary tree layer (mid) of Bruguiera parviflora, Ceriops tagal and Bruguiera exaristata low open forest. The ground layer is generally a low open shrubland of Aegialitis annulata and Acanthus ilicifolius.</td>
</tr>
<tr>
<td>62</td>
<td>Mixed species mid closed forest with a Bruguiera spp., Ceriops spp. low open forest mid</td>
</tr>
<tr>
<td>VMU</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>63/66</td>
<td>Low open forest of <em>Avicennia marina, Ceriops tagal, Bruguiera spp, Rhizophora stylosa</em> with a secondary dense (open forest) tree layer of <em>Ceriops tagal, Avicennia marina, Osbornia octodonta</em>. The ground stratum is typically a low open-shrubland of <em>Avicennia marina, Ceriops tagal, Aegialitis annulata</em>.</td>
</tr>
<tr>
<td>64</td>
<td>Low open forest of <em>Ceriops tagal, Avicennia marina +/- Lumnitzera racemosa</em>. Mid sparse shrubland of <em>Aegialitis annulata</em>. Low sparse chenopod shrubland of <em>Halosarcia indica</em> and <em>Halosarcia halocnemoides</em>.</td>
</tr>
<tr>
<td>65</td>
<td>Low closed-forest of <em>Ceriops tagal, Bruguiera spp +/- Excoecaria ovalis</em>. Mid layer sparse low-shrubland/woodland of <em>Ceriops tagal +/- Aegiceras corniculatum +/- Scyphiphora hydrophyllacea</em>. Ground strata of <em>Ceriops tagal +/- Aegialitis annulata</em> low open-shrubland.</td>
</tr>
<tr>
<td>88/89</td>
<td>Low shrubland to low sparse shrubland of <em>Halosarcia indica, Halosarcia halocnemoides, Suaeda spp., Sporobolus virginicus, Fimbristylis spp. and Cyperus spp</em> to bare saltflat/mudflats with occasional shrubs.</td>
</tr>
<tr>
<td>99</td>
<td>Anthropogenic features (e.g. mine tailings dams)</td>
</tr>
</tbody>
</table>
4.3 Vegetation Mapping Unit Descriptions

Vegetation Mapping Unit 1

**Acacia shirleyi** low open forest over a mixed species low sparse tussock grassland with occasional mixed sedge and forb species.

**NVIS Description**

U+ ^Acacia shirleyi, Eucalyptus leucophloia (^Tree\6\c), M ^Flueggea virosa, Dodonaea lanceolata, Atalaya hemiglauca, Terminalia canescens (^Shrub, Tree \6\r) G Bidens bipinnata, Sporobolus australasicus, Sida filiformis, Eragrostis amabilis, Bulboystis barbata (^Forb, Sedge\1\r).

**Upper Stratum**

Low open forest of **Acacia shirleyi** (fq 100%) with Eucalyptus leucophloia (fq 85%).

**Mid Stratum**

Tall sparse shrubland of **Flueggea virosa** (fq 46%) with Atalaya hemiglauca (fq 31%) and **Terminalia canescens** (fq 23%).

**Ground stratum**

Low sparse forbland of **Bidens bipinnata** (fq 54%), Sporobolus australasicus (fq 46%), **Sida filiformis** (fq 46%), **Eragrostis amabilis** (fq 38%) and **Bulboystis barbata** (fq 38%).

**Other common species**

**Upper stratum**

Corymbia dichromophloia (fq 8%), Corymbia terminalis (fq 8%), Erythrophyllum chlorostachys (fq 8%).

**Mid Stratum**

Dodonaea lanceolata (fq 15%), Alphitonia excelsa (fq 15%), Petalostigma pubescens (fq 8%), Carissa lanceolata (fq 8%), Dodonaea physocarpa (fq 8%).

**Ground stratum**

Paspalidium rarum (fq 38%), Digitaria brownii (fq 38%), Capparis lasiantha (fq 38%), Euphorbia comans (38%), Evolvulus alsinoides (fq 38%), Pitilotus fusiformis (38%), Eulalia aurea (fq 31%), Chrysopogon fallax (fq 31%), Panicum mindanaense (fq 31%), Triodia bitextura (fq 31%), Cucumis melo (fq 31%), Phyllanthus sp. (fq 31%), Xenostegia tridentata (fq 31%), Enneapogon oblongus (fq 23%), Enneapogon lindleyanus (fq 23%), Santalum lanceolatum (fq 23%), Premna acuminata (fq 23%), Achyrantes aspera (fq 23%), Aristida queenslandica (fq 23%), Ipomoea polymorpha (fq 23%), Mnesithea formosa (fq 23%), Sauropus trachyspermus (fq 23%), Scleria brownii (fq 23%), Sida rohlenae (fq 23%), Tephrosia delastangii (fq 23%), Sehima nervosum (fq 15%), Aristida sp. (fq 15%), Schizachyrium fragile (fq 15%), Eriachne mucronata (fq 15%), Panicum decompositum (fq 15%), Galactia tenuiflora (fq 15%), Triodia stenostachya (fq 15%), Cullen plumosum (fq 15%), Eriachne ciliata (fq 15%), Alternanthera sp. (fq 15%), Cleome viscosa (fq 15%), Enneapogon polyphylus (fq 15%), Jasminum molle (fq 15%), Unknown species (fq 15%), Acanthospermum hispidum (fq 15%), Acracne racemosa (fq 15%), Amaranthus interruptus (fq 15%), Capparis umberonata (fq 15%), Cheilanthes brownii (fq 15%), Clerodendrum floribundum (fq 15%), Enneapogon purpurascens (fq 15%), Herissantia crispa (fq 15%), Hibiscus pentaphyllus (fq 15%), Hybanthus enneaspermus (fq 15%), Marsdenia australis (fq 15%), Marsdenia viridiflora (fq 15%), Melania oblongifolia (fq 15%), Oldenlandia mitracamoides (fq 15%), Panicum effusum (fq 15%), Portulaca oleracea (fq 15%), Rhynchosia minima (fq 15%), Dichanthium fecundum (fq 8%), Digitaria sp. (fq 8%), Paspalidium distans (fq 8%), Abutilon hannis (fq 8%), Mnesithea formosa (fq 8%), POACEAE sp. (fq 8%), Pterocaulon sp. (fq 8%), Undetd sp. (fq 8%), Cymbopogon bombycinos (fq 8%), Aristida hololhera (fq 8%), Boerhavia coccinea (fq 8%), Bonamia pannosa (fq 8%), Bothriochloa ewartiana (fq 8%), Capparis sp. (fq 8%), Commelina ensifolia (fq 8%), Crotalaria medicaginea (fq 8%), Ehretia saligna (fq 8%), Enchyela tomentosa (fq 8%), Eriachne obtusa (fq 8%), Erythroxylum ellipticum (fq 8%), Gomphrena brachystylis (fq 8%), Heteropogon contortus (fq 8%), Indigofera colutea (fq 8%), Iseilema sp. (fq 8%), Jacquemontia paniculata (fq 8%), Merremia incisa (fq 8%), Neptunia monosperma (fq 8%), Perotis rara (fq 8%), Pterocaulon serrulatum (fq 8%), Triodia sp. (fq 8%), Walthertia indica (fq 8%).
Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover% (Range)</th>
<th>Mean height (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Shrub</td>
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<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>19.25 (19.25-62)</td>
<td>0.15 (0-0.3)</td>
<td>1r</td>
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</tbody>
</table>

Landscape Description:
Low hills/rises, scarps and plains on tenosols and rudosols derived from coarse grained sediments or on shallow ferricrete.

Landform Pattern/Element:
Low Hills, Plains/Hillslope, Plain

Geology:
Czl - Ferricrete

KI – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Drainage:
Well drained to rapidly drained.

Notes:
This Vegetation Mapping Unit is characteristic of residual scarps and hills as well as Mesozoic sediments associated with the Sturt Plateau in the southern parts of the study area.

Photo:

Map: VMU1

Area: 10,631 Hectares

No. of sites: 13
BARK001, DOC3_S731, LANCEWOOD_30A, LANCEWOOD_30B, LANCEWOOD_31A, LANCEWOOD_31B, LANCEWOOD_32A, MCAR085, MCAR113, PDA1, PDA10, PDA15, PDA370.
Vegetation Mapping Unit 2

_Erythrophleum chlorostachys_ low open woodland to woodland with an open mid stratum of mixed tree species over a low tussock grassland that often includes _Chrysopogon fallax, Heteropogon contortus, Triodia bitextura_ and _Aristida spp._

**NVIS Description**

Upper Stratum

Mid woodland of _Erythrophleum chlorostachys_ (fq 100%), _Corymbia dichromophloia_ (fq 27%), _Bauhinia cunninghamii_ (fq approx 20%), _Corymbia terminalis_ (fq 27%) and/or _Corymbia ferruginea_ (fq 20%).

Mid Stratum

Low open woodland of _Terminalia canescens_ (fq 73%), _Bauhinia cunninghamii_ (fq approx 40%), _Flueggea virosa_ (fq 40%), and _Brachychiton diversifolius_ (fq 33%).

Ground Stratum

Low open tussock grassland of _Chrysopogon fallax_ (fq 27%), _Heteropogon contortus_ (fq 53%), _Triodia bitextura_ (fq 47%) and _Aristida sp._ (fq 27%).

Other common species

Upper stratum

_Corymbia terminalis_ (fq 27%), _Eucalyptus tectifica_ (fq 20%), _Corymbia confertiflora_ (20%), _Corymbia grandifolia_ (20%), _Eucalyptus chlorophylla_ (fq 13%)

Mid Stratum

_Hakea arborescens_ (fq 27%), _Carissa lanceolata_ (fq 27%), _Erythroxylum ellipticum_ (fq 27%), _Acacia torulosa_ (fq 20%), _Grewia retusifolia_ (fq 20%), _Alphitonia excelsa_ (13%), _Atalaya hemiglauca_ (fq 13%), _Dodonaea physocarpa_ (fq 13%), _Petalostigma pubescens_ (fq 14%), _Ventilago viminalis_ (fq 13%), _Hibiscus meriaukensis_ (fq 13%), _Alphitonia pomaderroides_ (fq 7%).

Ground Stratum

_Schizachyrium fragile_ (fq 33%), _Aristida holothera_ (fq 27%), _Sehima nervosum_ (fq 20%), _Sorghum plumosum_ (fq 20%), _Aristida inaequiglumis_ (fq 13%), _Setaria apiculata_ (fq 13%), _Petalostigma quadrilociulare_ (13%), _Distichostemon hispidulus_ , _Themeda triandra_ (fq 13%), _Eragrostis sp._ (fq 13%), _Panicum sp._ (fq 13%), _Cassytha filiformis_ (fq 13%), _Jasminum molle_ (fq 13%), _Premnna acuminata_ (fq 13%), _Bidens bipinnata_ (fq 7%), _Chamaecrista absus_ (fq 7%), _Aristida latzii_ (fq 7%), _Cenchrus sp._ (fq 7%), _Acacia sp._ (fq 7%), _Abutilon hannii_ (fq 7%), _Bulbostylis sp._ (fq 7%), _Capparis sepriaria_ (fq 7%), _Cheilanthes contigua_ (fq 7%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height m (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>10.58 (7.5-13.5)</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>12.14 (1-22)</td>
<td>2.7 (1.5-6)</td>
<td>T6r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>31.3 (31-58)</td>
<td>0.4 (0.3-0.6)</td>
<td>G1i</td>
</tr>
</tbody>
</table>

**Landscape Description:**

Occurs on sandy to clayey plains and lower slopes of low hills/rises throughout the study area. Soils are principally kandosols and tenosols (with texture contrast soils prominent) derived from variably sized sedimentary parent materials.
Landform Pattern/Element:
Plain, Undulating Rises, Low Hills/ Plain, Hillslope

Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Et (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pma (Amelia Dolomite) – Silty dolomite and algal dolomite.

Pmea (Mara Dolomite Member) – Ridge forming dololutite, dolomitic sandstone, dolarenite and dolomitic breccia.

Pml (Mallapunyah Formation) – Purple siltstone, quartz sandstone and dolomitic sandstone.

Drainage:
Well drained.

Notes:
Widespread vegetation type found across a range of substrate types often in association with other mixed woodland VMU’s (e.g. 5, 6, 17, 18, 19 and 22).

Photo:

Map: VMU2

Area: 55,821 Hectares

No. of sites: 15
BARK002, MCAR114, BARK004, DOC3_S734, MCAR006, MCAR038, PDA232, PDA300, PDA377, PDA157, PDA83, PDA85, PDA260, MacarthurR_MR2, MCAR008.
Vegetation Mapping Unit 3

_Eucalyptus pruinosa_ low open woodland with +/- low sparse shrubland of _Carissa lanceolata_ with _Atalaya hemiglauca_ over a mixed species low open tussock grassland.

**NVIS Description**

U+ ^Eucalyptus pruinosa, Bauhinia cunninghamii, Erythrophleum chlorostachys, Eucalyptus leucophloia, Corymbia terminalis (^Tree\6r), M ^Carissa lanceolata, Atalaya hemiglauca, Flueggea virosa, Grevillea striata, Terminalia canescens (^Shrub, Tree\3r), G ^Chrysopogon fallax, Eulalia aurea, Sehima nervosum, Dichanthium fecundum, Heteropogon contortus (^Tussock grass\G1i).

**Upper Stratum**

Low open woodland of _Eucalyptus pruinosa_ (fq 100%), _Erythrophleum chlorostachys_ (fq 10%), _Bauhinia cunninghamii_ (fq approx 12%), _Eucalyptus leucophloia_ (fq 10%) and/or _Corymbia terminalis_ (fq 3%).

**Mid Stratum**

Mid sparse shrubland of _Carissa lanceolata_ (fq 52%), _Atalaya hemiglauca_ (fq 52%), _Flueggea virosa_ (fq 26%), _Grevillea striata_ (fq 16%) and _Terminalia canescens_ (fq 10%).

**Ground Stratum**

Low open tussock grassland of _Chrysopogon fallax_ (fq 61%), _Eulalia aurea_ (fq 54%), _Sehima nervosum_ (fq 38%), _Dichanthium fecundum_ (fq 32%) and _Heteropogon contortus_ (fq 32%).

**Other common species**

**Upper Stratum**

_Corymbia polycarpa_ (fq 3%), _Eucalyptus chlorophylla_ (fq 3%), _Corymbia grandifolia_ (fq 3%), _Corymbia confertiflora_ (fq 3%), _Eucalyptus tectifica_ (fq 3%), _Melaleuca citrolens_ (fq 3%), _Mistletoe_ (fq 3%).

**Mid Stratum**

_Grewia retusifolia_ (fq 6%), _Terminalia volucris_ (fq 6%), _Dodonaea oxyptera_ (fq 6%), _Dolichandrone filiformis_ (fq 6%), _Vachellia farnesiana_ (fq 6%), _Hakea arborescens_ (fq 6%), _Bauhinia cunninghamii_ (fq approx 4%), _Ventilago viminalis_ (fq 3%), _Dodonea polyzyga_ (fq 3%), _Dodonaea physocarpa_ (fq 3%), _Excoecaria parvifolia_ (fq 3%), _Hakea lorea_ (fq 3%), _Acacia sp._ (6%), _Margaritaria dubium-traceyi_ (fq 3%).

**Ground Stratum**

_Themeda triandra_ (fq 29%), _Triodia bitextura_ (fq 26%), _Wrightia saligna_ (fq 23%), _Aristida sp._ (fq 19%), _Aristida latifolia_ (fq 16%), _Dichanthium sp._ (fq 13%), _Iseilema fragile_ (fq 10%), _Cymbopogon bombycinus_ (fq 6%), _Dichanthium sericeum_ (fq 6%), _Eriachne sp._ (fq 6%), _Sorghum timorense_ (fq 6%), _Aristida hygrometrica_ (fq 6%), _Sorghum sp._ (6%), _Grewia retusifolia_ (fq 6%), _Atalaya variifolia_ (fq 6%), _Eriachne murnonata_ (fq 3%), _Rhynchosia minima_ (fq 3%), _Sorghum plumosum_ (fq 3%), _Cyperus sp._ (fq 3%), _Triodia pungens_ (3%), _Aristida holathera_ (fq 3%), _Oryza australiensis_ (fq 3%), _Stemodia viscosa_ (fq 3%), _Triodia burridgeana_ (fq 3%), _Brachyachne ambigua_ (fq 3%), _Cleome viscosa_ (fq 3%), _Enneapogon purpurascens_ (fq 3%), _Enneapogon sp._ (fq 3%), _Digitaria sp._ (fq 3%), _Acacia galioides var. galioides_ (fq 3%), _Brachyachne convergens_ (fq 3%), _Fimbristylis sp._ (fq 3%), _Iseilema fragile_ (fq 3%), _Setaria apiculata_ (fq 3%), _Enneapogon oblongus_ (fq 3%), _Goodenia sp._ (fq 3%), _Heliotropium sp._ (fq 3%), _Iseilema vaginiflorum_ (fq 3%), _Sesbania cannabina_ (fq 3%).

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</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>12.43 (2-19)</td>
<td>6.89 (4.5-9)</td>
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<tr>
<td>Mid (M1)</td>
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<td>S3r</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>38.29 (38-63)</td>
<td>0.4 (0.3-0.6)</td>
<td>G1i</td>
</tr>
</tbody>
</table>
Landscape Description:
Low relief plains and outwashes associated with drainage from the hills and ranges of the southern portion of the study area (Sturt Plateau). Soils are generally derived from fine grained sedimentary materials, particularly dolostones and limestones's and consequently have a higher clay content (kandosols and possibly dermosols).

Landform Pattern/Element:
Plain, Undulating Plain/Plain

Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czs – Residual soil and sand.

KI – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

€t (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pmea (Mara Dolomite Member) – Ridge forming dololutite, dolomitic sandstone, dolarenite and dolomitic breccia.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Drainage:
Moderately well drained to imperfectly drained.

Notes:
Commonly occurring vegetation type on low relief outwash and undulating plains associated with the hills and ranges in the southern and south-western parts of the study area.
No. of sites: 31
BARK003, BARK014, DOC3_S733, DOC3_S743, DOC3_S744, MCAR046, MCAR047, MCAR049, MCAR084, MCAR087, MCAR112, MCAR116, MCAR118, MCAR119, MCAR179, PDA123, PDA20, PDA279, PDA29, PDA322, PDA341, PDA346, PDA400, PDA424, PDA458, PDA489, PDA53, PDA68, PDA9, SPAR013, MCAR018.

Area: 159,812 Hectares
**Vegetation Mapping Unit 4**

*Eucalyptus camaldulensis +/- Lophostemon grandiflorus* mid woodland with an open mid stratum of trees generally including *Melaleuca viridiflora, Terminalia bursarina,* and *Acacia spp.* over a low sparse tussock grassland often including *Heteropogon contortus, Chrysopogon spp.* and *Acanthospermum hispidum.*

**NVIS Description**

U+ *Eucalyptus camaldulensis, Lophostemon grandiflorus, Melaleuca leucadendra, Melaleuca argentea, Eucalyptus microtheca (*Tree*), M *Melaleuca viridiflora, Flueggea virosa Terminalia bursarina, Acacia hemsleyi, Hakea arborescens (*Tree, Shrub*), G *Heteropogon contortus, Chrysopogon fallax, Acanthospermum hispidum, Chrysopogon elongatus, Arundinella nepalensis (*Tussock grass, Herb*).*

**Upper Stratum**

Mid woodland of *Eucalyptus camaldulensis* (fq 100%), *Lophostemon grandiflorus* (fq 33%), *Melaleuca leucadendra* (fq 8%), *Melaleuca argentea* (fq 8%) and/or *Eucalyptus microtheca* (fq 8%).

**Mid Stratum**

Low open woodland of *Melaleuca viridiflora* (fq 17%), *Flueggea virosa* (fq 25%), *Terminalia bursarina* (fq 8%), *Acacia hemsleyi* (fq 8%) and/or *Hakea arborescens* (fq 8%).

**Ground Stratum**

Low sparse tussock grassland of *Heteropogon contortus* (fq 33%), *Chrysopogon fallax* (fq 25%), *Grewia retusifolia* (fq 25%), *Acanthospermum hispidum* (fq 17%) and *Chrysopogon elongatus* (fq 8%).

**Other common species**

**Upper Stratum**

*Syzygium eucalyptoides* (fq 8%), *Corymbia terminalis* (8%), *Corymbia polycarpa* (8%), *Melaleuca cajuputi* (8%).

**Mid Stratum**

*Acacia* sp. (fq 17%), *Excoecaria parvifolia* (fq 17%), *Vachellia farnesiana* (17%), *Melaleuca acacioides* (fq 8%), *Owenia vernicosa* (fq 8%), *Acacia coleii* (fq 8%), *Acacia holosericea* (fq 8%), *Terminalia canescens* (fq 8%), *Acacia plectocarpa* (fq 8%), *Pandanus aquaticus* (fq 8%), *Terminalia carpentariae* (fq 8%), *Barringtonia acutangula* (fq 8%), *Bauhinia cunninghamii* (fq 8%), *Cathormion umbellatum* (fq 8%), *Coelospermum* sp. (fq 8%), *Diospyros humilis* (fq 8%), *Parkinsonia aculeata* (fq 8%), *Acacia difficalis* (fq 8%), *Cayratia trifolia* (fq 8%), *Erythrophleum chlorostachys* (fq 8%).

**Ground Stratum**

*Waltheria indica* (fq 17%), *Alaternanthera pungens* (fq 17%), *Panicum* sp. (fq 17%), *Arundinella nepalensis* (fq 8%), *Triodia microstachya* (fq 8%), *Chrysopogon oliganthus* (fq 8%), *Heteropogon* sp. (fq 8%), *Pseudoraphis spinascens* (fq 8%), *Dichanthium sericeum subsp. polystachyum* (fq 8%), *Eragrostis tenellula* (fq 8%), *Crotalaria medicaginea* (fq 8%), *Crotalaria retusa* (fq 8%), *Chrysopogon latifolius* (fq 8%), *Brachyachne ambiguus* (fq 8%), *Calystich brownii* (fq 8%), *Sorghum plumosum* (fq 8%), *Cyperaceae* *genus indet.* (fq 8%), *Eragrostis sp.* (fq 8%), *Ludwigia perennis* (fq 8%), *Mnesithea rotboelliformes* (fq 8%), *Sehima nervosum* (fq 8%), *Tephrosia sp.* (fq 8%), *Themeda triandra* (fq 8%), *Ammannia multiflora* (fq 8%), *Antidesma ghesseambilla* (fq 8%), *Bidens pilosa* (fq 8%), *Corchorus aestuans* (fq 8%), *Cyanotis axillaris* (fq 8%), *Echinocloa colonum* (fq 8%), *Eulalia aurea* (fq 8%), *Fimbristylis rara* (fq 8%), *Gomphrena* sp. (fq 8%), *Hibiscus merakwensis* (fq 8%), *Hygrophila angustifolia* (fq 8%), *Indigofera colutea* (fq 8%), *Malvastrum americanum* (fq 8%), *Melochia pyramidalata* (fq 8%), *Panicum trachyrhachis* (fq 8%), *Setaria apiculata* (fq 8%), *Trichodesma zeylanicum* (fq 8%), *Atalaya varifolia* (fq 8%), *Brachychiton diversifolius* (fq 8%), *Cnium angustifolium* (fq 8%), *Cullen sp.* (fq 8%), *Cyperus javanicus* (fq 8%), *Passiflora foetida* (fq 8%), *Vigna adenantha* (fq 8%), *Euphorbia vachellii* (fq 8%).
<table>
<thead>
<tr>
<th>Strata</th>
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<th>Mean cover % (Range)</th>
<th>Mean height m (Range)</th>
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</tr>
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<tr>
<td>Upper (U1)</td>
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<td>Mid (M1)</td>
<td>Tree</td>
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<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>13 (13-20)</td>
<td>0.37 (0.05-0.8)</td>
<td>G1r</td>
</tr>
</tbody>
</table>

**Landscape Description:**
Vegetation type characteristic of drainage depressions, stream channels, banks, levees and alluvial plains (minor occurrences) throughout the Mc Arthur River catchment. Soils are generally imperfectly to poorly drained hydrosols and tenosols.

**Landform Pattern/Element:**
Alluvial Plain, Plain/Stream Bank, Levee, Drainage Depression

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**
Imperfectly to poorly drained.

**Notes:**
Often occurs in association with other VMU’s typical of riparian areas (e.g. 37, 38 and 42) and may occur as an unmapped (or sub-dominant) component of these units. Often characteristic of lower order drainage systems and the upper reaches of the major stream systems.
No. of sites: 12
MacarthurR_Glyde13, MCAR045, MCAR150, PDA26, PDA268, PDA327, RIPARIAN_B_MC01\R1, RIPARIAN_B_MC01\R2, RIPARIAN_B_MC05\R3, SPAR029, PDA342, PDA462.
Vegetation Mapping Unit 5

Eucalyptus tectifica +/- Corymbia spp. low open woodland to woodland with a sparse to open low mixed tree understorey predominately including Terminalia canescens over mixed species low open tussock grassland.

NVIS Description
U+ ^Eucalyptus tectifica, Erythrophleum chlorostachys, Corymbia terminalis, Corymbia grandifolia, Corymbia confertiflora, Corymbia ferruginea (Tree\6\r), M^ Terminalia canescens, Carissa lanceolata, Hakea arborescens, Bauhinia cunninghamii, Dodonaea physocarpa (Tree\6\r), G^ Eulalia aurea, Sehima nervosum, Triodia bitextura, Sorghum plamumosum, Aristida sp. (Tussock grass\1\i).

Upper Stratum
Low open woodland with Eucalyptus tectifica (fq 100%), Erythrophleum chlorostachys (fq 33%), Corymbia terminalis (fq 20%) and Corymbia grandifolia (fq 18%).

Mid Stratum
A sparse to open low mixed woodland with Terminalia canescens (fq 47%), Carissa lanceolata (fq 29%), Hakea arborescens (fq 24%), Bauhinia cunninghamii (fq 10%) and/or Dodonaea physocarpa (fq 8%).

Ground Stratum
An Eulalia aurea (fq 43%), Sehima nervosum (fq 41%), Triodia bitextura (fq 41%), Sorghum plamumosum (fq 39%), and/or Aristida sp. (fq 39%) tussock grassland.

Other common species

Upper Stratum
Eucalyptus leucophloia (fq 24%), Corymbia confertiflora (fq 33%), Corymbia ferruginea (fq 33%), Corymbia polycarpa (fq 27%), Corymbia dichromophloia (fq 10%), Corymbia bella (fq 8%). Corymbia flavescens (fq 4%), Eucalyptus tetrodonta (fq 4%), Corymbia confertiflora (fq 8%), Callitris intratropica (fq 2%), Eucalyptus pruinosa (fq 2%), Melaleuca sp. Redbark (fq 2%), Terminalia platyphylla (fq 2%), Melaleuca nervosa (fq 2%).

Mid Stratum
Acacia sp. (fq 8%), Flueggea virosa (fq 6%), Brachychiton diversifolius (fq 6%), Melaleuca viridiiflora (fq 6%), Melaleuca acacioides (fq 4%), Maytenus cunninghamii (fq 4%), Melaleuca stenostachya (fq 4%), Melaleuca citrozensis (fq 4%), Vachellia farnesiana (fq 4%), Pelalostigma banksii (fq 4%), Atalaya hemiglauca (fq 4%), Cochlospermum fraseri (fq 4%), Terminalia volucris (fq 4%), Acacia hemignosta (fq 2%), Alphitonia excelsa (fq 2%), Buchanania obovata (fq 2%), Erythroxylum ellipticum (fq 2%), Gardenia megasperma (fq 2%), Grevillea striata (fq 2%), Acacia armitii (fq 2%), Acacia lamprocarpa (fq 2%), Capparis umbonata (fq 2%), Doliichandron filiformis (fq 2%), Ehretia saligna (fq 2%), Grevillea dimidiata (fq 2%), Owenia vernicosa (fq 2%), Persoonia falcata (fq 2%), Planchonia careya (fq 2%), Acacia difficilis (fq 2%), Cathormion umbellatum (fq 2%), Acacia dimidiata (fq 2%), Acacia lysiphloia (fq 2%), Arsemortyrus symphycarpa (fq 2%), Excoecaria parvifolia (fq 2%).

Ground Stratum
Chrysopogon fallax (fq 38%), Heteropogon contortus (fq 33%), Pelalostigma quadriloculare (fq 27%), Grewia retusifolia (fq 22%), Schizachyrium fragile (fq 18%), Aristida holathera (fq 14%), Erichne obtus (fq 12%), Themeda triandra (fq 12%), Dichanthium fecundum (fq 10%), Grevillea dryandra (fq 8%), Distichostemon hispidulus (fq 8%), Erichne sp. (fq 8%), Aristida latifolia (8%), Schizachyrium sp. (8%), Eragrostis sp. (fq 8%), Chrysopogon latifolius (fq 8%), Pelalostigma pubescens (fq 8%), Wrightia saligna (fq 8%), Grevillea mimosoides (fq 6%), Erichne mucronata (fq 6%), Sorghum sp. (fq 6%), Helicheres cana (fq 4%), Iselenna vaginiformus (fq 4%), Melhania oblongifolia (fq 4%), Panicum decompositum (fq 4%), Pseudopogonatherum sp. (fq 4%), Eragrostis tenellula (fq 4%), Fimbristylis sp. (fq 4%), Whiteochloa airoides (fq 4%), Aristida ingratea (fq 2%), Cyperus sp. (fq 2%), Grewia sp. (fq 2%), Tephrusa sp. (fq 2%), Acacia galoids (fq 2%), Enneapogon purpurascens (fq 2%), Euphorbia vachelli (fq 2%), Gomphrena sp. (fq 2%), Hibiscus panduriformis (fq 2%), Mnesithea formosa (fq 2%), Acacia...
*subternata* (fq 2%), *Aristida hygrometrica* (fq 2%), *Aristida schultzii* (fq 2%), *Cajanus pubescens* (fq 2%), *Chrysopogon sp1* (v355) (fq 2%), *Eriachne ciliata* (fq 2%), *Evolvulus alsinoides* (fq 2%), *Heliotropium sp.* (fq 2%), *Lilaceae sp1* (v136) (fq 2%), *Oryza sp.* (v135) (fq 2%), *Setaria apiculata* (fq 2%), *Brachyachne convergens* (fq 2%), *Enneapogon sp.* (fq 2%), *Hibiscus meraukensis* (fq 2%), *POACEAE sp3* (v303) (fq 2%), *Polycarpaea sp.* (fq 2%), *Sporobolus australasicus* (fq 2%), *Oryza australiensis* (fq 2%), *Aristida calycina* (fq 2%), *Dichanthium sericeum* (fq 2%), *Panicum sp.* (fq 2%), *Digitaria sp.* (fq 2%), *Cymbopogon sp.* (fq 2%), *Enteropogon sp.* (fq 2%), *Chrysopogon sp.* (fq 2%), *Chrysopogon elongatus* (fq 2%), *Dichanthium sericeum* subsp. *polystachyum* (fq 2%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>18.07 (4-48)</td>
<td>9.6 (5-14)</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>6.07 (1-33)</td>
<td>2.96 (1-5.5)</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>26.5 (6-75)</td>
<td>0.37 (0.2-0.8)</td>
<td>G1i</td>
</tr>
</tbody>
</table>

**Landscape Description:**
Plains and slopes of low hills and hills principally in the north west of the study area (outwash of the Tawallah Range) on residual soils and soils derived from fine to medium grained sedimentary parent materials. Generally soils may be classed as tenosols and kandosols.

**Landform Pattern/Element:**
Plain, Hills, Low Hills/Plain, Hillslope

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Pmr (Stretton Sandstone) – Ridge forming, fine to medium grained, thin to medium bedded quartzarenite.

Pmnh (Hot Spring Member) – Ridge forming thin-bedded dolomitic siltstone and silty dololutite with interbeds of fine grained sandstone.

**Drainage:**
Well drained.

**Notes:**
Widely distributed vegetation community in the north and west of the study area on outwash and alluvial plains associated with the near-coastal range formations adjacent to the coastal plain. Closely associated and often occurring in a mosaic with VMU’s 17, 18, 19 and 22.
Photo: No. of sites: 51
BARK005, BARK009, DOC3_S735, DOC3_S739, GULF005, MCAR001, MCAR010, MCAR067, MCAR083, MCAR094, MCAR115, MCAR136, MCAR156, PDA134, PDA143, PDA165, PDA209, PDA239, PDA241, PDA259, PDA263, PDA297, PDA319, PDA331, PDA422, PDA434, PDA436, PDA441, PDA496, PDA548, PDA96, SPAR017, SPAR020, MCAR125, MCAR126, MCAR127, PDA112, MCAR120, PDA225, PDA228, PDA267, PDA440, MCAR009, MCAR178, PDA190, PDA343, PDA417, PDA257, SPAR018, SPAR008, PDA480.

Map: VMU5

Area: 39,875 Hectares
Vegetation Mapping Unit 6

Eucalyptus tectifica and Erythrophleum chlorostachys mid open woodland to woodland with a sparse to open low shrubland frequently including Alphitonia pomaderroides and Carissa lanceolata over a mixed species low open tussock grassland.

NVIS Description

U+ ^Eucalyptus tectifica, ^Erythrophleum chlorostachys, Corymbia confertiflora, Corymbia bella, Corymbia polycarpa (^Tree\7r), M ^Alphitonia pomaderroides, Carissa lanceolata, Acacia lamprocarpa, Maytenus cunninghamii, Melaleuca viridiflora (^Tree, Shrub\6r), G ^Chrysopogon fallax, Heteropogon contortus, Sorghum plumosum, Eulalia aurea, Sehima nervosum (^Tussock grass\1i).

Upper Stratum

Mid open woodland of Eucalyptus tectifica (fq 100%), Erythrophleum chlorostachys (fq 100%), Corymbia confertiflora (fq 71%), Corymbia bella (fq 29%) and Corymbia polycarpa (fq 29%).

Mid Stratum

Low open woodland of Alphitonia pomaderroides (fq 29%), Carissa lanceolata (fq 29%), Acacia lamprocarpa (fq 14%), Maytenus cunninghamii (fq 14%) and Melaleuca viridiflora (fq 14%).

Ground Stratum

Low open tussock grassland of Chrysopogon fallax (fq 71%), Heteropogon contortus (fq 57%), Sorghum plumosum (fq 43%), Eulalia aurea (fq 43%) and Sehima nervosum (fq 43%).

Other Common Species

Upper Stratum

Brachychiton diversifolius (fq 29%), Corymbia sp. (fq 14%), Corymbia greeniana (fq 14%), Eucalyptus tetrodonta (fq 14%)

Mid Stratum

Brachychiton paradoxus (fq 14%), Acacia difficilis (fq 14%), Bauhinia cunninghamii (fq 14%), Petalostigma banksii (fq 14%), Alphitonia excelsa (fq 14%), Flueggea virosa (fq 14%), Grevillea striata (fq 14%), Hakea arborescens (fq 14%), Santalum lanceolatum (fq 14%)

Ground Stratum

Dichanthium fecundum (fq 29%), Grewia retusifolia (fq 29%), Eriachne obtusa (fq 14%), Aristida hygrometrica (fq 14%), Aristida holathera (fq 14%), Chrysopogon latifolius (fq 14%), Eriachne sp1(v275) (fq 14%), Pseudopogonatherum sp. (fq 14%), Sporobolis sp. (fq 14%), Ergrostis sp. (fq 14%), Panicum sp. (fq 14%), Aristida inaequiglumis (fq 14%), Hyptis suaveolens (fq 14%), Antidesma ghesaembilla (fq 14%), Premna acuminata (fq 14%)

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>16.6 (13-22)</td>
<td>11.4 (10.5-12)</td>
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</tr>
<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>12.2 (2-28)</td>
<td>4.14 (1.5-6)</td>
<td>T6r</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>38 (29-47)</td>
<td>0.44 (0.2-0.8)</td>
<td>G1i</td>
</tr>
</tbody>
</table>

Landscape Description:

Alluvial and residual plains of the near coastal range formations and coastal plain geomorphic provinces. Soils are generally sandy (minor clays) kandosols and tenosols derived from the fine to medium grained dolostones, siltstones and sandstones of the Tallawah and Bukalara Ranges.

Landform Pattern/Element:

Plain, Low Hills/Plain, Hillslope
Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Drainage:
Well drained.

Notes:
Closely related vegetation community to other *Eucalyptus tectifica* and *Corymbia terminalis* VMU’s mapped within the study area (5, 17 and 19).

No. of sites: 7
MCAR177, PDA258, PDA402, PDA404, PDA425, PDA428, SPAR005.

Photo: 

Map: VMU6

Area: 44,740 Hectares
Vegetation Mapping Unit 7

*Corymbia grandifolia* +/- *Eucalyptus tectifica* low open woodland to woodland with an open mid stratum of mixed trees over a low open hummock grassland to grassland generally including *Triodia bitextura, Eulalia aurea, Petalostigma quadriloculare, Sehima nervosum* and *Sorghum plumosum*.

**NVIS Description**

U+ ^Corymbia grandifolia, Eucalyptus tectifica, Erythrophleum chlorostachys, Brachychiton diversifolius, Eucalyptus leucophloia (^Tree\6r), M ^Terminalia canescens, Bauhinia cunninghamii, Petalostigma pubescens, Acacia hammondii, Hakea arborescens (^Tree, Shrub\6r), G ^Triodia bitextura, Eulalia aurea, Petalostigma quadriloculare, Sehima nervosum, Sorghum plumosum (^Tussock grass, Hummock grass\2i)

**Upper Stratum**

Low open woodland of *Corymbia grandifolia* (fq 100%), *Eucalyptus tectifica* (fq 80%), *Erythrophleum chlorostachys* (fq 40%), *Brachychiton diversifolius* (fq 20%) and *Eucalyptus leucophloia* (fq 10%)

**Mid Stratum**

Low open woodland of *Terminalia canescens* (fq 70%), *Bauhinia cunninghamii* (fq 30%), *Petalostigma pubescens* (fq 10%), *Acacia hammondii* (fq 10%), and *Hakea arborescens* (fq 10%)

**Ground Stratum**

Mid open tussock grassland of *Triodia bitextura* (fq 70%), *Eulalia aurea* (fq 60%), *Petalostigma quadriloculare* (fq 60%), *Sehima nervosum* (fq 50%), and *Sorghum plumosum* (fq 40%)

**Other Common Species**

**Upper Stratum**

*Corymbia greeniana* (fq 10%), *Eucalyptus chlorophylla* (fq 10%), *Corymbia confertiflora* (fq 10%), *Eucalyptus pruinosa* (fq 10%)

**Mid Stratum**

*Grevillea mimosoides* (fq 20%), *Acacia gonoclada* (fq 10%), *Carissa lanceolata* (fq 10%), *Owenia vernicoso* (fq 10%), *Atalaya hemiglauca* (fq 10%), *Dodonaea physocarpa* (fq 10%)

**Ground Stratum**

*Chrysopogon fallax* (fq 30%), *Heteropogon contortus* (fq 30%), *Aristida latifolia* (fq 30%), *Aristida calycina* (fq 20%), *Schizachyrium fragile* (fq 20%), *Aristida sp.* (fq 20%), *Aristida holothera* (fq 20%), *Aristida hygrometrica* (fq 10%), *Eriachne mucronata* (fq 10%), *Enneapogon polyphyllus* (fq 10%), *Sesuvium portulacastrum* (fq 10%), *Aristida schultzii* (fq 10%), *Corchorus sidoides* (fq 10%), *Dichanthium ficundum* (fq 10%), *Eriachne melicacea* (fq 10%), *Acacia galioides* (fq 10%), *Cassytha filiformis* (fq 10%), *Grevillea dryandri* (fq 10%), *Schizachyrium sp.* (fq 10%), *Themeda triandra* (fq 10%)

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height m (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>12.13 (1-22)</td>
<td>9.93 (8-12)</td>
<td>T6r</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>7.63 (2-17)</td>
<td>3.29 (1.8-4.5)</td>
<td>T6r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>28.75 (8-62)</td>
<td>0.35 (0.05-0.7)</td>
<td>G2i</td>
</tr>
</tbody>
</table>

**Landscape Description:**

Low relief undulating plains, lower slopes and footslopes of low hills principally through the middle parts of the Mc Arthur River catchment. Soils are principally shallow, rocky tenosols and rudosols derived from fine grained sedimentary parent materials. Associated with the larger range systems within the study area.
Landform Pattern/Element:
Plain, Low Hills/ Plain, Hillslope

Geology:
Cz

Pml (Mallapunyah Formation) – Purple siltstone, quartz sandstone and dolomitic sandstone.
Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.
Pnz (Balbirini Dolomite) – Generally recessive dololutite, dolarenite, dolomitic siltstone and shale.

Drainage:
Well drained

Notes:
Relatively restricted unit, often occurring as small areas (below mapping scale) in association with other mapping units (VMU’s 8, 9, 17, 18, & 19).

Photo:

Map: VMU7

Area: 4,141 Hectares

No. of sites: 10
PDA118, PDA340, PDA465, PDA92, PDA128, PDA109, PDA120, PDA295, SPAR019, SPAR024.
Vegetation Mapping Unit 8

_Eucalyptus leucophloia_ low woodland to open forest generally with an isolated to sparse shrubland over a low open tussock grassland dominated by _Eulalia aurea_, and commonly including _Triodia bitextura_.

**NVIS Description**

U+ _Eucalyptus leucophloia, Corymbia terminalis, Erythrophleum chlorostachys, Eucalyptus tectifica, Brachychiton diversifolius_ (*Tree*\(^6\)), M _Terminalia canescens, Carissa lanceolata, Flueggea virosa, Atalaya hemiglauca, Dodonaea physocarpa_ (*Shrub, Tree*\(^3\)), G _Eulalia aurea, Triodia bitextura, Chrysopogon fallax, Sehima nervosum, Dichanthium fecundum_ (*Tussock grass, Hummock grass*\(^!\)).

**Upper Stratum**

Low woodland of _Eucalyptus leucophloia_ (fq 100%) with or without _Corymbia terminalis_ (fq 37%), _Erythrophleum chlorostachys_ (fq 16%), _Eucalyptus tectifica_ (fq 13%), _Brachychiton diversifolius_ (fq 13%)

**Mid Stratum**

Mid sparse shrubland of _Terminalia canescens_ (fq 47%), _Carissa lanceolata_ (fq 40%), _Flueggea virosa_ (fq 20%), _Atalaya hemiglauca_ (fq 11%) and _Dodonaea physocarpa_ (fq 9%)

**Ground Stratum**

Low open tussock grassland of _Eulalia aurea_ (fq 69%), _Triodia bitextura_ (fq 45%), _Chrysopogon fallax_ (fq 33%), _Sehima nervosum_ (fq 27%) and/or _Schizachyrium fragile_ (fq 25%)

**Other Common Species**

**Upper Stratum**

_Eucalyptus pruinosa_ (fq 7%), _Corymbia dichromophloia_ (fq 5%), _Eucalyptus chlorophylla_ (fq 5%), _Corymbia ferruginea_ (fq 2%), _Terminalia bursarina_ (fq 2%), _Corymbia confertiflora_ (fq 2%), _Corymbia grandifolia_ (fq 2%)

**Mid Stratum**

_Bauhinia cunninghamii_ (fq 15%), _Acacia umbellata_ (fq 11%), _Petalostigma pubescens_ (fq 5%), _Cochlospermum fraseri_ (fq 5%), _Santalum lanceolatum_ (fq 5%), _Hakea arborescens_ (fq 5%), _Maytenus cunninghamii_ (fq 5%), _Dodonaea oxypera_ (fq 4%), _Capparis lasiantha_ (fq 4%), _Dodonaea lanceolata_ (fq 4%), _Acacia phlebocarpa_ (fq 4%), _Jasminum aemulum_ (fq 2%), _Terminalia volucris_ (fq 2%), _Acacia dimidiata_ (fq 2%), _Acacia oswaldii_ (fq 2%), _Acacia hemignosta_ (fq 2%), _Acacia lysiphloia_ (fq 2%), _Gardenia sp._ (fq 2%), _Terminalia pterocarya_ (fq 2%), _Vachellia bidwillii_ (fq 2%), _Acacia difficultis_ (fq 2%), _Acacia humifusa_ (fq 2%), _Acacia laccata_ (fq 2%), _Acacia platycarpa_ (fq 2%), _Acacia torulosa_ (fq 2%), _Grevillea mimosoides_ (fq 2%), _Hakea lorea_ (fq 2%), _Stenocarpus acacioides_ (fq 2%), _Terminalia aridicola_ (fq 2%)

**Ground Stratum**

_Themeda triandra_ (fq 24%), _Aristida sp._ (fq 20%), _Petalostigma quadriloculare_ (fq 20%), _Dichanthium fecundum_ (fq 18%), _Heteropogon contortus_ (fq 18%), _Cymbopogon bombycinus_ (fq 16%), _Sorghum plumosum_ (fq 13%), _Grewia retusifolia_ (fq 11%), _Aristida holathera_ (fq 11%), _Eriachne mucronata_ (fq 9%), _Triodia sp._ (fq 7%), _Acacia wickhamii_ (fq 7%), _Sporobolus australasicus_ (fq 7%), _Aristida latifolia_ (fq 7%), _Eriachne sp._ (fq 7%), _Eriachne ciliata_ (fq 7%), _Triodia burchidgeana_ (fq 5%), _Enneapogon sp._ (fq 5%), _Chrysopogon latifolius_ (fq 5%), _Mnesithea formosa_ (fq 5%), _Acacia gonioclada_ (fq 5%), _Aristida inaequiligmis_ (fq 5%), _Dichanthium sp._ (fq 4%), _Enneapogon polyphyllus_ (fq 4%), _Dichanthium sericeum subsp. polystachion_ (fq 4%), _Cyperus sp._ (fq 4%), _Eragrostis sp._ (fq 4%), _Acacia galooides_ (fq 4%), _Panicum decompositum_ (fq 4%), _Cochrurus siodoides_ (fq 4%), _Triodia latzii_ (fq 2%), _Triodia pungens_ (fq 2%), _Dichanthium annulatum_ (fq 2%), _Funcristyliis sp._ (fq 2%), _Schizachyrium sp._ (fq 2%), _Digitaria sp._ (fq 2%), _Eragrostis tenellula_ (fq 2%), _Aristida sp._ (fq 2%), _Acacia conjunctifolia_ (fq 2%), _Aristida hygrometrica_ (fq 2%), _Aristida strigose_ (fq 2%), _Cassytha filiformis_ (fq 2%), _Cyperus sp._ (INDET) (fq 2%), _Distichostemon hispidulus_ (fq 2%), _Acacia sp1_ (v498) (fq 2%), _Aristida calycina_ (fq 2%), _Chrysopogon sp._ (fq 2%), _Cymbopogon procerus_ (fq 2%), _Enneapogon lindleyanus_ (fq 2%), _Heliotropiumpaniculatum_ (fq 2%), _Paspalidium distans_ (fq 2%), _Scleria novaehollandiae_ (fq 2%), _Scleria sp._ (fq 2%), _Tephrasoria
sp. (fq 2%), *Waltheria indica* (fq 2%), *Helicteres cana* (fq 2%), *Ptilotus* sp. (fq 2%), *Scleria brownii* (fq 2%), *Corchorus sericeus* (fq 2%), *Eriachne obtusa* (fq 2%), *Grewia* sp. (fq 2%), *Sida* sp. (fq 2%), *Wrightia saligna* (fq 2%)

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<tbody>
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<td>Upper (U1)</td>
<td>Tree</td>
<td>27.2 (9-66)</td>
<td>7.93 (5.5-13.5)</td>
<td>T6i</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>3.93 (0-14)</td>
<td>1.78 (0-3)</td>
<td>S3r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>26.4 (9-61)</td>
<td>0.37 (0.1-0.6)</td>
<td>G1i</td>
</tr>
</tbody>
</table>

**Landscape Description:**
Hills, low hills, ridges and minor plains (on plateaus) of shallow stony rudosols and minor tenosols, derived from fine to medium grained sedimentary parent materials. Associated with the major range formations of the study area.

**Landform Pattern/Element:**
Low Hills, Rises, Hills, Plain/Hillslope, Plain

**Geology:**
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czl - Ferricrete

Kl – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Pmj (Yalco Formation) – Ridge forming thinly interbedded stomatolitic dololutite, silty dololutite, dolarenite and minor sandstone.

Pmr (Stretton Sandstone) – Ridge forming, fine to medium grained, thin to medium bedded quartzarenite.

**Drainage:**
Well drained

**Notes:**
Common and widespread vegetation type within the study area. Differentiated from the closely associated VMU’s 9 and 10 by the dominance of tussock grasses in the ground stratum.
No. of sites: 55
MCAR129, MCAR130, MCAR111, MCAR174, PDA155, PDA21, PDA371, SPAR023, SPAR032, PDA16, PDA114, PDA13, PDA64, PDA328, PDA47, PDA90, MCAR034, MCAR050, PDA174, PDA364, PDA33, PDA394, SPAR011, PDA186, SPAR004, PDA203, PDA236, PDA23, PDA89, SPAR031, PDA380, PDA214, PDA245, PDA51, PDA54, PDA65, PDA78, PDA8, PDA80, PDA326, PDA149, BARK007, DOC3_S736, DOC3_S737, MCAR065, MCAR066, MCAR103, MCAR131, MCAR149, MCAR078, MCAR089, MCAR098, BARK006, MCAR145, MCAR169.

Area: 231,077 Hectares
Vegetation Mapping Unit 9

_Eucalyptus leucophloia_ +/– _Corymbia spp._, with _Erythrophleum chlorostachys_ low open woodland to woodland with a sparse to open tall shrubland of species such as _Terminalia canescens_ and _Carissa lanceolata_, over a low open hummock grassland dominated by _Triodia bitextura_, with tussock grasses commonly including _Eulalia aurea_ and _Heteropogon contortus_.

NVIS Description

U+ ^Eucalyptus leucophloia, Corymbia terminalis, Erythrophleum chlorostachys, E. tectifica, C. grandifolia (^Tree^6\vi^r), M Terminalia canescens, Carissa lanceolata, Bauhinia cunninghamii, Hakea arborescens, Flueggea virosa (^Shrub, Tree^4\vr), G ^Triodia bitextura, Eulalia aurea, Heteropogon contortus, Petalostigma quadriloculare, Sehima nervosum (^Hummock grass, Tussock grass, Shrub^1\i)

Upper Stratum

Low open woodland of _Eucalyptus leucophloia_ (fq 100%) and occasionally _Corymbia terminalis_ (fq 43%), _Erythrophleum chlorostachys_ (fq 25%), _Eucalyptus tectifica_ (fq 14%) and/or _Corymbia grandifolia_ (fq 11%)

Mid Stratum

Sparse open shrubland of _Terminalia canescens_ (fq 50%), _Carissa lanceolata_ (fq 43%), _Bauhinia cunninghamii_ (fq 21%), _Hakea arborescens_ (fq 18%) and _Flueggea virosa_ (fq 11%)

Ground Stratum

_Triodia bitextura_ (fq 89%), _Eulalia aurea_ (fq 64%), _Heteropogon contortus_ (fq 39%), _Sehima nervosum_ (fq 39%), _Schizachyrium fragile_ (fq 32%) low open mixed grassland.

Other common species

Upper stratum

_Brachychiton diversifolius_ (fq 14%), _Eucalyptus pruinosa_ (fq 11%), _Eucalyptus chlorophylla_ (fq 7%), _Corymbia dichromophloia_ (fq 7%), _Eucalyptus sp._ (fq. 4%), _Corymbia ferruginea_ (fq. 4%), _Corymbia bella_ (fq. 4%).

Mid Stratum

_Acacia sp._ (fq. 14%), _Atalaya hemiglauca_ (fq 11%), _Dodonaea physocarpa_ (fq 11%), _Cochlospermum fraseri_ (fq 11%), _Acacia dimidiata_ (fq 7%), _Maytenus cunninghamii_ (fq 7%), _Melaleuca citroliens_ (fq 4%), _Vachellia farnesiana_ (fq 4%), _Vitex acuminata_ (fq 4%), _Dodonaea oxyptera_ (fq 4%), _Distichostemon hispidulus subsp. hispidulus_ (fq. 4%), _Grevillea dimidiata_ (fq. 4%), _Jacksonia dilatata_ (fq. 4%), _Petalostigma banksii_ (fq. 4%), _Acacia torulosa_ (fq. 4%), _Dolichandrone heterophylla_ (fq. 4%), _Verticordia sp._ (fq. 4%), _Wrightia saligna_ (fq. 4%), _Petalostigma pubescens_ (fq. 4%), _Santalum lanceolatum_ (fq. 4%).

Ground Stratum

_Sorghum plumosum_ (fq 25%), _Petalostigma quadriloculare_ (fq 25%), _Chrysopogon bombycinus_ (fq 14%), _Themeda triandra_ (fq 11%), _Aristida sp._ (fq 11%), _Dichanthium fecundum_ (fq 11%), _Aristida inaequiglumis_ (fq 11%), _Chrysopogon latifolius_ (fq 11%), _Eriachne ciliata_ (fq 11%), _Triodia pungens_ (fq 7%), _Isellima vaginillorum_ (fq 7%), _Dichanthium sericeum subsp. polystac_ (fq 7%), _Aristida latifolia_ (fq 7%), _Digitaria sp._ (fq 7%), _Eriachne mucronata_ (fq 7%), _Sida filiformis_ (fq 7%), _Polycarpaceae sp._ (fq 4%), _Sporobolus australasicus_ (fq 7%), _Gyrocarpus americanus_ (fq 7%), _Chrysopogon sp._ (fq 4%), _Themeda arguens_ (fq 4%), _Triodia microstachya_ (fq 4%), _Eriachne obtusa_ (fq 4%), _Pseudopogonatherum contortum_ (fq 4%), _Acacia conjunctifolia_ (fq 4%), _Rhynchospora affinis_ (fq 4%), _Eriachne basedowii_ (fq 4%), _Aristida hygrometrica_ (fq 4%), _Enneapogon sp._ (fq 4%), _Eragrostis sp._ (fq 4%), _Hibiscus merauakensis_ (fq 4%), _Aristida holathera_ (fq 4%), _Cajanus pubescens_ (fq 4%), _Eragrostis tenellula_ (fq 4%), _Setaria apiculata_ (fq 4%), _Evolvulus alsinoides_ (fq 4%), _Aristida calycina_ (fq 4%), _Rhynchosia sp._ (fq 4%).
Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height m (Range)</th>
<th>NVIS code</th>
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<tr>
<td>Upper (U1)</td>
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<tr>
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<td>Shrub</td>
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<td>Ground (G1)</td>
<td>Hummock/Tussock G.</td>
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<td>0.35 (0.2-0.6)</td>
<td>H1i</td>
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</table>

Landscape Description:
Slopes, crests and undulating outwash plains associated with major range formations in the southern and central parts of the study area. Soils are generally shallow, rocky rudosols.

Landform Pattern/Element:
Undulating Plain, Rises, Low Hills/Plain, Hillslope, Hillcrest

Geology:
Єt (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Pnz (Balbirini Dolomite) – Generally recessive dololutite, dolarenite, dolomitic siltstone and shale.

Pmx (Reward Dololutite) – Ridge forming and recessive dololutite, dolarenite, dolorudite and sandstone.

Drainage:
Well drained.

Notes:
This VMU is distinguished from the closely associated VMU’s 8 and 10 by the equal dominance of mixed tussock and hummock grasses in the ground layer. This VMU is principally associated with the lower and footslopes of the low hills and hills in the southern and western portion of the study area.
Photo: 

No. of sites: 28
BARK010, BARK012, DOC3_S740, DOC3_S742, MCAR032, MCAR036, MCAR074, MCAR076, MCAR086, MCAR095, MCAR100, MCAR128, MCAR137, MCAR140, MCAR148, MCAR154, MCAR157, MCAR166, PDA31, PDA71, PDA113, PDA135, PDA151, PDA316, PDA357, PDA378, PDA460, SPAR007

Map: VMU9

Area: 60,276 Hectares
Vegetation Mapping Unit 10

_Eucalyptus leucophloia +/− Eucalyptus chlorophylla_ and _Corymbia_ spp. low open woodland over a mixed low hummock grassland with species including _Triodia_ bitextura, _Eulalia aurea_, _Petalostigma quadriloculare_, _Heteropogon contortus_ and _Triodia pungens_.

**NVIS Description**

U+ ^Eucalyptus leucophloia, Corymbia terminalis, Corymbia grandifolia, Eucalyptus chlorophylla, Corymbia ferruginea (^Tree\6\r), Terminalia canescens, Cochlospermum fraseri, Dodonaea lanceolata, Dodonaea physocarpa, Acacia torulosa (^Tree, Shrub\6\r) G ^Triodia bitextura, Eulalia aurea, Petalostigma quadriloculare, Schizachyrium fragile, Heteropogon contortus (^Hummock grass, Tussock grass, Shrub\1\i).

**Upper Stratum**

Low open woodland of _Eucalyptus leucophloia_ (fq 100%) and occasionally _Corymbia terminalis_ (fq 17%), _Corymbia grandifolia_ (fq 10%), _Eucalyptus chlorophylla_ (fq 7%) and/or _Corymbia ferruginea_ (fq 7%)

**Mid Stratum**

Mixed low open woodland of _Terminalia canescens_ (fq 48%), _Cochlospermum fraseri_ (fq 14%), _Dodonaea lanceolata_ (fq 10%), _Dodonaea physocarpa_ (fq 10%) and/or _Acacia torulosa_ (fq 7%)

**Ground Stratum**

Low open hummock grassland of _Triodia bitextura_ (fq 83%), _Eulalia aurea_ (fq 55%), _Petalostigma quadriloculare_ (fq 38%), _Schizachyrium fragile_ (fq 17%) and/or _Heteropogon contortus_ (fq 10%)

**Other Common Species**

**Upper Stratum**

_Corymbia dichromophloia_ (fq 7%), _Erythrophleum chlorostachys_ (fq 7%)

**Mid Stratum**

_Acacia gonoclada_ (fq 10%), _Petalostigma pubescens_ (fq 7%), _Carissa lanceolata_ (fq 7%), _Grevillea pteridifolia_ (fq 3%), _Melaleuca stenostachya_ (fq 7%), _Acacia oswaldii_ (fq 3%), _Hakea arborescens_ (fq 3%), _Acacia laccata_ (fq 3%), _Flueggea virosa_ (fq 3%), _Melaleuca viridiflora_ (fq 3%), _Calytrix mimiana_ (fq 3%), _Gardenia sp._ (fq 3%), _Grevillea striata_ (fq 3%), _Acacia argyraea_ (fq 3%), _Acacia cowleana_ (fq 3%), _Acacia umbellata_ (fq 3%), _Atalaya hemiglauca_ (fq 3%), _Maytenus cunninghamii_ (fq 3%), _Santalam lanceolatum_ (fq 3%)

**Ground Stratum**

_Acacia galiioides_ (fq 28%), _Aristida sp._ (fq 17%), _Eriachne ciliata_ (fq 10%), _Schizachyrium sp._ (fq 10%), _Aristida holathera_ (fq 10%), _Cymbopogon bombycinos_ (fq 10%), _Sehima nervosa_ (fq 10%), _Triodia pungens_ (fq 7%), _Triodia microstachya_ (fq 7%), _Eriachne sp._ (fq 7%), _Grevillea dryandri_ (fq 7%), _Triodia burridgeana_ (fq 3%), _Jacksonia sp._ (fq 3%), _Acacia nuperrima_ (fq 3%), _Chrysocephalus fallex_ (fq 3%), _Dichanthium fecondum_ (fq 3%), _Distichostemon hispidulus_ (fq 3%), _Enneapogon polyphillus_ (fq 3%), _Eragrostis sp._ (fq 3%), _Evolvulus alsinoides_ (fq 3%), _Fimbristylis sp._ (fq 3%), _Helioceras cana_ (fq 3%), _Heliotropium sp._ (fq 3%), _Stackhousia intermedia_ (fq 3%), _Corchorus sericeus_ (fq 3%), _Mitrasacme connata_ (fq 3%), _Trichodesma zeylanicum_ (fq 3%), _Acacia asperulaeae_ (fq 3%), _Cymbopogon sp._ (fq 3%)

**Stratum summary table**

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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Ground (G1)</td>
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<td>35 (9-61)</td>
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<td>H1i</td>
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</tbody>
</table>
Landscape Description:
Slopes, plateau tops, crests of hills, low hills, undulating plains of medium to coarse grained sedimentary landscapes of the major range formations within the study area. Soils are generally shallow to very shallow rocky rudosols.

Landform Pattern/Element: Rises, Low Hills, Undulating Plain/Hillslope, Plain

Geology:
£lb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.

Pmd (Tatoola Sandstone) – Ridge forming, mainly medium grained thin to medium bedded sandstone, commonly dolomitic and lithic.

Pmnh (Hot Spring Member) – Ridge forming thin-bedded dolomitic siltstone and silty dololutite with interbeds of fine grained sandstone.

Pmo (Looking Glass Formation) – Recessive, silicified, commonly stromatolitic dolostones, dolarenite and sandy dolarenite.

Pny (Smythe Sandstone) – Ridge forming massive, coarse, polymictic conglomerate, pebbly lithic sandstone and sandstone.

Ptlr (Rosie Creek Sandstone Member) – Ridge forming very fine grained to coarse grained and conglomeritic sandstone.

Ptn (Wununmantyala Sandstone) – Ridge forming locally feldspathic medium grained sandstone.

Drainage:
Well drained to rapidly drained.

Notes:
This VMU is distinguished from the closely associated VMU’s 9 and 10 by the dominance of hummock grasses (Triodia spp.) in the ground layer. This VMU is principally associated with plateaus, upper and middle slopes of the low hills and hills in the central and southern portions of the study area.
Photo:

Map: VMU10

No. of sites: 29
LANCEWOOD_32X, MCAR022, PDA111, PDA150, PDA179, PDA189, PDA193, PDA218, PDA221, PDA235, PDA243, PDA255, PDA280, PDA281, PDA314, PDA320, PDA36, PDA66, PDA75, PDA86, PDA91, SPAR009, SPAR028, MCAR030, MCAR037, PDA184, MCAR072, LANCEWOOD_31X, MCAR024.

Area: 120,277 Hectares
Vegetation Mapping Unit 11

*Lophostemon grandiflorus +/- Eucalyptus camaldulensis, Nauclea orientalis* mid open forest with a prominent mixed species mid stratum often including species such as *Ficus sp. carpentariensis, Barringtonia acutangula* and *Atalaya hemiglauc*a generally over a low sparse tussock grassland of *Chrysopogon elongatus*.

**NVIS Description**

U+ *Lophostemon grandiflorus, Eucalyptus camaldulensis, Nauclea orientalis, Melaleuca argentea, Ficus coronulata (^Tree\7\c)* M *Ficus sp. carpentariensis, Barringtonia acutangula, Atalaya hemiglauc*a, *Flueggea virosa, Antidesma parvifolium (^Tree, Shrub\6\i)* G *Chrysopogon elongatus, Bulbosylis barbata, Cucumis melo, Vitex glabrata, Xanthium strumarium (^Tussock grass, Sedge, Herb\1\r)*.

**Upper Stratum**
Mid open forest of *Lophostemon grandiflorus* (fq 100%) and/or *Eucalyptus camaldulensis* (fq 60%), *Nauclea orientalis* (fq 40%), *Melaleuca argentea* (fq 40%), and *Ficus coronulata* (fq 60%)

**Mid Stratum**
Low woodland of *Ficus sp. Carpentariensis (W.B.Spencer 01/Jul/11)* (fq 40%), *Barringtonia acutangula* (fq 40%), *Atalaya hemiglauc*a (fq 40%), *Flueggea virosa* (fq 40%), *Antidesma parvifolium* (fq 20%)

**Ground Stratum**
Low sparse tussock grassland with *Chrysopogon elongatus* (fq 60%), *Bulbosylis barbata* (fq 40%), *Cucumis melo* (fq 40%), *Vitex glabrata* (fq 20%), *Xanthium strumarium* (fq 20%) common components.

**Other Common Species**

**Upper Stratum**
*Melaleuca leucadendra* (fq 20%), *Syzygium eucalyptoides* (fq 20%), *Capparis lasiantha* (fq 20%), *Terminalia platyphylla* (fq 20%), *Terminalia volucris* (fq 20%)

**Mid Stratum**
*Passiflora foetida* (fq 40%), *Acacia drepanocarpa* (fq 20%), *Ficus cerasicarpa* (fq 20%), *Pouteria sericea* (fq 20%), *Strychnos lucida* (fq 20%), *Excoecaria parvifolia* (fq 20%), *Antidesma ghesaembilla* (fq 20%), *Bauhinia cunninghamii* (fq 20%), *Cayratia trifolia* (fq 20%), *Terminalia bursarina* (fq 20%)

**Ground Stratum**
*Physalis angulata* (fq 40%), *Achyranthes aspera* (fq 20%), *Chionachne cyathopoda* (fq 20%), *Alternanthera denticulata* (fq 20%), *Amaranthus pallidiflorus* (fq 20%), *Corchorus aestuans* (fq 20%), *Desmodium filiforme* (fq 20%), *Diciplerta sp.* (fq 20%), *Ectrosia leporina* (fq 20%), *Euphorbia vachellii* (fq 20%), *Heteropogon contortus* (fq 20%), *Hyptis suaveolens* (fq 20%), *Ludwigia octovalvis* (fq 20%), *Polycarpaea corymbosa* (fq 20%), *Portulaca pilosa* (fq 20%), *Rothia indica subsp. australis* (fq 20%)

**Stratum summary table**

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<thead>
<tr>
<th>Strata (U1)</th>
<th>Modal Growth Form</th>
<th>Mean cover % (Range)</th>
<th>Mean height m (Range)</th>
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<tr>
<td>Ground (G1)</td>
<td>Tussock grass</td>
<td>5</td>
<td>0.1</td>
<td>G1r</td>
</tr>
</tbody>
</table>

**Landscape Description:**

Rocky drainage depressions and streams in low hills. Generally well drained with low residence time of waters within the stream channels. Bed loads may range from sandy to rocky.

**Landform Pattern/Element:**

Low Hills/Drainage Depression
**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams. Below the 1:250 000 scale of geological mapping, incorporated into adjacent bedrock geologies.

**Drainage:**
Well drained

**Notes:**
Spatially restricted to small and minor creeks and drainage lines (lower order streams) away from the coast.

**Photo:**

**Map:** VMU11

**Area:** 1,124 Hectares

**No. of sites:** 5
MacarthurR_Glyde16, MacarthurR_Glyde9, PDA40, MacarthurR_Glyde26, RIPARIAN_B_MC03/R1.
Vegetation Mapping Unit 12

_Corymbia dichromophloia_ +/- _Erythrophleum chlorostachys, Eucalyptus spp. and Corymbia spp._

Low open woodland with a mixed mid stratum of trees and shrubs including *Terminalia canescens*, *Grevillea spp.*, *Petalostigma pubescens* and *Acacia* spp. The mixed ground stratum is characteristically low and open with species such as *Triodia bitextura*, *Petalostigma quadriloculare*, *Eulalia aurea* and *Schizachyrium* spp. prominent.

**NVIS Description**

U+ ^_Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus leucophloia, Eucalyptus miniata, Corymbia ferruginea (Tree), M ^_Terminalia canescens, Grevillea refracta, Acacia wickhamii, Petalostigma pubescens, Flueggea virosa (Tree, Shrub), G ^_Triodia bitextura, Petalostigma quadriloculare, Eulalia aurea, Chrysopogon fallax, Eriachne ciliata (Hummock grass, Tussock grass)^1▲

**Upper Stratum**

Low open woodland of *Corymbia dichromophloia* (fq. 98%), *Erythrophleum chlorostachys* (fq. 26%), *Eucalyptus leucophloia* (fq. 22%), *Eucalyptus miniata* (22%) and *Corymbia ferruginea* (fq. 19%)

**Mid Stratum**

Mixed low open woodland of *Terminalia canescens* (fq. 48%), *Grevillea refracta* (fq. 14%), *Petalostigma pubescens* (fq. 12%) and/or *Flueggea virosa* (fq. 12%)

**Ground Stratum**

Low open hummock grassland including *Triodia bitextura* (83%), *Petalostigma quadriloculare* (fq. 43%), *Eulalia aurea* (fq. 24%), *Chrysopogon fallax* (fq. 22%) and/or *Eriachne ciliata* (fq. 21%)

**Other Common Species**

**Upper Stratum –**

*Corymbia aspera* (fq. 14%), *Eucalyptus phoenicea* (fq. 7%), *Acacia shirleyi* (fq. 5%), *Eucalyptus tetrodonta* (fq. 5%), *Cochlospermum fraseri* (fq. 5%), *Eucalyptus chlorophylla* (fq. 3%), *Eucalyptus tectifica* (fq. 3%), *Eucalyptus distans* (fq. 2%).

**Mid Stratum –**

*Acacia hammondii* (fq. 10%), *Calytrix exstipulata* (fq. 10%), *Acacia sp.* (fq. 9%), *Acacia latifolia* (fq. 9%), *Acacia allenianna* (fq. 7%), *Bossiaea bossiaeioides* (fq. 7%), *Grevillea dryandri* (fq. 7%), *Acacia shirleyi* (fq. 5%), *Acacia gonoarpa* (fq. 5%), *Carissa lanceolata* (fq. 5%), *Acacia platycarpa* (fq. 5%), *Templetonia hookeri* (fq. 5%), *Distichostemon hispidulus* (fq. 5%), *Jacksonia vernicosa* (fq. 5%), *Alphitonia excelsa* (fq. 5%), *Grevillea pyramidalis* (fq. 5%), *Acacia galiioides* (fq. 5%), *Cochlospermum fraseri* (fq. 5%), *Gardenia pyrifomis* (fq. 5%), *Acacia jasperensis* (fq. 3%), *Grevillea striata* (fq. 3%), *Jacksonia odontocladia* (fq. 3%), *Grevillea parallela* (fq. 3%), *Jacksonia sp.* (fq. 3%), *Dodonaea phycocarpa* (fq. 3%), *Jacksonia dilatata* (fq. 3%), *Owenia vernicosa* (fq. 3%), *Erythroxylum ellipticum* (fq. 3%), *Gardenia sp.* (fq. 3%), *Acacia latescens* (fq. 2%), *Acacia tenuissima* (fq. 2%), *Terminalia volucris* (fq. 2%), *Acacia hemsleyi* (fq. 2%), *Acacia laccata* (fq. 2%), *Acacia subternata* (fq. 2%), *Calytrix achaeta* (fq. 2%), *Grewia retusifolia* (fq. 2%), *Planchonia careya* (fq. 2%), *Acacia dimidiata* (fq. 2%), *Acacia lycopodiifolia* (fq. 2%), *Acacia plectocarpa subsp. tanuminrensis* (fq. 2%), *Ventilago viminalis* (fq. 2%), *Acacia orthocarpa* (fq. 2%), *Atalaya hemiglauca* (fq. 2%), *Grevillea heliosperma* (fq. 2%), *Santalum lanceolatum* (fq. 2%), *Sarcostemma viminalis* (fq. 2%), *Stackhousia intermedia* (fq. 2%), *Templetonia sp.* (fq. 2%), *Terminalia sp.* (fq. 2%).

**Ground Stratum –**

*Schizachyrium fragile* (fq. 19%), *Triodia sp.* (fq. 12%), *Heteropogon contortus* (fq. 10%), *Schizachyrium sp.* (fq. 7%), *Aristida sp.* (fq. 7%), *Sehima nervosum* (fq. 5%), *Triodia burbridgeana* (fq. 5%), *Eriachne sp.* (fq. 5%), *Aristida latifolia* (fq. 5%), *Fimbristylis dichotoma* (fq. 5%), *Mnesithea formosa* (fq. 5%), Unknown Species (fq. 5%), *Heliotropium* sp. (fq. 5%), *Eriachne mucronata* (fq. 5%), *Bulbostylis barbata* (fq. 5%), *Tephrosia sp.* (fq. 5%), *Aristida holothera* (fq. 5%), *Cymbopogon bombycinus* (fq. 5%), *Triodia microstachya* (fq. 3%), *Chrysopogon sp.* (fq. 3%), *Aristida hygrometrica* (fq. 3%), *Cymbopogon procerus* (fq. 3%), *Eriachne melicacea* (fq. 3%), *Corchorus sidoides* (fq. 3%), *Cyperus cunninghhamii* (fq. 3%), 58
Uraria lagopodioides (fq. 3%), Acacia nuperrima (fq. 3%), Triodia pungens (fq. 2%), Dichanthium fecundum (fq. 2%), Enneapogon polyphyllus (fq. 2%), Yakirra australiensis (fq. 2%), Sorghum plumosum (fq. 2%), Aristida calycina (fq. 2%), Boerhavia sp. (indet) (fq. 2%), Cleome viscous (fq. 2%), Cheilanthes sp. (fq. 2%), Chrysopogon elongatus (fq. 2%), Corchorus sp. (fq. 2%), Mneithsia formosa (fq. 2%), Pseudoraphis spinescens (fq. 2%), Capillipedium parviflorum (fq. 2%), Ptilotus fusiformis (fq. 2%), Ventilago viminalis (fq. 2%), Alternanthera nodiflora (fq. 2%), Ammannia multiflora (fq. 2%), Corchorus sericeus (fq. 2%), Euphorbia vachellii (fq. 2%), Fimbristylis rupestris (fq. 2%), Heliotropium epacrideum (fq. 2%), Indigofera linifolia (fq. 2%), Mitrasacme connata (fq. 2%), Oldenlandia mitrasacmoides (fq. 2%), Polygala exsquarrosa (fq. 2%), Tephrosia leptoclada (fq. 2%), Triumfetta sp. (fq. 2%), Zornia muriculata (fq. 2%).

Stratum summary table

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<thead>
<tr>
<th>Strata</th>
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<th>Mean Cover % (Range)</th>
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<td>Upper (U1)</td>
<td>Tree</td>
<td>18.7 (4-42)</td>
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<td>T6r</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>9.9 (0-71)</td>
<td>2.06 (0-4)</td>
<td>T6r</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>29.8 (8-59)</td>
<td>0.47 (0.2-0.8)</td>
<td>H1i</td>
</tr>
</tbody>
</table>

Landscape Description:
Plateau tops, hillslopes and crests on hills and escarpments on various sedimentary (predominantly fine to medium grained) lithology’s associated with the major range formations of the central and southeastern portions of the study area. Soils are very shallow rudosols and tenosols.

Landform Pattern/Element:
Plateau, Plain, Low Hills, Hills/Plain, Hillslope, Hillcrest

Geology:
Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.
Pru (Mainoru Formation) – Recessive micaceous siltstone to very fine grained sandstone

Pro (Corcoran Formation) – Recessive, interbedded mudstone, siltstone and fine-grained sandstone.

Drainage:
Well drained.

Notes:
Very common vegetation type of the sandstone plateaus, hills and escarpments associated with and the edges of the Sturt Plateau bioregion. Generally characterised by a mixed ground layer dominated by hummock grasses.
No. of sites: 58

Area: 122,136 Hectares
Vegetation Mapping Unit 13

_Corymbia dichromophloia_ and _C. ferruginea_ +/- _Eucalyptus miniata_ low open-woodland with a sparse shrubby mid-stratum of _Acacia_ spp., _Grevillea_ spp. and _Bossiaea bossiaeoides_. The mixed ground stratum is characteristically low and open with species such as _Triodia bitextura_, _Eriachne obtusa_, _Schizachyrium fragile_ and _Petalostigma quadriloculare_ prominent.

**NVIS Description**

U ^Corymbia dichromophloia, Corymbia ferruginea, Melaleuca nervosa, Corymbia aspera, Eucalyptus miniata (^Tree\6\r), M Acacia torulosa, Bossiaea bossiaeoides, Acacia dimidiata, Acacia platycarpa, Grevillea refracta (^Shrub, Tree\4\r), G ^Triodia bitextura, Eriachne obtusa, Schizachyrium fragile, Petalostigma quadriloculare, Aristida hygrometrica (^Hummock grass, Tussock grass, Shrub\1\i)

**Upper Stratum**

Low open woodland of _Corymbia dichromophloia_ (fq. 100%), _Corymbia ferruginea_ (fq. 100%) and/or _Corymbia aspera_ (fq. 20%), _Eucalyptus miniata_ (fq. 20%), _Melaleuca nervosa_ (fq. 20%).

**Mid Stratum**

Mixed sparse tall shrubland of _Acacia torulosa_ (fq. 40%), _Bossiaea bossiaeoides_ (fq. 40%), _Acacia dimidiata_ (fq. 40%), _Acacia platycarpa_ (fq. 40%) and/or _Grevillea refracta_ (fq. 40%).

**Ground Stratum**

Low open hummock/tussock grassland of _Triodia bitextura_ (fq. 100%), _Eriachne obtusa_ (fq. 40%), _Schizachyrium fragile_ (fq. 40%), _Petalostigma quadriloculare_ (fq. 40%) and/or _Aristida hygrometrica_ (fq. 20%).

**Other Common Species**

**Upper Stratum** –

_Corymbia aspera_ (fq. 20%), _Corymbia grandifolia_ (fq. 20%), _Eucalyptus tectifica_ (fq. 20%).

**Mid Stratum** –

_Grevillea dryandri_ (fq. 20%), _Grevillea heliosperma_ (fq. 20%), _Grevillea mimosoides_ (fq. 20%), _Grevillea pteridifolia_ (fq. 20%), _Jacksonia odontoclada_ (fq. 20%), _Melaleuca viridiflora_ (fq. 20%), _Terminalia canescens_ (fq. 20%).

**Ground Stratum** –

_Eriachne ciliata_ (fq. 20%), _Eriachne sp._ (fq. 20%), _Eulalia aurea_ (fq. 20%), _Fimbristylis macrantha_ (fq. 20%), _Sorghum plumosum_ (fq. 20%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>16.25 (9-24)</td>
<td>8.13 (6-11)</td>
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<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>4.75 (2-8)</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>33.25 (14-52)</td>
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</tbody>
</table>

**Landscape Description:**

Plains of plateau surfaces and hillslopes throughout the catchment. Soils are generally poorly developed, stony to rocky, being derived from primarily medium to coarse grained sedimentary parent materials. Soils tend to be shallow and poorly developed tenosols and rudosols.

**Landform Pattern/Element:**

Plain, Low Hills/Plain, Hillslope

**Geology:**

Czs – Residual soil and sand.
Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.

Prr (Crawford Formation) – Ridge forming fine-grained micaceous sandstone and siltstone with minor mudstone beds, glauconitic and feldspathic sandstone.

Pru (Mainoru Formation) – Recessive micaceous siltstone to very fine grained sandstone

**Drainage:**
Well drained to rapidly drained

**Notes:**
Commonly occurring vegetation community on hills and ranges throughout the catchment on a variety of predominantly coarser grained sediments, often on upper slopes and plateau tops. Generally dominated in the ground layer by *Triodia* spp.

**Photo:**

**Map:** VMU13

**Area:** 158,399 Hectares

**No. of sites:** 5
MCAR002, PDA147, PDA253, PDA467, PDA491.
Vegetation Mapping Unit 14

**Eucalyptus phoenicea** and **Eucalyptus miniata +/- Corymbia dichromophloia, Erythrophleum chlorostachys** and **Corymbia ferruginea** mid woodland with a prominent low shrub layer of **Acacia** spp., and/or **Grevillea** spp. The hummock grass dominated ground layer is characterised by **Triodia bitextura +/- Petalostigma quadriloculare**.

**NVIS Description**

Upper Stratum
Mid woodland of **Eucalyptus phoenicea** (fq. 100%), **Eucalyptus miniata** (fq. 100%) and/or **Corymbia dichromophloia** (fq. 75%), **Erythrophleum chlorostachys** (fq. 25%), **Corymbia ferruginea** (fq. 25%).

Mid Stratum
Mid shrubland of **Jacksonia vernicosa** (fq. 50%), **Acacia platycarpa** (fq. 50%), **Grevillea refracta** (fq. 50%), **Buchanania obovata** (fq. 50%) and **Acacia orthocarpa** (fq. 25%).

Ground Stratum
Hummock grassland of **Triodia bitextura** (fq. 100%) and/or **Petalostigma quadriloculare** (fq. 75%), **Chrysopogon fallax** (fq. 25%) or **Hibbertia lepidota** (fq. 25%).

Other Common Species

Upper Stratum – **Callitris intratropica** (fq. 25%), **Owenia vernicosa** (fq. 25%).

Mid Stratum –
**Acacia torulosa** (fq. 25%), **Acacia alleniana** (fq. 25%), **Acacia dimidiata** (fq. 25%), **Acacia gonocarpa** (fq. 25%), **Acacia hemsleyi** (fq. 25%), **Callitris intratropica** (fq. 25%), **Grevillea mimosoides** (fq. 25%), **Owenia vernicosa** (fq. 25%), **Tephrosia** sp. (fq. 25%).

Ground Stratum –
**Hibbertia lepidota** (fq. 25%), **Tephrosia** sp. (fq. 25%), Unknown Species (fq. 25%).

**Stratum summary table**

<table>
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<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Upper (U1)</td>
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<tr>
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<td>Shrub</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>33 (27-38)</td>
<td>0.53 (0.4-0.8)</td>
<td>H2c</td>
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</tbody>
</table>

**Landscape Description:**

Very rocky plains and slopes associated with plateau surfaces and hills of the Bukalara Range in the east of the study area. Soils are very poorly developed rudosols and derived from the coarse grained sedimentary parent materials that form the ranges.

**Landform Pattern/Element:**

Plain, Rises/Plain, Hillslope

**Geology:**

Czs – Residual sand and soil.

Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.
Pra (Abner Sandstone) – Undivided Abner Sandstone.

**Drainage:**
Well drained to rapidly drained.

**Notes:**
Characteristic Eucalypt open-woodland to woodland of the escarpments and plateaus associated with the Bukalara Range. Largely restricted to this range formation and widespread across the plateau top.

**Photo:**

No. of sites: 4
PDA363, PDA374, PDA397, PDA463.

**Map:** VMU14

**Area:** 79,186 Hectares
Vegetation Mapping Unit 15

Eucalyptus phoenicea +/- Corymbia dichromophloia and Corymbia ferruginea low open woodland with a low sparse mid stratum of Grevillea spp., Acacia spp., Calytrix exstipulata and Jacksonia spp. and a Triodia bitextura dominated hummock grassland ground stratum.

NVIS Description
U ^ Eucalyptus phoenicea, Corymbia dichromophloia, Corymbia ferruginea, Eucalyptus tetrodonta, Eucalyptus miniata (^Tree^6r), M Grevillea refracta, Acacia platycarpa, Calytrix exstipulata, Jacksonia dilatata, Acacia alleniana (^Shrub, Tree^3i), G ^Triodia bitextura, Triodia sp., Aristida holathera, Eriachne ciliata, Bulbostylys barbata (^Hummock Grass, Tussock Grass, Sedge^2c)

Upper Stratum
Low open woodland of Eucalyptus phoenicea (fq. 100%) and/or Corymbia dichromophloia (fq. 50%), Corymbia ferruginea, Eucalyptus tetrodonta and Eucalyptus miniata

Mid Stratum
Mid Sparse Shrubland of Grevillea refracta, Acacia platycarpa, Calytrix exstipulata, Jacksonia dilatata and Acacia alleniana

Ground Stratum
Mid hummock grassland of Triodia bitextura, Triodia sp., Aristida holathera, Eriachne ciliata and Bulbostylys barbata

Other Common Species

Upper Stratum –
Mid Sparse Shrubland of Cochlospermum gregorii (fq. 14%), Corymbia aspera (fq. 7%), Eucalyptus herbertiana (fq. 7%), Eucalyptus miniata (fq. 7%), Eucalyptus sp. (fq. 7%), Eucalyptus tetradonta (fq. 7%), Melaleuca viridiflora (fq. 14%).

Mid Stratum –
Acacia hammondii (fq. 21%), Acacia monticola (fq. 21%), Acacia torulosa (fq. 21%), Buchanania obovata (fq. 21%), Boronia lanuginosa (fq. 21%), Distichostemon hispidulus (fq. 21%), Bossiaea bossiaeoides (fq. 14%), Grevillea pteridifolia (fq. 14%), Melaleuca viridiflora (fq. 14%), Acacia latecens (fq. 14%), Acacia latifolia (fq. 14%), Acacia sp. (fq. 7%), Acacia jasperensis (fq. 7%), Acacia orthocarpa (fq. 7%), Acacia gonocarpa (fq. 7%), Acacia gonoclada (fq. 7%), Acacia lycopodiifolia (fq. 7%), Gardenia pyriformis (fq. 7%), Grevillea dimidiata (fq. 7%), Hibiscus zonatus (fq. 7%), Acacia laccata (fq. 7%), Boronia lanceolata (fq. 7%), Calytrix achaeta (fq. 7%), Dolichandrone filiformis (fq. 7%), Ficus cerasicarpa (fq. 7%), Grevillea sp. (fq. 7%), Grevillea wickhamii (fq. 7%), Jacksonia odontocloada (fq. 7%), Owenia vernicosa (fq. 7%), Persoonia falcata (fq. 7%), Tephrosia spechtii (fq. 7%), Tephrosia sp. (fq. 7%).

Ground Stratum –
Hibbertia lepidota (fq. 29%), Petalostigma quadriloculare (fq. 21%), Cyperus pulchellus (fq. 14%), Schizachyrium fragile (fq. 14%), Byblis liniflora (fq. 7%), Cassytha carpillaris (fq. 7%), Cleome microaustralica (fq. 7%), Corchorus sidoides (fq. 7%), Cyperus castaneus (fq. 7%), Cyperus sp. (fq. 7%), Cyperus squarrosum (fq. 7%), Erneapogon polyphillus (fq. 7%), Eriachne mucronata (fq. 7%), Eulalia aurea (fq. 7%), Fimbristylis sp. (fq. 7%), Fimbristylis sphaerocephala (fq. 7%), Fimbristylis trigastrocarya (fq. 7%), Gomphrena flaccida (fq. 7%), Gomphrena lanata (fq. 7%), Gomphrena leptothecus (fq. 7%), Indigofera haplophylla (fq. 7%), Leptosperma villosum (fq. 7%), Mitracasme glaucascens (fq. 7%), Oldenlandia mitracasmoides (fq. 7%), Philydrium lanuginosum (fq. 7%), Phyllanthus carpentariae (fq. 7%), Polygala esquerrosa (fq. 7%), Pililotus polystachyus (fq. 7%), Schizachyrium sp. (fq. 7%), Schizachyrium sp. Wingless (S.T.Blake 17764) (fq. 7%), Unknown Sp. (fq. 7%), Unknown Species (fq. 7%).
Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>18 (9-31)</td>
<td>9.93 (7.5-14)</td>
<td>T6r</td>
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<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>14.14 (4-33)</td>
<td>1.79 (1.1-3)</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>30.43 (18-37)</td>
<td>0.51 (0.3-0.8)</td>
<td>H2c</td>
</tr>
</tbody>
</table>

Landscape Description:
Plateaus and rises associated with major ranges and escarpments of medium to coarse grained sedimentary parent materials in the south and east of the study area. Soils are very rocky and poorly developed and may be a minor feature of the substrate surface, with rock platform being prominent. Where present soils are rudosols with some minor tenosols.

Landform Pattern/Element:
Plateau, Rises/Plain, Hillslope

Geology:
Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.

Pre (Bessie Creek Sandstone) – Ridge-forming, pseudo-karstically weathered, strongly jointed quartzarenite.

Drainage:

Notes:
Characteristic vegetation community of the major ranges in the east (Bukalara) of the study area, with minor occurrence in the Abner Range.

Photo:

Map: VMU15

Area: 30,074 Hectares

No. of sites: 14
MacarthurR_Glyde4, MacarthurR_Glyde17, MacarthurR_Glyde27, MacarthurR_MR8, MCAR028, MCAR004, MCAR026, PDA219, PDA302, PDA349, PDA366, PDA414, PDA415, PDA426
Vegetation Mapping Unit 16

*Eucalyptus miniata* +/- *Corymbia dichromophloia* and *Corymbia ferruginea* mid open woodland with a secondary, low open tree layer of *Grevillea* spp., *Acacia* spp., *Buchanania obovata*, and *Distichostemon hispidulus* with a *Triodia bitextura* dominated hummock grassland ground stratum.

**NVIS Description**

U ^Tree^7rv, M *Grevillea refracta*, *Buchanania obovata*, *Acacia latifolia*, *Acacia alleniana*, *Calytrix exstipulata* ^Tree, Shrub^6rv, G *Triodia bitextura*, *Petalostigma quadriloculare*, *Eriachne ciliata*, *Chrysopogon fallax*, *Triodia burbidgeana* ^Hummock grass, Shrub, Tussock grass^1

**Upper Stratum**

Mid open woodland of *Eucalyptus miniata* (fq. 100%), *Corymbia dichromophloia* (fq. 38%), *Corymbia ferruginea* (fq. 33%), *Erythrophleum chlorostachys* (fq. 22%) and *Eucalyptus tetrodonta* (fq. 15%).

**Mid Stratum**

Low open woodland of *Grevillea refracta* (fq. 30%), *Buchanania obovata* (fq. 30%), *Distichostemon hispidulus* (fq. 26%), *Acacia alleniana* (fq. 22%) and/or *Calytrix exstipulata* (fq. 22%).

**Ground Stratum**

Low open hummock grassland of *Triodia bitextura* (fq. 74%), *Petalostigma quadriloculare* (fq. 33%), *Eriachne ciliata* (fq. 33%), *Triodia* sp. (fq. 26%) and *Schizachyrium fragile* (fq. 22%).

**Other Common Species**

**Upper Stratum –**

*Corymbia aspera* (fq. 15%), *Corymbia grandifolia* (fq. 7%), *Eucalyptus* sp. (fq. %), *Eucalyptus distans* (fq. 4%), *Eucalyptus phoenicea* (fq. 4%), *Eucalyptus herbertiana* (fq. 4%), *Eucalyptus tectifica* (fq. 4%).

**Mid Stratum –**

*Acacia latifolia* (fq. 22%), *Terminalia canescens* (fq. 22%), *Owenia vernicosa* (fq. 22%), *Acacia platycarpa* (fq. 15%), *Grevillea heliosperma* (fq. 15%), *Acacia sp.* (fq. 11%), *Jacksonia dilatata* (fq. 11%), *Acacia dimidiata* (fq. 11%), *Acacia orthocarpa* (fq. 11%), *Acacia galoides* (fq. 11%), *Acacia latecens* (fq. 11%), *Grevillea pteridifolia* (fq. 7%), *Jacksonia vernicosa* (fq. 7%), *Verticordia verticillata* (fq. 7%), *Cochlospermum fraseri* (fq. 4%), *Bossiaea bosssiaoides* (fq. 4%), *Acacia gonocarpa* (fq. 4%), *Jacksonia sp.* (fq. 4%), *Hibiscus zonatus* (fq. 4%), *Gardenia fucata* (fq. 4%), *Hibiscus setulosus* (fq. 4%), *Acacia monticola* (fq. 4%), *Alphitonia pomaderaoides* (fq. 4%), *Flemingia pauciflora* (fq. 4%), *Gardenia sp.* (fq. 4%), *Grevillea sp.* (fq. 4%), *Senna sp.* (fq. 4%), *Terminalia ferrandiana* (fq. 4%), *Acacia torulosa* (fq. 4%), *Corymbia ptychocarpa* (fq. 4%), *Atalaya hemiglaucu* (fq. 4%), *Boronia lanuginosa* (fq. 4%), *Gardenia pyriformis* (fq. 4%), *Gardenia pyriformis* subsp. *orientalis* (fq. 4%), *Grevillea pyramidalis* (fq. 4%), *Grevillea wickhamii* (fq. 4%), *Grewia retusifolia* (fq. 4%), *Heliotropium epacridium* (fq. 4%), *Heliotropium sp.* (fq. 4%), *Jacksonia odontoclada* (fq. 4%), *Lithomyrtus hypoleuca* (fq. 4%), *Passiflora foetida* (fq. 4%), *Persoonia falcata* (fq. 4%), *Pityrodia terifolia* (fq. 4%), *Tarenna dallachiana* (fq. 4%), *Templetonia hookeri* (fq. 4%).

**Ground Stratum –**

*Sorghum plumosum* (fq. 15%), *Hibbertia lepidota* (fq. 15%), *Chrysopogon fallax* (fq. 7%), *Triodia burbidgeana* (7%), *Aristida holathera* (fq. 7%), *Scaevola revoluta* (fq. 7%), *Corchorus sericeus* (fq. 7%), *Corchorus siodoe* (fq. 7%), *Cyperus microcephalus* (fq. 7%), *Fimbriostylis* sp. (fq. 7%), *Bonamia pannosa* (fq. 7%), *Bulbostylis barbata* (fq. 7%), *Indigofera hapiophylla* (fq. 7%), *Phyllanthus carpenteri* (fq. 7%), *Spermacoce lignosa* (fq. 7%), *Tephrosia* sp. (fq. 7%), *Bossiaea bosssiaoides* (fq. 4%), *Acacia humifusa* (fq. 4%), *Aristida hygrometrica* (fq. 4%), *Aristida sp.* (fq. 4%), *Eulalia aurea* (fq. 4%), *Heteropogon contortus* (fq. 4%), *Tephrosia procer* (fq. 4%), *Triodia pungens* (fq. 4%), *Eriachne mucronata* (fq. 4%), *Poaceae sp2* (v149) (fq. 4%), *Spermacoce stenophylla* (fq. 4%), *Corchorus* sp. (fq. 4%), *Cyperus sp.* (fq. 4%), *Eriachne obtusa* (fq. 4%), *Scleria novae-hollandiae* (fq. 4%), *Senna* sp. (fq. 4%), *Setaria apiculata* (fq. 4%), *Unknown Spp.* (fq. 4%), *Cassytha capillaris* (fq. 4%), *Cleome microaustaliana* (fq. 4%), *Cleome viscosa* (fq. 4%), *Cyperus* sp. (INDET) (fq. 4%), *Eriachne avenacea* (fq. 4%), *Gomphrena sp.* (fq. 4%), *Gonocarpus leptothecus* (fq. 4%), *Heliotropium epacridium* (fq. 4%),
Heliotropium sp. (fq. 4%), Lithomyrtus hypoleuca (fq. 4%), Oldenlandia mitrasacmoides (fq. 4%), Passiflora foetida (fq. 4%), Polycarpaea spirostylis (fq. 4%), Polygala sp. Top End (L.A.Craven 5464) (fq. 4%), Portulaca bicolor (fq. 4%), Sauropus rigidulus (fq. 4%), Senna venusta (fq. 4%), Stemodia lythrifolia (fq. 4%), Zornia prostrata (fq. 4%).

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tbody>
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<td>Upper (U1)</td>
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<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>26 (30-11)</td>
<td>0.47 (0.15-1)</td>
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Landscape Description:
Plateau tops, slopes and crests of major range formations throughout the study area. Principally medium to coarse grained sedimentary parent materials and the presence of significant rock outcrop and platform result in soils being typically poorly developed rudosols where present.

Landform Pattern/Element: Plateau, Low Hills, Rises, Hills/Plain, Hillslope, Hillcrest

Geology:
Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.

Pra (Abner Sandstone) – Undivided Abner Sandstone.

Ptl (Sly Creek Sandstone) – Ridge-forming, medium bedded, fine to medium grained quartzarenite to very coarse grained quartz pebble beds.

Pty (Yiyintyi Sandstone) – Ridge forming, medium bedded, medium to coarse grained quartz sandstone.

Drainage:
Well drained to rapidly drained.

Notes:
Widespread vegetation community found on ranges and plateaus, primarily away from the coastal plains, throughout the study area. Closely related floristically to the Eucalyptus tetradonta and E. miniata communities of the lateritised coastal plain (VMU 23 and 24) but occurring on distinctly different landforms and soils.
No. of sites: 27

Area: 151,074 Hectares
Vegetation Mapping Unit 17

Corymbia terminalis and Eucalyptus tectifica +/- Erythrophleum chlorostachys mid open woodland with a secondary, low open tree layer of Terminalia canescens, Hakea arborescens and Bauhinia cunninghamii with a mixed tussock grass dominated ground stratum.

NVIS Description

U ^Corymbia terminalis, ^Eucalyptus tectifica, Erythrophleum chlorostachys, Eucalyptus leucoxphloia, Corymbia confertiflora (*Tree\yn*), M ^Terminalia canescens, Hakea arborescens, Carissa lanceolata, Bauhinia cunninghamii, Grewia retusifolia (*Tree, Shrub\yn*), G Chrysopogon fallax, Heteropogon contortus, Sehima nervosum, Triodia bitextura, Aristida sp. (*Tussock grass, Hummock grass\yn*).

Upper Stratum
Mid open woodland of Corymbia terminalis (fq. 100%), Eucalyptus tectifica (fq. 100%) and/or Erythrophleum chlorostachys (fq. 53%), Eucalyptus leucophloia (fq. 33%) or Corymbia confertiflora (fq. 27%).

Mid Stratum
Low open woodland of Terminalia canescens (fq. 60%), Hakea arborescens (fq. 60%) and/or Carissa lanceolata (fq. 47%), Bauhinia cunninghamii (fq. 40%) and Grewia retusifolia (fq. 27%).

Ground Stratum
Low grassland of Chrysopogon fallax (fq. 67%), Heteropogon contortus (fq. 67%), Sehima nervosum (fq. 60%), Schizachyrium fragile (fq. 53%) and Aristida sp. (fq. 47%).

Other Common Species

Upper Stratum –
Brachychiton diversifolius (fq. 27%), Eucalyptus sp. (fq. 7%), Corymbia dichromophloia (fq. 7%), Corymbia grandifolia (fq. 7%), Corymbia flavescens (fq. 7%).

Mid Stratum –
Atalaya hemiglauca (fq. 20%), Dodonaea physocarpa (fq. 13%), Flueggea virosa (fq. 13%), Terminalia volucris (fq. 7%), Buchanania obovata (fq. 7%), Dolichandrone heterophylla (fq. 7%), Maytenus cunninghamii (fq. 7%), Callitris intratropica (fq. 7%), Gossypium australicum (fq. 7%).

Ground Stratum –
Sorghum plumosum (fq. 40%), Themeda triandra (fq. 40%), Eulalia aurea (fq. 33%), Sporobolus australasicus (fq. 27%), Triodia bitextura (fq. 27%), Eragrostis sp. (fq. 20%), Eragrostis tenella (fq. 20%), Chrysopogon sp. (fq. 13%), Enneapogon polyphyllus (fq. 13%), Dichanthium ecundum (fq. 13%), Eriachne mucronata (fq. 13%), Aristida holothera (fq. 13%), Eriachne ciliata (fq. 13%), Petalostigma quadriloculare (fq. 13%), Dichanthium sericeum subsp. polystachyum (fq. 7%), Fimbristylis sp. (fq. 7%), Aristida calycina (fq. 7%), Setaria apiculata (fq. 7%), Polycarpacea sp. (fq. 7%), Chrysopogon latifolius (fq. 7%), Panicum decompositum (fq. 7%), Cymbopogon bombycinus (fq. 7%), Heteropogon triticeus (fq. 7%), Themeda sp. (fq. 7%), Aristida latifolia (fq. 7%), Spermacoce sp. (fq. 7%), Bonamia pannosa (fq. 7%), Bulbostylis barbata (fq. 7%), Crotalaria montana (fq. 7%), Euphorbia schlitzii (fq. 7%), Evolvulus alsinoides (fq. 7%), Hybanthus enneaspermus (fq. 7%), Indigofera colutea (fq. 7%), Melhania oblongifolia (fq. 7%), Mnesithea formosa (fq. 7%), Murdannia graminea (fq. 7%), Panicum sp. (fq. 7%), Perotis rara (fq. 7%), Petalostigma pubescens (fq. 7%), Polycarpacea corymbosa (fq. 7%), Polygala arvensis (fq. 7%), Polygala longifolia (fq. 7%), Polygala sp. Mudginberri (J.Russell-Smith 987) (fq. 7%), Polymers acutifolia (fq. 7%), Rhyphanosia minima (fq. 7%), Spermacoce dolichosperma (fq. 7%), Tribulopsis pentandra (fq. 7%), Waltheria indica (fq. 7%), Yakirra pauciflora (fq. 7%), Yakirra sp. (fq. 7%).
**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>18.8 (14-28)</td>
<td>10.14 (8-12)</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>9.2 (4-16)</td>
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<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>39.2 (29-64)</td>
<td>0.42 (0.3-0.6)</td>
<td>G1c</td>
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</table>

**Landscape Description:**
Occurs on sandy to clayey plains and the lower slope/footslopes of low rises throughout the catchment, generally derived from finer grained sedimentary parent materials and alluvium. Soils are principally kandosols and tenosols.

**Landform Pattern/Element:** Plain, Undulating Plain, Rises/Plain, Hillslope

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Pma (Amelia Dolomite) – Silty dolomite and algal dolomite.

Pmnh (Hot Spring Member) – Ridge forming thin-bedded dolomitic siltstone and silty dololutite with interbeds of fine grained sandstone.

**Drainage:**
Well drained.

**Notes:**
Widespread, commonly occurring vegetation community on depositional plains and low rises throughout the study area. Principally associated with finer-grained sedimentary landscapes, residual soils and alluvium adjacent to major range formations. Closely aligned with VMU's 5, 6, 18, 19 and 22.
No. of sites: 15
MacarthurR_MR17, MCAR064, MCAR079, MCAR104, MCAR108, MCAR110, MCAR151, MCAR155, PDA176, PDA333, PDA335, PDA379, PDA547, SPAR001, SPAR002

Area: 251,299 Hectares
Vegetation Mapping Unit 18

*Corymbia terminalis* and *Eucalyptus chlorophylla* +/- *Erythrophleum chlorostachys* low open woodland with a secondary, low open tree layer of *Terminalia canescens*, *Hakea arborescens* and *Bauhinia cunninghamii* with a mixed tussock grass dominated ground stratum +/- *Triodia* spp.

NVIS Description

U ^Corymbia terminalis^, ^Eucalyptus chlorophylla^, *Erythrophleum chlorostachys*, *Eucalyptus leucophloia*, *Brachychiton diversifolius* (*^Tree\6\r*), M ^Terminalia canescens^, *Hakea arborescens*, *Bauhinia cunninghamii*, *Carissa lanceolata*, *Flueggea virosa* (*^Tree, Shrub\6\r*), G ^Eulalia aurea^, *Chrysopogon fallax*, *Sehima nervosum*, *Dichanthium fecundum*, *Triodia bitextura* (*^Tussock grass, Hummock grass\1\c*

Upper Stratum

Low open woodland with *Corymbia terminalis*, ^Eucalyptus chlorophylla^ and variously *Erythrophleum chlorostachys*, *Eucalyptus leucophloia* or *Brachychiton diversifolius*.

Mid Stratum

Low open woodland with *Terminalia canescens*, *Hakea arborescens*, *Bauhinia cunninghamii*, *Carissa lanceolata*, and *Flueggea virosa*.

Ground Stratum

Mixed tussock grassland with *Eulalia aurea*, *Chrysopogon fallax*, *Sehima nervosum*, *Dichanthium fecundum* and *Triodia bitextura*.

Other Common Species

**Upper Stratum** – *Corymbia confertiflora* (fq. 13%), *Eucalyptus pruinosa* (fq. 7%), *Eucalyptus tectifica* (fq. 7%), *Corymbia bella* (fq. 7%), *Corymbia flavescens* (fq. 7%), *Corymbia grandifolia* (fq. 7%).

**Mid Stratum** – *Atalaya hemiglauca* (fq. 33%), *Melhania oblongifolia* (fq. 27%), *Dodonaea physocarpa* (fq. 27%), *Grewia retusifolia* (fq. 27%), *Maytenus cunninghamii* (fq. 20%), *Acacia holosericea* (fq. 20%), *Acacia lysiphloia* (fq. 13%), *Capparis lasiantha* (fq. 13%), *Grewia retusifolia* (fq. 27%), *Maytenus cunninghamii* (fq. 20%), *Acacia holosericea* (fq. 20%), *Acacia lysiphloia* (fq. 13%), *Capparis lasiantha* (fq. 13%), *Grewia retusifolia* (fq. 27%), *Maytenus cunninghamii* (fq. 20%), *Acacia holosericea* (fq. 20%), *Acacia lysiphloia* (fq. 13%).

**Ground Stratum** – *Heteropogon contortus* (fq. 27%), *Themeda triandra* (fq. 27%), *Melhania oblongifolia* (fq. 27%), *Sorghum plumosum* (fq. 20%), *Aristida holathera* (fq. 20%), *Aristida calycina* (fq. 13%), *Enneapogon purpurascens* (fq. 13%), *Eriachne sp.* (fq. 13%), *Schizachyrium fragile* (fq. 13%), Unknown Species (fq. 13%), *Rostellularia adscendens* (fq. 13%), *Corchorus pumilio* (fq. 13%), *Crotalaria montana* (fq. 13%), *Evolutulus alsinoides* (fq. 13%), *Hybanthus enneaspermus* (fq. 13%), *Chrysopogon latifolius* (fq. 7%), *Aristida inaequiglumis* (fq. 7%), *Petalostigma quadriloculare* (fq. 7%), *Triodia burdidgeana* (fq. 7%), *Aristida sp.* (fq. 7%), *Panicum sp.* (fq. 7%), *Alloteropsis semialata* (fq. 7%), *Aristida latifolia* (fq. 7%), *Sesbania sp.* (fq. 7%), *Bonamia pannosa* (fq. 7%), *Cajanus sp.* (fq. 7%), *Corchorus sp.* (fq. 7%), *Cymbopogon bombycinus* (fq. 7%), *Enneapogon polyphyllus* (fq. 7%), *Eragrostis tenellula* (fq. 7%), *Erythroxylum ellipticum* (fq. 7%), *Euphorbia mitchelliana* (fq. 7%), *Galactia tenuiflora* (fq. 7%), *Gomphrena sp.* (fq. 7%), *Heliceres cana* (fq. 7%), *Heliotropium sp.* (fq. 7%), *Ipomoea eriocarpa* (fq. 7%), *Jasminum molle* (fq. 7%), *Panicum decompositum* (fq. 7%), *Polygala sp.* Mudginberri (J.Russell-Smith 987) (fq. 7%), *Pterocephalum serrulatum* (fq. 7%), *Rhynchosia minima* (fq. 7%), *Sida spinosa* (fq. 7%), *Tephrosia brachyodon* var. indeterminate (fq. 7%), *Waltheria indica* (fq. 7%).
### Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>15.7 (7-24)</td>
<td>8.74 (7-10.5)</td>
<td>T6r</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>10.8 (3-31)</td>
<td>2.39 (1.4-4.5)</td>
<td>T6r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>38.3 (11-58)</td>
<td>0.42 (0.3-0.6)</td>
<td>G1c</td>
</tr>
</tbody>
</table>

### Landscape Description:
Occurs on plains and lower/footslopes of low hills throughout the southern portion of the catchment. Soils are derived from a variety sedimentary and igneous parent materials. Soils may range from better developed tenosols to kandosols.

### Landform Pattern/Element:
Plain, Undulating Plain, Low Hills/ Plain, Hillslope, Footslope

### Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czl - Ferricrete

Čt (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Pte (Settlement Creek Volcanics) – Basalt, tuff, tuffaceous siltstone.

### Drainage:
Well drained.

### Notes:
Widespread vegetation community characteristic of areas away from the coastal plain and eastern sandstone ranges. Closely associated with a number of VMU’s within the study area (5, 6, 17, 19 and 22). May be more closely associated with sandier surfaced soils.
No. of sites: 16
BARK011, DOC3_S741, MacarthurR_MR15, MacarthurR_MR16,
PDA18, PDA43, PDA55, PDA59, PDA72, PDA77, PDA136,
PDA164, PDA244, PDA254, PDA301, SPAR027

Area: 132,519 Hectares
Vegetation Mapping Unit 19
Corymbia terminalis +/- Erythrophleum chlorostachys, Eucalyptus chlorophylla, Eucalyptus leucophloia low open woodland with a secondary, low open tree layer of Terminalia canescens, Hakea arborescens and Bauhinia cunninghamii with a mixed tussock grass dominated ground stratum +/- Triodia spp.

NVIS Description
U ^Corymbia terminalis Erythrophleum chlorostachys, Eucalyptus chlorophylla, Eucalyptus leucophloia, Eucalyptus tectifica (*Tree*/7)i, M ^Terminalia canescens, Hakea arborescens, Bauhinia cunninghamii, Carissa lanceolata, Atalaya hemiglauca (*Tree, Shrub*/6ir), G ^Heteropogon contortus, Sehima nervosum, Chrysopogon fallax, Eulalia aurea, Triodia bitextura (*Tussock grass, Hummock grass*/1c)

Upper Stratum
Low open woodland with Corymbia terminalis (fq. 100%) and variously Erythrophleum chlorostachys (fq. 40%), Eucalyptus chlorophylla (fq. 20%), Eucalyptus leucophloia (fq. 20%) or Eucalyptus tectifica (fq. 14%)

Mid Stratum
Low open woodland with Terminalia canescens (fq. 54%), Hakea arborescens (fq. 49%), Bauhinia cunninghamii (fq. 40%), Carissa lanceolata (fq. 20%) and/or Atalaya hemiglauca (fq. 20%)

Ground Stratum
Mixed tussock grassland with Heteropogon contortus (fq. 60%), Sehima nervosum (fq. 60%), Chrysopogon fallax (fq. 60%), Eulalia aurea (fq. 31%) and Triodia bitextura (fq. 26%)

Other Common Species
Upper Stratum –
Corymbia grandifolia (fq. 17%), Eucalyptus tectifica (fq. 14%), Brachychiton diversifolius (fq. 11%), Corymbia ferruginea (fq. 6%), Corymbia polyciada (fq. 6%), Ficus virid var. viridens (fq. 3%), Eucalyptus microtheca (fq. 3%), Brachychiton collinus (fq. 3%), Lophostemon grandiflorus (fq. 3%)

Mid Stratum –
Flueggea virosa (fq. 11%), Cochlospermum fraseri (fq. 11%), Dodonaea physocarpa (fq. 11%), Acacia lyshiofila (fq. 9%), Grewia retusfolia (fq. 9%), Acacia platycarpa (fq. 9%), Petalostigma pubescens (fq. 6%), Acacia dimidiata (fq. 6%), Melaleuca viridiflora (fq. 6%), Acacia sp. (fq. 6%), Erythroxylum ellipticum (fq. 6%), Gyrocarpus americanus (fq. 6%), Maytenus cunninghamii (fq. 6%), Santalum lanceolatum (fq. 6%), Terminalia volucris (fq. 3%), Acacia torulosa (fq. 3%), Grevillea pteridifolia (fq. 3%), Timonius timon (fq. 3%), Vachellia farnesiana (fq. 3%), Alphitonia excelsa (fq. 3%), Acacia gonocarpa (fq. 3%), Acacia gonoclada (fq. 3%), Jacksonia odontoclada (fq. 3%), Acacia oswaldii (fq. 3%), Acacia wickhamii (fq. 3%), Terminalia sp. (fq. 3%), Acacia plectocarpa (fq. 3%), Acacia umbellata (fq. 3%), Brachychiton collinus (fq. 3%), Diospyros sp. (fq. 3%), Distichostemon hispidulus (fq. 3%), Ficus aculeata (fq. 3%), Hibiscus panduriformis (fq. 3%), Melaleuca nervosa (fq. 3%), Ficus coronulata (fq. 3%), Vachellia bidwillii (fq. 3%), Excoecaria parvifolia (fq. 3%), Gardenia megasperma (fq. 3%), Grevillea dryandri (fq. 3%), Grevillea mimosoides (fq. 3%), Grevillea reflexa (fq. 3%), Hibiscus meraukensis (fq. 3%)

Ground Stratum –
Sorghum plumosum (fq. 25%), Themeda triandra (fq. 25%), Schizachyrium fragile (fq. 20%), Dichanthium leucodendron (fq. 17%), Arista undulata (fq. 17%), Aristida latifolia (fq. 11%), Spermacoce sp. (fq. 9%), Aristida hygrometrica (fq. 9%), Aristida calycina (fq. 9%), Petalostigma quadranulare (fq. 9%), Brachychon convergens (fq. 6%), Eriachne muncronata (fq. 6%), Setaria adscendens (fq. 6%), Limnophila sp. (fq. 6%), Enneapogon polyphyllus (fq. 6%), Chrysopogon latifolius (fq. 6%), Melhania oblenglia (fq. 6%), Aristida inaequiglumis (fq. 6%), Eragrostis taeniflora (fq. 6%), Unknown Species (fq. 6%), Cymbopogon bombycinus (fq. 6%), Eriachne obtusa (fq. 6%), Sporobolus australis (fq. 6%), Ptilotus sp. (fq. 6%), Dichanthium sericeum subsp. polystachyum (fq. 3%), Polycarpaea sp. (fq. 6%), Triodia sp. (fq. 3%), Andropogon sp. (fq. 3%), Enneapogon sp. (fq. 3%), Eriachne sp. (fq. 3%), Panicum decompositum (fq. 3%), Unknown Grass (fq. 3%), Corchorus sericeus (fq. 3%), Eragrostis sp. (fq. 3%)
**Eriachne ciliata** (fq. 3%), **Fimbristylis macrantha** (fq. 3%), **Helicteres cana** (fq. 3%), Poaceae sp5 (v838) (fq. 3%), **Crotalaria** sp. (fq. 3%), **Eriachne basedowii** (fq. 3%), **Trichodesma zeylanicum** (fq. 3%), **Waltheria indica** (fq. 3%), **Cyperus** sp. (fq. 3%), **Heliotropium** sp. (fq. 3%), **Hibiscus meraukensis** (fq. 3%), **Schizachyrium** sp. (fq. 3%), **Setaria** sp. (fq. 3%), **Sida** sp. (fq. 3%), **Yakirra** sp. (fq. 3%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Mid (M1)</td>
<td>Tree</td>
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<td>T6r</td>
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<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>31.43 (4-68)</td>
<td>0.42 (0.05-1.2)</td>
<td>G1c</td>
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</tbody>
</table>

**Landscape Description:**

Occurs on plains and lower/footslopes of low hills throughout the catchment. Soils are usually derived from a variety of fine grained sedimentary parent materials, the development of which may be locally reflective of more favourable local topographic positions within the landscape (e.g. often found on outwash flats and in association with open drainage floors on slightly sandier soil types). Soils may range from better developed tenosols to kandosols.

**Landform Pattern/Element:**

Plain, Undulating Plain, Low Hills, Rises/Plain, Hillslope, Footslope

**Geology:**

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Єт (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

**Drainage:**

Well drained.

**Notes:**

Commonly occurring and widely distributed vegetation community within the study area often occurring in close association with a number of other VMU’s (5, 6, 17, 18 & 22) and may often occur in a mosaic with these VMU’s. Generally distinguished by the dominance of *C. terminalis* over the range of other species present in the upper stratum and the prominence of tussock grasses in the understorey, perhaps reflecting the better development of soil physical and chemical characteristics associated with the landscape positions (run-on sites) on which this VMU usually occurs.
Photo:

No. of sites: 33
MCAR035, MCAR053, MCAR058, MCAR080, MCAR146, MCAR082, MCAR088, MCAR106, MCAR175, PDA38, PDA100, PDA101, PDA125, PDA175, PDA182, PDA194, PDA196, PDA198, PDA220, PDA233, PDA242, PDA251, PDA284, PDA293, PDA306, PDA324, PDA352, PDA358, PDA348, PDA457, PDA484, PDA493, SPAR033.

Area: 92,240 Hectares
Vegetation Mapping Unit 20

Eucalyptus microtheca +/- Eucalyptus camaldulensis, Corymbia confertiflora, Corymbia terminalis, Corymbia bella low open woodland with a secondary, low open tree layer of Bauhinia cunninghamii, Hakea arborescens and Atalaya hemiglauca. The variable ground layer is commonly composed of mixed tussock grasses OR is Astrebla spp. and Iseilema spp. dominated.

NVIS Description
U ^Eucalyptus microtheca, Eucalyptus camaldulensis, Corymbia terminalis, Corymbia confertiflora, Corymbia bella (^Tree\6\i), M ^Bauhinia cunninghamii, Hakea arborescens, Atalaya hemiglauca, Terminalia canescens, Grewia retusifolia (^Shrub, Tree\3\i), G ^Chrysopogon fallax, Dichanthium fecundum, Sehima nervosum, Heteropogon contortus, Eulalia aurea (OR) Astrebla squarrosa, Astrebla lappacea, Iseilema spp. (^Tussock grass\1\i)

Upper Stratum
Low open woodland with Eucalyptus microtheca and variously Eucalyptus camaldulensis, Corymbia terminalis, Corymbia confertiflora and/or Corymbia bella.

Mid Stratum
Low open woodland of Bauhinia cunninghamii, Hakea arborescens, Atalaya hemiglauca, Terminalia canescens, and/or Grewia retusifolia.

Ground Stratum
Mixed tussock grassland with Chrysopogon fallax, Dichanthium fecundum, Sehima nervosum, Heteropogon contortus, Eulalia aurea (OR) Astrebla squarrosa, Astrebla lappacea, Iseilema fragile and Iseilema sp.

Other Common Species

Upper Stratum –
Brachychiton diversifolius (fq. 10%), Eucalyptus pruinosa (fq. 5%), Erythrophleum chlorostachys (fq. 5%).

Mid Stratum –

Flueggea virosa (fq. 15%), Acacia sp. (fq. 10%), Excoecaria parvifolia (fq. 10%), Melaleuca citroless (fq. 10%), Xanthium strumarium (fq. 10%), Carissa lanceolata (fq. 10%), Corymbia confertiflora (fq. 10%), Vachellia farnesiana (fq. 10%), Sesbania cannabina (fq. 10%), Sesbania brachycarpa (fq. 5%), Hibiscus panduriformis (fq. 5%), Acacia holosericea (fq. 5%), Melaleuca stenostachya (fq. 5%), Barringtonia acutangula (fq. 5%), Dodonaea viscosa (fq. 5%), Hibiscus meranensis (fq. 5%), Abelmoschus ficulneus (fq. 5%), Planchonia careya (fq. 5%), Wrightia saligna (fq. 5%), Aeschynomene indica (fq. 5%), Melochia corchorifolia (fq. 5%), Terminalia volucris (fq. 5%), Acacia hemignosta (fq. 5%), Ludwigia octovalvis (fq. 5%), Melochia pyramidata (fq. 5%), Aeschynomene villosa (fq. 5%), Capparis lasiantha (fq. 5%), Melaleuca viridiflora (fq. 5%).

Ground Stratum –
Panicum decompositum (fq. 20%), Cyperus sp. (fq. 15%), Pseudoraphis spinescens (fq. 15%), Aristida latifolia (fq. 15%), Sorghum plumnosum (fq. 15%), Chrysopogon latifolius (fq. 15%), Eragrostis sp. (fq. 15%), Eragrostis tenellula (fq. 15%), Aristida sp. (fq. 15%), Sida spinosa (fq. 15%), Triodia bitextura (fq. 10%), Urochloa reptans (fq. 10%), Cynodon dactylon (fq. 10%), Rostellularia adscendens (fq. 10%), Alternanthera nodiflora (fq. 10%), Corchorus aestuans (fq. 10%), Phyllanthus maderaspatensis (fq. 10%), Poaceae sp1 (v193) (fq. 5%), Poaceae sp5 (v838) (fq. 5%), Cyperus javosicus (fq. 5%), Schizachyrium fragile (fq. 5%), Echinocloa colonia (fq. 5%), Iseilema sp. (fq. 5%), Polygonia longifolia (fq. 5%), Chrysopogon pallidus (fq. 5%), Pseudopogonatherum cortortum (fq. 5%), Aristida hygrometrica (fq. 5%), Brachychne convergens (fq. 5%), Chrysopogon elongatus (fq. 5%), Panicum sp. (fq. 5%), Abelmoschus ficulneus (fq. 5%), Aristida inaequiligumis (fq. 5%), Enneapogon polypellus (fq. 5%), Eriachne obtusa (fq. 5%), Eriachne squarrosa (fq. 5%), Boerhavia schombergiana (fq. 5%), Eriachne
basedowii (fq. 5%), *Eriachne mucronata* (fq. 5%), *Hybanthus enneaspermus* (fq. 5%), *Achyranthes aspera* (fq. 5%), *Anisomeles malabarica* (fq. 5%), *Cajanus geminatus* (fq. 5%), *Cajanus pubescens* (fq. 5%), *Corchorus sidoides* (fq. 5%), *Eragrostis cumingii* (fq. 5%), *Ludwigia octovalvis* (fq. 5%), *Melochia pyramidata* (fq. 5%), *Nelsonia campestris* (fq. 5%), *Anammia multiflora* (fq. 5%), *Corchorus olitorius* (fq. 5%), *Digitaria bicornis* (fq. 5%), *Eriachne glauca* (fq. 5%), *Ludwigia perennis* (fq. 5%), *Physalis angulata* (fq. 5%), *Plumbago zeylanica* (fq. 5%), *Portulaca oleracea* (fq. 5%), *Sporobolus australasicus* (fq. 5%), *Trichodesma zeylanicum* (fq. 5%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Shrub</td>
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<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>29.64 (8-54)</td>
<td>0.26 (0.1-0.6)</td>
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</table>

**Landscape Description:**
Alluvial plains, plains and floodplains primarily associated with clayey sediments derived from fine grained (typically dolostones and limestone’s) sedimentary rock types. Soils are typically hydrosols and vertosols. Commonly found associated with relatively low relief drainage systems of the southern portion of the study area.

**Landform Pattern/Element:**
Alluvial Plain, Plain, Floodplain/Plain, Back Plain, Drainage Depression, Swamp

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**
Poorly to very poorly drained

**Notes:**
Vegetation type associated with a number of fluvial/alluvial landform elements on fine, heavy soils. This VMU is strongly associated with VMU 45, which may occur within this unit.
No. of sites: 20
MacarthurR_MR4, MacarthurR_MR12, MCAR061, MCAR039, MCAR041, MCAR042, MCAR117, PDA14, PDA63, PDA67, PDA102, PDA215, PDA310, PDA339, PDA344, PDA388, PDA403, PDA526, RIPARIAN_B_MC04/O, RIPARIAN_B_MC05/R2.

Area: 6,080 Hectares
Vegetation Mapping Unit 21

Low woodland of *Bauhinia cunninghamii* +/- *Atalaya hemiglauca*, *Hakea arborescens*, *Corymbia terminalis*, *Terminalia canescens* and Deciduous Vine Thicket elements over a mixed tussock grass ground layer.

NVIS Description

U *Bauhinia cunninghamii*, *Atalaya hemiglauca*, *Hakea arborescens*, *Corymbia terminalis*, *Terminalia canescens* (*^Tree^6,^vi*), M *Bauhinia cunninghamii*, *Atalaya hemiglauca*, *Carissa lanceolata*, *Hakea arborescens*, *Terminalia canescens* (*^Tree^, ^Shrub^6,^vi*), G *Eulalia aurea*, *Dichanthium fercundum*, *Panicum* sp., *Dichanthium sericeum*, *Aristida holathera* (*^Tussock grass^6,^c*).

Upper Stratum

Low woodland with *Bauhinia cunninghamii* (fq. 97%) and variously *Atalaya hemiglauca* (fq. 53%), *Corymbia terminalis* (fq. 32%), *Hakea arborescens* (fq. 26%) and/or *Terminalia canescens* (24%).

Mid Stratum

Low woodland with *Bauhinia cunninghamii* (fq. 97%), *Atalaya hemiglauca* (fq. 53), *Carissa lanceolata* (fq. 53%), *Hakea arborescens* (fq. 26%) and/or *Terminalia canescens* (24%).

Ground Stratum

Mixed tussock grassland with *Eulalia aurea* (fq. 47%), *Heteropogon contortus* (fq. 38%), *Chrysopogon fallax* (fq. 35%), *Dichanthium fercundum* (fq. 26%) and *Aristida latifolia* (fq. 26%).

Other Common Species

Upper Stratum –

*Erythrophleum chlorostachys* (fq. 18%), *Eucalyptus microtheca* (fq. 18%), *Eucalyptus chlorophylla* (fq. 12%), *Gyrocarpus americanus* (fq. 12%), *Eucalyptus pruinosa* (fq. 12%), *Flemingia pauciflora* (fq. 9%), *Corymbia bella* (fq. 9%), *Cochlospermum fraseri* (fq. 9%), *Terminalia volucris* (fq. 6%), *Eucalyptus leucophloia* (fq. 6%), *Corymbia flavescens* (fq. 6%), *Corymbia confertiflora* (fq. 6%), *Dendrophthoe gibrescens* (fq. 3%), *Corymbia grandifolia* (fq. 3%), *Atalaya variifolia* (fq. 3%), *Terminalia platyptera* (fq. 3%), *Terminalia sp.* (fq. 3%), *Acacia hemignosta* (fq. 3%), *Corymbia dichromophloia* (fq. 3%), *Eucalyptus tectiflora* (fq. 3%), *Grevillea striata* (fq. 3%), *Celtis* sp. (fq. 3%), *Grevillea mimosoides* (fq. 3%), *Owenia vernicosat* (fq. 3%).

Mid Stratum –

*Vachellia farnesiana* (fq. 29%), *Grewia retusifolia* (fq. 24%), *Flueggea virosa* (fq. 21%), *Acacia* sp. (fq. 15%), *Capparis lasiantha* (fq. 12%), *Flemingia pauciflora* (fq. 9%), *Abelmoschus ficulneus* (fq. 9%), *Wrightia saligna* (fq. 9%), *Excoecaria parvifolia* (fq. 9%), *Terminalia volucris* (fq. 6%), *Acacia victoriae* (fq. 6%), *Acacia platycarpa* (fq. 6%), *Santalam lanceolatum* (fq. 6%), *Melochia corchorifolia* (fq. 6%), *Setaria apiculata* (fq. 3%), *Sporobolus lenticularis* (fq. 3%), *Alysicarpus muelleri* (fq. 12%), *Aristida calycina* (fq. 3%), *Atalaya variifolia* (fq. 3%), *Distichostemon hispidus* subsp. *hispidus* (fq. 3%), *Enneapogon purpurascens* (fq. 3%), *Eriachne* sp. (fq. 3%), *Terminalia platyptera* (fq. 3%), *Terminalia sp.* (fq. 3%), *Acacia hemignosta* (fq. 3%), *Celtis* sp. (fq. 3%), *Flemingia sp.* (fq. 3%), *Ludwigia perennis* (fq. 3%), *Melhania oblongifolia* (fq. 3%), *Sesbania brachycarpa* (fq. 3%), *Xanthium strumarium* (fq. 3%).

Ground Stratum –

*Panicum decompositum* (fq. 26%), *Schizachyrium fragile* (fq. 15%), *Brachyachne convergens* (fq. 12%), *Corchorus siodoide* (fq. 12%), *Aristida holathera* (fq. 9%), *Triodia bitextura* (fq. 9%), *Enneapogon polyphyllus* (fq. 9%), *Cyperus sp1(v531)* (fq. 9%), *Aristida* sp. (fq. 9%), *Cyperus sp.* (fq. 9%), *Eragrostis tenellula* (fq. 9%), *Sida spinosa* (fq. 9%), *Iselieama* sp. (fq. 9%), *Aristida inequiglumis* (fq. 9%), *Corchorus aestuans* (fq. 9%), *Rostellularia adscendens* (fq. 9%), *Panicum* sp. (fq. 6%), *Sorghum plumosum* (fq. 6%), *Themeda triandra* (fq. 6%), *Iselieama vaginiflorum* (fq. 6%), *Chrysopogon pallidus* (fq. 6%), *Sporobolus australasicus* (fq. 6%), *Aristida inequiglumis* (fq. 6%), *Trichodesma zeylanicum* (fq. 6%), *Enneapogon* sp. (fq. 6%), *Aristida hygrometrica* (fq. 6%), *Chrysopogon latifolius* (fq. 6%), *Eriachne ciliata* (fq. 6%), *Astrebla elymoides* (fq. 6%), *Neptunia dimorphantha* (fq. 6%), *Unknown Species* (fq. 6%),
Corchorus olitorius (fq. 6%), Crotalaria montana (fq. 6%), Dichanthium sp. (fq. 6%), Melochia corchorifolia (fq. 6%), Operculina aequisepala (fq. 6%), Phyllanthus maderaspatensis (fq. 6%), Ptilotus spicatus (fq. 6%), Rhynchosia minima (fq. 6%), Panicum trachyrachis (fq. 3%), Polycarpaea sp. (fq. 3%), Dichanthium sericeum (fq. 3%), Dichanthium annulatum (fq. 3%), Astrebla pectinata (fq. 3%), Triodia pungens (fq. 3%), Eriachne mucronata (fq. 3%), Dendrophthoe glabrescens (fq. 3%), Brachychaene ambiguа (fq. 3%), Enneapogon robustissimus (fq. 3%), Chionachne hubbardiana (fq. 3%), Cynodon dactylon (fq. 3%), Setaria apiculata (fq. 3%), Sida sp. (fq. 3%), Sporobolus lenticularis (fq. 3%), Alysicarpus muelleri (fq. 3%), Aristida calycina (fq. 3%), Enneapogon purpurascens (fq. 3%), Eriachne sp. (fq. 3%), Bidens bipinnata (fq. 3%), Cymbopogon bombycinus (fq. 3%), Abutilon hannii (fq. 3%), Bonamia media (fq. 3%), Clitoria ternatea (fq. 3%), Commelina ciliata (fq. 3%), Gomphrena sp. (fq. 3%), Ipomoea coptica (fq. 3%), Ludwigia perennis (fq. 3%), Polygala rhinanthoides (fq. 3%), Spermacoce sp1 (v413) (fq. 3%), Triodia sp. (fq. 3%), Vigna radiata (fq. 3%).

Stratum summary table

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<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Upper (U1)</td>
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<td>Ground (G1)</td>
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<td>32.1 (7-61)</td>
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Landscape Description:
Plains and gentle lower slopes/footslopes of low hills in the upper sections of the catchment area. Soils are generally clay-rich and may range from kandosols to hydrosols and possibly some dermosols.

Landform Pattern/Element:
Plain, Alluvial Plain, Low Hills/Plain, Hillslope

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czb – Quaternary to Tertiary, grey-black earthy clay-rich soil: black soil plain, residual black soils.

Ct (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Drainage:
Imperfectly to poorly drained.

Notes:
Occurs on a variety of clay-rich soil types associated with alluvial, residual or fine-grained sedimentary landscapes. Closely related to VMU 28 but generally distinguished by the dominance of Bauhinia cunninghamii and its occurrence on the abovementioned soil types rather than on rockier slopes.
No. of sites: 33
BARK013, DOC3_S745, MacarthurR_MR11, MacarthurR_MR18, MacarthurR_MR20, MCAR007, MCAR040, MCAR057, MCAR077, MCAR091, MCAR102, MCAR132, MCAR133, MCAR160, MCAR167, PDA44, PDA52, PDA60, PDA69, PDA137, PDA152, PDA173, PDA274, PDA275, PDA285, PDA287, PDA307, PDA309, PDA313, PDA315, PDA351, PDA355, SPAR014

Area: 12,144 Hectares
Vegetation Mapping Unit 22

Low woodland of Eucalyptus chlorophylla +/- Erythrophleum chlorostachys, Corymbia spp., and Eucalyptus spp. with a secondary tree strata of Terminalia canescens and Bauhinia cunninghamii and a mixed ground layer tussock grasses.

NVIS Description

U ^Eucalyptus chlorophylla, Erythrophleum chlorostachys, Corymbia terminalis, Corymbia confertiflora, Eucalyptus leucophloia (^Tree\1\i, M ^Terminalia canescens, Flueggea virosa, Petalostigma pubescens, Dodonaea physocarpa, Hakea arborescens (^Tree, Shrub\1\i), G ^Chrysopogon fallax, Eulalia aurea, Sehima nervosum, Dichanthium fecundum, Sporobolus australasicus (^Tussock grass\1\i)

Upper Stratum

Low woodland of Eucalyptus chlorophylla (fq. 91%) and variously Erythrophleum chlorostachys (fq. 43%), Corymbia terminalis (fq. 35%), Corymbia confertiflora (fq. 13%) and/or Eucalyptus leucophloia (fq. 13%).

Mid Stratum

Low open woodland of Terminalia canescens (fq. 52%), Carissa lanceolata (fq. 39%), Bauhinia cunninghamii (fq. 35%), Dodonaea physocarpa (fq. 30%) and Flueggea virosa (fq. 26%).

Ground Stratum

Low grassland of Chrysopogon fallax (fq. 78%), Heteropogon contortus (fq. 52%), Eulalia aurea (fq. 48%), Sehima nervosum (fq. 39%) and Dichanthium fecundum (fq. 30%).

Other Common Species

Upper Stratum –

Bauhinia cunninghamii (fq. 35%), Brachychiton diversifolius (fq. 13%), Corymbia grandifolia (fq. 9%), Corymbia ferruginea (fq. 9%), Corymbia greeniana (fq. 4%), Eucalyptus miniata (fq. 4%), Eucalyptus pruinosa (fq. 4%), Eucalyptus tectifica (fq. 4%), Eucalyptus leucophloia (fq. 4%), Eucalyptus chlorophylla (fq. 39%) and

Mid Stratum –

Grewia retusifolia (fq. 21%), Hakea arborescens (fq. 17%), Terminalia sp. (fq. 17%), Petalostigma pubescens (fq. 13%), Acacia sp. (fq. 9%), Acacia lamprocarpa (fq. 9%), Acacia lysiphylla (fq. 4%), Acacia gonoclada (fq. 4%), Acacia umbellata (fq. 4%), Melaleuca citroliens (fq. 4%), Acacia coeli (fq. 4%), Dolichandrone heterophylla (fq. 4%), Excoecaria parvifolia (fq. 4%), Terminalia volucris (fq. 4%), Acacia wickhamii (fq. 4%), Atalaya hemiglauca (fq. 4%), Cayratia trifolia (fq. 4%), Calytrix exstipulata (fq. 4%), Cochlospermum fraseri (fq. 4%), Grevillea mimosoides (fq. 4%), Grevillea striata (fq. 4%), Maytenus cunninghamii (fq. 4%).

Ground Stratum –

Thesmeda triandra (fq. 30%), Sorghum plumosum (fq. 26%), Triodia bitexturata (fq. 17%), Schizachyrium fragile (fq. 17%), Petalostigma quadriloculare (fq. 13%), Aristida sp. (fq. 13%), Triodia sp. (fq. 9%), Brachychne convergens (fq. 9%), Aristida holothera (fq. 9%), Aristida calycina (fq. 9%), Aristida latifolia (fq. 9%), Evolvulus alsinoideus (fq. 9%), Abutilon hannii (fq. 9%), Alternanthera nana (fq. 9%), Bonamia pannosa (fq. 9%), Bulbosystis barbata (fq. 9%), Corchorus aestivalis (fq. 9%), Corchorus siodoides (fq. 9%), Cotaralia montana (fq. 9%), Cymbopogon bombycinus (fq. 9%), Hybanthus enneaspermus (fq. 9%), Indigofera colutea (fq. 9%), Melianthus oblongifolia (fq. 9%), Neptania dimorphantha (fq. 9%), Perotis rara (fq. 9%), Polygala sp. Mudginberri (J.Russell-Smith 987) (fq. 9%), Pterocaulon sp, Schizachyrium fragile (fq. 9%), Sida spinosa (fq. 9%), Spermacoce dolichosperma (fq. 9%), Urochloa pubigera (fq. 9%), Waltheria indica (fq. 9%), Tephrosia sp1 (v89) (fq. 4%), Sporobolus australasicus (fq. 4%), Triodia burdigeana (fq. 4%), Unknown Sp. (fq. 4%), Aristida pruinosa (fq. 4%), Hypitis suaveolens (fq. 4%), Schizachyrium sp. (fq. 4%), Eragrostis tenellula (fq. 4%), Eriachne obtusa (fq. 4%), Helicteres cana (fq. 4%), Atalaya hemiglauca (fq. 4%), Cajanus geminatus (fq. 4%), Cleome microaustrialca (fq. 4%), Corchorus sericeus (fq. 4%), Cucumis melo (fq. 4%), Dichanthium sericeum (fq. 4%), Enneapogon decipiens (fq. 4%), Eragrostis cunningii (fq. 4%), Eragrostis sp. (fq. 4%), Eriachne ciliata (fq. 4%), Eriachne pulchella (fq.
4%), Goodenia janamba (fq. 4%), Indigofera hirsuta (fq. 4%), Indigofera linifolia (fq. 4%), Ipomoea eriocarpa (fq. 4%), Ipomoea polymorpha (fq. 4%), Iseilema sp. (fq. 4%), Jasminum molle (fq. 4%), Mnesithea formosa (fq. 4%), Paspalidium rarum (fq. 4%), Polygala arvensis (fq. 4%), Polygala rhianthoides (fq. 4%), Portulaca bicolor (fq. 4%), Ptilotus corymbosus (fq. 4%), Ptilotus fusiformis (fq. 4%), Rhynchosia minima (fq. 4%), Setaria apiculata (fq. 4%), Stylosanthes hamata (fq. 4%), Tribulopsis pentandra (fq. 4%), Trichodesma zeylanicum (fq. 4%), Vigna radiata (fq. 4%).

Stratum summary table

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<td>0.38 (0.2-0.6)</td>
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</tbody>
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Landscape Description:
Plains and lower slopes of low rises relating to outwash areas from the major range formations in the western part of the study area. Soils are generally finer textured kandosols with some teneosols.

Landform Pattern/Element:
Plain, Low Hills, Rises/Plain, Hillslope

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Pmr (Stretton Sandstone) – Ridge forming fine to medium grained thin to medium bedded quartzarenite.

Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Drainage:
Well drained.

Notes:
Widely distributed on a range of substrate and landform types across the catchment. Closely associated with a number of VMU’s (18 and 19)
No. of sites: 23
MacarthurR_MR14, MacarthurR_MR13, MacarthurR_MR9, PDA11, PDA79, PDA81, PDA84, PDA103, PDA144, PDA170, PDA211, PDA222, PDA234, PDA250, PDA252, PDA256, PDA273, PDA283, PDA304, PDA311, PDA323, PDA347, PDA513.

Area: 50,713 Hectares
Vegetation Mapping Unit 23

Mid woodland of Eucalyptus tetradonta +/- Corymbia spp., Eucalyptus spp. and Erythrophleum chlorostachys with a mid-stratum of Corymbia ferruginea Bossiaeae bossiaeoides and Petalostigma spp. and a mixed ground layer of tussock and hummock Grasses.

NVIS Description

Upper Stratum

Mid woodland of Eucalyptus tetradonta (fq. 100%), Corymbia ferruginea (fq. 44%), Corymbia polycarpa (fq. 33%), Erythrophleum chlorostachys (fq. 33%) and Eucalyptus miniata (fq. 8%).

Mid Stratum

Low open woodland of Corymbia ferruginea (fq. 44%), Bossiaeae bossiaeoides (fq. 41%), Terminalia canescens (fq. 33%), Buchanania obovata (fq. 26%) and Petalostigma pubescens (fq. 22%).

Ground Stratum

Low open tussock grassland of Sorghum plumosum (fq. 56%), Chrysopogon fallax (fq. 44%), Triodia bitextura (fq. 37%), Aristida sp. (fq. 33%) and Scaevola browniana (fq. 22%).

Other Common Species

Upper Stratum – Corymbia flavescens (fq. 4%), Eucalyptus leucophloia (fq. 4%), Eucalyptus tectifica (fq. 4%), Corymbia grandifolia (fq. 4%).

Mid Stratum – Acacia dimidiata (fq. 22%), Distichostemon hispidulus (fq. 22%), Grevillea dryandri (fq. 19%), Grevillea parallela (fq. 19%), Melaleuca viridiflora (fq. 19%), Petalostigma banksii (fq. 15%), Hakea arborescens (fq. 15%), Acacia hamondii (fq. 11%), Brachychiton paradoxus (fq. 11%), Calytrix extispulata (fq. 11%), Acacia difficilis (fq. 11%), Alphitonia pomaderoides (fq. 11%), Grevillea heliosperma (fq. 11%), Boronia lanuginosa (fq. 7%), Calitris intratropica (fq. 7%), Alphiton excelsa (fq. 7%), Melaleuca nervosa (fq. 7%), Acacia sp. (fq. 7%), Acacia plectocarpa (fq. 7%), Melaleuca sp. (fq. 7%), Gardenia sp. (fq. 7%), Stenocarpus acacioides (fq. 7%), Acacia dunnii (fq. 4%), Acacia oncinocarpa (fq. 4%), Dolichandron heterophyly (fq. 4%), Grevillea pteridifolia (fq. 4%), Grewia sp. (fq. 4%), Jacksionia odontoclada (fq. 4%), Acacia lamprocarya (fq. 4%), Cycas angulata (fq. 4%), Melaleuca stenostachya (fq. 4%), Acacia leptocarpa (fq. 4%), Corymbia pychocarpa (fq. 4%), Gardenia megasperma (fq. 4%), Grevillea sp. (fq. 4%), Maytenus cunninghamii (fq. 4%), Persoonia falcata (fq. 4%), Planchonia careya (fq. 4%), Erythroxylum ellipticum (fq. 4%), Santalum lanceolatum (fq. 4%).

Ground Stratum – Acacia nuperrima (fq. 19%), Schizachyrium fragile (fq. 19%), Whiteochloa aroides (fq. 15%), Eriachne sp. (fq. 15%), Aristida holathera (fq. 15%), Eriachne obtusa (fq. 11%), Whiteochloa capillipes (fq. 11%), Aristida hygrometrica (fq. 11%), Bonamia pannosa (fq. 11%), Fimbristylis sp. (fq. 7%), Sarga sp. (fq. 7%), Aristida contorta (fq. 7%), Setaria apiculata (fq. 7%), Schizachyrium sp. (fq. 7%), Cassytha filiformis (fq. 7%), Waltheria indica (fq. 7%), Yakirra sp. (fq. 7%), Spermacoce sp. (fq. 7%), Chrysopogon sp. (fq. 4%), Ergrostis tenellula (fq. 4%), Eulalia aurea (fq. 4%), Hibbertia lepidota (fq. 4%), Aristida calcina (fq. 4%), Eriachne squarrosa (fq. 4%), Fimbristylis macrantha (fq. 4%), Grewia sp. (fq. 4%), Heteropogon confortus (fq. 4%), Unknown Species (fq. 4%), Eriachne mucronata (fq. 4%), Scaevola ovalifolia (fq. 4%), Spermacoce stenophylla (fq. 4%), Thaumastochloa sp. (fq. 4%), Ectrosis sp. (fq. 4%), Evolvulus alsinoides (fq. 4%), Hybanthus enneaspermus (fq. 4%), Phyllanthus sp. (fq. 4%), Pseudopogonatherum sp. (fq. 4%), Corchorus sp. (fq. 4%), Helicteres cana (fq. 4%).
### Stratum Summary Table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tr>
<td>Upper (U1)</td>
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<td>0.26 (0-0.4)</td>
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</table>

**Landscape Description:**
Plains and rises of the coastal plain geomorphic province developed on a variety of soils including deep red kandosols and tenosols derived from medium grained sedimentary materials.

**Landform Pattern/Element:**
Plain, Undulating Plain, Rises/Plain, Hillslope

**Geology:**
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

KI – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Pra (Abner Sandstone) – Undivided Abner Sandstone.

**Drainage:**
Well drained

**Notes:**
Widespread vegetation community of relatively deep soils of the coastal plain and near coastal hills and ranges. Occurs of a range of substrate types and is likely to include significant areas of soils developed as a result of deep weathering processes during the Tertiary.
No. of sites: 27
DOC3_GS2 320, DOC3_GS2 526, GULF004, MCAR171, PDA262, PDA406, PDA407, PDA408, PDA411, PDA419, PDA444, PDA445, PDA459, PDA468, PDA472, PDA473, PDA477, PDA479, PDA482, PDA498, PDA528, PDA529, PDA530, PDA539, PDA540, PDA555, SPAR022

Area: 42,480 Hectares
Vegetation Mapping Unit 24

*Eucalyptus tetrodonta* +/- *Corymbia ferruginea* and *E. miniata* mid open woodland to mid woodland with an open mid stratum of mixed tree and shrub species such as *Erythrophleum chlorostachys*, *Terminalia canescens* and *Bossiaea bossiaeoides*, over a open hummock grassland dominated by *Triodia bitextura*.

**NVIS Description**

Upper Stratum

Mid woodland of *Eucalyptus tetrodonta* (fq 100%), *Corymbia ferruginea* (fq 59%), *Eucalyptus miniata* (fq 27%), *Corymbia dichromophloia* (fq 9%), and *E. leucophloia* (Tree 9%).

Mid Stratum

Low open woodland of *Erythrophleum chlorostachys* (fq 41%), *Buchanania obovata* (fq 32%), *Terminalia canescens* (fq 23%), *Grevillea dryandri* (fq 23%) and *Acacia platycarpa* (fq 23%).

Ground Stratum

Low open hummock grassland of *Triodia bitextura* (fq 91%), *Sorghum plumosum* (fq 27%), *Chrysopogon fallax* (fq 37%), *Petalostigma quadriloculare* (fq 23%) and *Schizachyrium fragile* (fq 23%).

**Other Common Species**

Upper Stratum – *Eucalyptus phoenicea* (fq 5%), *Eucalyptus tectifica* (fq 5%), *Corymbia grandifolia* (fq 5%), *Corymbia polycarpa* (fq 5%).

Mid Stratum – *Owenia vernicosa* (fq 14%), *Acacia plectocarpa* (fq 9%), *Bossiaea bossiaeoides* (fq 9%), *Acacia subternata* (fq 9%), *Acacia dimidiata* (fq 9%), *Alphitonia excelsa* (fq 9%), *Petalostigma pubescens* (fq 9%), *Acacia torulosa* (fq 5%), *Acacia gonocarpa* (fq 5%), *Petalostigma banksii* (fq 5%), *Acacia leptocarpa* (fq 5%), *Distichostemon hispidulus* (fq 5%), *Grevillea retracta* (fq 5%), *Gardenia sp.* (fq 5%), *Grevillea heliosperma* (fq 5%), *Grevillea mimosoides* (fq 5%), *Grevillea pteridifolia* (fq 5%).

Ground Stratum – *Aristida sp.* (fq 14%), *Chrysopogon sp.* (fq 9%), *Eriachne sp.* (fq 9%), *Hibbertia lepidota* (fq 9%), *Scaevola ovalifolia* (fq 9%), *Acacia galoides* (fq 9%), *Aristida holathera* (fq 9%), *Tephreria sp.* (fq 9%), *Bonamia pannosa* (fq 9%), *Triodia microstachya* (fq 5%), *Whiteochloa airoides* (fq 5%), *Fimbristylys sp.* (fq 5%), *Fimbristylys squarrolosa* (fq 5%), *Dichanthium fecundum* (fq 5%), *Eriachne ciliata* (fq 5%), *Eriachne obtusa* (fq 5%), *Eriachne triseta* (fq 5%), *Acacia nuperrima* (fq 5%), *Gompholobium subulatum* (fq 5%), *Tephreria oblongata* (fq 5%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Tree</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>22.94 (23-61)</td>
<td>0.35 (0.2-0.7)</td>
<td>H1i</td>
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</table>

**Landscape Description:**

Low hills/rises and plateaux on tenosols and rudosols derived from coarse grained sediments or on plains of deep red kandosols and tenosols associated with the coastal plain. May also include minor areas of rudosols on elevated plateau surfaces and escarpments.
Landform Pattern/Element:
Low hills, Low rises, Plateau, Plains/Hillslope, Hill-crest, Plateau, Plain

Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits; unconsolidated gravel, sand, silt, clay, ferruginous cemented detritus, minor calcrete, silcrete and ferricrete.

KL – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Єlb (Bukalara Sandstone) – fine to very coarse grained friable sandstone.

Prah (Roper Group, Hodgson Sandstone Member) – Ridge forming pseudo-karstically weathered strongly jointed quartz arenite, medium grained, well sorted.

Drainage: Well drained.

Notes:
This Vegetation Mapping Unit is characteristic of hills and plateaux associated with the coarser grained sedimentary units of both the Proterozoic and Cretaceous lithologies of the McArthur River catchment.

Map: VMU24

Area: 84,474 Hectares

No. of sites: 22
PDA107, MCAR172, SPAR021, PDA93, PDA544, PDA538, PDA535, PDA524, PDA501, PDA499, PDA494, PDA492, PDA471, PDA455, PDA443, PDA418, PDA413, PDA392, PDA230, PDA108, GULF003, DOC3_GS2 524.
Vegetation Mapping Unit 25

Low woodland of *Callitris intratropica*, *Petalostigma pubescens*, *Terminalia* spp. and *Melaleuca* spp. and a mixed ground layer of tussock and hummock Grasses.

NVIS Description

U ^Callitris intratropica*, ^Petalostigma pubescens*, *Brachychiton diversifolius*, *Terminalia canescens*, *Dolichandrone heterophylla*, *Melaleuca acacioides* (*Tree*), M ^Terminalia canescens*, *Melaleuca acacioides*, *Calyptrix extipulata*, *Dolichandrone heterophylla*, *Flueggea virosa* (*Shrub*, *Tree*), G ^Chrysopogon fallax*, *Heteropogon contortus*, *Eriachne squarrosa*, *Schizachyrium fragile*, *Aristida* sp. (*Tussock grass*).

Upper Stratum

Low woodland of *Callitris intratropica* (fq. 100%), *Petalostigma pubescens* (fq. 100%), *Terminalia canescens* (fq. 100%), *Dolichandrone heterophylla* (fq. 100%) and *Melaleuca acacioides* (fq. 67%).

Mid Stratum

Tall open shrubland of *Terminalia canescens* (fq. 100%), *Calyptrix extipulata* (fq. 100%), *Flueggea virosa* (fq. 67%), *Melaleuca acacioides* (fq. 67%) and *Melaleuca viridiflora* (fq. 67%).

Ground Stratum

Low open tussock grassland of *Chrysopogon fallax* (fq. 67%), *Eriachne squarrosa* (fq. 67%), *Schizachyrium fragile* (fq. 67%) and *Heteropogon contortus* (fq. 33%), *Aristida* sp. (fq. 33%).

Other Common Species

Upper Stratum –

*Brachychiton diversifolius* (fq. 67%), *Melaleuca viridiflora* (fq. 67%), *Terminalia volucris* (fq. 33%), *Corymbia confertiflora* (fq. 33%), *Eucalyptus tectifica* (fq. 33%), *Hakea arborescens* (fq. 33%).

Mid Stratum –

*Wrightia saligna* (fq. 67%), *Terminalia volucris* (fq. 33%), *Acacia hammondii* (fq. 33%), *Carissa lanceolata* (fq. 33%), *Hakea arborescens* (fq. 33%), *Maytenus cunninghamii* (fq. 33%), *Premna acuminata* (fq. 33%).

Ground Stratum –

*Evolvulus alsinoides* (fq. 67%), *Waltheria indica* (fq. 67%), *Enneapogon* sp. (fq. 33%), *Mnesithea formosa* (fq. 33%), *Panicum* sp. (fq. 33%), *Rhynchosia* sp. (fq. 33%), *Cassytha filiformis* (fq. 33%), *Cleome* sp. (fq. 33%), *Phyllanthus* sp. (fq. 33%), *Ptilotus spicatus* (fq. 33%).

Stratum summary table

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<tr>
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<td>Shrub</td>
<td>23</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>23</td>
<td>0.2</td>
<td>G1i</td>
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</table>

Landscape Description:

Plains on the near coastal plain on relatively tenosols and sandy kandosols.

Landform Pattern/Element:

Plain/Plain

Geology:

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.
Czs>a – Quaternary soil and sand.

Kl – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Drainage:
Well drained

Notes:
Vegetation community restricted to sandy soils of the coastal plain. Limited occurrences mapped within the study area although may occur in association with other VMU’s (26 & 36) below the scale of mapping.

Photo:
NO PHOTOGRAPH

No. of sites: 3
DOC3_GS2/522, GULF001, PDA156

Map: VMU25

Area: 3,582 Hectares
Vegetation Mapping Unit 26

*Melaleuca acacioides* low woodland with a mixed shrub dominated mid stratum of isolated plants and a mixed isolated tussock grass ground layer.

NVIS Description

U+ *Melaleuca acacioides, Excoecaria parvifolia, Asteromyrtus symphyocarpa, Melaleuca viridiflora, Petalostigma pubescens (Tree)* M *Grewia retusifolia, Acacia leptocarpa, Acacia sp.* S *Chrysopogon elongatus, Fimbristylis sp., Whiteochloa aroides, Aristida hygrometrica, Chrysopogon fallax (Tussock Grass, Sedge)*

Upper Stratum

Low woodland of *Melaleuca acacioides* (fq. 100%), *Excoecaria parvifolia* (fq. 43%), *Asteromyrtus symphyocarpa* (fq. 14%), *Melaleuca viridiflora* (fq. 14%) and *Petalostigma pubescens* (fq. 14%).

Mid Stratum

Low isolated shrubs of *Grewia retusifolia* (fq. 14%), *Acacia leptocarpa* (fq. 14%), *Acacia sp.* (fq. 14%), *Grevillea dryandra* (fq. 14%) and *Jacksonia sp.* (fq 14%).

Ground Stratum

Low isolated tussock grasses of *Chrysopogon elongatus* (fq. 57%), *Fimbristylis sp.* (fq. 29%), *Whiteochloa aroides* (fq. 14%), *Aristida hygrometrica* (fq. 14%) and *Chrysopogon fallax* (fq 14%)

Other Common Species

Upper Stratum –

*Alphitonia pomaderroides* (fq 14%), *Antidesma ghesaembilla* (fq 14%), *Cathormion umbellatum* (fq. 14%), *Cochlospermum fraseri* (fq. 14%), *Hakea arborescens* (fq. 14%), *Melaleuca nervosa* (fq. 14%)

Mid Stratum –

*Evolvulus alsinoides* (fq. 14%), *Ludwigia perennis* (fq. 14%).

Ground Stratum –

*Aristida* sp. (fq 14%), *Cyperus* sp. (fq 14%), *Dichanthium sericeum* (fq 14%), *Digitaria* sp. (fq 14%), *Ectrosia danesii* (fq 14%), *Enteropogon* sp. (fq 14%), *Eragrostis* sp. (fq 14%), *Eriachne glauca* (fq 14%), *Eriachne obtusa* (fq 14%), *Heteropogon contortus* (fq 14%), *Iseilema vaginiflorum* (fq 14%), *Mnesithea formosa* (fq 14%), *Panicum mindanaense* (fq 14%), *Panicum* sp. (fq 14%), *Schizachyrium fragile* (fq 14%), *Thespidium basiliiflorum* (fq 14%), *Triodia bitextura* (fq 14%), *Unknown Species* (fq 14%), *Waltheria indica* (fq 14%), *Xerochloa* sp. (fq 14%)

Stratum summary table

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<thead>
<tr>
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<td>Upper (U1)</td>
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Landscape Description:

Alluvial and marine plains of the near coastal zone associated with major streams and minor drainage depressions adjacent to tidal flats. Often found on relict marine plains. Soils are generally classified as hydrosols and may be subject to periodic or residual saline influence.

Landform Pattern/Element:

Marine Plain, Plain, Alluvial Plain/Plain, Levee, Back Plain, Drainage Depression

Geology:

Qa – Gravel, sand and silt: alluvium.
Qa>b – coastal silt and sand.

Qc – Sand, silt and clay: active coastal alluvium.

Qc>1 – Shelly silt and clay, incised vegetated coastal alluvium.

Czs>a – Quaternary soil and sand.

**Drainage:**
Imperfectly to poorly drained.

**Notes:**
Vegetation community principally associated with the landward edge of the littoral zone and the seaward edge of the terrestrial environment, consequently a number of salt tolerant taxa (especially grasses and sedges) may be found in the ground layer, with residual salts from the marine plain mobilised during inundation and evaporation events. *Melaleuca acacioides* characterises this community which is closely aligned with VMU 36 (*M. citrolens*).

**Photo:**

**Map:** VMU26

**Area:** 12,227 Hectares

**No. of sites:** 7
GULF007, PDA476, PDA516, PDA521 PDA533, PDA545, PDA556.
Vegetation Mapping Unit 27
Low woodland of mixed deciduous tree species (Deciduous Microphyll Vine Thicket), commonly including Bauhinia cunninghamii, Cochlospermum spp., Hakea arborescens, Gyrocarpus americanus, Brachychiton diversifolius, and Grevillea mimosoides. Emergent Eucalyptus spp. or Corymbia spp. may be present. A prominent mid layer of mixed shrubs is often present with species Terminalia canescens generally prominent over a low tussock grassland of Sehima nervosum, Chrysopogon fallax, Enneapogon spp. and Aristida spp.

NVIS Description
U+ ^Bauhinia cunninghamii, Cochlospermum fraseri, Hakea arborescens, Corymbia terminalis, Gyrocarpus americanus (*Tree*6%), M ^Terminalia canescens, Atalaya hemiglauca, Carissa lanceolata, Flueggea virosa (*Tree, Shrub*6%), G^Sehima nervosum, Chrysopogon fallax, Enneapogon polyphyllus, Triodia bitextura, Aristida holothera (*Tussock Grass, Hummock Grass, Forb*1%)c

Upper Stratum
Low woodland of Bauhinia cunninghamii (fq 75%), Cochlospermum fraseri (fq 75%), Corymbia terminalis (fq 63%), Gyrocarpus americanus (fq 44%), and Erythrophleum chlorostachys (fq 38%)

Mid Stratum
Low open woodland of Hakea arborescens (fq 69%), Terminalia canescens (fq 56%), Atalaya hemiglauca (fq 31%), Celtis philippensis (fq 25%) and Grevillea mimosoides (fq 25%)

Ground Stratum
Low tussock grassland of Heteropogon contortus (fq 63%), Sehima nervosum (50%), Chrysopogon fallax (fq 31%), Enneapogon polyphyllus (fq 25%) and Triodia bitextura (fq 25%)

Other Common Species

Upper Stratum —
Acacia hemignosta (fq 19%), Cochlospermum gregorii (fq 19%), Eucalyptus leucophloia (fq 19%), Ventilago viminalis (fq 19%), Brachychiton diversifolius (fq 13%), Eucalyptus chlorophylla (fq 13%), Owenia vernicosa (fq 13%), Alphitonia excelsa (fq 6%), Antidesma parvifolium (fq 6%), Brachychiton sp. (fq 6%), Buchanania obovata (fq 6%), Celtis paniculata (fq 6%), Celtis philippensis (fq 6%), Celtis sp. (fq 6%), Corymbia grandifolia (fq 6%), Diospyros humilis (fq 6%), Erythroxylum ellipticum (fq 6%), Eucalyptus herbertiana (fq 6%), Ficus platypoda (fq 6%), Ficus virens (fq 6%), Indigofera colutea (fq 6%), Melaleuca viridiflora (fq 6%), Pouteria sericea (fq 6%), Terminalia subacroptera (fq 6%), Tinospora smilacina (fq 6%).

Mid Stratum —
Capparis lasiantha (fq 19%), Carissa lanceolata (fq 19%), Flueggea virosa (fq 19%), Acacia alleniana (fq 6%), Acacia gonoclada (fq 6%), Acacia latifolia (fq 6%), Acacia ileyphloia (fq 6%), Acacia monticola (fq 6%), Cajanus geminatus (fq 6%), Calytrix brownii (fq 6%), Diospyros humilis (fq 6%), Distichostemon hispidulus (fq 6%), Dodonaea physocarpa (fq 6%), Hibiscus zonatus (fq 6%), Maytenus cunninghamii (fq 6%), Melaleuca viridiflora (fq 6%), Santalum lanceolatum (fq 6%), Xenostegia tridentata (fq 6%)

Ground Stratum —
Aristida holothera (fq 19%), Eriachne sp. (fq 19%), Schizachyrium fragile (fq 19%), Aristida hygrometrica (fq 13%), Aristida sp. (fq 13%), Chichorius sidooides (fq 13%), Dichantium fiscundum (fq 13%), Eriachne ciliata (fq 13%), Eriachne obtusa (fq 13%), Setaria apiculata (fq 13%), Sorghum plumosum (fq 13%), Spermacoce sp1 (v413) (fq 13%), Triodia sp. (fq 13%), Abutilon hanning (fq 6%), Adenosma muelleri (fq 6%), Aristida calycina (fq 6%), Bidens bipinnata (fq 6%), Bulbostylis barbata (fq 6%), Cheilanthes brownii (fq 6%), Cleome viscosa (fq 6%), Commelina ensifolia (fq 6%), Chorchorus sp. (fq 6%), Crotalaria montana (fq 6%), Cucumis melo (fq 6%), Cymbopogon procerus (fq 6%), Diciptera sp. (fq 6%), Digitaria bicornis (fq 6%), Enneapogon purpurascens (fq 6%), Eriachne mucronata (fq 6%), Eulalia aurea (fq 6%), Ehretia saligna (fq 6%), Evolvulus alsinoides (fq 6%), Gomphrena sp. (fq 6%), Heliotropium haemus (fq 6%), Hypoestes floribunda (fq 3%), Indigofera colutea (fq 6%), Lindernia sp. Open throated (J.Russell-
Smith 5581) (fq 6%), *Melhania oblongifolia* (fq 6%), *Mnesithea formosa* (fq 6%), *Perotis rara* (fq 6%), *Phyllanthus carpentariae* (fq 6%), *Polygala* sp. Mudginberri (J.Russell-Smith 987) (fq 6%), *Pouteria sericea* (fq. 6% ), *Ptilotus corymbosus* (fq 6%), *Schizachyrium sp1* (v579) (fq 6%), *Scleria sp.* (fq 6%), *Tacca leontopetaloides* (fq 6%), *Tephrosia spechtii* (fq 6%), *Tribulopis pentandra* (fq 6%), *Urochloa subquadripara* (fq 6%).

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<tr>
<td>Upper (U1)</td>
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<td>T6i</td>
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<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>16.75 (1-68)</td>
<td>2.158333 (1-5)</td>
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</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>30.33 (8-61)</td>
<td>0.46 (0.3-1.2)</td>
<td>G1c</td>
</tr>
</tbody>
</table>

**Landscape Description:** Hillslopes and crests of low rises / hills on rudosols and kandosols derived from fine grained dolostones.

**Landform Pattern/Element:** Low hills, Low rises\Hillslope, Hill-crest

**Geology:**

Pmt (McArthur Group, Toogainie Formation) – Dolomitic siltstone and shale with resistant interbeds of yellow stromatolitic dololutite and sandy dolarenite

Pnz (Nathan Group, Balbarini Dolomite) – Dolarenites and dololutites with prominent stromatolitic marker beds evaporates and pseudomorphs common in lower part.

**Drainage:** Well drained.

**Notes:**

This Vegetation Mapping Unit is characteristic of hills and plateaux associated with the coarser grained sedimentary units of both the Proterozoic and Cretaceous lithologies of the McArthur River catchment.
No. of sites: 17
MacarthurR_MR3, MacarthurR_Glyde7, MCAR062, MCAR101, PDA37, PDA41, PDA48, PDA49, PDA70, PDA73, PDA82, PDA110, PDA129, PDA166, PDA169, PDA286, PDA386.

Area: 23,758 Hectares
**Vegetation Mapping Unit 28**

*Terminalia canescens* low open woodland with a mixed low open tussock grassland of *Schizachyrium fragile*, *Heteropogon contortus*, *Triodia bitextura* and *Aristida* spp.

**NVIS Description**

U+ ^Terminalia canescens*, *Bauhinia cunninghamii*, *Petalostigma pubescens*, *Corymbia terminalis*, *Erythrophleum chlorostachys* (^Tree\6\r), M ^Terminalia canescens*, *Carissa lanceolata*, *Calytrix extipulata*, *Flueggea virosa*, *Dodonea physocarpa* (^Shrub\4\i), G ^Schizachyrium fragile*, *Heteropogon contortus*, *Triodia bitextura*, *Aristida holathera*, *Chrysopogon fallax* (^Tussock Grass\1\i)

**Upper Stratum**

Low open-woodland of *Terminalia canescens* (fq. 100%), *Bauhinia cunninghamii* (fq. 41%) and variously *Petalostigma pubescens* (fq. 41%), *Corymbia terminalis* (fq. 29%) and *Erythrophleum chlorostachys* (fq. 29%).

**Mid Stratum**

Tall shrubland of *Terminalis canescens* (fq. 100%), *Carissa lanceolata* (fq. 24%), *Calytrix extipulata* (fq 12%), *Flueggea virosa* (fq. 12%) and/or *Dodonea physocarpa* (fq. 12%).

**Ground Stratum**

Low open tussock Grassland of *Schizachyrium fragile* (fq. 76%), *Heteropogon contortus* (fq. 76%), *Triodia bitextura* (fq. 59%), *Aristida holathera* (fq. 47%) and *Chrysopogon fallax* (fq. 35%).

**Other Common Species**

**Upper Stratum** –

*Hakea arborescens* (fq. 29%), *Eucalyptus leucophloia* (fq. 18%), *Corymbia confertiflora* (fq. 12%), *Corymbia ferruginea* (fq. 12%), *Corymbia grandifolia* (fq. 12%), *Melaleuca viridiflora* (fq. 12%), *Alphitonia excelsa* (fq. 6%), *Atalaya hemiglauca* (fq. 6%), *Brachychiton diversifolius* (fq. 6%), *Cochlospermum fraseri* (fq. 6%), *Cochlospermum gregorii* (fq. 6%), *Corymbia dichromophloia* (fq. 6%), *Corymbia flavescens* (fq. 6%), *Corymbia polycarpa* (fq. 6%), *Erythroxylum ellipticum* (fq. 6%), *Eucalyptus chlorophylla* (fq. 6%), *Eucalyptus pruinosa* (fq. 6%), *Grevillea mimosoides* (fq. 6%), *Terminalia* sp. (fq. 6%).

**Mid Stratum** –

*Acacia hammondii* (fq. 6%), *Acacia humifusa* (fq. 6%), *Acacia platycarpa* (fq. 6%), *Acacia torulosa* (fq. 6%), *Acacia umbellata* (fq. 6%), *Calytrix* sp. (fq. 6%), *Dodonea lanceolata* (fq. 6%), *Dodonea oxyptera* (fq. 6%), *Grewia retusifolia* (fq. 6%), *Persoonia falcata* (fq. 6%).

**Ground Stratum** –

*Eriachne ciliata* (fq. 29%), *Sehima nervosum* (fq. 29%), *Aristida* sp. (fq. 24%), *Eriachne* sp. (fq. 24%), *Aristida hygrometrica* (fq 12%), *Dichanthium fecundum* (fq. 12%), *Eriachne obtusa* (fq. 12%), *Eulalia aurea* (fq. 12%), *Sorghum plumosum* (fq. 12%), *Triodia* sp. (fq. 12%), *Aristida inequiglumis* (fq. 6%), *Aristida latifolia* (fq. 6%), *Aristida pruinosa* (fq. 6%), *Corchorus sidoides* (fq. 6%), *Enneapogon polyphyllus* (fq. 6%), *Eragrostis sp.* (fq. 6%), *Eriachne burkittii* (fq. 6%), *Eriachne melicacea* (fq. 6%), *Poaceae sp4* (v488) (fq. 6%), *Rhynchospora* sp. (fq. 6%), *Triumfetta plumigera* (fq. 6%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>14.57 (4-74)</td>
<td>6.37 (2.2-11)</td>
<td>T6i</td>
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<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>20 (1-68)</td>
<td>2.74 (0-6.5)</td>
<td>T6r</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>26.21 (9-39)</td>
<td>0.31 (0.2-0.4)</td>
<td>G1c</td>
</tr>
</tbody>
</table>
Landscape Description:
Occurs across a variety of landforms on substrates generally derived from fine grained sedimentary materials, particularly dolostones. Soils are generally somewhat heavier kandosols. May also occur on plains with kandosols and more well-developed tenosols.

Landform Pattern/Element:
Plain, Undulating Plain, Low Hills/Plain Hillslope, Hillcrest

Geology:
Єt (Top Springs Limestone) – Karstically weathering, micritic limestone.
Pmd (Tatoola Sandstone) – Ridge forming, mainly medium grained thin to medium bedded sandstone, commonly dolomitic and lithic.
Pmea (Mara Dolomite Member) – Ridge forming dololutite, dolomitic sandstone, dolarenite and dolomitic breccia.
Pmnd (Donnegan Member) – Recessive, dolomitic siltstone and sandstone, sandy dolarenite.
Pmt (Toogaminie Formation) – Generally recessive dololutite, dolomitic shale and siltstone, dolarenite.

Drainage:
Well drained.

Notes:
Widely distributed but patchy vegetation community often occurring in association with a variety of other Eucalyptus spp. dominated VMU’s on hills and plains throughout the study area.

Photo:

Map: VMU28

Area: 32,129 Hectares

No. of sites: 16
MCAR141, PDA28, PDA42, PDA46, PDA57, PDA62, PDA97, PDA116, PDA131, PDA163, PDA227, PDA269, PDA292, PDA353, PDA447, SPAR003
Vegetation Mapping Unit 29

Melaleuca viridiflora +/- Corymbia spp. and Petalostigma pubescens low open-woodland to woodland with a sparse shrub layer of Melaleuca spp., Acacia spp. and Grevillea pteridifolia over a mixed low tussock grassland of species including Chrysopogon fallax, Schizachyrium fragile, Aristida spp., Eriachne spp. and Eulalia aurea.

NVS Description

U+ ^Melaleuca viridiflora, Petalostigma pubescens, Corymbia grandifolia, Corymbia polycarpa, Corymbia ferruginea (^Tree^) M ^Melaleuca viridiflora, Grevillea pteridifolia, Hakea arborescens, Terminalia canescens, Acacia torulosa (^Shrub, Tree^), U ^Chrysopogon fallax, Schizachyrium fragile, Triodia bitextura, Aristida sp., Eriachne obtusa (^Tussock Grass, Hummock Grass^).

Upper Stratum

Low open woodland with Melaleuca viridiflora (fq. 100%) and occasionally Petalostigma pubescens (fq. 26%), Corymbia grandifolia (fq. 20%), Corymbia polycarpa (fq. 20%) and/or Corymbia ferruginea (fq. 17%).

Mid Stratum

Sparse shrubland of Melaleuca viridiflora (fq. 100%), Grevillea pteridifolia and occasionally (fq. 20%), Hakea arborescens (fq. 17%), Terminalia canescens (fq. 17%) and/or Acacia torulosa (fq. 11%).

Ground Stratum

Mixed low tussock grassland with Chrysopogon fallax (fq. 51%), Schizachyrium fragile (fq. 31%), Triodia bitextura (fq. 29%), Aristida sp. (fq. 17%) and Eriachne obtusa (fq. 17%).

Other Common Species

Upper Stratum –

Corymbia terminalis (fq. 11%), Asteromyrtus symphyocarpa (fq. 9%), Erythrophleum chlorostachys (fq. 9%), Eucalyptus tectifica (fq. 9%), Cochlospermum fraseri (fq. 6%), Corymbia bella (fq. 6%), Eucalyptus microtheca (fq. 6%), Eucalyptus prunosa (fq. 6%), Melaleuca acacioides (fq. 6%), Melaleuca citrolens (fq. 6%), Melaleuca nervosa (fq. 6%), Bauhinia cunninghamii (fq. 3%), Brachychiton diversifolius (fq. 3%), Callitris intratropica (fq. 3%), Corymbia confertiflora (fq. 3%), Eucalyptus leucophloia (fq. 3%), Eucalyptus miniata (fq. 3%), Melaleuca cajuputi (fq. 3%), Terminalia volucris (fq. 3%).

Mid Stratum –

Acacia torulosa (fq. 11%), Bossiaea bossiaeoides (fq. 11%), Acacia difficilis (fq. 6%), Acacia holosericea (fq. 6%), Acacia plectocarpa (fq. 6%), Grevillea heliosperma (fq. 6%), Hibiscus merualensis (fq. 6%), Jacksonia sp. (fq. 6%), Melaleuca acacioides (fq. 6%), Melaleuca citrolens (fq. 6%), Melaleuca nervosa (fq. 6%), Persoonia falcata (fq. 6%), Petalostigma banksii (fq. 6%), Verticordia cunninghamii (fq. 6%), Acacia dimidiata (fq. 3%), Acacia hammondii (fq. 3%), Acacia leptocarpa (fq. 3%), Acacia lycopodiifolia (fq. 3%), Acacia umbellata (fq. 3%), Bauhinia cunninghamii (fq. 3%), Carissa lanceolata (fq. 3%), Distichostemon hispidulus (fq. 3%), Dolichandrone filiformis (fq. 3%), Grevillea parallela (fq. 3%), Grevillea pyramidalis (fq. 3%), Grevillea striata (fq. 3%), Jacksonia odontocladia (fq. 3%), Jacksonia vernicosa (fq. 3%), Mitrasacme nudicaulis (fq. 3%), Pandanus spiralis (fq. 3%), Verticordia verticillata (fq. 3%).

Ground Stratum –

Eulalia aurea (fq. 17%), Chimbrystylis sp. (fq. 14%), Sorghum plumosum (fq. 14%), Bossiaea bossiaeoides (fq. 11%), Cassytha tiniformis (fq. 11%), Triodia sp. (fq. 11%), Aristida holathera (9%), Aristida hygrometrica (9%), Eragrostis sp. (9%), Eriachne sp. (9%), Heteropogon contortus (9%), Blumea diffusa (fq. 6%), Cyperus sp. (fq. 6%), Ectrosis sp. (fq. 6%), Chimbrystylis oxytachyza (fq. 6%), Chimbrystylis simulans (fq. 6%), Petalostigma quadriloculare (fq. 6%), Pseudopogonatherum sp. (fq. 6%), Rhynchospora pterochaeta (fq. 6%), Rhynchospora sp. (fq. 6%), Schoenus punctatus (fq. 6%), Triodia microstachya (fq. 6%), Acacia nuperrima (fq. 3%), Allotropopsis semialata (fq. 3%), Aristida calycina (fq. 3%), Aristida inaequilunis (fq. 3%), Bothriochloa sp. (fq. 3%), Cartonema parviflorum (fq. 3%), Chrysopogon latifolius (fq. 3%), Chrysopogon sp1 v(355) (fq. 3%), Dichanthium sp. (fq. 3%), Ectrosis
leporina (fq. 3%), Eragrostis sp1. (fq. 3%), Eriachne armitii (fq. 3%), Eriachne ciliata (fq. 3%), Eriachne squarrosa (fq. 3%), Fimbristylis dichotoma (fq. 3%), Fimbristylis macrantha (fq. 3%), Indeterminate genus 1 (v812 - sticks) (fq. 3%), Panicum decompositum (fq. 3%), Panicum effusum (fq. 3%), Panicum sp. (fq. 3%), Polycarpaea sp. (fq. 3%), Pseudopogonatherum contortum (fq. 3%), Rhynchosia sp. (fq. 3%), Schizachyrium pseudoeulalia (fq. 3%), Schizachyrium sp. (fq. 3%), Sorghum timorense (fq. 3%), Spermacoe sp. (fq. 3%), Spermacoe stenophylla (fq. 3%), Stylosanthes humilis (fq. 3%), Themeda triandra (fq. 3%), Unknown Species (fq. 3%), Whiteochloa airoides (fq. 3%), Whiteochloa capillipes (fq. 3%), Xyris complanata (fq. 3%).

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>Mid (M1)</td>
<td>Shrub</td>
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<td>2.35 (0-6)</td>
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<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>37.5 (0-76)</td>
<td>0.31 (0-0.6)</td>
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</tbody>
</table>

Landscape Description:
Plains on a variety of substrate types with variably textured soils. Soils are characteristically hydrosols.

Landform Pattern/Element:
Plain, Alluvial Plain, Undulating Plain/Plain, Valley Flat

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czc – Sand deposits with distinct linear elements.

Czs – Residual soil and sand.

Drainage:
Imperfectly to poorly drained.

Notes:
Widespread VMU occurring extensively on gentle lower slopes, undulating plains and plains on the coastal plain geomorphic province as part of a well developed, repeated topo-sequence of vegetation communities on lateritic profiles (VMU’s 23 and 24).
Photo:

No. of sites: 35
DOC3_GS2 525, DOC5_OTDOW123, DOC5_OTDOW124, GULF008, MCAR019, MCAR142, MCAR176, MELA002, MELA003, PDA121, PDA124, PDA159, PDA177, PDA338, PDA369, PDA384, PDA387, PDA391, PDA395, PDA416, PDA438, PDA442, PDA453, PDA464, PDA466, PDA483, PDA487, PDA488, PDA50, PDA511, PDA523, PDA537, PDA543, PDA549, PDA554.

Map: VMU29

Area: 32,129 Hectares
Vegetation Mapping Unit 30

Melaleuca nervosa +/- Melaleuca viridiflora and Asteromyrtus symphyocarpa low open woodland over a mixed low hummock or tussock grassland of species including Triodia bitextura, Bossiaea bossiaeoides and Chrysopogon spp.

NVIS Description
U+^ Melaleuca nervosa, Melaleuca viridiflora, Asteromyrtus symphyocarpa, Bauhinia cunninghamii, Grevillea pteridifolia (T4r), G^ Triodia bitextura, Bossiaea bossiaeoides, Chrysopogon elongatus, Chrysopogon fallax, Sorghum plumosum (H1c)

Upper Stratum
Low open woodland with Melaleuca nervosa (fq. 91%) and variously Melaleuca viridiflora (fq. 55%), Asteromyrtus symphyocarpa (fq. 18%), Bauhinia cunninghamii (fq. 9%) and/or Grevillea pteridifolia (fq. 9%).

Ground Stratum
Low grassland with Triodia bitextura (fq. 36%), Bossiaea bossiaeoides (fq. 18%), Chrysopogon elongatus (fq. 18%), Chrysopogon fallax (fq. 9%) and/or Sorghum plumosum (fq. 9%).

Other Common Species
Upper Stratum –
Corymbia aspera (fq. 9%), Corymbia bella (fq. 9%), Corymbia ferruginea (fq. 9%), Corymbia polycarpa (fq. 9%), Owenia vernicosa (fq. 9%), Petalostigma pubescens (fq. 9%).

Mid Stratum –
Ground Stratum –
Eragrostis cumingii (fq. 18%), Oldenlandia galoides (fq. 18%), Pseudoraphis spinescens (fq. 18%), Acacia dimidiata (fq. 9%), Acacia hammondii (fq. 9%), Acacia platycarpa (fq. 9%), Aristida holothera (fq. 9%), Aristida hygrometrica (fq. 9%), Brachyachne ambigua (fq. 9%), Chamaecrista symonii (fq. 9%), Cyperaceae sp1 (v306) (fq. 9%), Eragrostis tenellula (fq. 9%), Eriachne obtusa (fq. 9%), Eriachne squarrosa (fq. 9%), Euclia aurea (fq. 9%), Jacksonia sp. (fq. 9%), Perotis rara (fq. 9%), Petalostigma pubescens (fq. 9%), Petalostigma quadriloculare (fq. 9%), Platyzoma microphyllum (fq. 9%), Pseudopogonatherum contortum (fq. 9%), Setaria apiculata (fq. 9%), Sida sp. (fq. 9%), Spermacoce sp. (fq. 9%), Tephrosia sp. (fq. 9%), Whiteochloa capillipes (fq. 9%).

Stratum summary table

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<tr>
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<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
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<td>5.5</td>
<td>T4r</td>
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<tr>
<td>Mid (M1)</td>
<td>Hummock Grass</td>
<td>69</td>
<td>0.4</td>
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</tbody>
</table>

Landscape Description:
Higher level sandy plains/alluvial plain less frequently inundated or saturated. Soils are characteristically hydrosols.

Landform Pattern/Element:
Alluvial Plain/Plain

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Drainage:
Imperfectly to poorly drained.
Notes:
Widely distributed but restricted VMU within the study area. Almost exclusively occurs in association with other Melaleuca spp. dominated VMU’s (29, 36 & 43) on alluvial plains and drainages.

Photo:

Map: VMU30

Area: 15,802 Hectares

No. of sites: 11
DOC5_BORRO101, DOC3_GS2_527, MCAR005, MCAR017, MCAR021, MCAR027, MCAR162, GULF009, MELA006, MELA006_MELA06, PDA551.
Vegetation Mapping Unit 31

*Corymbia bella* +/- *Corymbia* spp. and *Eucalyptus* spp. mid woodland on alluvial flats and terraces with an open mid stratum of *Bauhinia cunninghamii*, *Erythrophleum chlorostachys*, *Hakea arborescens* and a mixed mid tussock grassland of species such as *Chrysopogon fallax*, *Heteropogon contortus*, *Dichanthium fecumund* and *Sehima nervosum*.

NVIS Description
U+ ^*Corymbia bella*, *Corymbia polycarpa*, *Corymbia terminalis*, *Corymbia conferftiflora*, *Eucalyptus tectifica* (*^Tree\17\i*), M ^*Bauhinia cunninghamii*, *Erythrophleum chlorostachys*, *Hakea arborescens*, *Brachychiton diversifolius* (*^Tree, Shrub\6\r*), G ^*Chrysopogon fallax*, *Heteropogon contortus*, *Grewia retusifolia*, *Dichanthium fecumund*, *Sehima nervosum* (*^Tussock Grass, Shrub\2\c*).

Upper Stratum
Mid woodland of *Corymbia bella* (fq. 100%) and variously *Corymbia polycarpa* (fq. 29%), *Corymbia terminalis* (fq. 21%), *Corymbia conferftiflora* (fq. 12%) or *Eucalyptus tectifica* (fq. 12%).

Mid Stratum
Low woodland of *Bauhinia cunninghamii* (fq. 46%) and variously *Erythrophleum chlorostachys* (fq. 21%), *Hakea arborescens* (fq 21%), *Brachychiton diversifolius* (17%), *Vachelia farnesiana* (17%).

Ground Stratum
Mid tussock grassland of *Chrysopogon fallax* (fq. 58%), *Heteropogon contortus* (fq. 54%), *Grewia retusifolia* (fq. 50%), *Dichanthium fecumund* (fq. 33%) and *Sehima nervosum* (fq. 33%).

Other Common Species

Upper Stratum –
*Brachychiton paradoxus* (fq. 8%), *Erythrina vespertilio* (fq. 8%), *Eucalyptus microtheca* (fq. 8%), *Corymbia flavescens* (fq. 4%), *Corymbia greeniana* (fq. 4%), *Eucalyptus chlorophylla* (fq. 4%), *Eucalyptus leucophloia* (fq. 4%).

Mid Stratum –
*Acacia* sp. (12%), *Ficus aculeata* (12%), *Acacia difficilis* (fq. 8%), *Acacia lamprocarpa* (fq. 8%), *Alphitonia pomaderroides* (fq. 8%), *Atalaya hemiglaucu* (fq. 8%), *Callitris intratropica* (fq. 8%), *Ficus coronulata* (fq. 8%), *Melaleuca viridiflora* (fq. 8%), *Planchonia careya* (fq. 8%), *Acacia dimitiata* (fq. 4%), *Acacia torulosa* (fq. 4%), *Alphitonia excelsa* (fq. 4%), *Atalaya varifolia* (fq. 4%), *Bridelia tomentosa* (fq. 4%), *Carissa lanceolata* (fq. 4%), *Flemingia pauciflora* (fq. 4%), *Flueggea virosa* (fq. 4%), *Owenia vernicosa* (fq. 4%), *Pandanus spiralis* (fq. 4%), *Persoonia falcata* (fq. 4%), *Terminalia canescens* (fq. 4%), *Terminalia carpentariae* (fq. 4%), *Terminalia platypylla* (fq. 4%), *Terminalia volucris* (fq. 4%), *Wrightia saligna* (fq. 4%).

Ground Stratum –
*Eulalia aurea* (fq. 25%), *Aristida* sp. (fq. 21%), *Mnesithea rotboellioides* (fq. 17%), *Sorghum plumosum* (fq. 17%), *Themea triandra* (fq. 17%), *Aristida holathera* (fq. 12%), *Cyperus* sp. (fq. 12%), *Panicum decompositum* (fq. 12%), *Chrysopogon elongatus* (fq. 8%), *Chrysopogon* sp. (fq. 8%), *Crotalaria* sp. (fq. 8%), *Eragrostis* sp. (fq. 8%), *Glycine tomentella* (fq. 8%), *Panicum mindanaense* (fq. 8%), *Setaria apiculata* (fq. 8%), *Sida* sp. (fq. 8%), *Trichodesma zeylanicum* (fq. 8%), *Waltheria indica* (fq. 8%), *Aristida hygrometrica* (fq. 4%), *Aristida latifolia* (fq. 4%), *Aristida pruinosa* (fq. 4%), *Aristida schultzi* (fq. 4%), *Blumea tenella* (fq. 4%), *Bothriochloa decipiens* (fq. 4%), *Bothriochloa ewartiana* (fq. 4%), *Brachychne convergens* (fq. 4%), *Chrysopogon latifolius* (fq. 4%), *Chrysopogon pallidus* (fq. 4%), *Crotalaria novae-hollandiae* (fq. 4%), *Dichanthium sericeum* (fq. 4%), *Digitaria bicorns* (fq. 4%), *Digitaria* sp. (fq. 4%), *Echinochloa colonae* (fq. 4%), *Ectrosia* sp. (fq. 4%), *Enneapogon polyphyllus* (fq. 4%), *Euphoria hirta* (fq. 4%), *Ficus aculeata* (fq. 4%), *Fimbristylis macrantha* (fq. 4%), *Fuirena ciliaris* (fq. 4%), *Goodenia janamba* (fq. 4%), *Heliotropium tenuifolium* (fq. 4%), *Heteropogon triticeus* (fq. 4%), *Hyptis suaveolens* (fq. 4%), *Indigofera* sp. (fq. 4%), *Iseliema* sp. (fq. 4%), *Iseliema vaginiformum* (fq. 4%), *Nelsonia campestris* (fq. 4%), *Neptunia major* (fq. 4%), *Panicum* sp. (fq. 4%), *Pseudopogonatherum contortum* (fq. 4%), *Pterocalon serrulatum* (fq. 4%), *Pterocalon* sp. (fq. 4%), *Rhynchospora exserta*.
Sarga timorense (fq. 4%), Setaria sp. (fq. 4%), Sorghum sp. (fq. 4%), Spermacoce stenophylla (fq. 4%), Thecanthes punicea (fq. 4%), Yakirra pauciflora (fq. 4%).

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Tussock Grass</td>
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<td>0.51 (0.2-1)</td>
<td>G2c</td>
</tr>
</tbody>
</table>

Landscape Description:
Plains, terraces and levees on alluvial plains/plains associated with active river and stream channels. Soils are generally derived from sandy alluvium and range from tenosols to hydrosols.

Landform Pattern/Element:
Alluvial Plains, Plains/Plains, Levees, Terraces.

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Drainage:
Well drained to imperfectly drained.

Notes:
This Vegetation Mapping Unit is composed of 2 floristic groups.
No. of sites: 24
MacarthurR_MR22, MCAR043, MCAR059, MCAR060, MCAR068, MCAR073, MCAR123, MCAR161, PDA117, PDA119, PDA122, PDA145, PDA191, PDA261, PDA270, PDA272, PDA399, PDA409, PDA474, PDA490, PDA507, PDA550, PDA95, PDA99.

Map: VMU31
Area: 27,385 Hectares
Vegetation Mapping Unit 32
Shrublands of variable structure and floristics with Acacia spp., Melaleuca spp., Grevillea spp. and Jacksonia spp. typical. An emergent upper stratum of Eucalyptus spp. and/or Corymbia spp. may be present. The mixed ground layer is typically dominated by Triodia spp. and tussock grasses such as Eriachne spp. and Schizachyrium spp.

NVIS Description
U ^Corymbia dichromophloia, Corymbia ferruginea, Eucalyptus leucophloia, Corymbia grandifolia, Eucalyptus phoenicea (^Tree\6r), M+ ^Melaleuca viridiflora, Acacia hammondii, Grevillea pteridiflora, Jacksonia odontoclada, Acacia torulosa (^Shrub, Tree\3i), G ^Triodia bitextura, Eriachne ciliata, Eriachne obtusa, Schizachyrium fragile, Triodia buridgeana (Hummock Grass, Tussock Grass\1c)

Upper Stratum
Emergent low open woodland with Corymbia dichromophloia (fq. 27%), Corymbia ferruginea (fq. 7%), Eucalyptus leucophloia (fq. 7%), Corymbia grandifolia (fq. 7%) and/or Eucalyptus phoenicea (fq.7%).

Mid Stratum
Mixed species mid open shrubland with Melaleuca viridiflora (fq. 40%), Acacia hammondii (fq. 33%), Grevillea pteridiflora (fq. 33%), Jacksonia odontoclada (fq. 27%) and/or Acacia torulosa (fq. 20%).

Ground Stratum
Mixed species low grassland with Triodia bitextura (fq. 80%), Eriachne ciliata (fq. 27%), Eriachne obtusa (fq. 13%), Schizachyrium fragile (fq. 13%) and/or Triodia buridgeana (fq. 13%).

Other Common Species

Upper Stratum –
Acacia shirleyi (fq. 7%), Corymbia ferruginea (fq. 7%), Corymbia grandifolia (fq. 7%), Eucalyptus camaldulensis (fq. 7%), Eucalyptus sp. (fq. 7%), Eucalyptus tectifica (fq. 7%), Hakea arborescens (fq. 7%), Owenia vernicosa (fq. 7%).

Mid Stratum –
Grevillea refracta (fq. 20%), Jacksonia dilatata (fq. 20%), Acacia plectocarpa (fq. 13%), Acacia sp. (fq. 13%), Acacia wickhamii (fq. 13%), Buchanania obovata (fq. 13%), Calytrix exstipulata (fq. 13%), Jacksonia vernicosa (fq. 13%), Acacia gonoclada (fq. 7%), Acacia holosericea (fq. 7%), Acacia jasperensis (fq. 7%), Acacia latifolia (fq. 7%), Acacia oswaldii (fq. 7%), Acacia phebocarpa (fq. 7%), Acacia platycarpa (fq. 7%), Acacia shirleyi (fq. 7%), Bossiaea bossiaeoides (fq. 7%), Carissa lanceolata (fq. 7%), Dodonaea oxyptera (fq. 7%), Gardenia lucata (fq. 7%), Grevillea dryandri (fq. 7%), Grevillea wickhamii (fq. 7%), Hakea arborescens (fq. 7%), Hibiscus zonatus (fq. 7%), Jacksonia sp. (fq. 7%), Melaleuca citrolena (fq. 7%), Melaleuca nervosa (fq. 7%), Owenia vernicosa (fq. 7%), Persoonia falcata (fq. 7%), Templetonia hookeri (fq. 7%), Tephrosia remotiflora (fq. 7%), Terminalia canescens (fq. 7%).

Ground Stratum –
Triodia sp. (fq. 13%), Aristida holathera (fq. 7%), Aristida hygrometrica (fq. 7%), Bulbostylis barbata (fq. 7%), Dapsilianthus spathaceus (fq. 7%), Desmodium trichostachyum (fq. 7%), Ectrosia leporina (fq. 7%), Eragrostis cumingii (fq. 7%), Eragrostis tenellula (fq. 7%), Eriachne burkittii (fq. 7%), Eulalia aurea (fq. 7%), Ischaemum australis (fq. 7%), Nelsonia campestris (fq. 7%), Paspalidium basicladum (fq. 7%), Perotis rara (fq. 7%), Petaloctigma quadriloculare (fq. 7%), Phyllanthus amarus (fq. 7%), Rhynchospora sp. (fq. 7%), Schoenus sparteus (fq. 7%), Sebastiana chamaelea (fq. 7%), Setaria apiculata (fq. 7%).

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Upper (U1)</td>
<td>Tree</td>
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<td>Mid (M1)</td>
<td>Shrub</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock/Tussock G.</td>
<td>40 (30-51)</td>
<td>0.5 (0.2-0.8)</td>
<td>H1c</td>
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Landscape Description:
Plateau tops and slopes of hills and rises primarily on medium to coarse grained sandstones of the major range formations (Bukalara and Abner Ranges). Soils are generally poorly developed, shallow and stony to rocky with rudosols and tenosols most common.

Landform Pattern/Element:
Plain, Escarpment, Plateau, Low Hills, Low Rises/Plain, Hillslope, Hillcrest

Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czl/Pra – Ferricrete developed over Abner Sandstone.

Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.

Prah (Hodgson Sandstone Member) – Ridge forming, pseudo-karstically weathered strongly jointed medium grained quartzarenite.

Drainage:
Well drained to rapidly drained.

Notes:
This Vegetation Mapping Unit is highly variable in its structural and floristic composition, and may relate to the parent material of the substrate on which it occurs or disturbance (such as fire).

Photo:  
Map: VMU32  

Area: 27,385 Hectares

No. of sites: 15
MCAR003, MCAR013, MCAR033, PDA24, PDA171, PDA185, PDA207, PDA238, PDA367, PDA376, PDA383, PDA461, PDA520, RIPARIAN_B_MC02/R2.
Vegetation Mapping Unit 33

*Corymbia ferruginea* low open woodland with a sparse tall shrub layer of *Terminalia canescens* +/- *Calytrix extipulata, Acacia hammondii*, Petalostigma pubescens and *Bossiaea bossiaeoides* over a low hummock grassland of *Triodia bitextura, Aristida* spp., *Eriachne* spp and *Schizachyrium fragile*.

NVIS Description

Upper Stratum

Low open woodland with *Corymbia ferruginea* (fq. 94%) and variously *Eucalyptus tetradonta* (fq. 33%), *Corymbia dichromophloia* (fq. 27%), *Erythrophleum chlorostachys* (27%) and/or *Eucalyptus miniata* (fq. 13%).

Mid Stratum

Tall sparse shrubland with *Terminalia canescens* (fq. 67%) and variously *Calytrix exstipulata* (fq. 27%), *Acacia hammondii* (fq. 20%), *Petalostigma pubescens* (fq. 20%), *Petalostigma quadriloculare* (Shrub 4%), *Bossiaea bossiaeoides* (fq. 13%).

Ground Stratum

Low grassland of *Triodia bitextura* (fq. 67%), *Aristida* sp. (fq. 40%), *Eriachne ciliata* (fq. 33%) and/or *Aristida holathera* (fq. 20%)

Other Common Species

Upper Stratum –  *Brachychiton diversifolius* (fq. 13%), *Corymbia grandifolia* (fq. 7%), *Corymbia polycarpa* (fq. 7%), *Eucalyptus leucophloia* (fq. 7%), *Eucalyptus tectifica* (fq. 7%)

Mid Stratum –  *Buchanania obovata* (fq. 13%), *Carissa lanceolata* (fq. 13%), *Hakea arborescens* (fq. 13%), *Owenia vernicosa* (fq. 13%), *Petalostigma banksii* (fq. 13%), *Petalostigma quadriloculare* (fq. 13%), *Acacia galoides* (fq. 7%), *Acacia gonocarpa* (fq. 7%), *Acacia phlebocarpa* (fq. 7%), *Acacia platycarpa* (fq. 7%), *Acacia sp.* (fq. 7%), *Acacia torulosa* (fq. 7%), *Acacia wickhamii* (fq. 7%), *Antidesma ghesaembilla* (fq. 7%), *Atalaya hemiglauca* (fq. 7%), *Bauhinia cunninghamii* (fq. 7%), *Callitris intratropica* (fq. 7%), *Cochlospermum gregorii* (fq. 7%), *Distichostemon hispidulus* (fq. 7%), *Dodonaea physocarpa* (fq. 7%), *Flueggea virosa* (fq. 7%), *Grevillea dryandri* (fq. 7%), *Grevillea heliosperma* (fq. 7%), *Grevillea parallela* (fq. 7%), *Grewia retusifolia* (fq. 7%), *Jacksonia odontocladua* (fq. 7%), *Melaleuca viridiflora* (fq. 7%), *Terminalia volucris* (fq. 7%)

Ground Stratum –  *Chrysopogon fallax* (fq. 13%), *Eriachne obtusa* (fq. 13%), *Eulalia aurea* (fq. 13%), *Fimbristylis sp.* (fq. 13%), *Heteropogon contortus* (fq. 13%), *Mnesithea formosa* (fq. 13%), *Sorghum plumosum* (fq. 13%), *Alloteropsis semialata* (fq. 7%), *Aristida hygrometrica* (fq. 7%), *Aristida latifolia* (fq. 7%), *Boronia lanuginosa* (fq. 7%), *Cassycla filiformis* (fq. 7%), *Corchorus validans* (fq. 7%), *Digitaria bicornis* (fq. 7%), *Gompholobium subulatum* (fq. 7%), *Grevillea dryandri* (fq. 7%), *Grevillea heliosperma* (fq. 7%), *Grevillea parallela* (fq. 7%), *Grewia retusifolia* (fq. 7%), *Jacksonia odontocladua* (fq. 7%), *Melaleuca viridiflora* (fq. 7%), *Terminalia volucris* (fq. 7%).
Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>16.89 (7-24)</td>
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<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
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<tr>
<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>40 (30-11)</td>
<td>0.42 (0.2-0.8)</td>
<td>H1i</td>
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Landscape Description:
Occurs on plateau tops, plains and hillslopes associated with major range formations and minor occurrences on sandstone derived outliers of the coastal plain. Soils may range from rocky rudosols and tenosols on crests and slopes to kandosols on sandy plains.

Landform Pattern/Element:
Plain, Plateau, Low Rises/Plain, Hillslope

Geology:
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.
KI – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.
Czl/Pra – Ferricrete developed over Abner Sandstone.
Єlb (Bukalara Sandstone) – Fine to very coarse grained friable sandstone.
Pma (Amelia Dolomite) – Silty dolomite and algal dolomite.
Pmd (Tatoola Sandstone) – Ridge forming, mainly medium grained thin to medium bedded sandstone, commonly dolomitic and lithic.
Pml (Mallapunyah Formation) – Purple siltstone, quartz sandstone and dolomitic sandstone.

Drainage:
Well drained.

Notes:
Widespread vegetation community with a patchy distribution. Often occurs in association with VMU’s dominated by Corymbia dichromophloia and Eucalyptus leucophloia below the scale of mapping. Generally characterised by a Hummock Grass dominated understorey.
No. of sites: 14
MCAR075, MCAR164, MCAR170, McarthurR_MR21, PDA61, PDA76, PDA188, PDA208, PDA485, PDA437, PDA45, PDA456, SPAR015, SPAR034.
Vegetation Mapping Unit 34
Open hummock grassland of *Triodia bitextura*, *Triodia microstachya*, *Schizachyrium fragile*, *Enneapogon* spp. And *Eriachne* spp. +/- emergent shrubs and *Corymbia* spp.

**NVIS Description**
U\(^^\) *Corymbia aspera*, *Corymbia dichromophloia* (T6bi), M\(^^\) *Tephrosia* sp., *Galactia* sp., *Acacia* sp., *Jacksonia* sp. (F1bi), G\(^^\) *Triodia bitextura*, *Schizachyrium fragile*, *Triodia microstachya*, *Enneapogon* sp., *Eriachne* sp. (H1i)

**Upper Stratum**
Scattered emergent tree layer including *Corymbia aspera*, *Corymbia dichromophloia* and variously *Terminalia canescens*, *Melaleuca viridiflora* and/or *Melaleuca nervosa* when present.

**Mid Stratum**
Scattered emergent shrubs including *Tephrosia* sp., *Acacia* sp. and/or *Jacksonia* sp.

**Ground Stratum**
Low open grassland including *Triodia bitextura* (fq. 80%), *Schizachyrium fragile* (fq. 80%), *Triodia microstachya* (fq. 40%) and variously *Enneapogon* sp. (fq. 20%) and/or *Eriachne* sp. (fq. 20%).

**Other Common Species**

**Upper Stratum** –
*Eucalyptus leucophloia* (fq. 20%), *Eucalyptus miniata* (fq. 20%), *Grevillea refracta* (fq. 20%)

**Mid Stratum** –

**Ground Stratum** –
*Eragrostis* sp. (fq. 20%), *Eriachne ciliata* (fq. 20%), *Galactia* sp. (fq. 20%), *Oldenlandia galioides* (fq. 20%)

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>40 (30-11)</td>
<td>0.4(0.3-0.5)</td>
<td>H1i</td>
</tr>
</tbody>
</table>

**Landscape Description:**
Slopes of rises and hills of variable slope classes. Generally, soils are very rocky and may be a minor component of the overall community, with rock platform and outcrop dominating. Where present, soils are typically rudosols.

**Landform Pattern/Element:**
Steep Hills/Hillslope

**Geology:**
Єlb (Bukalar Sandstone) – Fine to very coarse grained friable sandstone.

**Drainage:**
Well drained to rapidly drained.

**Notes:**
Very minor occurrences on slopes and plateau tops of coarse grained sedimentary formations associated with the major ranges (particularly the Bukalar Range). Generally characterised by a range of *Triodia* spp. with *T. bitextura* being a relatively minor component of the overall floristic assemblage.
No. of sites: 6
MCAR081, MCAR163, PDA27, PDA88, SPAR010, SPAR026.

Area: 4,538 Hectares
**Vegetation Mapping Unit 35**

Low tussock grassland of mixed species including *Eulalia aurea*, *Chrysopogon fallax*, *Aristida* spp., *Sorghum plumosum* and *Dichanthium* spp. +/- emergent shrubs and trees.

**NVIS Description**

U ^Corymbia terminalis*, *Eucalyptus tectifica*, *Bauhinia cunninghamii*, *Corymbia confertiflora* (^Tree\(6r\)), M ^Vachellia farnesiana*, *Carissa lanceolata*, *Gossypium austral*, *Grewia retusifolia*, *Ficus aculeata* (^Shrub\(4r\)), G+ ^Eulalia aurea*, *Chrysopogon fallax*, *Aristida latifolia*, *Sorghum plumosum*, *Dichanthium fecundum* (^Tussock Grass\(1c\))

**Upper Stratum**
Emergent isolated tree layer, if present, including *Corymbia terminalis* (fq. 21%), *Eucalyptus tectifica* (fq. 7%), *Bauhinia cunninghamii* (fq. 7%), *Brachychiton diversifolius* (fq. 7%) and/or *Corymbia confertiflora* (fq. 7%).

**Mid Stratum**
Emergent isolated shrubs, if present, including *Vachellia farnesiana* (fq. 14%), *Carissa lanceolata* (fq. 14%), *Gossypium australe* (fq. 7%), *Grewia retusifolia* (fq. 7%) and/or *Ficus aculeata* (fq. 7%).

**Ground Stratum**
Mixed species low tussock grassland with variously *Eulalia aurea* (fq. 50%), *Chrysopogon fallax* (fq. 43%), *Aristida latifolia* (fq. 29%), *Sorghum plumosum* (fq. 29%) and *Dichanthium fecundum* (fq. 21%).

**Other Common Species**

**Upper Stratum** – *Grevillea striata* (fq. 7%).

**Mid Stratum** – *Abelmoschus ficulneus* (fq. 7%), *Cayratia trifolia* (fq. 7%), *Wrightia saligna* (fq. 7%).

**Ground Stratum** –
*Aristida inaequiglumis* (fq. 21%), *Astrebla* sp. (fq. 14%), *Brachyachne ambigua* (fq. 14%), *Dichanthium* sp. (fq. 14%), *Panicum decompositum* (fq. 14%), *Panicum* sp. (fq. 14%), *Sehima nervosum* (fq. 14%), *Alloteropsis* sp. (fq. 7%), *Aristida holathera* (fq. 7%), *Aristida ingrata* (fq. 7%), *Aristida* sp. (fq. 7%), *Astrebla squarrosa* (fq. 7%), *Chrysopogon latifolius* (fq. 7%), *Chrysopogon pallidus* (fq. 7%), *Chrysopogon* sp. (fq. 7%), *Cleome viscosa* (fq. 7%), *Cyperaceae sp2* (v308) (fq. 7%), *Cyperaceae sp2* (v306) (fq. 7%), *Cyperus sp1* (v531) (fq. 7%), *Dichanthium sericeum* (fq. 7%), *Eragrostis tenellula* (fq. 7%), *Eriachne obtusa* (fq. 7%), *Eulalia aurea* sp. (fq. 7%), *Evolvulus alsinoides* (fq. 7%), *Iseilema membraneceum* (fq. 7%), *Iseilema vaginiiflorum* (fq. 7%), *Panicum trachyrhachis* (fq. 7%), *Sporobolis australasius* (fq. 7%), *Triodia bitextura* (fq. 7%), Unknown Sp1 (fq. 7%), Unknown Sp2. (fq. 7%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>41.6 (18-70)</td>
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</table>

**Landscape Description:**

Low relief plains generally associated with current day or relict alluvial systems and some minor occurrences on heavy clay soils on plains, lower-slopes and footslopes of low rises derived from fine grained sedimentary formations (black soils over Top Springs Limestone and Mainoru Formation). Consequently, soils range from vertosols and hydrosols, reflecting the range of parent materials involved in the derivation of the soils. Generally, they are all united by being clay-rich and often cracking.
Landform Pattern/Element:
Plain, Alluvial Plain, Flood Plain, Hills/Plain, Drainage Depression, Hillslope

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czb – Quaternary to Tertiary, grey-black earthy clay-rich soil: black soil plain, residual black soils.

Єt (Top Springs Limestone) – Karstically weathering, micritic limestone.

Pru (Mainoru Formation) – Recessive micaceous siltstone to very fine grained sandstone.

Drainage:
Imperfectly to poorly drained.

Notes:
Variable in floristic composition but distinguished from VMU by landscape position (generally plains) and the absence of Hummock Grasses.

Photo:

Map: VMU35

No. of sites: 14
MCAR044, MCAR109, MCAR124, MCAR180, PDA126, PDA17, PDA132, PDA139, PDA146, PDA308, PDA365, PDA552, PDA553, RIPARIAN_B_MC05/O

Area: 20,810 Hectares
Vegetation Mapping Unit 36

Melaleuca citrolens low woodland with mixed low open tussock grassland of Chrysopogon fallax, Eulalia aurea, Sehima nervosum, Sorghum plumosum and Aristida spp.

NVIS Description

U+ ^Melaleuca citrolens, Eucalyptus pruinosa, Excoecaria parvifolia, Hakea arborescens, Terminalia volucris, (^Tree^6i), M ^Carissa lanceolata, Acacia umbellata, Dodonaea lanceolata, Petalostigma banksii, Terminalia canescens (^Shrub, Tree^3r), G ^Chrysopogon fallax, Eulalia aurea, Sehima nervosum, Aristida sp., Sorghum plumosum (^Tussock Grass^1r)

Upper Stratum

Low woodland of Melaleuca citrolens (fq. 100%) and variously Eucalyptus pruinosa (fq. 42%), Excoecaria parvifolia (fq. 17%), Hakea arborescens (fq. 17%) and/or Terminalia volucris (fq. 17%).

Mid Stratum

Mid sparse shrubland with Carissa lanceolata (fq. 29%), Acacia umbellata (fq. 13%), Dodonaea lanceolata (fq. 13%), Petalostigma banksii (fq. 13%) and Terminalia canescens (fq. 13%).

Ground Stratum

Mixed low open tussock grassland with Chrysopogon fallax (fq. 67%), Eulalia aurea (fq. 54%), Sehima nervosum (fq. 50%) and variously Aristida sp. (fq. 21%), Sorghum plumosum (fq. 21%).

Other Common Species

Upper Stratum –

Atalaya hemiglauca (fq. 13%), Petalostigma pubescens (fq. 13%), Terminalia canescens (fq. 13%), Eucalyptus leucophloia (fq. 8%), Eucalyptus tectifica (fq. 8%), Grevillea striata (fq. 8%), Melaleuca viridiflora (fq. 8%), Syzygium eucalyptoides (fq. 8%), Terminalia canescens (fq. 8%), Eucalyptus microtheca (fq. 4%), Eucalyptus sp. (fq. 4%), Melaleuca sp. (fq. 4%), Terminalia sp. (fq. 4%), Terminalia bursarina (fq. 4%), Vitex glabrata (fq. 4%).

Mid Stratum –

Acacia hammondii (fq. 8%), Acacia lysiphloia (fq. 8%), Calytrix exstipulate (fq. 8%), Dodonaea oxyptera (fq. 8%), Dodonaea physocarpa (fq. 8%), Flueggea virosa (fq. 8%), Maytenus cunninghamii (fq. 8%), Melaleuca viridiflora (fq. 8%), Strychnos lucida (fq. 8%), Xanthium strumarium (fq. 8%), Acacia sp. (fq. 4%), Acacia torulosa (fq. 4%), Atalaya variifolia (fq. 4%), Melochia corchorifolia (fq. 4%).

Ground Stratum –

Aristida holathera (fq. 17%), Dichanthium fecundum (fq. 13%), Themeda triandra (fq. 13%), undetd sp. (fq. 13%), Panicum decompositum (fq. 8%), Triodia sp. (fq. 8%), Trichodesma zeylanicum (fq. 8%), Dichanthium sp. (fq. 4%), Digitaria sp. (fq. 4%), Enneapogon sp. (fq. 4%), Eragrostis sp. (fq. 4%), Eriachne burkittii (fq. 4%), Eriachne ciliata (fq. 4%), Eriachne obtusa (fq. 4%), Eriachne sp. (fq. 4%), Hygrophila angustifolia (fq. 4%), Poaceae sp4 (v488) (fq. 4%), Pterocaulon sp. (fq. 4%), Schizachyrium pseudeulalia (fq. 4%), Schizachyrium sp. (fq. 4%), Sida sp. (fq. 4%), Spermacoeh sp. (fq. 4%), Triodia bitextura (fq. 4%), Triodia burdigeana (fq. 4%), Triodia pungens (fq. 4%), Unknown Species (fq. 4%), Whiteochloa capillipes (fq. 4%), Rostellaria ascendens (fq. 4%), Schoenoplectus litoralis (fq. 4%), Themeda triandra (fq. 4%), Trianthema portulacastrum (fq. 4%), Triumfetta sp. (fq. 4%), Urochloa reptans (fq. 4%).

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
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<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>36.36 (5-81)</td>
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<td>26.73 (9-61)</td>
<td>0.311 (0.1-0.6)</td>
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Landscape Description:
Occurs on a number of lithologies, generally with some degree of impeded drainage characteristics. Generally low relief undulating plains, alluvial plains and footslopes of low rises on the coastal plain. Soils may include hydrosols and kandosols.

Landform Pattern/Element:
Plain, Undulating Plain, Alluvial Plain, Low Hills/Plain, Hillslope, Terrace Plain

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.
Cz – Undifferentiated alluvial, colluvial and eluvial deposits.
KI – Sandstone, lithic sandstone, clayey sandstone, conglomerate, sandy claystone and siltstone, commonly ferruginised and silicified.

Drainage:
Imperfectly to poorly drained.

Notes:
Commonly occurring vegetation community occurring in association with other Melaleuca spp. units (particularly VMU 29) and Eucalyptus tetradonta dominated VMU’s (23 and 24) of the coastal alluvial and lateritic plains. Often occurs fringing the main drainage depressions at slightly higher levels in the landscape than the channel. Position in the landscape may reflect seepage from the surrounding, higher lateritised plains toward the drainage depressions.

Photo: 2008.01.12 11.22

Map: VMU36

Area: 35,071 Hectares

No. of sites: 24
PDA30, PDA141, PDA162, PDA223, PDA231, PDA240, PDA336, PDA389, PDA423, PDA430, PDA431, PDA449, PDA452, PDA500, PDA502, PDA503, PDA512, PDA522, PDA527, PDA531, PDA541, PDA546, SPAR006, SPAR016
Vegetation Mapping Unit 37
Melaleuca argentea +/- Melaleuca leucadendra, Corymbia bella, Casuarina cunninghamiana, Lophostemon grandiflorus, Eucalyptus camaldulensis mid open forest fringing sandy stream channels. Variable mid-stratum low tree layer of species such as Barringtonia acutangula, Acacia hemsleyi, Brachychiton multicaulis and Glochidion disparipes over a low tussock grassland of Chrysopogon spp. and Heteropogon contortus.

NVIS Description
U+ ^Melaleuca argentea, Corymbia bella, Casuarina cunninghamiana, Lophostemon grandiflorus, Melaleuca leucadendra (^Tree^c), M ^Barringtonia acutangula, Acacia hemsleyi, Brachychiton multicaulis, Glochidion disparipes, Syzygium eucalyptoides (^Tree, Shrub^v^f), G ^Chrysopogon elongatus, Bulbostylis barbata, Heliotropium ovalifolium, Nelsonia campestris, Heteropogon contortus (^Tussock Grass, Sedge, Forb^c)

Upper Stratum
Mid open forest with Melaleuca argentea (fq. 100%) and variously Corymbia bella (fq. 24%), Casuarina cunninghamiana (fq. 18%), Lophostemon grandiflorus (fq. 18%) and/or Melaleuca leucadendra (fq. 12%).

Mid Stratum
Low tree layer with variously Barringtonia acutangula (fq. 53%), Acacia hemsleyi (fq. 12%), Brachychiton multicaulis (fq. 12%), Glochidion disparipes (fq. 12%) and/or Syzygium eucalyptoides (fq. 12%).

Ground Stratum
Low tussock grassland with variously Chrysopogon elongatus (fq. 35%), Bulbostylis barbata (fq. 24%), Heliotropium ovalifolium (fq. 24%), Nelsonia campestris (fq. 24%) and/or Heteropogon contortus (fq. 18%).

Other Common Species

Upper Stratum –
Eucalyptus camaldulensis (fq. 12%), Melaleuca leucadendra (fq. 12%), Terminalia platyphylia (fq. 12%), Nauclea orientalis (fq. 6%).

Mid Stratum –
Dodonaea lanceolata (fq. 12%), Excoecaria parvifolia (fq. 12%), Ficus coronulata (fq. 12%), Flueggea virosa (fq. 12%), Pandanus aquaticus (fq. 12%), Strychnos lucida (fq. 12%), Terminalia platyphylia (fq. 12%), Xanthium strumarium (fq. 12%), Acacia sp. (fq. 6%), Alphitonia pomaderaoides (fq. 6%), Antidesma ghesaembilla (fq. 6%), Asteromyrtus symphyocarpa (fq. 6%), Atalaya hemiglauca (fq. 6%), Callitris intratropica (fq. 6%), Carissa lanceolata (fq. 6%), Caryatia trifolia (fq. 6%), Ficus sp. Carpentariansis (W.B.Spencer 01/Jul/11) (fq. 6%), Hakea arborescens (fq. 6%), Melaleuca viridi flora (fq. 6%), Mitracarpus hirtus (fq. 6%), Pouteria sericea (fq. 6%), Terminalia bursarina (fq. 6%), Vitex glabrata (fq. 6%).

Ground Stratum –
Chrysopogon oliganthus (fq. 12%), Cucumis melo (fq. 12%), Mnesithea rottboelliioides (fq. 12%), Passiflora foetida (fq. 12%), undetd sp. (fq. 12%), Aponogeton vanbruggenii (fq. 12%), Cyperus carinatus (fq. 12%), Cyperus polystachyos (fq. 12%), Eleocharis geniculata (fq. 12%), Euphorbia hirta (fq. 12%), Fimbristylis polytrichoides (fq. 12%), Gymnanthera oblonga (fq. 12%), Hptis suaveolens (fq. 12%), Mnesithea rottboelliioides (fq. 12%), Panicum mindanaense (fq. 12%), Paspalum scrobiculatum (fq. 12%), Physalis angulata (fq. 12%), Pseudoraphis spinescens (fq. 12%), Trichodesma zeylanicum (fq. 12%), Achyranthes aspera (fq. 6%), Alternanthera denticulata (fq. 6%), Aristida sp. (fq. 6%), Basilicium polystachyon (fq. 6%), Caryatia trifolia (fq. 6%), Digitaria bicorns (fq. 6%), Echinaclora colonum (fq. 6%), Ergrostis cumingii (fq. 6%), Ergrostis speciosa (fq. 6%), Ergrostis tenellula (fq. 6%), Euphorbia vachelli (fq. 6%), Heliotropium indicum (fq. 6%), Hygrophila angustifolia (fq. 6%), Ludwigia perennis (fq. 6%), Mitracarpus hirtus (fq. 6%), Oldenlandia galoides (fq. 6%), Operculina aequisepala (fq. 6%), Panicum sp. (fq. 6%), Paspalidium jubiflorum (fq. 6%), Phyllanthus maderaspatensis (fq. 6%),...
Phyllanthus reticulatus (fq. 6%), Pouteria sericea (fq. 6%), Rostellularia adscendens (fq. 6%), Schoenoplectus litoralis (fq. 6%), Themeda triandra (fq. 6%), Trianthema portulacastrum (fq. 6%), Triumfetta sp. (fq. 6%), Urochloa reptans (fq. 6%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>40</td>
<td>0.4</td>
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</tr>
</tbody>
</table>

**Landscape Description:**
Drainage depressions, stream beds, banks and channels on major riverine systems draining the Bukalara Range in the central and eastern sections of the study area. Generally sandy and stony alluvial soils (tenosols to hydrosols?) derived from the predominantly sandstone surrounding landscape.

**Landform Pattern/Element:** Plain/Drainage Depression

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**
Well drained to poorly drained dependent on position in relation to stream channel. Generally more quickly draining than similar VMU’s associated with the other major drainage systems of the study area due to the nature of the alluvial materials involved.

**Notes:**
Relatively restricted riparian VMU, commonly found within the major drainage systems of the Bukalara Range (e.g. the Glyde River system). Grades into other riparian VMU’s (particularly 38 and 42) both within this area and at the confluence with the Mc Arthur River. Generally characteristic of riverine systems with a sandier bedload.
No. of sites: 17

Area: 2,783 Hectares
Vegetation Mapping Unit 38

Melaleuca leucadendra and/or Melaleuca argentea +/- Eucalyptus camaldulensis, Nauclea orientalis, Casuarina cunninghamiana mid woodland with a lower tree stratum of species such as Ficus coronulata, Acacia hemsleyi, Barringtonia acutangula, Pandanus spiralis and Lophostemon grandiflorus over a mid tussock grassland of Chrysopogon elongatus, Ectrosia leporina, Echinaochloa colona, Eriachne mucronata and Paspalidium jubiflorum.

NVIS Description
U+ ^Melaleuca leucadendra, Melaleuca argentea, Eucalyptus camaldulensis, Nauclea orientalis, Casuarina cunninghamiana (^Tree\u20137i) M ^Ficus coronulata, Barringtonia acutangula, Pandanus spiralis, Lophostemon grandiflorus, Asteromyrtus symphyocarpa (^Tree\u20136i), G ^Chrysopogon elongatus, Ectrosia leporina, Xanthium strumarium, Echinaochloa colona, Eriachne mucronata (^Tussock Grass, Forb\u20122i)

Upper Stratum
Mid woodland with Melaleuca leucadendra (fq. 77%), Melaleuca argentea (fq. 69%) and/or Eucalyptus camaldulensis (fq. 46%), Nauclea orientalis (fq. 31%) and Casuarina cunninghamiana (fq. 23%).

Mid Stratum
Low open woodland with Ficus coronulata (fq. 38%), Barringtonia acutangula (fq. 31%), Pandanus spiralis (fq. 31%), Lophostemon grandiflorus (fq. 23%) and/or Asteromyrtus symphyocarpa (fq. 15%).

Ground Stratum
Mid tussock grassland with Chrysopogon elongatus (fq. 31%), Ectrosia leporina (fq. 23%), Xanthium strumarium (fq. 23%), Echinaochloa colona (fq. 15%) and/or Eriachne mucronata (fq. 15%).

Other Common Species

Upper Stratum –
Lophostemon grandiflorus (fq. 23%), Corymbia bella (fq. 15%), Terminalia platyphylla (fq. 15%), Eucalyptus microtheca (fq. 8%), Ficus racemosa (fq. 8%), Ficus racemosa var. racemosa (fq. 8%).

Mid Stratum –
Cayratia trifolia (fq. 15%), Melaleuca viridiflora (fq. 15%), Pandanus aquaticus (fq. 15%), Strychnos lucida (fq. 15%), Terminalia platyphylla (fq. 15%), Acacia alleniana (fq. 8%), Acacia holosericea (fq. 8%), Acacia sp. (fq. 8%), Acacia torulosa (fq. 8%), Atalaya hemiglauca (fq. 8%), Corymbia phyllocarpa (fq. 8%), Dodonaea platyptera (fq. 8%), Flueggea virosa (fq. 8%), Fuirena ciliaris (fq. 8%), Glochidion disperipes (fq. 8%), Grevillea pteridifolia (fq. 8%), Ludwigia octovalvis (fq. 8%), Melastoma malabathricum (fq. 8%), Syzygium eucalyptoides (fq. 8%).

Ground Stratum –
Germainia truncatiglumis (fq. 15%), Hygrophila angustifolia (fq. 15%), Hyptis suaveolens (fq. 15%), Mitracarpus hirtus (fq. 15%), Nelsonia campestris (fq. 15%), Paspalidium jubiflorum (fq. 15%), Phyllanthus maderaspatensis (fq. 15%), Physalis angulata (fq. 15%), Rostellularia ascendens (fq. 15%), Urochloa reptans (fq. 15%), Achyranthes aspera (fq. 8%), Alternanthera nodiflora (fq. 8%), Ammannia multiflora (fq. 8%), Bulbostylis barbata (fq. 8%), Cyperus exaltatus (fq. 8%), Dapsilanthus spathaceus (fq. 8%), Eragrostis amabilis (fq. 8%), Eragrostis spartinoides (fq. 8%), Eriachne stipacea (fq. 8%), Eriachne triseta (fq. 8%), Fimbristylis nutans (fq. 8%), Fimbristylis pauciflora (fq. 8%), Fuirena ciliaris (fq. 8%), Gymnanthera oblonga (fq. 8%), Heliotropium indicum (fq. 8%), Hybanthus enneaspermus (fq. 8%), Ischaemum australe (fq. 8%), Ischaemum sp. (fq. 8%), Ludwigia octovalvis (fq. 8%), Ludwigia perennis (fq. 8%), Mnesithea rottbellioides (fq. 8%), Panicum sp. (fq. 8%), Phyllanthus amarus (fq. 8%), Portulaca oleracea (fq. 8%), Schizachyrium fragile (fq. 8%), Stenochlaena palustris (fq. 8%), Stylosanthes hamata (fq. 8%), Trianthema portulacastrum (fq. 8%), Triodia burbridgeana (fq. 8%), Unknown Species (fq. 8%), Xyris complanata (fq. 8%).
Stratum summary table

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<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
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<td>Mid (M1)</td>
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<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>8.5 (2-12)</td>
<td>0.52 (0.1-1)</td>
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**Landscape Description:**
Stream channels, banks, beds and benches associated with the alluvial plains of major riverine systems within the study area. Permanence of water within the systems is variable and may be related to position within the catchment and the nature of water supply to the system (some are spring fed). Consequently soils may range from hydrosols to kandosols and tenosols.

**Landform Pattern/Element:**
Plain, Alluvial Plain, Undulating Rises/Stream Bed, Stream Bank, Stream Channel, Gully

**Geology:**
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**
Well drained to poorly drained relating to position with respect to the main riverine channels.

**Notes:**
Commonly occurring riparian vegetation community associated with larger riverine systems within the catchment. May be floristically variable in species associated with the dominant *Melaleuca* spp. that characterise this VMU with mesic elements often prominent in areas with persistent of permanent water.
Photo:

Map: VMU38

Area: 5,109 Hectares

No. of sites: 13
DOC5_WEARY102, MacarthurR_Glyde2, MacarthurR_Glyde25, MacarthurR_MR5, MacarthurR_MR10, PDA382, MELA005, PDA518, PDA264, PDA288, PDA433, PDA58, RIPARIAN_B_MC02/R1.
Vegetation Mapping Unit 39

*Asteromyrtus symphyocarpa* low open woodland +/- *Melaleuca viridiflora* and *Corymbia polycarpa* with an open shrubby mid-stratum of *Asteromyrtus symphyocarpa*, *Melaleuca* spp. and *Acacia* spp. The open ground stratum is dominated by *Triodia microstachya* and a mix of tussock grasses.

NVIS Description

U+ ^Asteromyrtus symphyocarpa, Melaleuca viridiflora, Corymbia polycarpa (Tree), M ^Asteromyrtus symphyocarpa, Acacia dimidiata, Planchonia careya, Acacia platycarpa (Shrub), G ^Triodia microstachya, Sorghum plumosum, Whiteochloa capillipes, Aristida schultzii (Hummock Grass)

Upper Stratum

Low open woodland of *Asteromyrtus symphyocarpa* (fq. 100%) with occasional *Melaleuca viridiflora* (fq. 50%), *Corymbia polycarpa* (fq 50%) emergents.

Mid Stratum

Open shrubland of *Asteromyrtus symphyocarpa* (fq. 100%), *Acacia dimidiata* (fq. 50%), *Pandanus spiralis* (fq. 50%), *Planchonia careya* (fq. 50%) and/or *Acacia platycarpa* (fq. 50%)

Ground Stratum

Tussock grassland with *Triodia microstachya* (fq. 50%), *Sorghum plumosum* (fq. 50%), *Whiteochloa capillipes* (fq. 50%) and/or *Aristida schultzii* (fq. 50%).

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
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<tbody>
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<td>Upper (U1)</td>
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<td>Mid (M1)</td>
<td>Shrub</td>
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<td>Ground (G1)</td>
<td>Hummock Grass</td>
<td>19.5 (9-30)</td>
<td>0.35 (0.3-0.4)</td>
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</tr>
</tbody>
</table>

Landscape Description:

Occurs in shallow closed depressions and on plains of the coastal alluvial plain and on plateau tops in the southerly parts of the catchment. Soils are generally hydrosols.

Landform Pattern/Element:

Plateau, Plain/Plain

Geology:

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

Czs>a – Quaternary soil, sand.

Drainage:

Imperfectly to poorly drained

Notes:

This vegetation community commonly occurs in small patches associated with *Melaleuca* spp. VMU’s (e.g. VMU’s 29, 30 and 43) although in some locations on the plains between Bing Bong and Borroloola occurs in patches large enough to map at 1:100 000 scale.
Photo:

No. of sites: 2
PDA187, PDA532.

Map: VMU39

Area: 1,951 Hectares
Vegetation Mapping Unit 40

*Melaleuca dealbata* woodland with a mid sedgeland dominated by *Cyperus vaginatus, Panicum mindanaense, Oryza rufipogon, Elytrophorus spicatus* and *Eragrostis* sp.

**NVIS Description**

U+ ^*Melaleuca dealbata* (Tree\7\1), G ^*Cyperus vaginatus, Panicum mindanaense, Oryza rufipogon, Elytrophorus spicatus, Eragrostis* sp. (Sedge\2\c)

**Upper Stratum**

*Melaleuca dealbata* (fq. 100%) woodland.

**Ground Stratum**

Mid sedgeland/grassland with *Cyperus vaginatus* (fq. 100%), *Panicum mindanaense* (fq. 100%), *Oryza rufipogon* (fq. 100%), *Elytrophorus spicatus* (fq. 100%) and *Eragrostis* sp. (fq. 50%)

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<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
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<td>-</td>
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</tbody>
</table>

**Landscape Description:**

Closed and open depressions of the coastal alluvial plain in association with the floodplains of major streams. Various Hydrosol soil sub-types predominate.

**Landform Pattern/Element:**

Plain, Alluvial Plain/Swamp, Drainage Depression

**Geology:**

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**

Imperfectly drained to poorly drained.

**Notes:**

Restricted vegetation community within the study area, although likely to occur in association with other *Melaleuca* spp. VMU’s below the scale of mapping.
Photo:

NO PHOTOGRAPH AVAILABLE

No. of sites: 2
DOC5_BORRO100, MELA007.

Map: VMU40

Area: 156 Hectares
Vegetation Mapping Unit 41

Palustrine wetlands generally associated within the coastal plain. Variable in floristics and structure but common species including *Eleocharis dulcis*, *Oryza* spp., *Cyperus* spp. +/- emergent *Melaleuca* spp. Structurally these communities may vary from open water (including areas mapped within riverine channels) to a closed sedgeland to a *Melaleuca* spp. dominated low woodland to low open-forest.

NVIS Description

**Upper Stratum**
Low woodland to low open forest of *Melaleuca viridiflora* (fq. 100%) when present.

**Mid Stratum**
Low sparse shrubland of *Melaleuca viridiflora* (fq. 100%) when present.

**Ground Stratum**
Low closed sedgeland of *Eleocharis dulcis* (fq. 100%) and *Dichanthium fecundum* (fq. 100%).

**Other Common Species**

**Upper Stratum** –
*Melaleuca dealbata*

**Ground Stratum** –
*Oryza* spp., *Cyperus breviculmis*, *Cyperus* spp., *Eriachne glauca*, *Nymphoides* spp.

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>17</td>
<td>7</td>
<td>T6r</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>1</td>
<td>2.5</td>
<td>S4r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Sedge</td>
<td>79</td>
<td>0.2</td>
<td>V1d</td>
</tr>
</tbody>
</table>

Landscape Description:
Typically closed depressions (swamps) with variable cover of *Melaleuca* spp. Found throughout the catchment from the alluvial coastal plains to internal drainage depressions on plateau tops of the Abner and Bukalara Ranges. Soils are generally hydrosols at the landform element scale.

Landform Pattern/Element: Alluvial Plain, Plain, Plateau/Swamp, Drainage Depression

Geology: Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Drainage: Poorly drained to very poorly drained.

Notes:
This Vegetation Mapping Unit is highly variable in both its floristics and structure both temporally and spatially within the study area. This unit encompasses a range of largely Palustrine wetland systems ranging from open water dominated lagoons (and in some instances river channels) through open to closed sedgelands characterised by a range of hydrophytic graminoid species.
Photo: No. of sites: 8 PDA217.

Map: VMU41

Area: 11,186 Hectares
Vegetation Mapping Unit 42

**Casuarina cunninghamiana +/− Eucalyptus camaldulensis, Melaleuca leucadendra, Eucalyptus microtheca** mid open forest with a mixed species sparse shrubland including *Pandanus aquaticus, Excoecaria parvifolia, and Atalaya hemiglaucu*. The ground layer consists of a mixed species low tussock grassland/forbland.

**NVIS Description**

**Upper Stratum**

*Casuarina cunninghamiana* (fq. 88%), *Eucalyptus camaldulensis* (fq. 50%), and/or *Nauclea orientalis* (fq. 38%), *Melaleuca leucadendra* (fq. 38%), *Eucalyptus microtheca* (fq. 38%) mid open forest.

**Mid Stratum**

*Excoecaria parvifolia* (fq. 50%), *Atalaya hemiglauca* (fq. 38%), *Ficus coronulata* (fq. 38%), *Barringtonia acutangula* (fq. 25%) and *Pandanus aquaticus* (fq. 25%) sparse shrubland/low woodland.

**Ground Stratum**

*Chrysopogon elongatus* (fq. 50%), *Xanthium strumarium* (fq. 50%), *Nelsonia campestris* (fq. 38%), *Echinochloa colona* (fq. 25%) mixed low tussock grassland.

**Other Common Species**

**Upper Stratum** – *Lophostemon grandiflorus* (fq. 25%), *Bauhinia cunninghamii* (fq. 13%), *Terminalia platyphylla* (fq. 13%).

**Mid Stratum** – *Flueggea virosa* (fq. 38%), *Parkinsonia aculeata* (fq. 38%), *Grewia retusifolia* (fq. 25%), *Vachellia farnesiana* (fq. 25%), *Acacia holosericea* (fq. 13%), *Bauhinia cunninghamii* (fq. 13%), *Ludwigia octovalvis* (fq. 13%), *Melochia corchorifolia* (fq. 13%), *Melochia pyramidata* (fq. 13%), *Terminalia bursarina* (fq. 13%).

**Ground Stratum** – *Passiflora foetida* (fq. 62.5%), *Ammannia multiflora* (fq. 38%), *Cucumis melo* (fq. 38%), *Nelsonia campestris* (fq. 38%), *Bidens bipinnata* (fq. 25%), *Dicliptera armata* (fq. 25%), *Echinochloa colona* (fq. 25%), *Euphorbia heterophylla* (fq. 13%), *Euphorbia vachelli* (fq. 13%), *Heliotropium indicum* (fq. 13%), *Ludwigia octovalvis* (fq. 13%), *Ludwigia perennis* (fq. 13%), *Melochia corchorifolia* (fq. 13%), *Melochia pyramidata* (fq. 13%), *Miracarpus hirtus* (fq. 13%), *Oldenlandia sp.* (fq. 13%), *Panicum mindanaense* (fq. 13%), *Paspalidium jubiflorum* (fq. 13%), *Paspalum scrobiculatum* (fq. 13%), *Portulaca oleracea* (fq. 13%), *Pseudoraphis spinescens* (fq. 13%), *Unkown Species* (fq. 13%), *Urochloa sp.* (fq. 13%), *Whiteochloa capillipes* (fq. 13%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper (U1)</strong></td>
<td>Tree</td>
<td>81</td>
<td>14.5</td>
<td>T7c</td>
</tr>
<tr>
<td><strong>Mid (M1)</strong></td>
<td>Shrub</td>
<td>5</td>
<td>1.5</td>
<td>T4r</td>
</tr>
<tr>
<td><strong>Ground (G1)</strong></td>
<td>Tussock Grass</td>
<td>30</td>
<td>0.1</td>
<td>G1c</td>
</tr>
</tbody>
</table>
Landscape Description:
Stream beds, banks and channels of alluvial plains on the major riverine systems of the Mc Arthur River catchment. Soils are variable relating to the position in the riverine system relative to the channel and the parent materials from which they are principally derived and may range from vertosols, to hydrosols and kandosols

Landform Pattern/Element:
Alluvial Plain, Plain/Stream Bank, Stream Bed, Stream Channel

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Drainage:
Well drained to poorly drained. Dependent upon local position within the riverine system and nature of the derivation of the substrate.

Notes:
Characteristic riparian vegetation type of middle sections of the major stream systems in the study area. This VMU occurs in close association with a number of other riparian VMU’s (4, 20, 37 and 38) and may include areas of these units not mappable at this scale.

Photo:  
Map: VMU42

Area: 16,748 Hectares

No. of sites: 8
DOC5, MELA001, MALA122, MacarthurR_MR6, MacarthurR_MR19, PDA142, RIPARIAN_B_MC04/R1, RIPARIAN_B_MC03/R2, RIPARIAN_B_MC05/R1.
**Vegetation Mapping Unit 43**

*Melaleuca stenostachya* woodland +/- emergent *Corymbia* spp. with a tall sparse shrub dominated mid-stratum of *Melaleuca* spp. and *Acacia* spp. Ground stratum of mixed low sparse tussock grasses.

**NVIS Description**

**U+** ^*Melaleuca stenostachya, Melaleuca viridiflora, Melaleuca nervosa, Corymbia ferruginea, Corymbia grandifolia* (^Tree\6\i), **M** ^*Melaleuca stenostachya, Melaleuca viridiflora, Melaleuca nervosa, Terminalia canescens, Acacia holosericea* (^Shrub, Tree\4\r), **G** ^*Triodia bitextura, Chamaeraphis hordeacea, Aristida sp., Panicum sp., Whiteochloa sp.* (^Hummock Grass, Tussock Grass\1\r)

**Upper Stratum**

*Melaleuca stenostachya* (fq. 100%) and variously *Melaleuca viridiflora* (fq. 50%), *Melaleuca nervosa* (fq. 50%), *Corymbia ferruginea* (fq. 50%) and/or *Corymbia grandifolia* (fq. 50%) woodland.

**Mid Stratum**

*Melaleuca stenostachya* (fq. 100%) and variously *Melaleuca viridiflora* (fq. 50%), *Melaleuca nervosa* (fq. 50%), *Terminalia canescens* (fq. 50%) and/or *Acacia holosericea* (fq. 50%) sparse shrubland.

**Ground Stratum**

*Triodia bitextura* (fq. 50%), *Chamaeraphis hordeacea* (fq. 50%), *Aristida* sp. (fq. 50%), *Panicum* sp. (fq. 50%) and *Whiteochloa* sp. (fq. 50%) low sparse tussock grassland.

**Other Common Species**

**Upper Stratum** – *Corymbia dichromophloia* (fq. 50%), *Corymbia polycarpa* (fq. 50%), *Terminalia canescens* (fq. 50%).

**Mid Stratum** – *Carissa lanceolata* (fq. 50%), *Ficus aculeata* (fq. 50%), *Flueggea virosa* (fq. 50%).

**Ground Stratum** – *Achyranthes aspera* (fq. 50%), *Chrysopogon latifolius* (fq. 50%).

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>38</td>
<td>8.5</td>
<td>T6i</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>13</td>
<td>3.5</td>
<td>S4r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock/hummock</td>
<td>7</td>
<td>0.4</td>
<td>G1r</td>
</tr>
</tbody>
</table>

**Landscape Description:**

Open and closed depressions in the coastal alluvial plain associated with major stream systems. Generally less frequently inundated areas of the alluvial plain, soils include hydrosols.

**Landform Pattern/Element:**

Alluvial Plain/Back Plain

**Geology:**

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Cz – Undifferentiated alluvial, colluvial and eluvial deposits.

**Drainage:**

Imperfectly drained to poorly drained.
Notes:
Restricted to scattered occurrences on the coastal plains at higher, less frequently flooded levels on the alluvial plain.

No. of sites: 2
MCAR168, PDA322.

Map: VMU43
Area: 917 Hectares
Vegetation Mapping Unit 44

_Corymbia polycarpa_ +/- _Erythrophleum chlorostachys, Eucalyptus tetracta, Melaleuca sp._ (Red Bark), _Corymbia bella_ mid woodland on sandy levees and terraces associated with major streams.

**NVIS Description**

U+ ^Corymbia polycarpa, Erythrophleum chlorostachys, Eucalyptus tetracta, Melaleuca sp._ (Red Bark), _Corymbia bella_ (^Tree^\i), M ^Buchanania obovata, Terminalia canescens, Melaleuca viridiflora, Pandanus spiralis, Melaleuca sp._ (Tree, Palm^\i), G ^Chrysopogon fallax, Aristida holothera, Whiteochloa capillipes, Eriachne obtusa, Pseudoraphis spinescens (^Tussock Grass^\i)

**Upper Stratum**

_Corymbia polycarpa_ (fq. 100%) and variously _Erythrophleum chlorostachys_ (fq. 50%), _Eucalyptus tetracta, Melaleuca sp._ (Red Bark) and/or _Corymbia bella_ mid woodland.  

**Mid Stratum**

_Buchanania obovata_ (fq. 38%), _Pandanus spiralis_ (fq. 38%), _Melaleuca sp._ (Red Bark) (fq. 25%), _Melaleuca viridiflora_ (fq. 25%) and/or _Terminalia canescens_ (fq. 25%) low woodland.

**Ground Stratum**

Mixed species low open tussock grassland including _Chrysopogon fallax_ (fq. 75%), _Aristida holothera_ (fq. 38%), _Whiteochloa capillipes_ (fq. 25%), and _Pseudoraphis spinescens_ (fq. 25%).

**Other Common Species**

**Upper Stratum** –  
_Terminalia carpentariae_ (fq. 25%), _Corymbia ferruginea_ (fq. 13%), _Eucalyptus camaldulensis_ (fq. 13%), _Eucalyptus microtheca_ (fq. 13%), _Melaleuca leucadendra_ (fq. 13%).

**Mid Stratum** –  
_Acacia dimidiata_ (fq. 38%), _Acacia platycarpa_ (fq. 25%), _Acacia torulosa_ (fq. 25%), _Alphitonia pomaderoides_ (fq. 25%), _Carissa lanceolata_ (fq. 25%), _Melaleuca sp._ (fq. 25%), _Melaleuca viridiflora_ (fq. 25%), _Owenia vernicosa_ (fq. 25%), _Petalostigma pubescens_ (fq. 25%), _Terminalia carpentariae_ (fq. 25%), _Acacia difficilis_ (fq. 13%), _Acacia latifolia_ (fq. 13%), _Acacia plectocarpa_ (fq. 13%), _Acacia sp._ (fq. 13%), _Boronia lanuginosa_ (fq. 13%), _Boschia bosiaoides_ (fq. 13%), _Brachychiton diversifolius_ (fq. 13%), _Callitris intratropica_ (fq. 13%), _Calyptrix exstipulata_ (fq. 13%), _Distichostemon hispidulus_ (fq. 13%), _Dodonaea physocarpa_ (fq. 13%), _Gardenia ewartii_ subsp. _ewartii_ (fq. 13%), _Grevillea heliosperma_ (fq. 13%), _Hakea arborescens_ (fq. 13%), _Maytenus cunninghamii_ (fq. 13%), _Melaleuca nervosa_ (fq. 13%), _Planchonia careya_ (fq. 13%), _Syzygium eucalyptoides_ (fq. 13%), _Verticordia cunninghamii_ (fq. 13%).

**Ground Stratum** –  
_Eriachne triodioides_ (fq. 25%), _Schizachyrium sp._ (fq. 25%), _Sorghum plumosum_ (fq. 25%), _Aristida contorta_ (fq. 13%), _Aristida hygrometrica_ (fq. 13%), _Corchorus sericeus_ (fq. 13%), _Ectrosia sp._ (fq. 13%), _Eragrostis tenellula_ (fq. 13%), _Eulalia aurea_ (fq. 13%), _Fimbristylis dichotoma_ (fq. 13%), _Heteropogon contortus_ (fq. 13%), _Panicum sp._ (fq. 13%), _Platycoma microphyllum_ (fq. 13%), _Sehima nervosum_ (fq. 13%), _Setania apiculata_ (fq. 13%), _Themeda triandra_ (fq. 13%), _Triodia bitextura_ (fq. 13%), _Unknown Species_ (fq. 13%), _Xyris complanta_ (fq. 13%).

**Stratum Summary Table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>25.14 (13-55)</td>
<td>14.58 (11.8-18)</td>
<td>T7i</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>20.57 (1-78)</td>
<td>4.16 (2.3-8)</td>
<td>T6i</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>27.29 (10-41)</td>
<td>0.41 (0.15-1.2)</td>
<td>G1i</td>
</tr>
</tbody>
</table>
Landscape Description:
Generally found on sandy levees and plains of the coastal plains in association with major stream systems. Soils may range from tenosols.

Landform Pattern/Element: Plain, Undulating Plain/Plain

Geology:
Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

Drainage:
Well drained.

Notes:
Vegetation community characteristic of sandy levees and plains associated with the meandering and flooding of major stream systems across the low relief coastal plain. Often occurs as small patches in amongst the more broadly distributed alluvial plain vegetation communities below the scale of mapping.

Photo:

Map: VMU44

Area: 14,708 Hectares

No. of sites: 8
GULF006PDA282, PDA337, PDA390, PDA446, PDA451, PDA525, PDA542.
Vegetation Mapping Unit 45

*Eucalyptus microtheca* Palustrine wetlands. Generally with closed ground stratum of tall woody forbs including *Sesbania* spp., *Aeschynomene* spp. and large tussock grasses such as *Leptochloa fusca*.

**NVIS Description**

U+ ^Eucalyptus microtheca (^Tree\6\r), M ^Aeschynomene indica, Sesbania cannabina, Leptochloa fusca (^Forb, Tussock Grass\3\d)

**Upper Stratum**

*Emergent Eucalyptus microtheca*

**Ground Stratum**

*Aeschynomene indica* (fq. 100%), *Sesbania cannabina* (fq. 100%), *Leptochloa fusca* (fq. 100%). tall closed forbland/grassland.

**Other Common Species**

**Upper Stratum** –

*Melaleuca dealbata*

**Mid Stratum** –

*Excoecaria parvifolia*

**Ground Stratum** –

*Eriachne glauca, Eulalia aurea, Nymphoides spp., Cyperus breviculmis, Cyperus spp.*

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>12</td>
<td>8.8</td>
<td>T6r</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Forb</td>
<td>81</td>
<td>1.8</td>
<td>F3d</td>
</tr>
</tbody>
</table>

**Landscape Description:**

Found in closed depressions, drainage depressions and in floodouts adjacent to large rivers. Soils are hydrosols, and vertosols generally grey to black. May be cracking.

**Landform Pattern/Element:**

Plain, Alluvial Plain/Drainage Depression, Swamp, Plain

**Geology:**

Qa – Quaternary alluvial deposits (gravel, sand and silt) associated with major rivers and streams.

**Drainage:**

Poorly drained

**Notes:**

Vegetation community of restricted occurrence within the study area. Palustrine wetlands generally associated with geomorphic provinces other than the coastal plain and characterised by a *Eucalyptus* spp. and being largely ephemeral on heavy, often cracking grey to black clay soils.
No. of sites: 1
PDA56.

Area: 2,437 Hectares
Vegetation Mapping Unit 46
Simple evergreen notophyll vine forest associated with sandstone springs (Spring Jungles). Characteristic species include Syzygium angophoroides, Alstonia actinophylla, Melaleuca argentea, Melicope elleryana and Ficus virens in the upper tree stratum with a well developed sub-canopy tree stratum of species such as Cupaniopsis anacardioides, Celtis philippensis, Diospyros humilis and Timonius timon. A low sparse shrub layer may be present.

NVIS Description
U+ ^Syzygium angophoroides, Alstonia actinophylla, Melaleuca argentea, Ficus virens, Melicope elleryana (T8d), M ^Celtis philippensis, Cupaniopsis anacardioides, Timonius timon, Pouteria sericea, Diospyros humilis (T6i) G ^ Antidesma parvifolium, Melastoma malabathricum Cayratia trifolia, Nephrolepis hirsutula, Colocasia esculenta (Shrub, Fern, Forb:\1'r)

Upper Stratum
Tall closed forest with Syzygium angophoroides, Alstonia actinophylla, Melaleuca argentea, Ficus virens, Melicope elleryana common components.

Mid Stratum
Low woodland including Celtis philippensis, Cupaniopsis anacardioides, Timonius timon, Pouteria sericea and Diospyros humilis.

Ground Stratum
Low sparse shrub layer (if present) including Antidesma parvifolium, Melastoma malabathricum Cayratia trifolia, Nephrolepis hirsutula, Colocasia esculenta. There is often a thick litter layer in these forests.

Other Common Species
Upper Stratum – Brachychiton sp. (fq. 100%).
Mid Stratum – Brachychiton sp. (fq. 100%), Gyrocarpus americanus (fq. 100%), Mallotus nesophilus (fq. 100%).
Ground Stratum – Stenochlaena palustris (fq. 100%), Christella dentata (fq. 100%), Lindsaea ensifolia (fq. 100%).

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>100</td>
<td>38</td>
<td>T8d</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>34</td>
<td>6</td>
<td>T6u</td>
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<tr>
<td>Ground (G1)</td>
<td>Shrub</td>
<td>5</td>
<td>0.5</td>
<td>S1i</td>
</tr>
</tbody>
</table>

Landscape Description:
Vegetation type of very restricted occurrence within the study area. Occurs in association with spring outwellings from sandstones at the bases of escarpments/cliffs of the Abner Range and other major range formations. Soils are generally sandy with high organic content (tenosols).

Landform Pattern/Element:
Escarptment/Footslope, Stream Bed

Geology:
Czl>Pra – Quaternary to Tertiary Ferricrete developed over Abner Sandstone.
Pra (Abner Sandstone) – Undivided Abner Sandstone.
Drainage:
Well drained to imperfectly drained.

Photo:

Map: VMU46

Area: 272 Hectares

No. of sites: 1
PDA153.
Vegetation Mapping Unit 60

Dry microphyll semi deciduous to deciduous monsoon vine forest associated with coastal dune fields or beach ridges. Characteristic species include *Vitex glabrata*, *Cathormion umbellatum*, *Celtis philippensis*, *Pouteria sericea*, *Denhamia obscura* and *Alstonia spectabilis* in the upper tree stratum, forming low woodlands to open forest. Emergent trees including *Bombax ceiba* and *Canarium australiatum* occasionally occur.

The mid stratum consists of upper stratum species and/or with the addition of *Strychnos lucida*, *Grewia brevifolia* and *Antidesma parvifolium*. Tussock grasses or a low sparse shrub layer may be present in the ground stratum.

NVIS Description

U+ ^ Vitex glabrata, Diospyros humilis, Cathormion umbellatum, Petalostigma pubescens (^Tree\6\i), M ^ Exocarpos latifolius, Wrightia sp., Luvunga monophylla (^Tree\6\i) G ^ Eragrostis sp., Sehima nervosum, Hyptis suaveolens, Sida cordifolia, Santalum sp (^Tussock Grass, Shrub \1\r)

Upper Stratum
Low woodland to open forest with *Vitex glabrata*, *Diospyros humilis*, *Cathormion umbellatum* and *Petalostigma pubescens* + additional spp.

Mid Stratum
Low open woodland of *Exocarpos latifolius*, *Wrightia sp.*, and *Luvunga monophylla* low open woodland.

Ground Stratum
Sparse tussock grassland of *Eragrostis sp.*, *Sehima nervosum*, *Hyptis suaveolens*, *Sida cordifolia*, *Santalum sp*.

Other Common Species
Upper Stratum –
*Canarium australianum*, *Celtis philippensis*, *Pouteria sericea*, *Denhamia obscura*, *Alstonia spectabilis*

Mid Stratum –
*Strychnos lucida*, *Grewia brevifolia*, *Antidesma parvifolium*, *Premna acuminata*

Ground Stratum –
*Capparis sepiaria*, *Abrus precatorius*.

Stratum Summary Table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Mean Cover % (Range)</th>
<th>Mean Height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>31</td>
<td>5(4-6)</td>
<td>T6i</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>14.2</td>
<td>1.6(1-2)</td>
<td>T6r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Tussock Grass</td>
<td>14.3</td>
<td>0.46(0.1-0.7)</td>
<td>G1r</td>
</tr>
</tbody>
</table>

Landscape Description:
Found in a variety of situations around the Southern Gulf coast, including dune fields and beach ridges, on calcareous sandy soils.

Landform Pattern/Element:
Beach Ridge Plain/ Embankment, Beach Ridge, Fore Dune

Geology:
Qzs>a – Quaternary soil, sand.

Drainage:
Well drained
Notes:
Restricted occurrences within the study area to relictual coastal sand (or rubble) deposits associated with the marine and coastal plains. Protection from fire in these situations allows the persistence of mesic, dry microphyll vine forest taxa.

Photo:

No. of sites: 2
One PDA site excluded from analysis due to inadequate positioning plus additional species information from Grp 12 MVF type - Russell-Smith(1991).

Map: VMU60

Area: 332 Hectares
Mangroves: General
The McArthur River tidal river system is one of the largest in northern Australia with approximately 230 kilometres of saltwater channels and hypersaline waterways, interspersed between mangrove forest, saltflats and mudflats. It also contains tributaries with substantial input of freshwater. Approximately fifty-one plant species are recognised as being regular inhabitants of Northern Territory mangrove communities. Twenty-seven of these species occur in the McArthur River region of the Gulf of Carpentaria. Only the most common species are listed in the map unit descriptions. There is a general latitudinal decline in species diversity from northern to southern regions along the Northern Territory coastline. Six vegetated mangrove communities are found in the McArthur river tidal system, fringing waterways and/or extending across the saltflats.

Vegetation Mapping Unit 61
Low closed-forest of *Ceriops tagal*, *Bruguiera spp* +/- *Excoecaria ovalis*. Mid layer sparse low-shrubland/woodland of *Ceriops tagal* +/- *Aegiceras corniculatum* +/- *Scyphiphora hydrophyllacea*. Ground strata of *Ceriops tagal* +/- *Aegialitis annulata* low open-shrubland.

NVIS Description
U+ ^Ceriops tagal, Bruguiera spp^//- Excoecaria ovalis^tree\6d; M ^Ceriops tagal^/-Aegiceras corniculatum^tree\2r;G ^Ceriops tagal^/-Aegialitis annulata^shrub\2r

Upper Stratum
Low closed forest of *Ceriops tagal*, *Bruguiera spp*. and *Excoecaria ovalis*.

Mid Stratum
Absent or a sparse low-shrubland/woodland of *Ceriops tagal* with or without *Aegiceras corniculatum*

Ground Stratum
Absent or a low open-shrubland of *Aegialitis annulata* and *Ceriops tagal* regeneration.

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>90 (5 - 100)</td>
<td>5.2 (2 - 10)</td>
<td>T6d</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>10 (0 - 25)</td>
<td>1.5 (0 - 3)</td>
<td>S2r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Shrub/Regeneration</td>
<td>5 (0 - 100)</td>
<td>0.5 (0 - 2)</td>
<td>S2r</td>
</tr>
</tbody>
</table>

Other Common Species
Upper Stratum
*Lumnitzera racemosa*, *Avicennia marina*

Description
This unit occupies extensive areas of the intertidal mangrove zone generally towards landward edge. *Ceriops tagal* is the dominant species often forming mono-specific stands, with heights ranging between 2–10 m. Scattered *Bruguiera spp* and *Excoecaria ovalis* may also occur. Isolated emergent *Avicennia marina* is characteristic also. Occupying the mid to high tidal flat, inundation is irregular. Soils are mainly muds to muddy sands that dry out during the neap tidal cycle. Salt-flats are associated with these communities which may be scattered throughout the community or found on the edges adjacent to the hinterland zone.

Tidal Level: Mean High Water Neap to Mean High Water Spring

Geomorphic Unit: Mid/High Tidal Flat
Landscape Description:
Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

Landform Pattern/Element:
Tidal flat/Tidal flat

Geology:
Qc – Sand, silt, clay: Active coastal alluvium

Drainage:
Not applicable.

Notes:

No. of sites: 2
Not applicable.

Area: 153 Hectares
Vegetation Mapping Unit 62
Low open forest of Ceriops tagal, Avicennia marina +/- Lumnitzera racemosa. Mid sparse shrubland of Aegialitis annulata. Low sparse chenopod shrubland of Halosarcia indica and Halosarcia halocnemoides.

NVIS Description
U+ ^Ceriops tagal, Avicennia marina+/Lumnitzera racemosa^tree\6\c; M ^Aegialitis annulata^shrub\3\r; G ^Halosarcia indica, Halosarcia halocnemoides^chenopod shrub\1\r

Upper Stratum
Low open forest of Ceriops tagal, Avicennia marina+/Lumnitzera racemosa.

Mid Stratum
Absent or a mid sparse shrubland of Aegialitis annulata.

Ground Stratum
Absent or a Low sparse chenopod shrubland of Halosarcia indica and Halosarcia halocnemoides

Other Common Species
Upper Stratum
Excoecaria ovalis, Excoecaria agallocha, Hibiscus tiliaceus, Avicennia marina, Lumnitzera littorea

Ground Stratum
Acrostichum speciosum, Batis argillicola

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>67.5 (1-80)</td>
<td>1.8 (0.2-3.7)</td>
<td>T6c</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Shrub</td>
<td>7(0-25)</td>
<td>1.5(0-3)</td>
<td>S2r</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Shrub/Regeneration</td>
<td>7(1-75)</td>
<td>0.3(0.2-0.3)</td>
<td>S1r</td>
</tr>
</tbody>
</table>

Description
This unit is typically associated with the landward edge or hinterland region of the mangrove zone. The community may vary from open forests as described above through to areas of open salt flat more or less devoid of vegetation. A number of mangrove associates may occur on the landward fringe.

Tidal Level: Supra tidal, Mean High Water Spring

Geomorphic Unit: High Tidal Flat/Hinterland

Landscape Description:
Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

Landform Pattern/Element:
Tidal flat/Tidal flat

Geology:
Qc – Sand, silt, clay: Active coastal alluvium

Drainage:
Not applicable.

Notes:
Photo:

Map: VMU62

No. of sites:
Not applicable.

Area: 367 Hectares
Vegetation Mapping Unit 63/66

Low open forest of *Avicennia marina*, *Ceriops tagal*, *Bruguiera spp*, *Rhizophora stylosa* with a secondary dense (open forest) tree layer of *Ceriops tagal*, *Avicennia marina*, *Osbornia octodonta*. The ground stratum is typically a low open-shrubland of *Avicennia marina*, *Ceriops tagal*, *Aegialitis annulata*.

NVIS Description

U+ *Avicennia marina, Ceriops tagal, Bruguiera spp, Rhizophora stylosa*\tree\6c; M *Ceriops tagal, Avicennia marina, Osbornia octodonta*\tree\6c; G *Avicennia marina, Ceriops tagal, Aegialitis annulata*\shrub\2i

**Upper Stratum**

Low Open Forest of *Avicennia marina, Ceriops tagal, Bruguiera spp. and Rhizophora stylosa.*

**Mid Stratum**

Low Open Forest or low woodland *Ceriops tagal, Avicennia marina and Osbornia octodonta.*

**Ground Stratum**

Low Open-Shrubland of *Aegialitis annulata and/or Avicennia marina and Ceriops tagal regeneration.*

**Other Common Species**

**Upper Stratum**

*Excoecaria ovalis, Lumnitzera racemosa*

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>55 (10 - 90)</td>
<td>4.5 (3 - 8)</td>
<td>T6c</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>50 (3 - 90)</td>
<td>1.7 (0.4 - 4.5)</td>
<td>T6c/T6i</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Shrub/Regeneration</td>
<td>15 (5 - 80)</td>
<td>0.5 (0.4 - 1.5)</td>
<td>S1i</td>
</tr>
</tbody>
</table>

**Description**

This unit occupies extensive areas of the intertidal mangrove zone landward of VMU 35a(1iv) and may extend to the landward edge of the mangrove zone.

**Tidal Level:**

Mean High Water Neap to Mean High Water Spring

**Geomorphic Unit:**

High Tidal Flat

**Landscape Description:**

Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

**Landform Pattern/Element:**

Tidal flat/Tidal flat

**Geology:**

Qc – Sand, silt, clay: Active coastal alluvium

**Drainage:**

Not applicable.

**Notes:**

Photo:

Map: VMU63/66

No. of sites: Not applicable.

Area: 4753 Hectares
Vegetation Mapping Unit 64

Mixed species mid closed forest with a *Bruguiera* spp., *Ceriops* spp. low open forest mid stratum over an *Aegialitis annulata*+/−*Acanthus ilicifolius* low open shrubland.

NVIS Description

Upper Stratum

Mid closed forest with mixed species dominance which may include *Rhizophora stylosa*, *Bruguiera parvifolia* and/or *Xylocarpus moluccensis*, *Sonneratia lanceolata* and *Avicennia marina*

Mid Stratum

Low open forest dominated by *Bruguiera parvifolia* and/or *Xylocarpus moluccensis*, *Sonneratia lanceolata* and *Avicennia marina*

Ground Stratum

Absent or a low open shrubland of *Aegialitis annulata* and/or *Acanthus ilicifolius*

Other Common Species

Upper Stratum

*Bruguiera gymnorrhiza*, *Excoecaria ovalis*, *Excoecaria agallocha*, *Lumnitzera racemosa*

Ground Stratum

*Acrostichum speciosum*, *Halosarcia indica*, *Halosarcia halocnemoides*

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>80 (60-100)</td>
<td>14 (10-20)</td>
<td>T7d</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>55 (40 - 65)</td>
<td>6 (5-8)</td>
<td>T6c</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Shrub</td>
<td>22 (0 - 60)</td>
<td>0.3 (0.2 – 0.5)</td>
<td>S2i</td>
</tr>
</tbody>
</table>

Description

A closed mixed forest in which a variety of the species may occur without being dominated by any one genus in particular. Generally found on landward edges of mangrove communities or in upper tidal reaches of creeks and rivers where there is a high freshwater influence. However landward edges are generally dominated by *Avicennia marina* and *Ceriops* spp. and abut saltpans which may contain chenopod shrubs and the mangrove fern *Acrostichum speciosum*.

Tidal creeks with high levels of freshwater input may support reasonable forests of *Xylocarpus moluccensis*, *Sonneratia lanceolata* or *Bruguiera gymnorrhiza* interspersed with the other species.

Tidal Level: Mean High Water Spring

Geomorphic Unit: High Tidal Flat/Tidal creek

Landscape Description:

Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

Landform Pattern/Element:

Tidal flat/Tidal flat
Geology:
Qc – Sand, silt, clay: Active coastal alluvium

Drainage:
Not applicable.

Notes:

Photo:
NO PHOTOGRAPH AVAILABLE

No. of sites:
Not applicable.

Map: VMU64

Area: 3461 Hectares
Vegetation Mapping Unit 65

Low closed forest of *Rhizophora stylosa*, *Bruguiera* spp, *Xylocarpus moluccensis* with a secondary tree layer (mid) of *Bruguiera parviflora*, *Ceriops tagal* and *Bruguiera exaristata* low open forest. The ground layer is generally a low open shrubland of *Aegialitis annulata* and *Acanthus ilicifolius*.

**NVIS Description**

U+ ^^Rhizophora stylosa, Bruguiera spp, Xylocarpus moluccensis ^tree\6\d; M ^Bruguiera parviflora, Ceriops tagal, Bruguiera spp\^tree\6\c;G ^^Aegialitis annulata, Acanthus ilicifolius\^shrub\2\i

Upper Stratum

Low closed forest of *Rhizophora stylosa*, *Bruguiera* spp. and *Xylocarpus mekongensis*.

Mid Stratum

Low open forest of *Bruguiera parviflora*, *Ceriops tagal* and *Bruguiera exaristata*.

Ground Stratum

Ground stratum is either absent or a low open shrubland of *Aegialitis annulata* and *Acanthus ilicifolius*.

Other common species

**Upper Stratum**

*Avicennia marina* (fq 5%)  

**Mid stratum**  

*Ceriops australis*

**Stratum summary table**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height(Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (U1)</td>
<td>Tree</td>
<td>95 (60 - 100)</td>
<td>7 (5 - 12)</td>
<td>T6d</td>
</tr>
<tr>
<td>Mid (M1)</td>
<td>Tree</td>
<td>32 (10 - 75)</td>
<td>3 (3 - 8)</td>
<td>T6c</td>
</tr>
<tr>
<td>Ground (G1)</td>
<td>Absent/shrub</td>
<td>4.5 (0 - 10)</td>
<td>0.9 (0 - 2)</td>
<td>S1i</td>
</tr>
</tbody>
</table>

**Description**

The tallest of all the mangrove communities, this unit is typically associated with seaward areas of the mangrove zone and the species mix can be highly variable dependant upon the specific hydrological regime (fresh vs. saline water flux) associated with a particular estuary system. Mono specific stands of *Rhizophora stylosa* can occur, particularly on seaward margins. This community is associated with highly mobile, fine, unconsolidated sediments (specifically muds) of the intertidal zone.

**Tidal Level**: Mean Sea Level to Mean High Water Neaps

**Geomorphic Unit**: Low/Mid Tidal Flat/Tidal creek bank

**Landscape Description**:  
Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

**Landform Pattern/Element**:  
Tidal flat/Tidal flat

**Geology**:  
Qc – Sand, silt, clay: Active coastal alluvium
**Drainage:**
Not applicable.

**Notes:**

**Photo:**

**Map:** VMU65

**Area:** 965 Hectares

**No. of sites:**
Not applicable.
Vegetation Mapping Unit 88/89

Low shrubland to low sparse chenopod shrubland of *Halosarcia indica* and *Halosarcia halocnemoides*.

NVIS Description

G ^Halosarcia indica, Halosarcia halocnemoides+/- Suaeda arbusculoides, Sporobolus virginicus, Cyperus spp.^chenopod shrub\1r

Ground Stratum

Low shrubland to sparse chenopod shrubland of *Halosarcia indica* and *Halosarcia halocnemoides*

Stratum summary table

<table>
<thead>
<tr>
<th>Strata</th>
<th>Modal Growth Form</th>
<th>Median cover % (Range)</th>
<th>Median height (Range)</th>
<th>NVIS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground (G1)</td>
<td>Shrub/grass</td>
<td>5 (0-80)</td>
<td>0.3 (0.2 – 0.4)</td>
<td>S1r</td>
</tr>
</tbody>
</table>

Description

The salt-flats may contain low growing plants comprised of sedges, grasses and samphires, depending on position and saltwater/freshwater influences. Grasses and sedges, including *Sporobolus virginicus, Xerochloa imberbis* and *Fimbristylis ferruginea*, generally occur on the higher landward edges of the salt-flats or those areas which may be inundated periodically with fresh water. Samphire species occur on the more saline regions and include *Halosarcia indica, H. halocnemoides* and *Tecticornia australasica*. Low shrubs and sub-shrubs may include *Batis argillicola* and *Suaeda arbusculoides*. Scattered colonising or stunted forms of *Avicennia marina* and *Lumnitzer racemosa* may also occur on the salt-flats. Bare salt-flat areas may occur within this vegetation mapping unit.

Includes bare saltflats and mudflats found on unconsolidated, generally hyper saline, muds or muddy sands. Irregularly inundated, once fortnightly or longer. Although not contributing to the vegetation biomass they are significant areas in terms of primary productivity of the marine ecosystem. Patches of the chenopod vegetation unit 88 may occur within the broader salt-flat area.

Tidal Level: Mean High Water Neap to Mean High Water Spring

Geomorphic Unit: High Tidal Flat

Landscape Description:

Tidal flats derived from outwash of alluvium from major stream systems into the coastal zone. Soils are classified as hydrosols.

Landform Pattern/Element:

Tidal flat/Tidal flat

Geology:

Qc – Sand, silt, clay: Active coastal alluvium

Drainage:

Not applicable.

Notes:

Photo:

Map: VMU88/89

No. of sites:
Not applicable.

Area: 45047 Hectares
4.4 Vegetation Map

Figure 7: Vegetation map of the Mc Arthur River catchment. Legend displays Broad Vegetation Groups of the study area.
Figure 8: 1:100 000 vegetation map sheet (Mallapanyah 6064), Mc Arthur River catchment displaying Vegetation Mapping Units. Refer to Appendix 7.2 for VMU map of the study area.
Figure 9: Image map of the Mc Arthur River catchment.
5.0 Discussion

Vegetation communities within the Mc Arthur River catchment study area represent the largely intact landscape of the Gulf Bioregions of the Northern Territory. Vegetation communities found cover a wide range of structural formations, varying from tussock and hummock grasslands through to Acacia shrublands, a wide variety of Eucalyptus/Corymbia woodlands/open woodlands and various closed forest formations such as mangrove and monsoon vine-forest associations.

Eucalyptus/Corymbia spp. vegetation communities dominate much of the catchment area, covering approximately 1 959 000 hectares or 76% of the study area. Of these associations, the Corymbia terminalis/Eucalyptus chlorophylla (VMU’s 17, 18, 19 and 22) and Eucalyptus leucopehloia (VMU’s 8, 9 and 10) dominated associations are the most commonly occurring, particularly through the middle and upper sections of the catchment. The C. terminalis/E. chlorophylla complex of VMU’s cover extensive areas of the alluvial and residual plains and low rises adjacent to the major streams and range formations (approx 20% of study area). These associations are closely linked and often occur together as a mosaic on generally sandy to loamy tenuosolic to kandosolic soils, between the outwashes of the ranges and the major stream valleys. Co-occurring with these dominant VMU’s are a number of additional VMU’s characterised by Ironwood (Erythrophleum chlorostachys) and Darwin Box (Eucalyptus tectifica), which also occupy similar landscape positions. Similarly, E. leucopehloia dominated associations (see below) are also a prominent component of the overall vegetation mosaic on these plains, occurring on low rises and undulations, often with gravely surfaced soils.

E. leucopehloia dominated associations with variable understoreys (VMU’s 8, 9 and 10) are a prominent feature of the low rises, hills and ranges derived from predominantly finer grained sedimentary parent materials. These occur through the central and south western parts of the catchment as well as on low rises associated with the C. terminalis/E. chlorophylla plains described above. Generally the ground layer component of these communities varies with the degree of soil development associated with a particular landscape. Hummock grasses dominating middle and upper slopes of hills on rudosols, whilst a mixed tussock and hummock or tussock grass dominated ground layer develops on tenosols and kandosols associated with footslopes and undulating rises on plains. These vegetation associations account for approximately 16% of the mapped area.

Although not extensive in area the E. tetradonta communities (VMU’s 23 and 24) and to a lesser extent some occurrences of E. miniata communities (VMU 16), associated with the deeply weathered Cainozoic coastal plains, are of particular note. These communities are intimately correlated with the pedological, topographic and hydrological sequence associated with this landscape and the widespread ‘melaleuca plains’ communities (VMU’s 29, 30 and 36; see below) that co-occur in these areas. A well defined and repeating sequence of vegetation communities can be seen to occur across these undulating plains landscapes. E. tetradonta/E. miniata dominated associations occupy the well drained, deep red kandosols of higher relative positions in this landscape grading through Melaleuca citroliens and M. viridiflora communities on the lower slopes and drainage floors. The variation in ground layer floristics and often the development of a shrubby mid storey within these E. tetradonta communities, may reflect the degree of soil profile development and the influence of water table fluctuations on the plant rooting zone.

A series of Eucalypt communities associated with sandstone escarpment and plateau environments (VMU’s 12, 13, 14, 15, 16 (in part) and 33 (in part)), form a major component of the mapped area within the Mc Arthur River catchment (approximately 21 % or 541200 hectares). The overstorey of these communities is generally characterised by C. dichromophloia, E. phoenicea or E. miniata or combinations of these species. Although these species are not restricted to sandstone landscapes and do occur on a number of other geomorphic surfaces (e.g. residual lateritic surfaces and deeply weathered lateritic plains), they generally typify the major sandstone range formations occupying extensive areas on the plateau surface of the catchment, particularly the Bukalara Ranges in the east. These communities are generally all characterised by the predominance of hummock grasses in the ground layer which is thought to correlate strongly with the rocky rudosols which characterise these communities and the presence of numerous shrub species in the mid-layer considered to be characteristic of sandstone environments.
Other notable and common *Eucalyptus* dominated vegetation communities include the *E. pruinosa* community (VMU 3) of the outwash plains and slopes associated with the fine-grained sedimentary ranges and residual surfaces of the southern rim of the catchment. The generally clay rich outwash from the surrounding hills and ranges, derived primarily from fine grained dolostones, has resulted in the formation of clay-rich, heavier textured kandosols and hydrosols. These are associated with the major drainage paths on which *E. pruinosa* dominates, with a range of tussock grasses being present which reflect micro-relief variation in water availability.

The next most common vegetation types within the study area are the *Melaleuca* spp. associations (VMU’s 26, 29, 30, 36, 37, 38, 39, 40, and 43), covering some 262 000 hectares or 10% of the total catchment area. These associations are primarily associated with plains and drainage depressions of the coastal plain. Three primary VMU’s (29, 30 and 36), accounting for some 91% of the area covered by these types, occur in a well defined topo-sequence relating to drainage and soil permeability on the lateritic surfaces seaward of the major range formations. Generally, either *M. viridiflora* or *M. citroens* are prominent features of the lower slopes of the undulating plains and lowest points in the open drainage depressions incising this land surface. This reflects the presence of a high water table in these areas and/or the impeded nature of drainage within the lower levels of the soil profiles as a result of the presence of indurated layers within the profile or kaolinitic clay rich horizons at depth. These drainage depressions may be of low relative relief when compared to the surrounding undulating plains, exhibit little development of riverine features (e.g. stream bank, bed and channels) and form the primary drainage paths and water courses draining the lateritic plains close to the coast. The interaction/relationships between groundwater and surface-water movements in these landscapes is relatively poorly understood and is thought to exert a strong influence upon the development of the vegetation community patterns and landscape as a whole.

Of particular significance within the study area are the restricted occurrences of vine-forest associations (VMU’s 46 and 60). These VMU’s occur across a range of deep sandy substrate types (coastal and organic sands). Generally, these associations are united by their topographic positions providing some protection from fire and a generally more mesic environment in which either the edaphic conditions and/or direct water supply result in an increased availability of soil moisture. Notophyll vine-forest found in association with sandstone springs on the margins of the Abner and Bukalara Ranges are of particular importance with respect to floristic diversity and are likely to provide significant refugial habitats for both flora and fauna within the broader landscape. Floristically, these sites are not dissimilar to other vine-forests associated with perennial spring systems across the Top End (Brock, 2001). However, the importance of these communities lies in the fact that they form an important part of the overall distribution of vine forests within the Northern Territory and a link between the far eastern vine forests of the Gulf Fall and Gulf Coastal Bioregions (Settlement Creek, Calvert and Robinson Rivers), the ‘core’ areas of vine-forest occurrence in Arnhem Land (Arnhem Plateau and Arnhem Coastal) and the Darwin Coastal Bioregions to the northwest.

Aligned closely with these generally more mesic vegetation types are the strongly deciduous microphyll vine thickets (VMU 27) which are a relatively widespread and common albeit of patchy occurrence within the study area. This unit is typically found on fire protected rocky sites with shallow, clay-rich soils derived from a range of predominantly dolostones which tend to inhibit the growth of fire carrying tussock grasses to some degree. These communities are highly adapted to seasonal water stress with many species being deciduous and possessing adaptations for water storage such as the swollen trunks of
Brachychiton and Cochlospermum. However, this community is also found in restricted patches on sandy plains in the western part of the catchment, where a higher proportion of evergreen taxa (e.g. Celtis philippinensis, Diospyros humilis and Ventilago viminalis) form a conspicuous part of the association.

A number of generally ‘treeless’ communities are also found within the study area. These range from both hummock (VMU 34) and tussock (VMU 35) grasslands through to a range of floristically diverse shrubland communities, generally associated with sandstone ranges (VMU 32). Trees may form a minor component of these communities as emergents. Generally speaking the latter two VMU’s are found on very rocky rudosols and rock pavements of coarse sandstones and conglomerates, where a lack of soil and/or moisture is likely to prevent the establishment of tree dominated structural formations. Conversely, tussock grasslands are generally found on a variety of heavy, clay rich vertosols and hydrosols associated with alluvial systems. In combination with the highly variable and seasonal nature of the climate (i.e. seasonal contraction and expansion of the soils associated with wetting and drying), these soils exert a strong influence on the establishment and growth of trees as a result of unfavourable mechanical/physical properties of the clays within the plant rooting zone. Shallow and flexibly rooted plants are favoured under such edaphic conditions over the more deeply penetrating root systems of trees which may be subject to mechanical damage as a result of soil expansion and contraction.

Similarly, wetland systems (VMU’s 41 and 45) are a prominent, yet spatial restricted component of the vegetation mosaic within the McArthur River catchment. These systems can be both temporally and spatially variable due to the ephemeral nature of their hydrological regimes. Generally speaking, the wetland systems of the central and upper catchment are distinguished from those of the coastal plain by the presence of Eucalyptus microtheca. Coastal plain wetlands may be largely treeless or range through to open-forests and are generally characterised by the dominance of Melaleuca spp. rather than Eucalyptus spp. In both cases soils are generally heavy vertosols or hydrosols with a highly variable lower strata which may include both hydrophytic shrubs and graminoids which vary in dominance depending upon method and timing of filling of the swamps.
6.0 References


7.0 Appendices

7.1 MatLab 49 Group Dendrogram of Mc Arthur River Survey Sites.
7.2 Vegetation Mapping Units of the Mc Arthur River Catchment (refer to Section 4.3 for complete VMU descriptions).
7.3 Checklist of Taxa Recorded During Mc Arthur River Survey

Abelmoschus ficulneus
Aegiceras corniculatum
Abrus precatorius
Aegiceras corniculatum
Abutilon sp.
Aeschynomene villosa
Acacia alleniana
Alloteropsis semialata
Acacia argyraea
Alloteropsis sp.
Acacia armitii
Alstonia actinophylla
Acacia asperulacea
Alternanthera nodiflora
Acacia colei
Alternanthera sp.
Acacia conjunctifolia
Ammannia multiflora
Acacia cowleana
Amyema mackayense
Acacia difficilis
Andropogon sp.
Acacia farnesiana
Antidesma ghesaembilla
Acacia farniciana
Antidesma parvifolium
Acacia galioides
Aragrostis sp.
Acacia galioides var. galioides
Aristida calycina
Acacia gonocarpa
Aristida contorta
Acacia gonocliada
Aristida holathera
Acacia hammondii
Aristida holothera
Acacia hemignosta
Aristida hygrometrica
Acacia hemsleyi
Aristida inaequiglumis
Acacia holosericea
Aristida inaequiglumis
Acacia humifusa
Aristida latifolia
Acacia jasperensis
Aristida latzii
Acacia jensenii
Aristida pruinosa
Acacia lamprocarpa
Aristida schultzii
Acacia latescens
Aristida shultzii
Acacia latifolia
Aristida sp
Acacia leptocarpa
Aristida sp.
Acacia lycopodiifolia
Aristida strigosa
Acacia lysiphloia
Arundinella nepalensis
Acacia monticola
Asteromyrtus symphyocarpa
Acacia nuperrima
Astrebla elymoides
Acacia oncinocarpa
Astrebla sp.
Acacia orthocarpa
Astrebla squarrosa
Acacia oswaldii
Atalaya hemiglauca
Acacia phlebocarpa
Atalaya variifolia
Acacia platycarpa
Avicennia marina
Acacia plectocarpa
Barringtonia acutangula
Acacia plectocarpa subsp. tanumbirin
Batis argillicola
Acacia shirleyi
Bauhinia cunninghamii
Acacia sp.
Bidens bipinnata
Acacia subternata
Blumea diffusa
Acacia tenuissima
Blumea tenella
Acacia torulosa
Boerhavia sp. (indet)
Acacia tropica
Bonamia media
Acacia umbellata
Bonamia pannosa
Acacia victoriae
Boronia lanuginosa
Acacia wickhamii
Bossiaea bossiaeoides
Acanthus ebracteatus
Bothriochloa decipiens
Acanthus ilicifolius
Bothriochloa sp.
Achyranthes aspera
Brachyachne ambigua
Acrostichum speciosum
Brachyachne convergens
Aegialitis annulata
Brachyachne sp.
Distichostemon hispidulus subsp. hispidulus
Dodonaea lanceolata
Dodonaea oxyptera
Dodonaea oxyptera
Dodonaea physocarpa
Dodonaea physocarpa.
Dodonaea platyptera
Dodonaea polyzyga
Dodonaea sp.
Dolichandrone filiformis
Dolichandrone heterophylla
Drosera sp.
Echinochloa colona
Ectrosia dansiei
Ectrosia leporina
Ectrosia sp.
Eleocharis dulcis
Eleocharis geniculata
Elytrophorus spicatus
Enneapogon lindleyanus
Enneapogon oblongus
Enneapogon polyphyllus
Enneapogon purpurascens
Enneapogon robustissimus
Enneapogon sp.
Enteropogon sp.
Eragrostis cumingii
eragrostis sp.
Eragrostis sp..
Eragrostis spartinoides
Eragrostis tenellula
Eregrostis sp.
Eriachne armittii
Eriachne basedowii
Eriachne burkittii
Eriachne ciliata
Eriachne glauca
Eriachne melicacea
Eriachne milicacea
Eriachne mucronata
Eriachne obtusa
Eriachne sp.
Eriachne sp1. (INDET)
Eriachne squarrosa
Eriachne trioides
Eriachne triseta
Erythrina vespertilio
Erythropheleum chlorostachys
Erythroxylum ellipticum
Eualaia aurea
Eucalyptus miniata
Eucalyptus phoeincea
Eucalyptus pruinosa
Eucalyptus sp.
Eucalyptus tectifica
Eucalyptus terminalis
Eucalyptus tetrodonata
Eulalia aurea
Eulalia aurea sp.
Eulalia sp.
Euphorbia hirta
Euphorbia vachelli
Evolvulus alsinoides
Excoecaria agallocha
Excoecaria ovalis
Excoecaria ovalis
Excoecaria parvifolia
Exocarpos latifolius
Ficus aculeata
Ficus coronulata
Ficus platypoda
Ficus racemosa
Ficus virens
Ficus virens var. virens
Fimbristylis dichotoma
Fimbristylis oxystachya
Fimbristylis polytrichoides
Fimbristylis simulans
Fimbristylis sp.
Fimbristylis squarrolosa
Flemingia pauciflora
Flemingia sp.
Flueggea virosa
Flueggea virosa subsp. melanthesoides
Fluggea virosa
Galactia sp.
Galactia tenuiflora
Gardenia ewartii subsp. ewartii
Gardenia fucata
Gardenia megasperma
Gardenia pyriformis
Gardenia pyriformis subsp. orientalis
Gardenia sp.
Germainia truncatiglumis
Glinus lotoides
Glochidion disparipes
Glycine tomentella
Gompholobium subulatum
Gomphrena sp.
Goodenia sp.
Grevillea dimidiata
Grevillea dryandri
Grevillea heliosperma
Grevillea mimosoides
Grevillea parallela
Grevillea pteridifolia
Grevillea pyramidalis
Grevillea refracta
Grevillea sp.
Grevillea striata
Grevillea wickhamii
Grewia retusifolia
Grewia sp.
Gymnanthera oblonga
Gyrocarpus americanus
Hakea arborescens
Hakea lorea
Halosarcia halocnemoides
Halosarcia indica
Halosarcia indica
Helicteres cana
Heliotropium epacrideum
Heliotropium haesum
Heliotropium ovalifolium
Heliotropium paniculatum
Heliotropium sp.
Heteropogon contortus
Heteropogon sp.
Heteropogon triticeus
Hibbertia lepidota
Hibiscus meruakensis
Hibiscus panduriformis
Hibiscus setulosos
Hibiscus sp.
Hibiscus tiliaceus
Hibiscus zonatus
Hygrophila angustifolia
Hypoestes floribunda
Hyptis suaveolens
Indigofera sp.
Iseilema sp.
Iseilema fragile
Iseilema membraccione
Iseilema vaginiflorum
Iseilema fragile
Jacksonia dilatata
Jacksonia odontoclada
Jacksonia sp.
Jacksonia vernicosa
Jasminum aemulum
Jasminum molle
Leptochloa fusca
Leptochloa fusca ssp. fusca
Lindsaya ensifolia
Lobelia sp.
Lophostemon grandiflorus
Ludwigia perennis
Luninitza littorea
Luninitza racemosa
Luvunga monophylla
Mallotus nesophilus
Margaritaria dubium-traceyi
Maytenus cunninghamii
Melaleuca acacioides
Melaleuca argentea
Melaleuca cajuputi
Melaleuca citriolens
Melaleuca dealbata
Melaleuca leucadendra
Melaleuca nervosa
Melaleuca sp.
Melaleuca sp. Redbark
Melaleuca stenostachya
Melaleuca viridiflora
Melastoma malostachya
Melania oblongifolia
Melicia elleryana
Melochia corchorifolia
Mitracne connata
Mitracne nudicalis
Mnesithia formosa
Mnesithia formosa
Mnesithia rottbeltioides
Mnesithia rottbeltioides
Nauclea orientalis
Nelsonia campestra
Nephrolepis hirsutula
Oldenlandia galloides
Oldenlandia sp.
Operculina aequiseepala
Ophiuros exaltatus
Oryza australiensis
Oryza rufipogon
Osbornia octodonta
Owenia vernicosa
Pandanus aquaticus
Pandanus spiralis
Panicum decompositum
Panicum effusum
Panicum mindanaense
Panicum sp.
Panicum trachytrachis
Parkinsonia aculeata
Paspalidium rarum
Paspalum scrobiculatum
Passiflora foetida
Pemphis acidula
Perotis rara
Persoonia falcata
Petalostigma banksii
Petalostigma pubescens
Petalostigma quadriloculare
Petalostigma sp.
Philydrum lanuginosum
Pityrodia terrifolia
Planchonia careya
Platyzoma microphyllum
Poaceae sp.
Polycarpaea sp.
Pouteria sericea
Premna acuminata
Pseudopogonatherum contortum
Pseudopogonatherum sp.
Pseudoraphis spinescens
Pterocaulon serrulatum
Pterocaulon sp.
Pterocaulon sphacelatum
Ptilotus fusiformis
Ptilotus sp.
Ptilotus spicatus
Rhizophora stylosa
Rhynchosia minima
Rhynchosia sp.
Rhynchospora affinis
Rhynchospora pterochaeta
Rhynchospora sp.
Rhynchospora sp.
Rostellularia adscendens
Santalum lanceolatum
Santalum sp.
Sarcostemma viminale
Scaevola browniana
Scaevola ovalifolia
Schizachyrium fragile
Schizachyrium pseudeulalia
Schizachyrium sp.
Scleria brownii
Scleria sp.
Sesbania cannabina
Sesbania sp.
Sesuvium portulacastrum
Sesuvium portulacastrum
Setaria apiculata
Setaria sp.
Sida cordifolia
Sida filiformis
Sida sp.
Solanum sp.
Sorghum plumosum
sorghum sp.
Spermacoce sp.
Spermacoce stenophylla
Sporobolus australasicus
Sporobolus sp.
Sporobolus australasicus
Sporobolus lenticularis
Sporobolus virginicus
Stackhousia intermedia
Stemodia lythrifolia
Stemodia viscosa
Stenocarpus acacioides
Stenochlaena palustris
Strychnos lucida
Stylosanthes humilis
Stylosanthes hamata
Syzygium angophoroides
Syzygium eucalyptoides
Tarenna dallachiana
Tecticornia australasica
Templetonia hookerii
Templetonia hookeri
Templetonia sp.
Tephrosia oblongata
Tephrosia procer a
Tephrosia sp.
Terminalia aridicola
Terminalia bursarina
Terminalia canescens
Terminalia carpentariae
Terminalia ferdinandiana
Terminalia platypyl a
Terminalia platyptera
Terminalia pluricarya
Terminalia sp.
Terminalia subacroptera
Terminalia volucris
Thaumastochloa sp.
Themedia arguens
Themedia sp.
Themedia triandra
Thespesia populneoides
Thespidium basiliflorum
Timonius timon
Tinospora smilacina
Trichodesma zeylanicum
Triodia bitextura
Triodia burdidgeana
Triodia latzii
Triodia microstachya
Triodia pungens
Triodia sp.
Triodia stenostachya
Triumphetta johnstonii
Triumphetta plumigera
Triumphetta sp.
Unknown Grass
Unknown Species
Uraria lagopodioides
Vachellia bidwillii
Vachellia farnesiana
Ventilago viminalis
Vitex acuminata
Vitex glabrata
Waltheria indica
Whiteochloa airoides
Whiteochloa sp.
Wrightia saligna
Wrightia sp.
Xerochloa imberbis
Xerochloa sp.
Xylocarpus moluccensis
Xyris complanata
Xyris complanta

Yakirra pauciflora
Yakirra sp.
7.4 Plant Checklist from HOLTZE Specimen Database: Darwin Herbarium within McArthur River region

Abelmoschus ficulneus
Abelmoschus moschatus
Abrus precatorius
Abrus precatorius subsp. precatorius
Abutilon sp.
Abutilon hannii f. subsp. Erect (J.Russell-Smith 7032)
Abutilon hannii f. subsp. Prostrate (P.K.Latz 427)
Abutilon hannii f. subsp. erect (J.Russell-Smith 7032)
Abutilon indicum subsp. albescens
Abutilon malvaefolium
Abutilon otocarpum
Acacia sp.
Acacia alleniana
Acacia argyaeae
Acacia asperulacea
Acacia bivenosa
Acacia chippendalei
Acacia coleii
Acacia coleii var. coleii
Acacia conjunctifolia
Acacia conspersa
Acacia cowleana
Acacia difficilis
Acacia dimidiata
Acacia drepanocarpa
Acacia drepanocarpa subsp. drepanocarpa
Acacia elachantha
Acacia galoides
Acacia galoides var. galoides
Acacia galoides var. glabriflora
Acacia gonocarpa
Acacia gonocarpa
Acacia hammondii
Acacia hemslieyi
Acacia holosericea
Acacia humifusa
Acacia hyaloneura
Acacia jasperensis
Acacia jensenii
Acacia laccata
Acacia lamprocarpa
Acacia latecens
Acacia latiloba
Acacia leptocarpa
Acacia ligulata
Acacia limbata
Acacia lysiphloia
Acacia monticola
Acacia multisiliqua
Acacia neurocarpa
Acacia nilotica subsp. indica
Acacia nuperrima

Acacia oncocarpa
Acacia orthocarpa
Acacia phlebocarpa
Acacia platycarpa
Acacia plectocarpa
Acacia plectocarpa subsp. plectocarpa
Acacia plectocarpa subsp. tanumbirinensis
Acacia producta
Acacia retivena
Acacia retivena subsp. retivena
Acacia sericophylla
Acacia simii
Acacia subternata
Acacia tenuissima
Acacia tephrina
Acacia torulosa
Acacia tropica
Acacia umbellata
Acacia victoriae
Acacia victoriae subsp. victoriae
Acacia wickhamii subsp.
Acacia wickhamii subsp. parviphylloidinea
Acacia wickhamii subsp. viscidula
Acanthophyllum hispidum
Acanthus ilicifolius
Acracne racemosa
Acrostichum speciosum
Adenosma sp.
Adenosma muelleri
Adenostemma lavenia
Adiantum diaphanum
Adiantum hispidulum var. hispidulum
Aegialitis annulata
Aegiceras corniculatum
Aerva javanica
Aeschynomene aspera
Aeschynomene indica
Aeschynomene villosa
Alectryon tropicus
Allopterigeron filifolius
Alloteropsis semialata
Alphitonia sp.
Alphitonia excelsa
Alphitonia pomaderroides
Alstonia actinophylla
Alteranthera sp.
Alteranthera angustifolia
Alteranthera denticulata
Alteranthera denticulata var. denticulata
Alteranthera nana
Alteranthera nodiflora
Alteranthera pungens
Alysicarpus muelleri
Alysicarpus ovalifolius
Alyxia spicata
Amaranthus sp.
Amaranthus cochleitepalus
Amaranthus interruptus
Amaranthus pallidiflorus
Amaranthus undulatus
Amaranthus viridis
Ammannia baccifera
Ammannia multiflora
Ammannia pubiflora
Amelocissus acetosa
Amelocissus frutescens
Amelopteris prolifera
Amyema sp.
Amyema bifurcata
Amyema herbertiana
Amyema mackayensis
Amyema mackayensis subsp. cycnei-sinus
Amyema maidenii
Amyema maidenii subsp. maidenii
Amyema miquelli
Amyema sanguinea
Amyema sanguinea var. sanguinea
Amyema vilflora
Amyema vilflora subsp. tomentilla
Amyema vilflora subsp. vilflora
Anagallis pumila
Anisomeles sp.
Anisomeles malabarica
Annona sp.
Antidesma ghesaembilla
Antidesma parvifolium
Aphyllodium biarticulatum
Aponogeton sp.
Aponogeton queenslandicus
Aponogeton vanbruggenii
Arenga australasica
Argemone ochroleuca subsp. ochroleuca
Aristida calycina var. calycina
Aristida dominii
Aristida exserta
Aristida holathera
Aristida holathera var. holathera
Aristida hygrometrica
Aristida inaequiglumis
Aristida ingrata
Aristida latifolia
Aristida polyclados
Aristida pruinosa
Aristida queenslandica var. queenslandica
Aristida schultzzii
Aristolochia elegans
Arundinella nepalensis
Arundinella setosa
Astarea intratropica
Asteromyrtus sp.
Asteromyrtus symphyocarpa
Astrebla elymoides
Astrebla lappacea
Astrebla pectinata
Astrebla squarrosa
Atalaya hemiglauca
Atalaya varifolia
Avicennia marina
Avicennia marina var. eucalyptifolia
Bacopa floribunda
Banksia dentata
Barringtonia acutangula subsp. acutangula
Basilicium polystachyon
Batis argillicola
Bauhinia cunninghamii
Baumea rubiginosa
Bergia ammannioides
Bergia pedicellaris
Bergia pusilla
Bergia trimeras
Bidens bipinnata
Blechnum indicum
Blechnum orientale
Blumea sp.
Blumea axillaris
Blumea diffusa
Blumea integrifolia
Blumea psammophila
Blumea saxatilis
Blumea tenella
Blyxa aubertii
Blyxa aubertii var. aubertii
Blyxa aubertii var. echinosperma
Boerhavia albiflora
Boerhavia burbridgeana
Boerhavia coccinea
Boerhavia dominii
Boerhavia gardneri
Boerhavia paludosa
Boerhavia tetrandra
Bonamia sp.
Bonamia brevifolia
Bonamia linearis
Bonamia media
Bonamia media var. media
Bonamia pannosa
Boronia lanceolata
Boronia lanuginosa
Bossiaea bossiaeoides
Bothriochloa bladhii
Bothriochloa bladhii subsp. bladhii
Bothriochloa decipiens
Bothriochloa ewartiana
Bothriochloa pertusa
Brachyachne convergens
Brachyachne tenella
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
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<tbody>
<tr>
<td>Brachychiton sp.</td>
<td>Cardiospermum hallucacabum var. hallucacabum</td>
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<td>Brachychiton collinus</td>
<td>Carissa lanceolata</td>
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<td>Calytrix achaeta</td>
<td>Chenopodium auricomum</td>
</tr>
<tr>
<td>Calytrix brownii</td>
<td>Chionachne cyathopoda</td>
</tr>
<tr>
<td>Calytrix exstipulata</td>
<td>Chionachne hubbardiana</td>
</tr>
<tr>
<td>Calytrix mimiana</td>
<td>Chloris barbata</td>
</tr>
<tr>
<td>Canarium australianum</td>
<td>Chloris lobata</td>
</tr>
<tr>
<td>Canavalia papuana</td>
<td>Christella dentata</td>
</tr>
<tr>
<td>Canavalia rosea</td>
<td>Christella dentata</td>
</tr>
<tr>
<td>Canscera diffusa</td>
<td>Christia australasica</td>
</tr>
<tr>
<td>Cansjera leptostachya</td>
<td>Chrysopogon elongatus</td>
</tr>
<tr>
<td>Capparis lasiantha</td>
<td>Chrysopogon fallax</td>
</tr>
<tr>
<td>Capparis sepiaria</td>
<td>Chrysopogon oliganthus</td>
</tr>
<tr>
<td>Capparis spinosa var. nummularia</td>
<td></td>
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</tbody>
</table>
Chrysopogon pallidus
Cissus adnata
Cissus reniformis
Citrullus colocynthis
Citrullus lanatus
Cladium mariscus
Cleome sp.
Cleome cleomoides
Cleome microaustralica
Cleome oxalidea
Cleome tetandra
Cleome tetandra var. tetandra
Cleome viscosa
Clerodendrum sp.
Clerodendrum floribundum
Clerodendrum floribundum var. attenuatum
Clerodendrum floribundum var. coriaceum
Clerodendrum inerme
Clerodendrum tomentosum
Clerodendrum tomentosum var. tomentosum
Clitoria ternatea
Cochlospermum fraseri subsp. fraseri
Cochlospermum gillivraei
Cochlospermum gregorii
Coldenia procumbens
Colocasia esculenta
Colubrina asiatica
Commelina sp.
Commelina agrostophylla
Commelina ciliata
Commelina ensifolia
Corchorus sp.
Corchorus aestuans
Corchorus fascicularis
Corchorus olitorius
Corchorus pumilio
Corchorus sericeus
Corchorus sericeus subsp. densiflorus
Corchorus sericeus subsp. sericeus
Corchorus sidoides
Corchorus sidoides subsp. rostrisepalus
Corchorus sidoides subsp. sidoides
Corchorus sidoides subsp. vermicularis
Corchorus tridens
Cordia dichotoma
Cordia subcordata
Corymbia aspera
Corymbia bella
Corymbia confertiflora
Corymbia curtipes
Corymbia dichromophloia
Corymbia drysdalesii
Corymbia ferruginea
Corymbia ferruginea subsp. ferruginea
Corymbia flavescens
Corymbia grandifolia subsp. grandifolia
Corymbia grandifolia
Corymbia greeniana
Corymbia kombolgiensis
Corymbia opaca
Corymbia pauciseta
Corymbia polycarpa
Corymbia ptychocarpa subsp. indeterminate
Corymbia ptychocarpa subsp. ptychocarpa
Corymbia setosa subsp. setosa
Corymbia terminalis
Corynthera lateriflora
Cressa australis
Crinum angustifolium
Crinum uniflorum
Crotalaria sp.
Crotalaria brevis
Crotalaria calycina
Crotalaria crispata
Crotalaria cunninghamii
Crotalaria cunninghamii subsp. cunninghamii
Crotalaria dissitiflora subsp. rugosa
Crotalaria juncea
Crotalaria medicaginea
Crotalaria medicaginea var. neglecta
Crotalaria montana
Crotalaria montana var. angustifolia
Crotalaria montana var. exserta
Crotalaria novae-hollandiae
Crotalaria novae-hollandiae subsp. lasiophylla
Crotalaria novae-hollandiae subsp. novae-hollandiae
Crotalaria ramosissima
Crotalaria retusa
Crotalaria verrucosa
Croton habrophyllus
Croton tomentellus
Cucumis maderaspatana
Cucumis melo
Cucumis melo subsp. agrestis
Cucumis melo subsp. melo
Cullen australasicum
Cullen balsamicum
Cullen plumosum
Cullen pustulatum
Cupaniopsis anacardioides
Curculigo ensifolia
Cuscuta victoriana
Cyanotis axillaris
Cyathostemma cinereum
Cycas angulata
Cyclosorus interruptus
Cymbidium canaliculatum
Cymbopogon ambiguus
Cymbopogon bombycinus
Cymbopogon dependens
Cymbopogon procerus
Cymbopogon refractus
Distichostemon barklyanus
Distichostemon hispidulus
Distichostemon hispidulus var. phyllopterus
Dodonaea sp.
Dodonaea lanceolata
Dodonaea lanceolata var. lanceolata
Dodonaea oxyptera
Dodonaea physocarpa
Dodonaea platyptera
Dodonaea polyzyga
Dodonaea stenophylla
Dodonaea viscosa
Dodonaea viscosa subsp. mucronata
Dolichandrone filiformis
Dolichandrone heterophylla
Drosera banksii
Drosera burmannii
Drosera petiolaris
Drypetes deplanchei
Dysphania rhadinostachya subsp. rhadinostachya
Echinochloa colona
Echinochloa elliptica
Eclipta sp.
Eclipta sp. Humpty Doo (H.S.McKee 8360)
Ectrosia sp.
Eleocharis atropurpurea
Eleocharis brassii
Eleocharis dulcis
Eleocharis geniculata
Eleocharis nuda
Eleocharis setifolia
Eleocharis sp. Affin acutangula (S.T.Blake 17630)
Eleocharis sp. Affin brassii (G.M.Chippendale 1486)
Eleocharis sp. Coonjimba Billabong (T.S.Henshall 3365)
Eleocharis sp. Nourlangie Creek (L.A.Craven 4652)
Elytrophorus spicatus
Enchytraea tomentosa
Enneapogon avenaceus
Enneapogon clelandii
Enneapogon decipiens
Enneapogon lindleyanus
Enneapogon oblongus
Enneapogon pallidus
Enneapogon polyphyllus
Enneapogon purpurascens
Enneapogon robustissimus
Enteropogon dolichostachyus
Enteropogon minutus
Eragrostis sp.
Eragrostis amabilis
Eragrostis brownii
Eragrostis confertiflora
Eragrostis cumingii
Eragrostis desertorum
Eragrostis exigua
Eragrostis fallax
Eragrostis hirticaulis
Eragrostis schultzii
Eragrostis spinatooides
Eragrostis speciosa
Eragrostis stagnalis
Eragrostis stenostachya
Eragrostis tenellula
Eremophila longifolia
Eriachne aristidea
Eriachne armitii
Eriachne avenacea
Eriachne basalis
Eriachne burkittii
Eriachne ciliata
Eriachne filiformis
Eriachne glauca
Eriachne glauca var. glauca
Eriachne major
Eriachne melicacea
Eriachne mucronata
Eriachne nervosa
Eriachne obtusa
Eriachne obtusa var. Short narrow inflorescence (R.B.Brown 267)
Eriachne pulchella subsp. dominii
Eriachne stipacea
Eriachne triiodioides
Eriachne triseta
Eriachne vesiculosa
Eriocaulon sp.
Eriocaulon carpentariae
Eriocaulon cinereum
Eriocaulon depressum
Eriocaulon fistulosum
Eriocaulon patericola
Eriocaulon pusillum
Eriocaulon pygmaeum
Eriocaulon setaceum
Eriocaulon sp. Arid Zone (D. Schunke 28/Aug/90)
Eriocaulon spectabile
Eriocaulon tortuosum
Eriochloa crebra
Eriochloa procera
Eriochloa pseudoacrotricha
Erythrina vespertilio
Erythrophleum chlorostachys
Erythroxylum ellipticum
Eucalyptus barklyensis
Eucalyptus camaldulensis var. obtusa
Eucalyptus chlorophylla
Eucalyptus distans
Eucalyptus herbartiana
Eucalyptus leucophloia
Eucalyptus leucophloia subsp. euroa
Eucalyptus microtheca
Eucalyptus miniata
Eucalyptus phoenicea
Eucalyptus pruinosa
Eucalyptus pruinosa subsp. pruinosa
Eucalyptus pruinosa subsp. tenuata
Eucalyptus tectifica
Eucalyptus tetrodonta
Eucalyptus tintinnans
Eulalia aurea
Euphorbia sp.
Euphorbia alsiniflora
Euphorbia armstrongiana
Euphorbia atoto
Euphorbia australis subsp. vaccaria
Euphorbia bicornexa
Euphorbia comans
Euphorbia cyathophora
Euphorbia heterophylla
Euphorbia hirta
Euphorbia micheliana
Euphorbia myrtoide subsp. myrtoide
Euphorbia petala
Euphorbia schizolepis
Euphorbia schultzii
Euphorbia tannensis subsp. eremophila
Euphorbia tannensis subsp. tannensis
Euphorbia vachelii
Evolvulus alsinoide var. alsinoides
Evolvulus alsinoide var. decumbens
Evolvulus alsinoide
Excoecaria agallocha
Excoecaria ovalis
Excoecaria parvifolia
Exocarpos latifolius
Ficus sp.
Ficus aculeata var. aculeata
Ficus atricha
Ficus brachypoda
Ficus cerasicarpa
Ficus coronulata
Ficus racemosa var. racemosa
Ficus sp. Carpentariensis (W.B. Spencer 01/Jul/11)
Ficus subpuberula
Ficus virens
Ficus virens var. virens
Fimbrystis sp.
Fimbrystis acicularis
Fimbrystis acuminata
Fimbrystis aestivalis
Fimbrystis blakei
Fimbrystis caespitosa
Fimbrystis cephalophora
Fimbrystis cinnamometorum
Fimbrystis complanata
Fimbrystis cymosa
Fimbrystis densa
Fimbrystis denudata
Fimbrystis depauperata
Fimbrystis dichotoma
Fimbrystis dolera
Fimbrystis ferruginea
Fimbrystis furva
Fimbrystis fuscocaudata
Fimbrystis laxiglumis
Fimbrystis littoralis
Fimbrystis littoralis var. littoralis
Fimbrystis macassarensis
Fimbrystis macrantha
Fimbrystis microcarya
Fimbrystis miliacea
Fimbrystis modesta
Fimbrystis neilsonii
Fimbrystis nuda
Fimbrystis nutans
Fimbrystis ovata
Fimbrystis oxystachya
Fimbrystis pachyptera
Fimbrystis pauciflora
Fimbrystis phaeoleuca
Fimbrystis polytrichoides
Fimbrystis pterygopetra
Fimbrystis pubisquama
Fimbrystis punctata
Fimbrystis rara
Fimbrystis recta
Fimbrystis rupestris
Fimbristylis stenostachya
Fimbristylis tetragona
Fimbristylis trigastrocarya
Fimbristylis tristachya
Fimbristylis velata
Flagellaria indica
Flaveria australasica
Flemingia sp.
Flemingia lineata
Flemingia parviflora
Flemingia pauciflora
Flueggea virosa
Flueggea virosa subsp. melanthesoides
Fuirena arenosa
Fuirena ciliaris
Fuirena incrassata
Fuirena umbellata
Galactia sp.
Galactia tenuiflora
Gardenia sp.
Gardenia ewartii
Gardenia ewartii
Gardenia fucata
Gardenia megasperma
Gardenia pyriformis
Gardenia pyriformis subsp. orientalis
Gardenia schwarzii
Geijera salicifolia
Geodorum neocaledonicum
Germainia grandiflora
Germainia truncatiglumis
Glinus lotoides
Glinus oppositifolius
Glochidion sp.
Glochidion apodogynum
Glochidion disparipes
Glochidion xerocarpum
Glossostigma diandrum
Glycine hirticaulis
Glycine tomentella
Glycosmis trifoliata
Gompholobium subulatum
Gomphrena sp.
Gomphrena breviflora
Gomphrena canescens subsp. canescens
Gomphrena canescens subsp. canescens
Gomphrena celosioides
Gomphrena conica
Gomphrena diffusa
Gomphrena diffusa subsp. diffusa
Gomphrena flaccida
Gomphrena floribunda
Gomphrena humilis
Gomphrena lanata
Gomphrena leptophylla
Gonocarpus chinensis
Gonocarpus leptothecus
Goodenia sp.
Goodenia armitiana
Goodenia armstrongiana
Goodenia azurea subsp. azurea
Goodenia bicolor
Goodenia byrneshii
Goodenia fascicularis
Goodenia grandiflora
Goodenia hispida
Goodenia janamba
Goodenia kakadu
Goodenia lamproperma
Goodenia leiosperma
Goodenia minutiiflora
Goodenia odonnellii
Goodenia pilosa
Goodenia pumilio
Goodenia purpurascens
Goodenia redacta
Goodenia strangfordii
Goodenia viscidula
Gossypium austral
Gossypium hirsutum
Grevillea sp.
Grevillea decurrens
Grevillea dimidiata
Grevillea dryandri
Grevillea dryandri subsp. dryandri
Grevillea heliosperma
Grevillea mimosoides
Grevillea paralela
Grevillea prasina
Grevillea pteridifolia
Grevillea pungens
Grevillea pyramidalis
Grevillea refracta subsp. refracta
Grevillea striata
Grevillea wickhamii
Grevillea wickhamii subsp. aprica
Grewia breviflora
Grewia oxyphylla
Grewia retusifolia
Guettarda speciosa
Gymnanthera oblonga
Gyrocarpus americanus
Haemodorus sp.
Haemodorus breviculae
Haemodorus succineum
Hakea arborescens
Hakea chordophylla
Hakea lorea subsp. borealis
Halodule uninevis
Halophila decipiens
Halophila ovalis
Haloragis sp.
Haloragis glauca f. glauca
Halosarcia sp.
Halosarcia indica
Helicteres angustifolia
Helicteres cana
Helicteres isora
Heliotropium sp.
Heliotropium ballii
Heliotropium bracteatum
Heliotropium epacrideum
Heliotropium fasciculatum
Heliotropium glabellum
Heliotropium haesum
Heliotropium indicum
Heliotropium leptaleum
Heliotropium pachyphyllum
Heliotropium paniculatum
Heliotropium plumosum
Heliotropium prostratum
Heliotropium ramulipatens
Heliotropium tenuifolium
Herissantia crispa
Heterachne abortiva
Heterachne gulliveri
Heteropogon contortus
Hibbertia sp.
Hibbertia lepidota
Hibbertia sp. Stellate above
Hibbertia tomentosa
Hibiscus sp.
Hibiscus australis
Hibiscus australis var. australis
Hibiscus fluvialis
Hibiscus leucocephalus
Hibiscus meriakensis
Hibiscus pentaphyllus
Hibiscus setulosus
Hibiscus sturtii
Hibiscus sturtii var. campylochlamys
Hibiscus sturtii var. grandiflorus
Hibiscus tillieuxii
Hibiscus trionum var. vesicarius
Hibiscus zonatus
Hybanthus sp.
Hybanthus aurantiacus
Hybanthus enneaspermus
Hybanthus enneaspermus
Hydrocotyle graminocarpa
Hygrochloa cravenii
Hygrophila angustifolia
Hyophila involuta
Hypericum gramineum
Hypoestes floribunda
Hypoestes floribunda var. cinerea
Hyptis suaveolens
Imperata cylindrica
Indigomitra parviflorum
Indigofera sp.
Indigofera colutea
Indigofera erecta
Indigofera hirsuta
Indigofera haplophylla
Indigofera linearis
Indigofera linnaei
Indigofera linnaei
Indigofera pratensis
Indigofera trita
Indigofera australis
Indigofera australis
Indigofera ewartiana
Indigofera ewartiana
Indigofera haplophylla
Indigofera hirsuta
Indigofera linearis
Indigofera linearis
Indigofera pratensis
Indigofera trita
Iotasperma australiense
Iotasperma sessilifolia
Iphigenia indica
Ipomoea aquatica
Ipomoea argillicola
Ipomoea brassii
Ipomoea cautica
Ipomoea diamantinensis
Ipomoea ericarpia
Ipomoea gracilis
Ipomoea macrantha
Ipomoea muellei
Ipomoea nil
Ipomoea pes-caprae subsp. brasiliensis
Ipomoea plebeia
Ipomoea polymorpha
Ipomoea racemigera
Ipomoea sp. OT Station (S.T.Blake 17676)
Isachne confusa
Isachne globosa
Isachne globosa var. effusa
Ischaemum australis
Ischaemum australis
Ischaemum decumbens
Ischaemum fragilis
Iseilema sp.
Iseilema alpha
Iseilema beta
Iseilema convexum
Iseilema fragilis
Iseilema membranaceum
Iseilema vaginiflorum
Isoetes muelleri
Isoetes humilima
Isopterygium sp.
Isopertygium minitirameum
Jacksonia aculeata
Jacksonia dilatata
Jacksonia laterita
Jacksonia odontoclada
Jacksonia vernicosa
Jacksonia vernicosa
Jacquemontia sp.
Jacquemontia browniana
Jacquemontia paniculata
Jasminum didymum
Jasminum didymum
Jasminum didymum
Jasminum didymum
Jasminum didymum
Jasminum didymum
Jasminum molle
Josephinia eugeniae
Lechenaultia filiformis
Lechenaultia filiformis
Lemna sp.
Lemna aequinoctialis
Leplanaria articulata
Leptochloa fusca subsp. fusca
Leptochloa neesii
Leptopus decaisnei
Leptosema bossiaeoides
Leptosema uniflorum
Lepturus repens
Limnophila sp.
Limnophila australis
Limnophila brownii
Limnophila chinensis
Limnophila fragrans
Lindernia sp.
Lindernia aplectra
Lindernia clausa
Lindernia lobeloides
Lindernia scapigera
Lindernia sp. Cliff lover (P.K.Latz 10123)
Lindernia sp. Open throated (J.Russell-Smith 5581)
Lindsaea ensifolia
Lipocarpha microcephala
Lithomyrtus hypoleuca
Lithomyrtus retusa
Livistona humilis
Livistona inermis
 Lobelia sp.
 Lobelia dioica
 Lobelia quadrangularis
 Lobelia stenophylla
 Lophostemon grandiflorus
 Lophostemon grandiflorus subsp. grandiflorus
 Lophostemon grandiflorus subsp. riparius
 Ludwigia octovalvis
 Ludwigia perennis
 Luffa aegyptiaca
 Luffa graveolens
 Lumnitzera littorea
 Lumnitzera racemosa
 Luvunga monophylla
 Lycopodiella cernua
 Lygodium flexuosum
 Lygodium microphyllum
 Lysiana spathulata
 Lysiana spathulata
 Lysiana spathulata subsp. parvifolia
 Lysiana spathulata subsp. spathulata
 Lysiana subfalcata
 Macarthuria sp.
 Macarthuria vertex
 Macropertanthes keckwickei
 Macroptilium atropurpureum
 Macrothelypteris torresiana
 Maidenia rubra
 Maireana villosa
 Mallotus nesophilus
 Malvastrum americanum
 Margaritaria dubium-traceyi
 Marsdenia sp.
 Marsdenia australis
 Marsdenia geminata
 Marsdenia viridiflora
 Marsdenia viridiflora subsp. tropica
 Marsilea sp.
 Marsilea angustifolia
 Marsilea drummondii
 Marsilea hirsuta
 Marsilea mutica
 Maytenus cunninghamii
 Melaleuca sp.
 Melaleuca acacioides
 Melaleuca acacioides subsp. acacioides
 Melaleuca argentea
 Melaleuca bracteata
 Melaleuca cajuputi
 Melaleuca citroens
 Melaleuca leucadendra
 Melaleuca nervosa
 Melaleuca sp. Red Bark (P.S.Brocklehurst 457)
 Melastoma malabathricum subsp. malabathricum
 Melia azedarach
 Melia azedarach var. australasica
 Melicepella elleryana
 Melochia coronifolia
 Melochia pyramidata
 Merremia sp.
 Merremia dissecta
 Merremia gemella
 Merremia incisa
 Merremia quinata
 Microcarpaea minima
 Micromelum minutum
 Mimulus uvedaliae var. uvedaliae
 Mitrasacme ambigu
 Mitrasacme connata
 Mitrasacme elata
 Mitrasacme exserta
 Mitrasacme gentianea
 Mitrasacme glaucescens
 Mitrasacme laricifolia
 Mitrasacme micrantha
 Mitrasacme multicaulis
 Mitrasacme nudicaulis var. nudicaulis
 Mitrasacme nummularia
 Mitrasacme patens
Mitrasacme scrithicola
Mitrasacme secedens
Mitrasacme stellata
Mnesithea formosa
Mnesithea rottboellioides
Mollugo sp.
Momordica balsamina
Monochoria cyanea
Monochoria vaginalis
Morinda citrifolia
Muehlenbeckia florulenta
Murdannia graminea
Myoporum montanum
Myriophyllum sp.
Myriophyllum dicoccum
Myriophyllum filiforme
Myriophyllum trachycarpum
Myriophyllum verrucosum
Myristica insipida var. insipida
Najas sp.
Najas graminea
Najas malesiana
Najas pseudograminea
Najas tenuifolia
Nauclea orientalis
Nelsonia campestris
Nephrolepis sp.
Nephrolepis hirsutula
Neptunia dimorphantha
Neptunia gracilis
Neptunia gracilis f. gracilis
Neptunia major
Neptunia monosperma
Nesaea crinipes
Nesaea muelleri
Nicotiana benthamiana
Nicotiana monoschizocarpa
Nitella sp.
Nymphaea macroserma
Nymphaea violacea
Nymphoides aurantiaca
Nymphoides crenata
Nymphoides exiliflora
Nymphoides indica
Nymphoides parvifolia
Nymphoides quadriloba
Nymphoides simulans
Octoblepharum albidum
Oldenlandia sp.
Oldenlandia argillacea
Oldenlandia galloiodes
Oldenlandia laceyi
Oldenlandia mitrasacmoides
Oldenlandia mitrasacmoides subsp. mitrasacmoides
Oldenlandia mitrasacmoides subsp. nigricans
Omegandra kanisi
Operculina aequisepala
Operculina turpethum
Ophioglossum gramineum
Ophiuros exaltatus
Opilia amentacea
Oryza australiensis
Osbornia octodonta
Owenia reticulata
Owenia vernicosa
Oxychloris scariosa
Pachynema sp.
Pandanus sp.
Pandanus aquaticus
Pandanus spiralis
Panicum decompositum
Panicum decompositum
Panicum effusum
Panicum laevinode
Panicum mindanaense
Panicum seminudum
Panicum seminudum
Panicum trachyrhachis
Panicum trichoides
Paraceretach muelleri
Parkinsonia aculeata
Parthenium hysterophorus
Paspalidium sp.
Paspalidium constrictum
Paspalidium distans
Paspalidium gracile
Paspalidium jubilferum
Paspalidium rarum
Paspalidium retiglume
Paspalum scrobiculatum
Paspalum vaginatum
Passiflora foetida
Pavetta sp.
Pavetta brownii
Pavetta brownii var. brownii
Pavetta muelleri
Pavetta rupecola
Pemphis acidula
Pennisetum pedicellatum
Pennisetum polystachion subsp. polystachion
Pentalepis eclipoides
Peplidium sp.
Peplidium maritim
Peplidium muelleri
Perotis rara
Persicaria attenuata
Persicaria attenuata subsp. attenuata
Persicaria barbata
Persoonia falcata
Petalostrigma sp.
Petalostrigma banksii
Petalostrigma nummularium
Petalostrigma pubescens
Petalostigma quadriloculare
Phacellothrix cladochaeta
Pheidochloa gracilis
Philonotis sp.
Philydrum lanuginosum
Phragmites vallatoria
Phyla nodiflora var. nodiflora
Phyllanthus sp.
Phyllanthus amarus
Phyllanthus aridus
Phyllanthus carpentariae
Phyllanthus debilis
Phyllanthus exilis
Phyllanthus hebecarpus
Phyllanthus indigoferoides
Phyllanthus lacerosus
Phyllanthus maderaspatensis
Phyllanthus maderaspatensis var. angustifolius
Phyllanthus minutiflorus
Phyllanthus reticulatus
Phyllanthus urinaria
Physalis angulata
Physalis micrantha
Pisonia aculeata
Pityrodia angustisepala
Pityrodia ternifolia
Planchonia careya
Platyzyga microphyllum
Plectranthus sp.
Plectranthus scutellarioides
Planchonia careya
Plumbago zeylanica
Polycarpaea breviflora
Polycarpaea corymbosa
Polycarpaea holtszi
Polycarpaea involucrata
Polycarpaea longiflora
Polycarpaea multicaulis
Polycarpaea spirostylis
Polygala sp.
Polygala exsquarrosa
Polygala longifolia
Polygala sp. Camooweal (R.A.Kerrigan 1262)
Polygala sp. Davenport Ranges (C.R.Dunlop 6042)
Polygala sp. Entire (M.O.Rankin 1932)
Polygala sp. Gregory (G.M.Wightman 2823)
Polygala sp. Mudginberri (J.Russell-Smith 987)
Polygala sp. Narrow Sepals (Muell.) var. congesta (R.A.Kerrigan)
Polygala sp. Obovate Leaves (C.P.Mangion 900)
Polygala sp. Rock lover (C.R.Michell 615) var. angustata
Polygala sp. Rock lover (C.R.Michell 615) var. petraphila
Polygala sp. Small Lobes (R.A.Kerrigan 754)
Polygala sp. Thickened Testa (I.D.Cowie 2472)
Polygala sp. Top End (L.A.Craven 5464)
Polygala sp. Winged Fruit (R.A.Kerrigan 917)
Polygala stenocladia
Polymeria sp.
Polymeria ambigu
Polymeria longifolia
Poranthera sp.
Poranthera coerulae
Portulaca bicolor
Portulaca filifolia
Portulaca intraterranea
Portulaca oleracea var. Undoolya (R.A.Perry 3267)
Portulaca oleracea var. Weedy (C.S.Robinson 162)
Portulaca oleracea var. Yuendumu (T.S.Henschall 2868)
Portulaca oleracea
Portulaca oligosperma
Portulaca pilosa
Portulaca sp. Clay soil (S.T.Blake 17854)
Potamogeton tricarinatus
Pouerea sericea
Premna acuminata
Premna odorata
Premna serratifolia
Prostanthera racemosus
Pseudopogonatherum contortum
Pseudopogonatherum irritans
Pseudoraphis spinescens
Psilotum nudum
Psydrax attenuata
Psydrax attenuata var. myrmecophila
Psydrax paludosa
Psydrax saligna
Pteris comans
Pterocaulon sp.
Pterocaulon serrulatum
Pterocaulon serrulatum
Pterocaulon serrulatum var. serrulatum
Pterocaulon serrulatum var. velutinum
Pterocaulon sphyacelatum
Pterocaulon verbascifolium
Ptilotus sp.
Ptilotus conicus
Ptilotus corymbosus
Ptilotus corymbosus var. acutiflorus
Ptilotus corymbosus
Ptilotus dissitiflorus
Ptilotus exaltatus
Ptilotus fusiformis
Ptilotus fusiformis var. fusiformis
Ptilotus fusiformis var. gracilis
Ptilotus polystachyus
Ptilotus spicatus
Ptilotus spicatus
Ptilotus spicatus subsp. leianthus
Ptilotus spicatus subsp. spicatus
Pycnospora lutescens
Ramalina subfraxinea
Rhamphicarpa australiensis
Rhizophora stylosa
Rhynchosia minima
Rhynchospora gracillima
Rhynchospora heterochaeta
Rhynchospora leae
Rhynchospora longiseta
Rhynchospora pterochaeta
Rhynchospora submarginata
Rhynchospora wightiana
Rostellaria adscendens
Rostellaria adscendens subsp. clementii
Rotala diandra
Rotala mexicana
Rotala occultiflora
Rotala tripartita
Rothia indica subsp. australis
Ruppiaria maritima
Rutidosiphon helichrysoideus subsp. acutiglumis
Saccolepis indica
Saccolepis myosuroides
Salomonia ciliata
Salsola tragus
Salsola tragus subsp. pontica
Santalum lanceolatum
Sarcostemma viminalin
Sarcostemma viminalin subsp. australis
Sarcostemma viminalin subsp. brunonianum
Sauropus sp.
Sauropus rigidulus
Sauropus trachyspermus
Scaevola sp.
Scaevola amblyanthera var. amblyanthera
Scaevola browniana
Scaevola glabrata
Scaevola revoluta
Scaevola revoluta subsp. revoluta
Scaevola taccada
Schizachyrium fragile
Schizachyrium occultum
Schizachyrium pachyarthron
Schizachyrium pseudoualila
Schizachyrium sp. Wingless (S.T.Blake 17764)
Schoenoplectus sp.
Schoenoplectus dissachanthus
Schoenoplectus laevis
Schoenoplectus lateriflorus
Schoenoplectus litoralis
Schoenoplectus mucronatus
Schoenoplectus praelongatus
Schoenus calostachyus
Schoenus falcatus
Schoenus punctatus
Schoenus sparteus
Scleria annularis
Scleria brownii
Scleria ciliaris
Scleria laxa
Scleria levis
Scleria lithosperma var. lithosperma
Scleria novae-hollandiae
Scleria poaeformis
Scleria pygmaea
Scleria rugosa
Scleroalaena bicorns
Scleroalaena glabra
Scoparia dulcis
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Secamone elliptica
Seshipa nervosa
Selaginella ciliaris
Senna artemisioides subsp. oligophylla
Senna leptocladia
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Senna planitiicola
Senna venusta
Sesbania benthamiana
Sesbania brachycarpa
Sesbania cannabina
Sesbania chippendaeli
Sesbania erubescens
Sesbania javanica
Sesuvium portulacastrum
Setaria apiculata
Setaria queenslandica
Setaria surgens
Sida sp.
Sida acuta
Sida brachypoda
Sida cordifolia
Sida corrigata
Sida filiformis
Sida filiformis
Sida hackettiana
Sida macrododa
Sida rohenea
Sida rohenea subsp. rohenea
Sida sp. Walhallow Station (C.Edgoose
28/Oct/94)
Sida spinoa
Sida subspecicata
Sida trichopoda
Sida virgata
Solanum sp.
Solanum carduiforme
Solanum dianthophorum
Solanum dioicum
Solanum eburneum
Solanum echinatum
Solanum esuriale
Solanum melanospermum
Solanum pugiunculiferum
Solanum quadricolatum
Solanum setheae
Solanum tumulicola
Sorghum sp.
Sorghum intrans
Sorghum laxiflorum
Sorghum plumericum
Sorghum plumosum
Sorghum plumosum var. plumosum
Spermacoce argillacea
Spermacoce auriculata
Spermacoce calliantha
Spermacoce dolichosperma
Spermacoce fabiformis
Spermacoce gilliesiae
Spermacoce latimarginata
Spermacoce lignosa
Spermacoce platyloba
Spermacoce pogostoma
Spermacoce remota
Spermacoce rupicola
Spermacoce stenophylla
Sphaeranthus africanus
Sphaeranthus indicus
Sphaeromorphaea australis
Sphenoclea zeylanica
Spinifex longifolius
Sporobolus actinocladus
Sporobolus australasicus
Sporobolus fertilis
Sporobolus mitchellii
Sporobolus virginicus
Stackhousia intermedia
Stemodia glabella
Stemodia lythrifolia
Stemodia platyphyllis
Stephania japonica var. timoriensis
Streptoglossa adscendens
Streptoglossa bubakii
Streptoglossa odorata
Striga curviflora
Strychnos lucida
Stylidium sp.
Stylidium adenophorum
Stylidium capillare
Stylidium floodii
Stylidium floribundum
Stylidium longicornu

Stylidium muscicola
Stylidium pachyrhizum
Stylidium schizanthum
Stylidium stenophyllum
Stylodanthes hamata
Stylodanthes humidis
Suriana maritima
Syngodium isotoefoliun
Syzygium angophoroides
Syzygium eucalyptoides
Syzygium eucalyptoides subsp. eucalyptoides
Tacca leontopetaloides
Tamarindus indica
Tarenna dallachiana subsp. expandens
Tecticornia australasica
Tecticornia halocnemoides subsp. tenuis
Tecticornia indica subsp. indica
Tecticornia indica subsp. leiostachya
Templetonia hookeri
Tephrosia sp.
Tephrosia brachyodon
Tephrosia brachyodon
Tephrosia brachyodon var. longifolia
Tephrosia brachyodon var. multiflora
Tephrosia conspicua
Tephrosia coriacea
Tephrosia delestangii
Tephrosia filipes var. filipes
Tephrosia filipes
Tephrosia gyropoda
Tephrosia lasiochlaena
Tephrosia laxa
Tephrosia laxa var. angustata
Tephrosia leptocladia
Tephrosia macrocarpa
Tephrosia oblongata
Tephrosia ologophylla
Tephrosia phaeosperma
Tephrosia procera
Tephrosia purpurea
Tephrosia rosea
Tephrosia simplicifolia
Tephrosia sp. Bing Bong (N.M.Henry 115)
Tephrosia sp. Crowded pinnae (C.R.Dunlop 8202)
Tephrosia sp. OT Station (S.T.Blake 17659)
Tephrosia sp. Pentecost River (I.D.Cowie 4168)
Tephrosia sp. (G.M.Chippendale 4809)
Tephrosia spechtii
Tephrosia stuartii
Tephrosia subpectinata
Tephrosia supina
Tephrosia virens
Terminalia sp.
Terminalia aridicola
Terminalia bursarina
Terminalia canescens
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Waltheria indica
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Wedelia verbisinoides
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Zornia chaetophora
Zornia muelleriana
Zornia muelleriana subsp. congesta
Zornia muriculata
Zornia muriculata subsp. angustata
Zornia prostrata
Zornia prostrata var. indeterminate
Zornia prostrata var. prostrata