



A COMPREHENSIVE SURVEY OF THE FLORA, EXTENT AND CONDITION OF VINE THICKETS ON COASTAL SAND DUNES OF DAMPIER PENINSULA, WEST KIMBERLEY 2000 – 2002

Final report September 2010

Prepared for
BROOME BOTANICAL SOCIETY (INC).



Prepared by
SALLY J. BLACK, TIM WILLING and DAVID M. DUREAU



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This document has been prepared for and by the Broome Botanical Society (Inc.). It reflects the findings and views of the authors, based on data and observations they collected during field surveys conducted between 2000 and 2002. It does not necessarily reflect the views of agencies who, jointly with the Society, funded the field work on which this independent report is based.

Given the time since field survey and the limitations imposed by the scope and funding of the project, readers are warned against relying solely on the information contained herein. Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.

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The representations on the maps, including roads and tracks, are not to scale and therefore should not be relied upon. Nor is the representation of roads and tracks evidence of public right of way.

FUNDING BODIES AND BACKGROUND

Field survey commenced as a joint project between the **Broome Botanical Society (Inc.)** and the Western Australian **Department of Environment and Conservation (DEC)** (formerly the Department of Conservation and Land Management). At that time DEC's WA Threatened Ecological Communities Unit (WATSCU) was hosting a short term project funded by the Commonwealth Government **Natural Heritage Trust (NHT)** and entitled 'Conserving Threatened Ecological Communities throughout the State, especially outside the SW'. The DEC West Kimberley District collaborated.

All resulting site data and maps were entered on DEC's Threatened Ecological Communities Database, and this information was used to assess the vine thickets on coastal sand dunes of Dampier Peninsula as a WA-listed Threatened Ecological Community. However, it was the request of the president of the Broome Botanical Society (Inc.), David M. Dureau, that a full report be prepared. This task was outside the scope and time frame of the WATSCU project and was later taken on by the Society, independently of DEC.

Field work and survey was conducted by the three authors. Tim Willing and David Dureau are both very long-term and active members of the Broome Botanical Society (Inc.) and provided the essential local knowledge and contacts. At the time of survey, Tim and Sally were also employees of DEC (West Kimberley District and the WATSCU project respectively).

In addition to DEC and NHT staffing and funding contributions to the field work, the Broome Botanical Society provided funding for field work, use of private vehicles, and volunteer labour. The Botanical Society also paid for a short term contract for assistance with EXCEL spreadsheets, in the preparation of this report. Compilation and writing of the report was mostly completed on a volunteer basis.

The **Environs Kimberley - West Kimberley Nature Project** provided funding for the finalisation and editing of the report. The WKNP is funded by Rangelands NRM WA as part of the Caring for our Country Dampierland Bioregion program.



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Traditional Owners, Administrators and Caretakers:

This survey would not have been possible without the support, assistance and local permission for access to survey vine thickets - as well as camping - from many people on the Dampier Peninsula. Certain vine thickets are associated with Aboriginal law protocols and were not surveyed, in respect to the cultural advice locally received. Future researchers are cautioned as to the importance of obtaining local permission from adjacent communities and traditional owners, before accessing vine thickets on the Dampier Peninsula.

Warning: Indigenous people are warned that the following list contains the names of a number of Aboriginal and non-Aboriginal people, who have since passed away

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FOREWORD

Since the set of recommendations in this report were first written and circulated as a draft, several of them are in the process of implementation. For example, the Environs Kimberley - West Kimberley Nature Project (EK WKNP), which is funded by Rangelands NRM WA through the Caring for our Country Dampierland Bioregion Program, is supporting Bardi Jawi and Nyul Nyul Rangers to develop and implement a series of projects to conserve and manage vine thickets in their country. The Indigenous Ranger groups are facilitated by the Kimberley Land Council and have identified the management of vine thickets as a key priority in their Working on Country plans. The EK WKNP is also collaborating with Fisher Research, with technical and practical support from Kings Park, University of WA and DEC to identify key biological indicators and design scientific monitoring protocols as assessment tools for vine thicket health, for use by managers beyond the life of the project. In addition, the Department of Environment and Conservation has commenced development of an interim recovery plan for the vine thickets as a threatened ecological community.

With growing public interest in the environment and its conservation, and the move towards more nature based tourism, we hope that these conservation management efforts will not be overshadowed by the effects of new developments and proposed moves to industrialise Dampier Peninsula.

SUMMARY

The vine thickets of Dampier Peninsula represent the southern-most occurrence of rainforest (dry monsoon forests) in Western Australia and provide refuge habitat for many plants and animals at the southern-most limit of their Australasian range. These vine thickets are confined to coastal dunes (and in some cases other unconsolidated Holocene coastal landforms) and have been shown to be distinct from other types of rainforest in the Kimberley Region. They are vulnerable to disturbance because of their occurrence in small patches and very narrow linear strands with large edge-to-area ratios, and are listed as a threatened ecological community by the Western Australian Department of Environment and Conservation. Prior to this study, the results of scientific surveys had been published for only four vine thicket patches and the full distribution and extent of such thickets on the Peninsula was unknown.

The aims of this study were to: (a) describe the overall distribution and extent of vine thicket patches on Dampier Peninsula through identifying and locating all occurrences and determining their approximate boundaries and size; (b) record the perennial flora of each patch and describe patterns of species composition found across their distribution; and (c) document the condition of and threatening processes impacting on each patch. Concurrent with these aims was the need to speak to as many local land users and stakeholders as possible to exchange information on vine thickets and raise the overall level of local awareness of their conservation significance and status. The results of this survey are intended to provide a basis for future conservation planning and management of the Peninsula's vine thickets, both at a landscape scale and as individual patches.

Seventy-two vine thicket patches were identified from aerial photographs. The existence of 67 of these was confirmed through our field visits, with an additional patch known from the earlier Kimberley Rainforest Survey (1987-1989). Sixty-two patches were comprehensively surveyed by us.

We confirmed that vine thickets occur as small patches scattered from Broome north along the west coast to the tip of Dampier Peninsula at Swan Point, and south along the east coast to Goodenough Bay. The patches occur in five obvious clusters. The clusters are: (a) two patches at Broome; (b) four patches between Cape Boileau and James Price Point (plus an anomalous cliff-top gully patch just north of the point); (c) nine patches between Cape Baskerville and Baldwin Creek; (d) four patches immediately north of Beagle Bay, and; (e) 52 patches in the far north between Pender Bay on the west coast around the Peninsula to Goodenough Bay on the east coast.

We estimated the total area of vine thicket patches at approximately 2300 ha. Intact patches ranged in size from clumps of a few trees up to 190 ha. Mean (average) patch size was 32 ha, median (mid-range) patch size was 20 ha, and the mode (most commonly occurring) patch size was 10 ha. Six patches were unusually large with one of 90 ha and each of five others greater than 100 ha in size.

Of the total area of vine thickets on Dampier Peninsula, approximately 43% (40 patches) occurred on Aboriginal Reserves, 41% (22 patches) on Unallocated Crown Land, 8% (7 patches) on Lombadina Grazing Lease, and 5% (3 patches) on freehold land. One degraded and unrepresentative patch (Patch 01) comprising approximately

3% of the total area of Dampier Peninsula's vine thickets occurred in a current conservation reserve (Minyirr Coastal Park). (Two patches of transitional vegetation with vine thicket species in the understorey occur in Coulomb Point Nature Reserve).

Overall floristic attributes include 169 vascular plant species recorded in 126 genera and 53 families across 62 surveyed vine thicket patches. The 97 native perennial plant species that we included in floristic analyses comprised 39 trees, 29 shrubs, 21 climbers, five hemiparasites (mistletoes), one perennial herb and one epiphyte (tree orchid).

The 151 native vascular plant species we recorded represent around 23% of the total number known to occur on Dampier Peninsula. Thirty eight of these 151 are known to be mostly or wholly confined to vine thickets. Of these 38, two are only known from vine thicket margins. Twenty-five (~66%) were evergreens, 12 (~31%) were deciduous or semi-deciduous, and one was permanently leafless (~3%).

Several tree and tall shrub species were common to most vine thickets. The trees were: Marool or Blackberry Tree *Terminalia petiolaris* (57 patches); Currant or Coffee Fruit *Grewia breviflora* (56 patches); Goonj *Celtis philippensis* (55 patches); Ebony Wood *Diospyros humilis* (50); Mangarr *Sersalisia sericea* (48 patches); Mamajen *Mimusops elengi* (47 patches); Mistletoe Tree *Exocarpos latifolius* (46 patches); Bauhinia or Jigal Tree *Bauhinia cunninghamii* (43 patches); and Helicopter Tree *Gyrocarpus americanus* subsp. *pachyphyllus* (43 patches). Common tall shrubs included: Snowball Bush *Flueggea virosa* subsp. *melanthesoides* (49 patches), along with *Croton habrophyllus* (44 patches) and Broad-winged Hop Bush *Dodonea platyptera* (44 patches). The most common climbers were Crabs Eye Bean *Abrus precatorius* (52 patches), Bush Caper *Capparis lasiantha* (44 patches), Snake Vine *Tinaspora smilacina* (44 patches), *Jasminum didymium* (42 patches), *Caesalpinia major* (37 patches), and Oyster-catcher Bill *Tylophora cinerascens* (35 patches).

While most vine thicket patches were dominated by a mix of several different tree species that varied in height, a few were dominated by a single tree species at a uniform height, and had little to no understorey of shrubs. Any ground layer was sparse in healthy patches. Twenty-three percent of the native perennial plant species within vine thicket patches comprised vines. These were most visible from within the canopy rather than conspicuously draping exposed canopy surfaces.

The most commonly dominant or codominant trees were the evergreens Ebony Wood *Diospyros humilis*, Mamajen *Mimusops elengi*, Goonj *Celtis philippensis*, and to a lesser extent Mangarr *Sersalisia sericea*, along with the semi-deciduous Marool or Blackberry Tree *Terminalia petiolaris* (usually an emergent) and the deciduous Currant or Coffee Fruit *Grewia breviflora* (a small tree). The height of tree species and their heights relative to one another also varied from patch to patch.

We estimated canopy heights (i.e. exclusive of emergents) commonly at around 8m but ranging from 3 m in a few patches on exposed beach and headland locations, up to at least 9m in the lee of very high dunes. Structurally, the patches of vine thickets most closely fell into the category of Deciduous Microphyll Vine Thicket (tropical monsoon forests) according to Webb's (1959) Physiognomic Classification of Australian Rainforests, from which they were originally named. However, the vine

thickets of Dampier Peninsula do not contain bottle trees or other swollen stems, and emergent trees are mostly semi-deciduous or evergreen. None of the patches fitted Webb's definition of vine forest (average canopy level 21-42 m tall). However, if the nomenclature of Walker and Hopkins (1984) for *non-rainforest* vegetation is applied to the vine thickets of Dampier Peninsula, the better developed patches could be referred to as mid-high (6 to 12 m) and low (3 to 6 m) closed forests.

Two new occurrences of the rare species *Pittosporum moluccanum* (Conservation Status Priority 4) were found, and some range extensions for other locally and regionally significant flora were identified.

Only a weak correlation between species richness and patch size was established.

Dendrogram classification of vine thickets by perennial plant species, and of perennial plant species by co-occurrence in the same thicket patches, showed some spatial associations and trends. Based on similarity of perennial plant species assemblages, vine thickets were subdivided into four main patch groups (referred to as B, C, D and E). Vine thicket patch groups largely corresponded with the clustered patch distributions, albeit with some outliers.

Group C is the largest patch group. This group occurs at the far northern end of Dampier Peninsula above the 750 mm per annum rainfall zone, and includes the most species-rich patches. Patches in this group extend across coastal dune systems onto red pindan soil plains in the lee of dunes. Most were characterised by several co-dominant evergreen tree species, often at a range of heights relative to each other within the patch. Group E patches are interspersed among Group C patches in the north and most occur entirely within extensive coastal dune systems that are either very broad or very high (one patch occurs on a headland). Group E patches tended to be dominated by a single tall evergreen tree species. Group D patches occur on the mid-west coast between Cape Baskerville and Baldwin Creek. Group D patches have the narrowest range of species, comprising mainly core rainforest plants. Group B patches occur at and towards the southern end of the distribution of vine thickets on each of the west and east coasts of the Peninsula. In comparison with the other patch groups, Group B patches are situated on low dunes and other relatively exposed locations, are depauperate in evergreen trees, and have a more open shrubby structure.

Evidence of threats to the vine thickets was widespread. Threats included weed invasion, fire, vegetation clearing, vehicular access and camping, feral and domestic animal damage, and altered drainage due to roads and other infrastructure. Forest product harvesting was a potential threat. Weeds occurred in 36 of 62 (58%) surveyed patches. The *Very High Priority* weed *Siratro Macroptilium atropurpureum* occurred in four patches. Six *High Priority* weeds occurred in five patches, three *Medium Priority* weeds in 19 patches and eight *Low Priority* weeds in 28 patches. The rapid rate of establishment of weeds in Patch 01 in Minyirr Coastal Park (Gubinge Road) in Broome highlights the urgent need for control of new weed outbreaks elsewhere. Fire damage was recorded in 20 of 62 (32%) patches and at two unsurveyed patches that were visited. Fire damage at nine of these patches was recent (within approximately one year) and severe. Although the extent of vegetation clearing in vine thickets at the time of survey was estimated at around only 5%, clearing was a relatively new threat

and was escalating with increasing rates of development. Damage to vine thickets from vehicular access was also increasing.

The severity of threats was generally related to proximity to settlements (particularly townships) and intensity of land use. However, fire was a widespread problem. At the time of survey the only obvious formal, coordinated and direct management of vine thicket patches was applied to Patch Group B patches in the southern part of Dampier Peninsula. An exception was that a few small landholders further north had individually made an effort to exclude fire from their holdings, although with varying success.

Vine thicket patches function as an ecological network. Therefore, it is essential that all patches be protected and managed for conservation and, because of the need to maintain connectivity, critical clusters of vine thicket patches must be conserved. Priorities outlined for the protection and conservation management of individual vine thicket patches included: six unusually large patches, structurally anomalous patches, patches containing regionally and locally significant flora occurring either within the canopy limits or at their edge, patches with high species-richness, and patches representative of each of the four patch-group clusters defined by floristic analyses. Detailed recommendations for conservation management of vine thickets were made.

Through mapping and describing the full distribution and extent of the vine thickets of Dampier Peninsula, demonstrating patterns of floristic composition among them, and describing the threatening processes to which they are subject, this study provides a necessary basis for the ongoing assessment of their conservation status, for planning and prioritising conservation management, for strategic planning, and for future monitoring.

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1 INTRODUCTION

1.1 Background

The term ‘rainforest’ refers to a range of closed-canopy vegetation types: from large tracts of tall complex jungles of the ever-wet tropics, to the seasonally dry monsoon forests that occur as small patches scattered across northern Australia (Webb 1959, Webb and Tracey 1981, McKenzie 1991, Russell-Smith 1991, Russell-Smith and Bowman 1992, Bowman 2000). In Australia, rainforests are limited in extent and fragmented. The Kimberley Region occupies the northern end of Western Australia, spanning 421 000 square kilometres. The total area of all rainforest patches in the Kimberley has been estimated at around 7000 ha, yet the Kimberley rainforests contain approximately one quarter of the region’s plant species (Kimber *et al.* 1991, Bureau of Meteorology 1996, Kenneally *et al.* 1996, Bowman 2000). Their dense canopy creates a protective shady and humid microclimate compared to the more open vegetation around them, and these rare ecosystems act as refuges for many plants and animals.

The coastal town of Broome lies just above 18.00° South latitude, close to the southern boundary of the Kimberley with the Great Sandy Desert to the south-east. Dampier Peninsula extends from Broome north of the Great Northern Highway (between Broome and Willare on the Fitzroy River) and is bounded to the west by the Indian Ocean and to the east by King Sound. It spans around 14000 square kilometres (Kenneally *et al.* 1996). The discrete pockets of low ‘vine thicket’ vegetation found on and adjacent to the landward slopes of coastal sand dunes near Broome and throughout Dampier Peninsula, represent the southern-most occurrences of rainforest in Western Australia. Many of the plant species and some animals that the Peninsula’s thickets contain are at the southern limit of their range, and are more commonly found in taller rainforest vegetation in more northerly parts of Australia and even Asia (McKenzie and Kenneally 1983, Kenneally *et al.* 1996, Western Australian Herbarium 2006, DEC 2007). However, these vine thickets have been shown to be distinct from rainforest types found elsewhere in the Kimberley, and are effectively confined to Dampier Peninsula, as are the coastal dune formations that support them (Johnstone and Burbidge 1991, Kenneally *et al.* 1991, McKenzie *et al.* 1991, Solem and McKenzie 1991).

Dampier Peninsula’s vine thickets are generally dominated by one or more evergreen tree species and tall semi-deciduous shrubs, often hung with native vines but with little or no ground storey. Many of the vine thicket trees and shrubs produce an abundance of edible fruits. For example, Ebony Wood *Diospyros humilis*, Mamajen *Mimusops elengi*, Yellow Ball Flower *Mallotus nesophilus*, Mangarr *Sersalisia sericea*, Mistletoe Tree *Exocarpos latifolius*, Marool or Blackberry Tree *Terminalia petiolaris*, Snowball Bush *Flueggea virosa* subsp. *melanthesoides*, and the rarer Banyan or strangler Fig *Ficus virens* (Kenneally *et al.* 1996). These fruits are important food resources for flying foxes and birds such as the Rose-crowned Fruit-dove *Ptilinopus regina* and Great Bowerbird *Ptilonorhynchus nuchalis*, which in turn perform a vital role in distributing seeds to maintain vine thicket communities (Price *et al.* 1999, Price 2004). On the Peninsula, the Rose-crowned Fruit-dove is confined to the vine thickets, and though at the southern limit of its range in Western Australia, is more common there than elsewhere in the Kimberley (Johnstone 1983). Other birds

that feed on vine thicket fruits are the Bar-shouldered Dove *Geopelia humeralis*, Red-winged Parrot *Aprosmictus erythropterus*, and Black-faced Cuckoo-Shrike *Coracina novaehollandiae*.

Aboriginal heritage and culture on the Peninsula has a close connection with the vine thickets because of the focussed supply of seasonal fruits and berries, yams, carving timber and other valued resources. Certain vine thicket patches still contain culturally sensitive law-grounds with restricted access protocols.

It has been estimated that up to 75% of Australia's rainforest has been destroyed since European colonisation, mainly for agriculture (Webb and Tracey 1981). Although much of the rainforest habitat across northern Australia appears to have remained intact due to its remoteness and the fact that pastoralism is a relatively low intensity agricultural regime, this vegetation is highly vulnerable to disturbance because it occurs in small patches and very narrow linear strands with large edge-to-area ratios (Russell-Smith and Dunlop 1987, Russell-Smith and Bowman 1992). Research in the Northern Territory has shown that through the movement of frugivorous (fruit-eating) birds and bats upon which rainforest plants depend for seed dispersal, rainforests function as a network of patches. In turn, the birds and bats rely on the scale of this large network to meet their food resource requirements. Therefore, the loss of any single rainforest patch can affect all of the other patches in the network (Price *et al.* 1999, Price 2004).

Radical changes have occurred in the ecology and fire regimes of Dampier Peninsula (and throughout the northern Australian rangelands) since the arrival of Europeans, the introduction of cattle grazing, and the decline in traditional Aboriginal land management, particularly burning practices (McKenzie and Kenneally 1983). During fieldwork conducted across the Peninsula in 1977 and 1978, McKenzie and Kenneally (1983) noted that there was hardly a hectare that did not include at least one cattle pad and that huge areas were at early stages of regeneration after fire. Many medium-sized and small native mammals, such as the Boodie or Burrowing Bettong *Bettongia lesueur* and Golden Bandicoot *Isodon auratus* had vanished from the area and Emus *Dromaius novaehollandiae* were shot out (McKenzie and Kenneally 1983, Kenneally *et al.* 1996). The implications of such losses are not fully understood, but are likely to be significant for plant abundance and seed dispersal (Kenneally *et al.* 1996).

Traditional Aboriginal burning practices throughout northern Australia involved the lighting of many small fires at the appropriate season and in restricted areas, resulting in patchwork mosaics of vegetative growth which maximised diversity in the ecosystem and prevented the repeated spread of late dry-season lightning-induced wildfires over vast areas (Russell-Smith and Bowman 1992, Kenneally *et al.* 1996). The latter is now commonplace on Dampier Peninsula. The Bardi Jawi Aboriginal people (and possibly others) are known to have taken care to keep fire away from the Peninsula's vine thickets, because of the valuable food resources they contain. In surveying 1220 rainforest sites in the Northern Territory, Russell-Smith and Bowman (1992) found that one third of all patches had boundaries severely degraded by fire, and concluded that this was the result of modern fire regimes, following the near-complete breakdown of traditional Aboriginal fire management. During the 'Kimberley Rainforest' survey conducted between 1987 and 1989, McKenzie *et al.* (1991) surveyed four vine thicket patches between Broome and Dampier Peninsula

and reported fire impacts as ‘severe (eg. tree death) on stand edge’ at one of the four patches, and as ‘severe throughout stand’ at the other three.

While repeated intense late dry-season wildfires in adjacent vegetation may cause vine thicket patches to contract in size over time, records show that the most severe impacts arise following disturbance (such as by introduced livestock, vehicles or artificial stormwater flows) that opens up the normally closed tree and shrub canopy, allowing grasses and weeds to invade. In turn these invaders create fuel for future fires that would not otherwise penetrate the cool micro-climate within (Russell-Smith and Dunlop 1987, McKenzie 1991, Russell-Smith and Bowman 1992, Bowman 2000). Under sustained pressure from disturbance impacts and/or burning, rainforest patches are not only degraded but may be eliminated (Russell-Smith and Bowman 1992).

Weeds have the capacity to substantially change fuel characteristics across rainforest boundaries and drastically increase flammability; they also directly threaten the biological integrity of rainforests by competing with the local native species (Bowman 2000). Despite some recent attempts at management, the Minyirr Coastal Park thicket in Broome has been severely degraded by weed infestation following the impacts of long-term physical disturbance, fire, and concentrated storm-water flooding redirected from nearby formed and sealed roads.

Cattle stations were first established on Dampier Peninsula around 1890 (Kenneally *et al.* 1996, DOLA 2000) and historically the entire area has been utilised for free-range cattle grazing, irrespective of tenure. The impacts of cattle on the four vine thicket patches surveyed between 1987 and 1989 were recorded as ‘evident’ in the patch within the Broome town site, and ‘widespread and severe’ at the three more remotely located patches on the Peninsula (McKenzie *et al.* 1991). However, most of Dampier Peninsula now comprises Aboriginal reserves vested for the ‘use and benefit of Aborigines’ along with Unallocated Crown Land, pastoral operations have been terminated and land destocked. Now though, tourists and local people frequently play a similar role to livestock in disturbing vine thicket vegetation through driving vehicles in and setting up temporary camps.

The 2006 resident population of Broome was 14 254. Broome is an internationally recognised tourist destination. The four-year average number of annual visitors to Broome (2000-2003) was 234 950 (Broome Visitor’s Centre 2006). In 2000, it was estimated that on present growth rates, Broome’s population was likely to double within 17 to 18 years. In addition, tourism growth was forecast as likely to outstrip resident population growth. These estimates did not include the added effects of Landcorp’s new land release in Broome and of the recently proposed LNG gas processing hub development. This implies steadily increasing local and tourist generated demand for access and use of the Peninsula’s coastal area for recreational pursuits and infrastructure development. A recent project to seal the 196 km Broome-to-Cape Leveque Road (and upgrade ancillary roads) will further accelerate vehicle traffic, economic development and tourism pressures.

The town of Broome and the settlements of One Arm Point and Lombadina-Djarindjin on Dampier Peninsula are all located adjacent to large vine thickets. With ongoing urban development in these areas as well as more recently commenced

establishment of outstation settlements and ecotourism ventures throughout the Peninsula's coast, clearing poses a relatively new threat to the vine thickets.

Mineral and petroleum activities account for 49% of the Kimberley Region's industry sector (based on the average value of production/turnover 1997/08 – 1999/00) (Broome Visitor's Centre 2006). An example of developments that would threaten vine thickets is the recent proposal by Woodside Energy Limited to exploit the Browse Basin gas fields and build an LNG processing hub on Dampier Peninsula. At the time of writing, the State Government had announced James Price Point as its preferred site. Important vine thickets occur in this area. If it were to proceed, the operation could encompass up to 3000 ha and involve large areas of vegetation clearing, as well as the employment of thousands of workers in the year-long construction phase (Coates 2009, Environs Kimberley 2009, Pritchard 2009).

Climate change has in recent years been formally recognised as a threat to biodiversity. Rates of climate change are very likely to exceed rates of evolutionary adaptation in many species, causing widespread changes in ecology and species composition of ecosystems (Hughes 2000, Hughes and Westoby 1994, Hennessy *et al.* 2007). The vulnerability of ecosystems is also likely to rise due to an increased incidence of extreme events such as fires, floods, droughts and tropical storms. The coastal location of the vine thickets may leave them particularly susceptible to rising sea-level, stronger tropical cyclones and increased intensity of oceanic storm surges (CSIRO 2001, Hennessy *et al.* 2004). Rare ecosystems such as the vine thickets, if they survive climate change, will be particularly important as refuges that provide possible sources of species for ecosystems under future climates (Hughes and Westoby 1994, Soule *et al.* 2004).

In 2000, based on our preliminary studies and the results of the Kimberley Rainforests survey conducted between 1986 and 1987 (McKenzie *et al.* 1991), these vine thickets were listed as a threatened ecological community by the Western Australian Department of Environment and Conservation (DEC; formerly CALM) under the name of 'Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula'. The category of threat assigned was Vulnerable¹, with the proviso that this level of threat be reviewed within 5 years.

The need to develop a strategy for the management of the vine thickets of Dampier Peninsula and to monitor their conservation status is clear and urgent. Given that only four patches had been formally surveyed and documented prior to the commencement of this project, the basic information required to more closely assess the conservation status and determine management requirements of the Peninsula's vine thickets was not available.

¹ Vulnerable (VU): An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

1.2 Aims and objective

The objective of this project was to provide a basis for conservation planning, management and monitoring, and recommend an appropriate management program for the vine thickets on coastal sand dunes of Dampier Peninsula.

Specifically, the aims of this project were:

- To identify and locate individual occurrences of vine thicket patches and determine their approximate boundaries and size, and to describe the overall distribution and extent of the vine thickets of Dampier Peninsula.
- To record the perennial flora present in each patch, and describe patterns of species composition across the vine thickets of Dampier Peninsula.
- To record the condition of the vine thickets of Dampier Peninsula and the threatening processes impacting on them, and assess their current conservation status.

Concurrent with this was the need to speak to as many local land users and stakeholders as possible in order to exchange information on the vine thickets and this project. As well gleaning information from knowledgeable local people, we also hoped to begin raising the general local level of awareness of the significance and value of the vine thickets to Dampier Peninsula, and their current conservation status and management issues.

2 METHODS

2.1 The study area /regional environment

2.1.1 Climate and seasons

The Kimberley Region has a tropical monsoonal climate with two dominant seasons 'the wet' and 'the dry' separated by short transitional periods. On Dampier Peninsula, the wet season usually occurs from about December to March, during which time almost all the annual rainfall is received, resulting in an effective growing period of three to four months. While thunderstorms occur, much of the heavy rainfall is derived from tropical cyclones and low pressure systems in the area (Kenneally *et al.* 1996). The average annual rainfall at Broome is 555 mm, at Beagle Bay is 736 mm, and at Cape Leveque is 757 mm. Mean annual number of rain days are 48 at Broome and Beagle Bay, and 44 at Cape Leveque. The average rate of evaporation at Broome is estimated at 2847 mm per year (Bureau of Meteorology 1996). Occasional fogs occur in the dry season, especially at Broome (Kenneally *et al.* 1996).

The average maximum temperature for January is 33°C. While the wet season is characterised by hot humid weather with winds mainly from the northwest (typically at 10 - 20 kilometres per hour), the dry season is typified by dry sunny days and cooler nights with south-easterly trade winds (of 10 - 30 kilometres per hour) flowing from central Australia. The mean maximum temperature in July is 29°C and the mean minimum 14°C. Gale-force winds other than those associated with cyclones do not often occur but are most commonly associated with thunderstorms. From 1909 to

1993, a total of 24 cyclones crossed the coast within 150 km of Broome, of these eight crossed within 50 km. A further 16 cyclones that did not cross the coast passed within 150 km of Broome, three of which were within 50 km (Kenneally *et al.* 1996).

Based on the continuous stratigraphy/pollen record, the mean annual precipitation in Western Australia is thought to have approximated present levels for the last 6000 to 7000 years, with little variation since then (Wyrwoll *et al.* 1986).

The Bardi and Yawuru Aboriginal people recognise six seasons on the Peninsula, distinguished mainly by wind and rainfall direction and intensity, the ripening of fruits, and the appearance or disappearance of and condition of fish and other animals (Kenneally *et al.* 1996).

2.1.2 Current and tides.

Seasonal changes in the regional wind system have a considerable effect on the oceanic currents off the north coast of Australia. The tides at Broome have a large range (11 meters) and regular cycles, with the largest tides occurring around the solar equinoxes in March and September. Tides are a major factor affecting the coastal environment, particularly as they increase the range of wave and current action. Unlike many tropical coastlines, Dampier Peninsula seems to receive relatively few tropical drift seeds and fruits that have been dispersed over long distances, although occasional instances have been recorded (Kenneally *et al.* 1996).

2.1.3 Geology

Dampier Peninsula, like much of the southwest Kimberley is typified by extensive reddish sandy plains; a mantle of mixed river-deposited and wind-blown sediments. These grade into yellowish-grey sandplains towards the northern end of the Peninsula (McKenzie and Kenneally 1983). While the Peninsula is underlain by the ancient Pre-Cambrian rocks of the Canning Basin, outcrops are scattered. Occasional outcrops of early Cretaceous sandstone occur in the Carnot Peak, Cygnet Bay and Mount Jowlaenga areas (with smaller outcrops south of Pender Bay). These include the Emeriau, Melligo and Broome Sandstones. The Emeriau Sandstone formation outcrops near Beagle Bay and forms King Peaks and Carnot Peak as well as other low hills in the area. It is described as fine to coarse poorly-sorted sandstone with minor conglomerate, it is cross-bedded and commonly ferruginous in outcrop, that is, low hills exhibit ironstone capping. Melligo Sandstone is a fine to medium well-sorted, thin-bedded to laminated sandstone. It is pebbly in places, contains heavy minerals and is partly silicified. Broome Sandstone is fine to coarse sandstone with some mudstone and minor conglomerate. It is ripple-marked, cross-bedded and bioturbated in part. Cainozoic rocks are restricted to relatively small exposures of calcretes in coastal situations on Waterbank Station, and laterites on uplands in the Mount Jowlaenga area (Gibson 1983a, Gibson 1983b, McKenzie and Kenneally 1983, Tyler and Griffin 1993).

The coastal dunes on Dampier Peninsula are described as coastal aeolian dunes comprising calcareous sand, partly oolitic. They include reworked calcareous and quartzose sandstone (Gibson 1983a, Gibson 1983b). Beach (or storm) ridge deposits comprise quartzose sand, shelly in places. These may occur as minor deposits within

tidal flat and mangrove swamp deposits of silty clay and black organic clay (Tyler and Griffin 1993). Beard and Kenneally (1993) described storm ridges in the dry coastal ecosystems of northern Australia as built up by cyclones and (unlike cheniers) tending to occur at the landward margins of tidal flats.

2.1.4 Soils

Vine thickets mainly occur on the deep white or grey calcareous sands of the Holocene dunes (lacking in soil horizons) that occur along the coast. Samples analysed from the Kimberley Rainforest Survey showed that the soils in vine thicket sites on Holocene dunes were alkaline and extremely low in all nutrients measured (Stoneman *et al.* 1991). Most of these dunes are stabilised although a few are active and encroaching on the hinterland (Kenneally *et al.* 1996).

Many vine thicket patches extend from the dune slopes inland onto the red pindan soils of adjacent sandplains. This 'pindan' is the principal soil type of Dampier Peninsula, comprising red earthy sands with deep uniform profiles of coherent clayish sands. Of windblown origin this soil developed during the Quaternary period on desert dune sandstone. The term pindan is also applied to the Acacia-dominated vegetation associated with this soil type, which occupies over 70% of the Peninsula (Johnstone 1983, Kenneally *et al.* 1996). Pindan soils and vegetation form extensive undulating plains with little or no organised surface drainage and seasonal runoff forms sheet flow. Around Broome the pindan is often overlain by a layer of more recent unconsolidated sand which assists in water penetration, and plant establishment and growth (Kenneally *et al.* 1996).

2.1.5 Land units and vegetation

In 1964, Speck *et al.* first described the south-west Kimberley as a series of land systems (recurring patterns of topography, soils and vegetation), with Dampier Peninsula comprising of six of these: the Carpentaria, Yeeda, Wanganut, Reeves, Frazer and Lowangan Land Systems. Subsequently Beard (1979) mapped the Peninsula as within the Dampier Botanical District of the Northern Botanical Province, and more recently it was allocated to the Dampier Land IBRA Bioprovince and Pindanland subregion (Dampierland 2) (Graham 2003). The majority of the Peninsula is mapped as Beard Vegetation Association 750: Shrublands, pindan; *Acacia tumida* shrubland with grey box and cabbage gum medium woodland over ribbon grass and curly Spinifex. A smaller area of the northeast Peninsula is mapped as Beard Vegetation Association 771: Shrublands, pindan; *Acacia tumida* shrublands with ghost gum (*Eucalyptus papuana*) and *Eucalyptus setosa* medium woodland over curly Spinifex. McKenzie and Kenneally (1983) further described ten terrestrial communities based on physiography, substrate, vegetation formation and structurally dominant floristics. Kenneally *et al.* (1996) also described ten plant communities for Dampier Peninsula, along with one marine community. These are: pindan; the Fitzroy sandplains; rocky outcrops; creeks, wetlands and seepage areas; vine thickets; coastal dunes, beaches and limestone outcrops; saltwater paperbark thickets; samphire flats; saline grasslands; mangroves; and marine seagrass meadows.

The occurrence of vine thickets on Dampier Peninsula was first recorded scientifically around 1977 and published in 1983 (McKenzie and Kenneally 1983). Although the

Bardi Aboriginal people referred to thick scrub generally as ‘boordan’ (Aklif 1999), they had individual place names for areas, including thickets.

2.2 Data collection and analysis

2.2.1 Data collection

Prior to the outset of this project the full number, location and extent of vine thicket patches associated with dunes and other coastal landforms on Dampier Peninsula (hereafter these are referred to as vine thickets) was unknown. We undertook a mapping project and identified 72 vine thicket patches from colour aerial photographs at scales of 1:25000 (Cape Leveque to Pt Torment runs 10 – 17 and Coulomb Pt to Cape Leveque runs 1, 2, 4, 7, 8 and 9, 10/09/1986; and Broome Riddell Point to Coulomb Point 17/07/1989 run 2 frame 5089) and 1:20000 (Waterbank Station 2/07/1996 runs 1 to 3). The existence of 67 of these 72 patches was confirmed through field survey (we surveyed 62 patches, or 86% of those identified) and field visits (including the five unsurveyed Patches 62, 65, 67, 71, and 73). The existence of a 68th (Patch 69) was known from the Kimberley Rainforest Survey conducted between 1986 and 1987 (McKenzie *et al.* 1991). Four of the identified patches were not surveyed *or* visited due to a lack of fieldwork time (Patches 63, 66, 68 and 70). The surveyed Patch 38 is a small remnant of the partially cleared much larger and unsurveyed Patch 71.

To estimate the size of each vine thicket patch, boundaries delineated on aerial photographs were drawn onto topographic maps of 1:50000 scale. Patch dimensions were then measured with a rule and the total area estimated using a grid. Fifty-seven of these patches were digitised for addition to the Western Australian Department of Environment and Conservation’s ‘Threatened Ecological Communities Database’, enabling us to check our patch area estimates against the digital measures and refine them where necessary.

Surveys were conducted in the dry season over three consecutive years; survey dates were 17 to 23 July 2000 (7 days), 21 July to 8 August 2001 (14 days), and 5 August to 7 September 2002 (25 days within this period). Field time was limited to the number of days survey team members could be available, rather than being based on the amount of time estimated as required. The total number of field days was 46 giving an average of almost 1.5 days per survey site. This time included not just field survey of patches (up to a few hours depending on the size of the patch), but also the time it took to access sites, to locate and meet with traditional owners, to set up temporary camp sites, and from time to time to restock provisions. In addition, ground-truthing the existence of potential vine thicket patches identified from aerial photographs was conducted concurrent with survey work. A small number of dark vegetation patches showing on the aerial photographs proved to be *Acacia monticola* thickets or dense *Lophostemon grandiflorus* woodland on field inspection. Where four-wheel drive bush tracks existed in the vicinity of intended survey, sites were accessed by vehicle and then the survey conducted on foot. Where existing tracks did not go as far as vine thicket patches, we walked several kilometres from the vehicle to and from survey sites.

Surveys involved recording all vascular plants present within the main canopy limits of the patches while the three survey team members walked an arbitrarily chosen transect through the longest axis of the vine thicket patch. The Survey team divided into two groups walking parallel within audible distance of one another in order to cover a larger area. Records focussed on perennial evergreen and semi-deciduous trees, shrubs and vines, but the few herbs encountered were also recorded. Annual plants were distinguished by annotation with an (A) superscript, and weeds by an asterisk. Species that only occurred at the interface between the patch and surrounding vegetation, or in glades within the patch, were recorded but distinguished by an (E) superscript. Landforms on which vine thickets occurred were recorded. Notes were taken on the condition of the vegetation and soil surface and observed impacts of threatening processes within patches. Due to insufficient time and funding, no attempt was made to sample soil or measure potential environmental correlates, especially given that field observation showed that many patches occurred contiguously over more than one land form and soil type.

Species nomenclature follows current usage at the Western Australian Herbarium. As the vast majority of species have been described by Kenneally *et al.* (1996) in the book *Broome and Beyond*, voucher specimens for plant names cited were not lodged at herbariums.

2.2.2 Data analysis

Vine thicket patches were classified according to similarities in species composition of identified native perennial taxa. The classification undertaken used the Czekanowski coefficient and 'unweighted pair-group mean average' fusion method (UPGMA; Sneath and Sokal 1973). In addition, species were classified into groups according to their occurrence at the same sites by using the TWOSTEP similarity algorithm (Belbin 1980) followed by UPGMA fusion.

Only identifiable native perennial plants recorded within the canopy limits were included in the floristic analyses. Excluded from the analysis were: annuals, weeds and edge taxa, rare plants (e.g. *Pittosporum moluccanum*), and highly seasonally deciduous perennials such as *Tacca leontopetaloides*. In the dry season the latter mostly only persist as geophytes, have low detectability, and lack sufficient identifying features if detected. Singletons were retained in analyses.

Two surveyed vine thicket patches associated with dune systems were not included in the floristic analyses because one included only three live taxa or species (Patch 64, 0.04 ha) and the other (Patch 72, 12 ha) was more than 80% cleared.

Note that preliminary floristic analyses clearly differentiated vine thicket patches on coastal landforms from the vegetation occurring on four samples of rock outcrops.

2.2.3 Limitations of methods

During the dry season some vine thicket plants, particularly vines, were cryptic because they were leafless or occur as geophytes. Survey late in the wet season is likely to have improved the plant inventory. However, sites are more easily accessed

during the dry season and survey team members were not available during the wet seasons.

The sampling effort in time spent within each patch may have been uneven between patches. Very small patches had comparatively more comprehensive sampling than large patches. Under-sampling occurred in a small number of large patches due to either limits on field time or access permission. More time at each of these patches is likely to have improved the plant species inventory. Flora survey and boundary ground-truthing work was particularly brief for Patches 01, 02, 03, 04 and 05, and Patches 23 and 24.

Our measures of patch areas could be further refined through the use of spatially rectified digital aerial photographs at a scale finer than 1:20 000, and a greater investment in the ground-truthing of boundaries determined from aerial photographs.

Assessment of patch condition and impacts was subjective. Formal numerical scoring against allocated criteria would allow better comparison of the data with that of future surveys.

Tight constraints on funding and field work time limited the opportunity to make more detailed studies of the structure of each vine thicket patch.

3 RESULTS

3.1 Distribution, extent and tenure of vine thickets

Vine thickets occurred in association with coastal landforms, particularly Holocene sand dune systems, where most occupied the leeward slopes and swales, and sometimes even the exposed crests. Many patches extended onto the red-soil plains on the inland side of dunes. Some also extended onto or, as for 13 patches, were entirely confined to one or a combination of the following landforms: beach fronts (five patches), sand-spit headlands (five patches), low cliffs above a mangrove-lined creek (two patches), storm ridges within intertidal flats (two patches), and a red-soil gully just inland of coastal cliffs (one patch).

The soils of the Holocene dunes were deep coastal dune sands, predominantly white in colour but sometimes ranged through to pink, with a superficial dark grey organic layer, and often contained marine shells. On adjacent plains red-brown sandy pindan soils occurred. Within the thickets, a layer of leaf litter was usually present on the soil surface, and was up to 6 cm in depth (Appendix 1: Photo 1).

Using aerial photography and 1:50000 topographic maps, we identified 72 vine thicket patches and estimated their total area at around 2300 ha. The existence of 67 of these patches was confirmed through site visits. Intact patches ranged in size from clumps of a few trees up to 190 ha (Appendix 2). However, the pre-clearing extent of Patch 71 at One Arm Point (now around 150 ha in size) is estimated to have been 200 ha. Mean (average) patch size was 32 ha, median (mid-range) patch size was 20 ha, and the mode (most commonly occurring) was 10 ha. Six patches were unusually

large with five over 100 ha in size (Patches 05, 20, 22, 47 and 71), and one at 90 ha (Patch 39) (Appendix 1: Photo 2).

The maps in Figure 1 show the distribution of all 72 vine thicket patches on Dampier Peninsula, each represented by a single point coordinate (not located in the middle of the patch). Coordinates and digitised patch boundary maps are held by the Species and Communities Branch of the Western Australian Department of Environment and Conservation in Perth (Appendix 3). Sixty of the vine thickets were included in the two floristic analyses, along with two patches of transitional vegetation referred to as Patch X and Patch Y. Figure 1 is colour coded to reflect the results of a floristic analysis in which vine thickets were classified according to similarities in their composition of perennial plant species. The twelve vine thicket patches not included in the floristic analyses are marked by a black circle.

The vine thickets occur as small discrete patches scattered from Broome north along the west coast to the tip of Dampier Peninsula at Swan Point, and to a much shorter distance south along the east coast to just north of Goodenough Bay. Many patches are linear in shape, as are the dunes. The patches are distributed in five obvious main clusters (Figure 1). These are: (a) two patches at Broome; (b) four patches between Cape Boileau and James Price Point (plus an anomalous cliff-top gully patch just north of the point); (c) nine patches between Cape Baskerville and Baldwin Creek; (d) four patches immediately north of Beagle Bay; and (e) 52 patches in the far north between Pender Bay on the west coast around the Peninsula to Goodenough Bay on the east coast.

As detailed in Section 3.5, patch groups arising from the floristic classification (based on similarities in perennial plant species composition) appeared to largely correspond with these clusters in distribution, albeit with some outliers.

The percentage of the total area of vine thickets on Dampier Peninsula that occurred within each land tenure category was:

- 43% (comprising 41 patches) on Aboriginal Reserves;
- 41% (22 patches) on Unallocated Crown Land (for which reserves were proposed in 1983);
- 8% (seven patches) on Lombadina Grazing Lease; and
- 5% (three patches) on freehold land (Table 1).

In addition, one unrepresentative patch (Patch 01) comprising approximately 3% of the total area of Dampier Peninsula's vine thickets occurs in a current conservation reserve. Patch 01, which is the southern-most and most degraded of all the patches, is located in Minyirr Coastal Park in the town of Broome. At the time of survey, management strategies for Minyirr Coastal Park were based on a Coastal Park Management Plan (Griffiths 1998) but park tenure awaited final resolution. However, this will be resolved in the agreement between the State Government, Shire of Broome and the Yawuru Aboriginal People, finalised in August 2010, under which Minyirr park will become a part of a larger Coastal Park to be co-managed by these parties. (Two patches of transitional vegetation with vine thicket species in the understorey occur in Coulomb Point Nature Reserve).

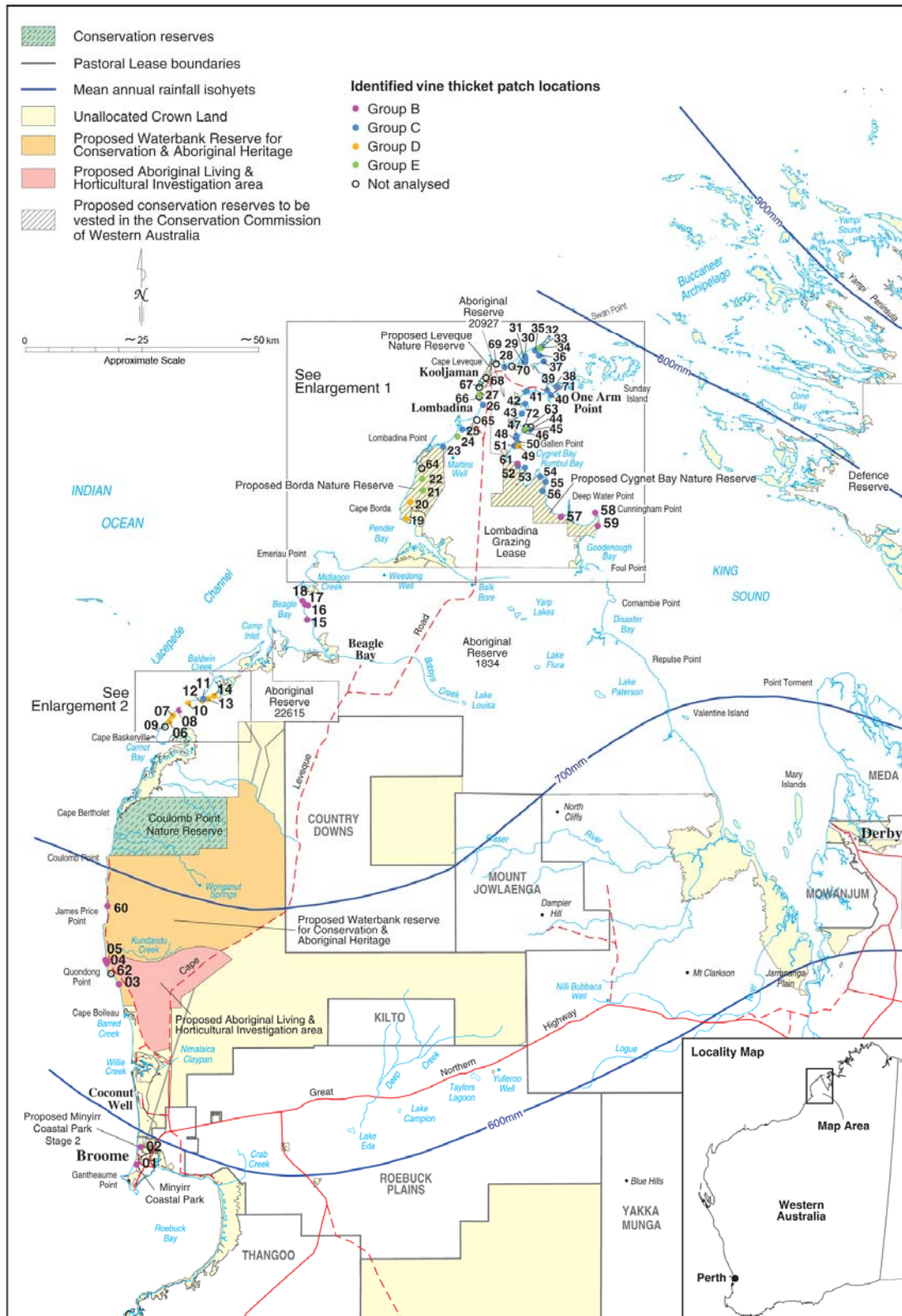


Figure 1. Point locations of vine thicket patches on coastal sand dunes of Dampier Peninsula, West Kimberley, surveyed 2000-2002. Points do not represent patch boundaries and are randomly taken from within each patch (not midpoints). Patches are grouped and colour-coded by similarity in perennial plant species composition.

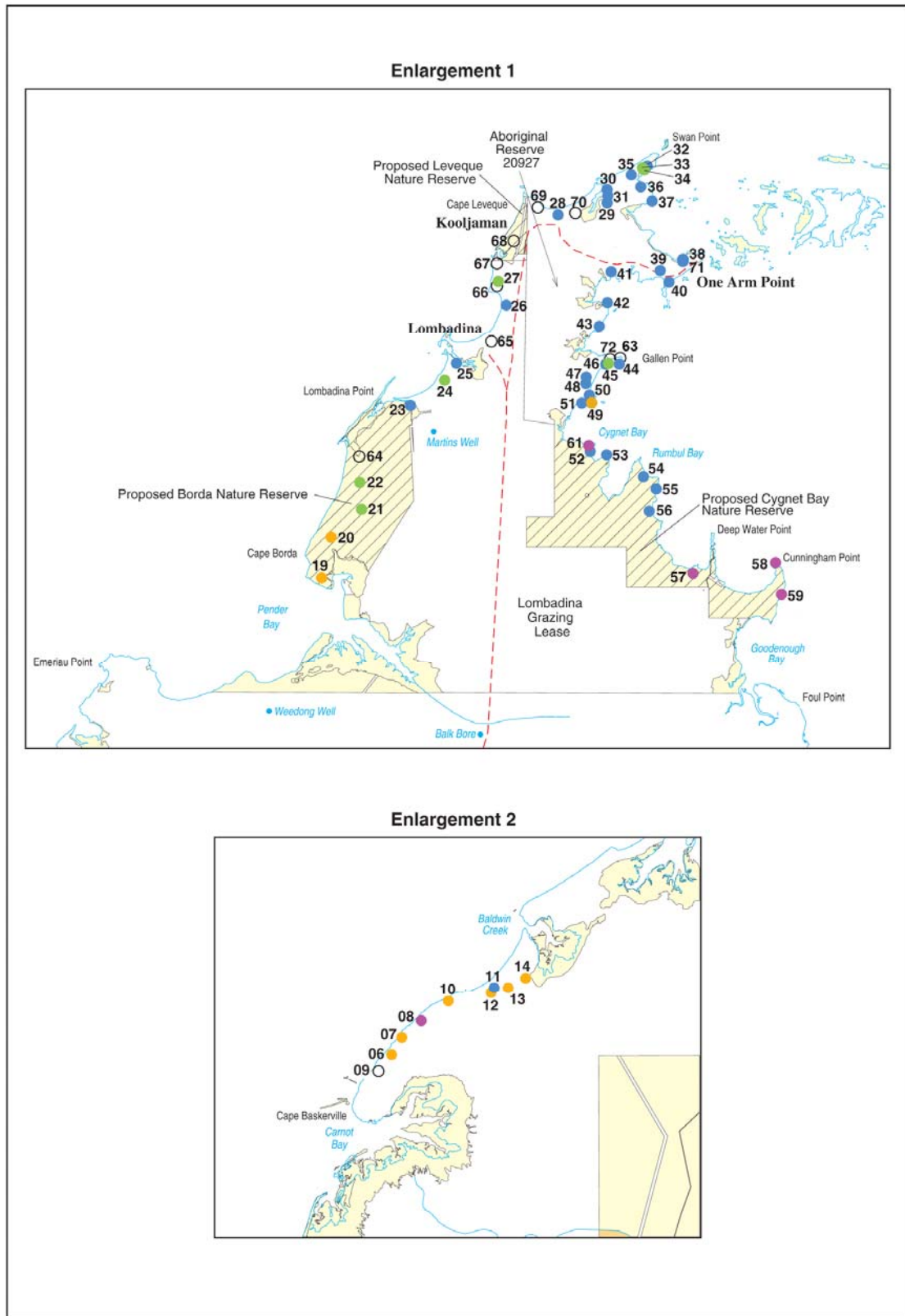


Figure 1. (continued).

Table 1. Number of patches and area of vine thickets on coastal dunes of Dampier Peninsula, West Kimberley, on each type of land tenure. Surveyed 2000 – 2002.

Land Tenure on which vine thickets occur	Area (ha)	Area (%)	Number of Patches
Unallocated Crown Land (UCL): Proposed Borda Nature Reserve	380	16	6
UCL: Proposed Cygnet Bay Nature Reserve	194	8	9
UCL: Proposed Leveque Nature Reserve	40	2	1
UCL: Proposed Waterbank Reserve for Conservation and Aboriginal Heritage	298	13	5
Proposed Minyirr Coastal Park Stage 2	40	2	1
UCL Proposed Conservation Reserves Subtotal	952	41	22
Aboriginal Reserve 1834 (Beagle Bay)	73	3	5
Aboriginal Reserve 20927 (One Arm Pt.)	782	33	26
Aboriginal Reserve 22615 (Beagle Bay)	139	6	9
Aboriginal Reserves Subtotal	994	43	40
Lombadina Grazing Lease	187	8	6
Grazing Lease Subtotal	187	8	6
Freehold	120	5	3
Freehold Subtotal	120	5	3
Minyirr Coastal Park Stage 1	60	3	1
Conservation Reserves Subtotal	60	3	1
TOTAL	2313	100	72

3.2 Flora and vegetation

3.2.1 Flora

A list of Dampier Peninsula's vine thicket flora is presented in Appendix 4 and Appendix 5 shows a separate species list for each of the surveyed vine thicket patches (except for Patch 72 as over 80% of it had been cleared). In total 169 vascular plant taxa (species, subspecies, varieties, and one hybrid; hereafter all referred to as 'species') were recorded in 126 genera and 53 families. The 151 native species represent around 23% of the total number of native vascular plant species known to occur on the Peninsula (649).

In their occurrence on Dampier Peninsula, 38 of the 151 (~25%) native vascular plant species we recorded in vine thickets, are known to be mostly or wholly confined to this habitat. Of these 38, two are only known from vine thicket margins (true ecotone or 'edge species'). Twenty-five (~66%) were evergreens, 12 (~31%) were deciduous or semi-deciduous, and one (Caustic Vine or Milk Bush *Sarcostemma* spp.) was leafless (~3%). We noted that one evergreen, *Glycosmis* sp. coped with the long dry season by retaining its leaves in a wilted state as described by Russell-Smith and Dunlop (1987).

The 96 native perennial species that occurred within vine thicket canopy limits were included in floristic analyses. These comprise 39 trees, 29 shrubs, 21 climbers, five hemiparasites (mistletoes), one perennial herb, and one epiphyte (Tree Orchid *Cymbidium canaliculatum*). The species not included in the analyses are: 47 widespread species that were only recorded at the margins of thickets or in large open glades within thickets; 18 weeds; one non-local native (possibly planted); six native annuals; one hybrid tree; one rare tree; and one climber that was only identified to genus level.

The most common families for perennial plants recorded within canopy limits were Fabaceae (21 species), Poaceae (14), Myrtaceae (11 species), Apocynaceae (seven species), Malvaceae (six species), Amaranthaceae (five species), and Loranthaceae (five species). The most common genera were *Acacia* (six species), *Corymbia* (four species), *Amyema* (three species), and *Capparis* (three species).

Individual species were not evenly distributed, occurring in from one to 57 of the 60 vine thicket patches included in the analysis. Seventeen species were singletons, that is, were only recorded once. However, several tree and tall shrub species were common to most vine thickets. The trees were: Marool or Blackberry Tree *Terminalia petiolaris* (57 patches); Currant or Coffee Fruit *Grewia breviflora* (56 patches); Goonj *Celtis philippensis* (55 patches); Ebony Wood *Diospyros humilis* (50); Mangarr *Sersalisia sericea* (48 patches); Mamajen *Mimusops elengi* (47 patches); Mistletoe Tree *Exocarpos latifolius* (46 patches); Bauhinia or Jigal Tree *Bauhinia cunninghamii* (43 patches); and Helicopter Tree *Gyrocarpus americanus* subsp. *pachyphyllus* (43 patches). Common tall shrubs included: Snowball Bush *Flueggea virosa* subsp. *melanthesoides* (49 patches), along with *Croton habrophyllus* (44 patches) and Broad-winged Hop Bush *Dodonea platyptera* (44 patches). The most common climbers were Crabs Eye Bean *Abrus precatorius* (52 patches), Bush Caper *Capparis lasiantha* (44 patches), Snake Vine *Tinaspora smilacina* (44 patches), *Jasminum didymum*

(42 patches), *Caesalpinia major* (37 patches), and Oyster-catcher Bill *Tylophora cinerascens* (35 patches).

Flora confined to localised populations (i.e. a small number of patches) included: the climber *Secamone timoriensis* (one patch), the Kimberley endemic shrub *Helicteres rhynchocarpa* (two patches), the annual climber Potato Vine *Opeculina aequisepala* (two patches), the small tree *Clerodendrum floribundum* var. *ovatum* (three patches), the climber *Capparis jacobsii* (four patches), the small tree *Pittosporum moluccanum* (two vine thicket patches plus one transitional patch of vegetation, and vegetation adjacent to a vine thicket), the shrub Musk-scented Plant *Hypoestes floribunda* var. *varia* (four patches), and the climber *Opilia amentacea* (four patches), the small tree Tuckeroo *Cupaniopsis anacardioides* (seven patches), the shrub *Luvunga monophylla* (eight patches), and the tree Wing-leaf Whitewood *Atalaya variifolia* (eight patches).

The occurrence of Musk-scented Plant *Hypoestes floribunda* var. *varia* on the Peninsula is disjunct, as it is mostly known from northern tropical areas.

We added two new records to the known distribution of the tree *Pittosporum moluccanum*, which in the Kimberley is rare and is listed by the Department of Environment and Conservation as a Priority 4 flora species². It has only been found previously at two locations on Dampier Peninsula and on Maret and Berthier Islands, although it also occurs in the Northern Territory, Indonesia, Philippines, Malaysia and Taiwan. We located one to two adjacent trees in each of four locations: vine thicket Patches 05 and 14 (from where they were previously recorded); within a patch of transitional pindan vegetation comprising some vine thicket species in the understorey, and; in one patch of Garnboorr *Melaleuca dealbata* woodland with scattered vine thicket elements adjacent to vine thicket Patch 11.

Prior to this survey, the distribution of *Capparis* aff. *jacobsii* on Dampier Peninsula was thought to be restricted to sandstone outcrops at Carnot Peak and King Peaks. However, we recorded it in vine thicket Patches 06, 11, and 14. This climber occurs elsewhere in the Kimberley and in the Northern Territory.

Our record of the climber *Secamone timoriensis* in Patch 25 could be a first for Dampier Peninsula. However, "*Secamone elliptica*" is listed in the Kimberley Rainforests of Australia as among the flora recorded in two Peninsula vine thickets, Patches 21 (29/02) and 52 (29/01) (Kenneally *et al.* 1991). Otherwise *S. timoriensis* is known from Lachlan and Koolan islands off the west Kimberley coast and from the far northeast Kimberley coast.

We also recorded a significant southerly extension to the known range of the shrub *Trophis scandens*, previously recorded no further south in WA than the North Kimberley Bioregion. We found two plants on a rocky outcrop on a headland adjacent to vine thicket Patch 41.

The shrub *Helicteres rhynchocarpa* is a Kimberley endemic, common on Yampi Peninsula and further north. On Dampier Peninsula it is restricted to woodland or

² Priority Four (P4) Rare taxa: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years (Atkins 2005).

open areas adjacent to vine thickets, and to a localised area of lateritic outcrops south of Pender Bay. We recorded it at the edge of Patches 39 and 41 only.

The vine or climber *Parsonsia kimberleyensis* is a Kimberley endemic and is only known from two collections, both at vine thicket patches on the Dampier Peninsula (near Bulgin/Hunters Creek). No occurrences were found during our survey using our standard survey methods.

Bush Currant *Vitex glabrata*, a small tree bearing edible fruit, occurs throughout the Kimberley. On Dampier Peninsula it is only known from vine thickets and only at three patches: Gallen Well, Skeleton Point and Hunter Creek. We did not find this species. However, at the time of survey it would have been leafless and hard to detect. One Traditional Owner expressed concern that they had not seen a Bush Currant tree since severe fires had occurred in the vine thicket patches known to them.

3.2.2 Species richness

The number of native perennial plant species within each vine thicket patch ranged from four to 47 (Appendices 3 and 4). The mean number of species per patch was 29, the median was 28, and the mode was 30. A Spearman rank correlation of 0.46 ($p < 0.05$) demonstrated a loose relationship between the number of perennial plant species within each patch and patch size. The maximum of 47 species occurred in a 35 ha patch (Figure 2). The few patches that comprised less than 20 species were small, at 12 ha or less in size. However, some small patches comprised more than 20 species. For example, Patch 31 at 1 ha had 23 species, Patch 11 at 6 ha had 28 species, and Patch 52 at 10 ha had 37 species. By contrast, two large patches of 150 ha (Patch 20) and 130 ha (Patch 22) only comprised 22 and 26 species respectively.

3.2.3 Vegetation structure and dominants

The relative abundance of commonly occurring species varied between patches. While most patches were dominated by a mix of several different tree species that varied in height, a few patches were dominated by a single tree species at a uniform height, and had little to no understorey of shrubs. Any ground layer was very sparse in healthy vine thicket patches. Twenty-three percent of the native perennial plant species recorded within vine thicket canopy limits comprised climbers or vines.

The most commonly dominant or codominant trees were the evergreens Ebony Wood *Diospyros humilis*, Mamajen *Mimusops elengi*, Goonj *Celtis philippensis*, and to a lesser extent Mangarr *Sersalisia sericea*, along with the semi-deciduous Marool or Blackberry Tree *Terminalia petiolaris* (usually an emergent) and the deciduous Currant or Coffee Fruit *Grewia breviflora* (small tree).

The height of tree species and their heights relative to one another varied from patch to patch. For example, Mamajen *Mimusops elengi* and/or Ebony Wood *Diospyros humilis* could be codominant with Goonj *Celtis philippensis*, all at about 6 to 8 m in height (with emergent Marool or Blackberry Tree *Terminalia petiolaris*, and with or without an understorey of tall shrubs). In other patches Mamajen *Mimusops elengi* was dominant at 6 to 8 m over Ebony Wood *Diospyros humilis* and Mangarr *Sersalisia sericea* at 4 to 5 m, and Goonj *Celtis philippensis* at 3 m.

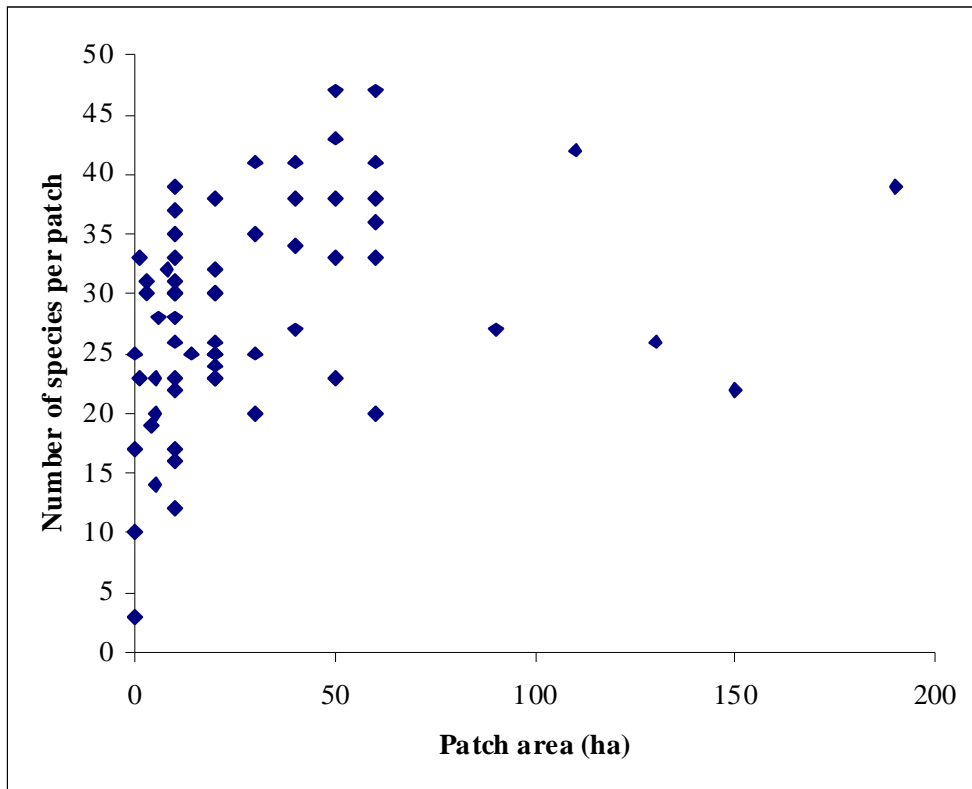


Figure 2. The relationship between number of perennial plant species within each patch, and patch size, for vine thickets surveyed on Dampier Peninsula, West Kimberley, between 2000 and 2002. The Spearman rank correlation is 0.46 ($p < 0.05$).

We estimated canopy heights (i.e. exclusive of emergents) commonly at around 8m but ranging from 3 m in a few patches on exposed beach and headland locations, up to at least 9m in the lee of very high dunes. Structurally, the vine thickets most closely fell into the category of Deciduous Microphyll Vine Thicket (tropical monsoon forests) according to Webb's (1959) Physiognomic Classification of Australian Rainforests, from which they were originally named. Webb described Deciduous Vine Thicket as having an uneven and discontinuous canopy level averaging 4.5 to 9 m in height, with practically all emergents being deciduous, and many understorey species deciduous or semi-evergreen. Swollen stems (bottle trees and other species) were described as common. However, the vine thickets of Dampier Peninsula do not contain bottle trees or other swollen stems, and emergent trees are mostly semi-deciduous or evergreen.

None of the patches fitted Webb's definition of vine forest (average canopy level 21-42 m tall). However, if the nomenclature of Walker and Hopkins (1984) for *non-rainforest* vegetation is applied to the vine thickets of Dampier Peninsula, the best developed patches could be referred to as mid-high (6 to 12 m) and low (3 to 6 m) closed forests.

The prefix 'vine' describes forests in which vines, twining or scrambling plants drape the tallest stratum and form 'climber towers' on emergent trees. According to Walker and Hopkins (1984) at least 60% of the exposed canopy surface should be smothered in vines if this term is used. However, while climber towers were present in vine thicket patches on Dampier Peninsula, the canopy surface was not covered with vines to this extent and vines were more visible from within the canopy (Appendix 1: Photo 3). One exception was a patch on a beach ridge (sand dune island within a mudflat), in which there was no evidence of past fires.

3.3 Classification of vine thicket patches by perennial plant species (patch dendrogram)

Vine thicket patches were classified according to similarities in the species composition of perennial plants (Figure 3).

The software program automatically truncated the dendrogram at the eight-group level (Figure 3). However, for simplicity we truncated the dendrogram at the second division or four-group level as this represented to us the best developed most interpretable pattern. These four groups comprise: Patch Group B (from Patch 01 to Patch 61); Patch Group C (from Patch 11 to Patch 28); Patch Group D (from Patch 06 to Patch 49) and Patch Group E (from Patch 21 to Patch 45). Patch groups are described further in Section 3.5.

3.4 Classification of perennial plant species by co-occurrence in the same vine thicket patches (species dendrogram)

The perennial plant species were classified according to their co-occurrence in the same vine thicket patches. The software program automatically truncated the dendrogram at the ten-group level (Figure 4). We truncated the dendrogram first at the three-group level, that is, recognising three main species assemblages which was

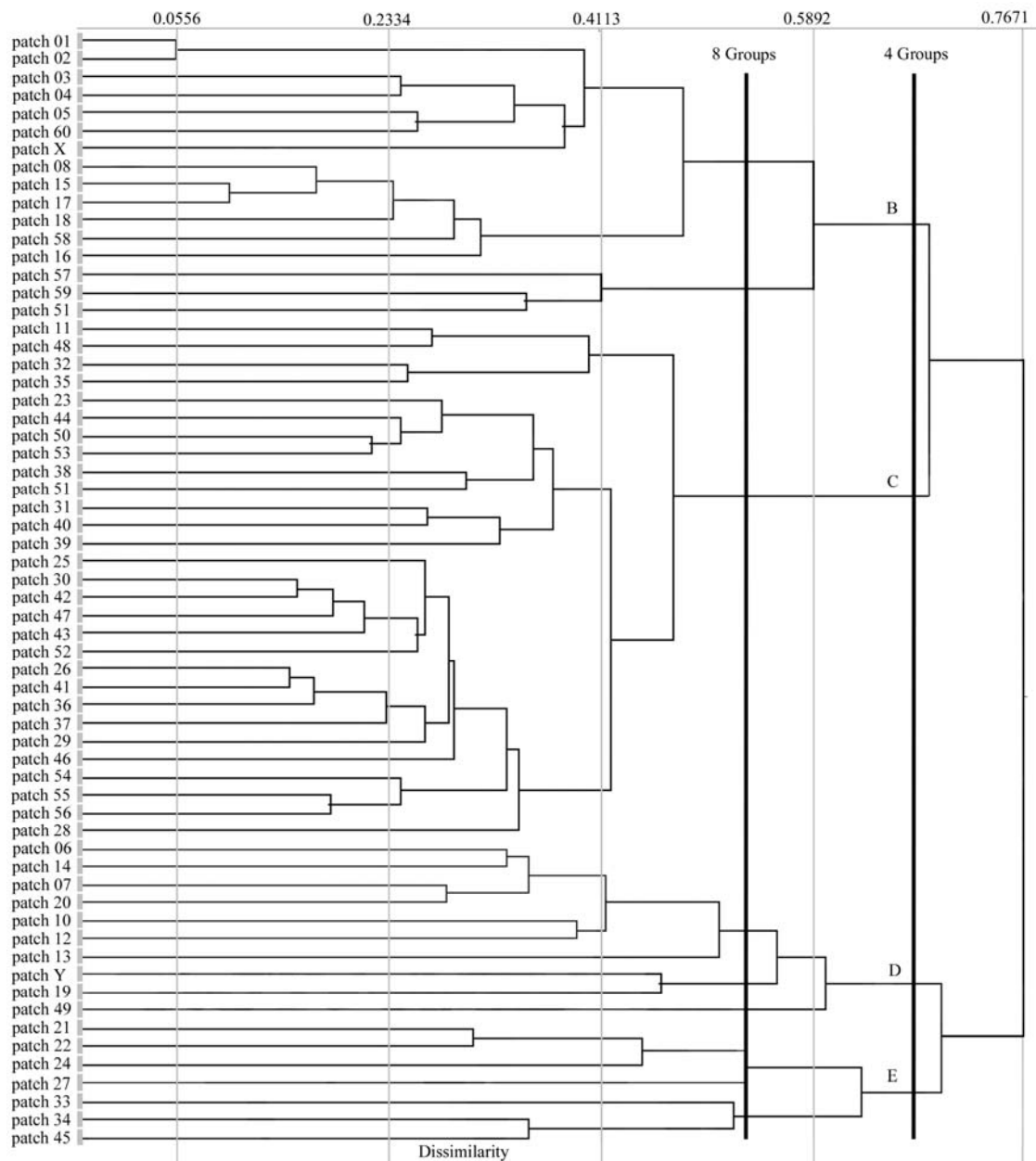


Figure 3. Dendrogram of vine thicket patches classified according to similarities in their perennial plant species composition (surveyed on Dampier Peninsula, West Kimberley, between 2000 and 2002). We truncated the dendrogram at the four-group level: Groups B, C, D and E.

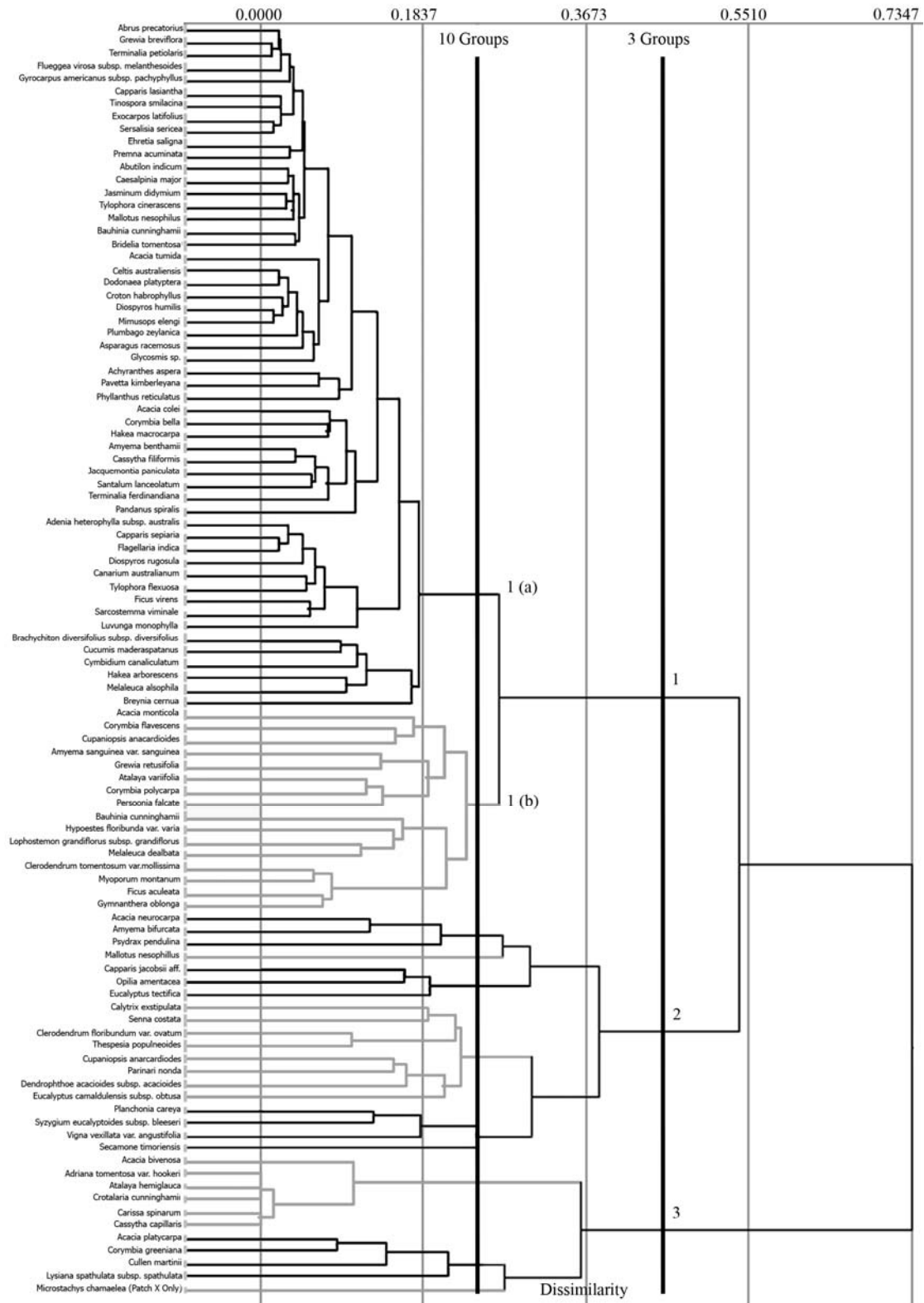


Figure 4. Dendrogram showing plant species classified according to their co-occurrence in the same vine thicket patches (surveyed on Dampier Peninsula, West Kimberley, between 2000 and 2002). We truncated the dendrogram at the three-group level: Groups 1, 2, and 3.

adequate for our purposes. The primary division was at the two-group level, separating Assemblage 3 from Assemblages 1 and 2. The second division separated Assemblage 1 from Assemblage 2. We then noted a further significant subdivision within Assemblage 1, recognising two groups 1(a) and 1(b). This subdivision also occurs at the ten-group level but we chose not to explore the detail of groupings within Assemblages 2 and 3.

Assemblage 1(a) is the largest plant assemblage comprising 54 species. In Figure 4 and the two-way table (Figure 5) these are from Crabs Eye Bean *Abrus precatorius* to *Breynia cernua*. This assemblage comprises the taxa that occur most often and characterise the vine thickets. It includes the true rainforest and vine thicket species along with some more widespread tropical species that commonly also occur within thickets; either scattered through it, near the margins, or as glades within gaps in thickets.

Assemblages 2 and 3 mostly comprise plants that occur with much less frequency across vine thicket patches (almost half are singletons), and which are not abundant within any one patch, being more characteristic of adjacent vegetation types. Three exceptions within Assemblage 2 are *Opilia amentacea*, Tuckeroo *Cupaniopsis anacardioides*, and Yellow Ball Flower *Mallotus nesophilus*. However, the latter two species also occur within Assemblage 1(a).

3.5 The two-way table and patch groups

Patch groups and plant assemblages are combined in the two-way table in Figure 5. As described above, we chose to truncate patch groups at the four-group level and assemblages at the three-group level, although valid finer subdivisions are also shown. All four vine thicket Patch Groups B, C, D and E are characterised by vine thicket species from Assemblage 1(a).

Vine thicket patches are clustered in their spatial distribution across Dampier Peninsula, and patch groups derived from floristic classification (based on similarities in perennial plant species composition) appear to correspond with these clusters, with only nine outliers (Patches 08, 11, 19, 21, 49, 61, 57, 58 and 59). This is illustrated in the maps in Figure 1 in which patches are colour-coded by patch group to assist interpretation.

There is no apparent relationship between patch size and patch groupings. In Patch Group B, patches range from 3 ha to 190 ha, Patch Group C from 1 ha to 150 ha, Patch Group D from 3 ha to 150 ha, and Patch Group E from 0.3 ha to 130 ha. The mean number of species for Patch Group B is 30 (range 19-39), Patch Group C is 33 (range 23-47), Patch Group D is 20 (range 12-25), and Patch Group E is 20 (range 10-28).

Patch Group C, the largest and most species-rich group comprising 29 vine thicket patches, is confined to the far northern end of Dampier Peninsula (above the 750 mm rainfall isohyet) with only one exception (Patch 11). Most Group C patches occurred across two distinct landforms; on sand dunes and swales with white sand, as well as extending onto adjacent plains inland of the dunes which consist of red pindan soil (Appendix 1: Photo 4). Most Group C patches were characterised by several

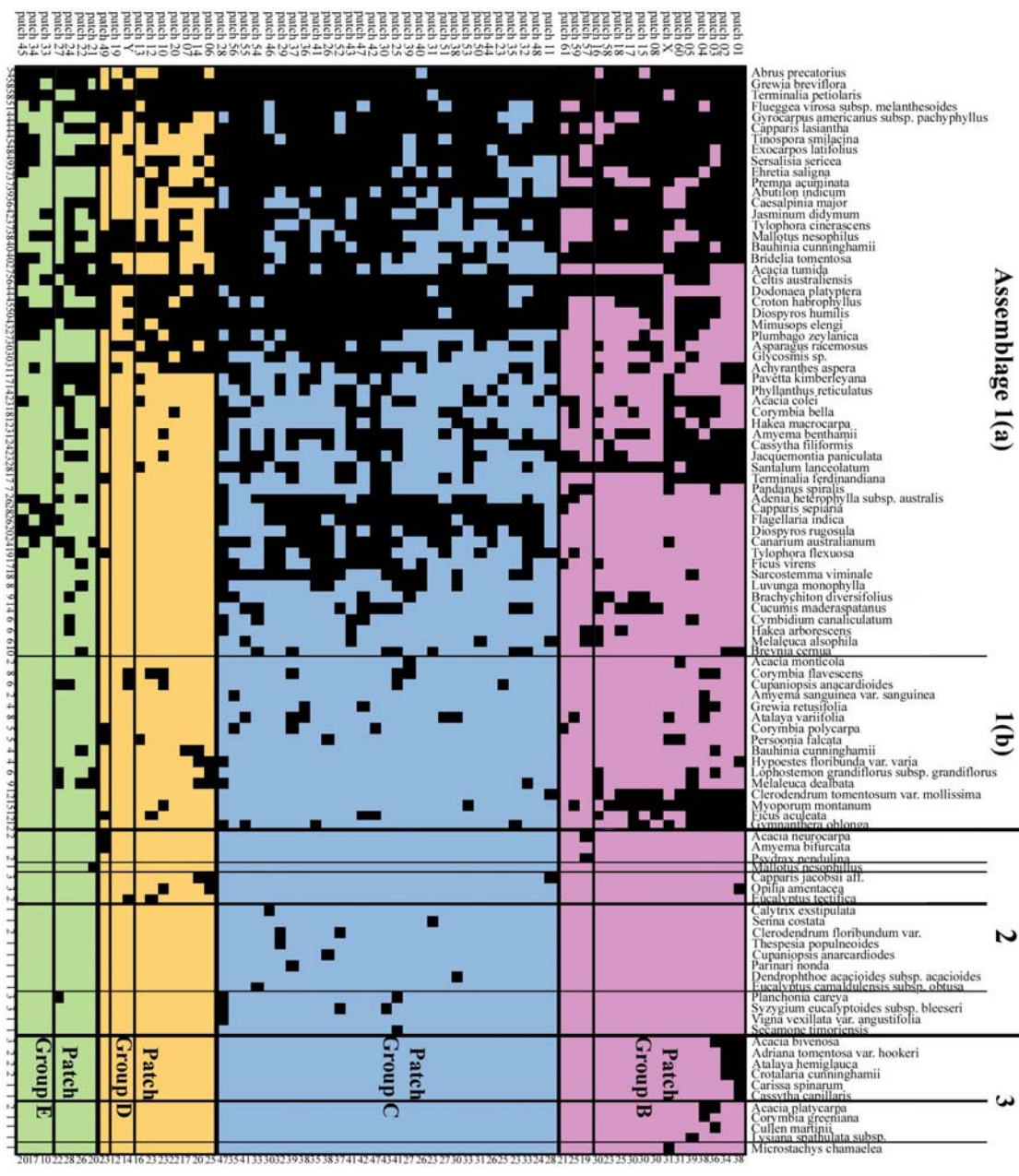


Figure 5. Sorted two-way table of vine thicket patches on coastal sand dunes of Dampier Peninsula, West Kimberley, showing patch groups and species occurrence by assemblage. Surveyed 2000-2002. Data is ordered according to the classification analyses. The four main patch groups are colour coded to match Figure 1.

co-dominant evergreen tree species, often at a range of heights relative to each other within the patch. Patch 11 belongs to Patch Group C but is an outlier of the group's northern cluster. It too extends across a dune onto the adjacent red pindan soil plain. As this survey treated each patch as a whole, it did not allow for analysis of intra-patch heterogeneity observed in the field.

The seven Patch Group E patches are all interspersed among the Patch Group C patches in the far north. With one exception on a headland, all of the Patch Group E patches occur entirely within extensive dune systems, either in the lee of particularly tall dunes (e.g. the dunes at Patch 24 reach 29 m) or surrounded by particularly broad tracts of unvegetated sand (such as Patches 33, 34 and 45). These locations are likely to provide shelter from oceanic winds and/or fire. Group E patches tended to be dominated by a single tall evergreen tree species (Mamajen *Mimusops elengi* or Ebony Wood *Diospyros humilis*) with little understorey (Appendix 1: Photo 5).

Patch Group D patches mostly occur in a cluster between Cape Baskerville and Baldwin Creek on the Peninsula's mid-west coast, although two patches (Patches 20 and 21) also occur to the north-west near Cape Borda, and one (Patch 49) in the north-east near Cygnet Bay. Patch Group D has the narrowest range of species. These are mostly core rainforest species in the first half of Assemblage 1(a) from Crabs Eye Bean *Abrus precatorius* through to Chaff Flower *Achyranthes aspera* (Figure 4, Figure 5).

Patch Group B, comprising 16 patches, occurs at or towards the southern end of the distribution of vine thickets on both the west and east coasts. Patch Group B patches are all situated in relatively exposed locations on or in association with very low sand dunes, often above cliffs, or on beaches, headlands (including sand-spits) and storm ridges. This leaves these patches relatively less sheltered from oceanic winds and from fires approaching on the inland side. Patch 60 is an anomaly as this vine thicket occurs on red pindan soil in a gully above coastal cliffs, rather than in association with coastal sand dune and beach formations.

In general Patch Group B thickets are depauperate in evergreen trees and have a more open shrubby structure than the northern thickets in Patch Groups C and E in which evergreen trees are dominant (Appendix 1: Photo 6, Photo 7). The evergreens Ebony Wood *Diospyros humilis*, Mamajen *Mimusops elengi* and Goonj *Celtis philippensis* are at their southern-most limit around Cape Boileau and do not occur in the two vine thicket patches in Broome (Patches 01 and 02). While these trees were present (and in some cases abundant) in some of the Patch Group B patches, most were dominated more by the deciduous Helicopter Tree *Gyrocarpus americanus* subsp. *pachyphyllus* and Currant or Coffee Fruit *Grewia breviflora*, along with Marool or Blackberry Tree *Terminalia petiolaris*. Notable exceptions were the well structured Patches 05, 15 and 18, at which Goonj *Celtis philippensis* was dominant. This rainforest species is characteristic of and largely restricted to vine thickets.

While Patch Group B appears to be relatively species-rich, the additional species common to these patches are characteristic of adjacent vegetation types rather than vine thickets, and occur in open glades within the canopy. For example, Assemblage 3 is restricted to Patch Group B (Figure 5).

Patch 08 is classified as Patch Group B but lies among a cluster of Patch Group D patches. In common with some of the Patch Group B patches and unlike most of the Patch Group D, Patch 08 occurs above a cliff top in the lee of very low dunes (in this case oriented east-west on their long axis). This vine thicket was structurally very open and many of the plant species recorded in it occurred only once within the patch. Patch 61, also classified as Group B, lies amongst a cluster of Patch Group C patches. It is a particularly small patch at 0.02 ha and structurally depauperate, and like some other Patch Group B patches, occurs on a sand-spit headland.

3.6 Impacts of threatening processes

The severity of threats was generally related to proximity to settlements (particularly townships) and intensity of land use. However, fire was a widespread problem. Major threats are outlined below. A summary of the impacts of threatening processes on vine thickets recorded during this survey is presented in Table 2.

3.6.1 Weeds and horticultural planting

Eighteen species of environmental weeds were recorded. These occurred in 36 of the 62 surveyed vine thicket patches (58%) (Table 3). These weeds were prioritised according to the severity of their potential impact on vine thickets. The very high priority weed Siratro *Macroptilium atropurpureum* is a fast growing climber capable of overwhelming tree and shrub canopies. Siratro was recorded in four vine thickets (Patches 01, 05, 39, and 40), as well as in the town of Broome and the settlements of One Arm Point and Lombadina-Djarindjin, all of which are located adjacent to vine thickets (vine thickets at One Arm Point and Lombadina-Djarindjin were not surveyed). Six high priority weeds were recorded in five vine thickets (Patches 01, 04, 05, 38, 40), three medium priority weeds were recorded in 19 vine thicket patches, and eight low priority weeds were recorded in 26 vine thicket patches.

Most weed infestation occurred at the edges and in disturbed parts of vine thickets. While the vine thickets of Dampier Peninsula still retained large areas that were free of weeds (at least 90% of any one patch), the exception was Patch 01 in Minyirr Coastal Park Broome, where the greatest diversity of weed species and most severe and widespread weed infestation had occurred. Because of its urban location, this was also the most disturbed and degraded patch. Siratro infestation was also recorded in Patch 05 at the site of soil disturbance caused by concentrated runoff from the Manari Road at 409598 E, 8064790 N, map zone 51 (Appendix 1: Photo 8). At Patch 39, Siratro was present at the edge of a patch where it had been cleared and the ground sown with Birdwood Grass *Cenchrus setiger*.

Hairy Morning Glory *Merremia dissecta* and Darwin Pea *Clitoria ternatea* are also vigorous climbers capable of overwhelming tree and shrub canopies at the edge of or in disturbed parts of vine thickets. The annual shrub or woody herb Horehound *Hyptis suaveolens* is a declared noxious weed that forms dense thickets in disturbed areas. Yellow Poinciana Tree *Peltophorum pterocarpum* is a garden 'escapee' which at the time of survey was currently restricted to Patch 01 in Broome. It also occurs throughout the Northern Territory and Queensland as a native component of coastal monsoon vine forest and thickets, and occasionally among mangrove vegetation.

Table 2. Impacts of threatening processes recorded for each vine thicket patch on coastal sand dunes of Dampier Peninsula, West Kimberley, surveyed 2000 – 2002. Record of impacts are marked with an X or other descriptor. Weeds are prioritised by degree of threat: Very High (VH), High (H), Medium (M), Low (L). For fire (S) denotes severe impacts.

Patch	Current Tenure	Weeds by priority	Fire	Clearing	Hydrological Changes	Tourism	Cattle	Domestic Pigs	Other
01	Minyirr Park	VH,H,M,L	X		X				Pedestrians
02	Proposed park	M							
03	Proposed Reserve (PR) on Unallocated Crown Land (UCL)	M, L	X (S)	Track		X			
04	UCL (PR)	H, M, L		Track		X			
05	UCL (PR)	VH,H,M,L	X	Track	X	X			Litter
06	Aboriginal Reserve (AR) 22615								
07	AR22615								
08	AR22615		X						
10	AR22615	M							
11	AR22615								
12	AR22615								
13	AR22615								
14	AR22615								
15	AR1834	L							
16	AR1834	M, L	X						
17	AR1834	L							
18	AR1834	M, L		Track, campsite			Feral		
19	UCL (PR)	L					Feral		
20	UCL (PR)						Feral		
21	UCL (PR)	L					Feral		
22	UCL (PR)						Feral		
23	UCL (PR)	M	X (S)	Track			Feral		
24	Grazing Lease (GL)		X				Feral		
25	GL	M, L					Feral		
26	GL		X (S)				Feral		
27	GL	L							
28	AR20927	L	X	Track, building					Mobile dune encroachment
29	AR20927	L						X	Nearby dump

Table 2. (continued).

Patch	Tenure	Weeds	Fire	Clearing	Hydrological Changes	Tourism	Cattle	Pigs	Other
30	AR20927	M		Track					
31	AR20927	M	X (S)				Feral	X	
32	AR20927								
33	AR20927								
34	AR20927								
35	AR20927			Track					
36	AR20927	L	X (S)				Feral		
37	AR20927						Feral		
38	AR20927	H, M, L	X						Pedestrians
39	Freehold	VH, L		12%					
40	Freehold	VH, H							
41	Freehold	M, L		Building			Domestic		
42	AR20927	L	X				Feral		
43	AR20927	L	X (S)				Feral		
44	AR20927	M, L	X (S)						Harvesting
45	AR20927								
46	AR20927	L	X				Feral		
47	AR20927	M	X (S)				Feral		
48	AR20927	L					Feral		
49	AR20927								
50	AR20927	L		Track, campsite					Rubbish dumping
51	AR20927	M							
52	UCL (PR)						Feral		
53	UCL (PR)	M, L	X (S)	Building			Feral		Rubbish dumping
54	UCL (PR)								
55	UCL (PR)						Feral		
56	UCL (PR)		X				Feral		
57	UCL (PR)	L							
58	UCL (PR)	L		Building					
59	UCL (PR)								
60	UCL (PR)	M				X			Soil erosion
61	UCL (PR)						X		
62 ¹	UCL (PR)			Track, campsite		X			
64	UCL (PR)						X		
71 ¹	AR20927			26% cleared					
72 ¹	AR20927			83% cleared					

¹ Patches visited on ground but not fully surveyed or explored due to constraints on time and/or permission to access. Impacts recorded are only those incidental ones that happened to be visible from the patch edge at the site of inspection.

Table 3. Weeds recorded in surveyed vine thicket patches and in adjacent towns on Dampier Peninsula, West Kimberley, between 2000 and 2002. Weeds are prioritised according to degree of threat to vine thickets.

Weed species	Priority	Recorded occurrence
<i>Aerva javanica</i> Kapok Bush (Shrub)	Low	Patch 01, Patch 03, Patch 05, Patch 15, Patch 38, One Arm Point, Lombadina-Djarindjin
<i>Azadirachta indica</i> Neem Tree	High	Patch 01, Patch 50 (1 planted)
<i>Carica papaya</i> Pawpaw (Tree)	Low	Patch 01
<i>Cenchrus biflorus</i> Gallon's Curse (Grass)	Low	Patch 01, Patch 02, Patch 18
<i>Cenchrus ciliaris</i> Buffel Grass	Medium	Patch 01, Patch 02, Patch 03, Patch 04, Patch 05, Patch 25, Patch 47, One Arm Point
<i>Cenchrus setiger</i> Birdwood Grass	Medium	Patch 01, Patch 02, Patch 03, Patch 04, Patch 05, Patch 10, Patch 16, Patch 23, Patch 30, Patch 31, Patch 38, Patch 41, Patch 44, Patch 51, Patch 53, Patch 60, One Arm Point, Lombadina-Djarindjin
<i>Chloris virgata</i> Feathertop Rhodes Grass	Low	Patch 01
<i>Clitoria ternatea</i> Darwin Pea (Vine)	High	Patch 01, Patch 38, One Arm Point
<i>Hyptis suaveolens</i> Horehound (Shrub)	High	Patch 01, Patch 40, One Arm Point, Lombadina-Djarindjin
<i>Leucaena leucocephala</i> Coffee Bush (Tree)	High	Patch04, Patch 05
<i>Macroptilium atropurpureum</i> Siratro (Vine)	Very High	Patch 01, Patch 05, Patch 39, Patch 40, One Arm Point, Lombadina-Djarindjin
<i>Merremia dissecta</i> Hairy Morning Glory (Vine)	High	Patch 01, Patch 04, One Arm Point, Lombadina-Djarindjin
<i>Passiflora foetida</i> var. <i>hispida</i> Wild Passionfruit (Vine)	Low	Patch 01, Patch 03, Patch 04, Patch 05, Patch 15, Patch 16, Patch 17, Patch 18, Patch 19, Patch 21, Patch 28, Patch 29, Patch 36, Patch 38, Patch 41, Patch 42, Patch 43, Patch 44, Patch 46, Patch 57, Patch 58, Patch X, One Arm Point
<i>Peltophorum pterocarpum</i> Yellow Poinciana (Tree)	High	Patch 01
<i>Senna surattensis</i> subsp. <i>sulfurea</i> (Tree)	Low	Patch 48, Patch 50, One Arm Point
<i>Stylosanthes hamata</i> Caribbean Stylo (Herb)	Low	Patch 04, Patch 25, Patch 27, Patch 38, Patch 39, Patch 41, Patch 42, Patch 53, One Arm Point
<i>Trianthema portulacastrum</i> Giant Pigweed (Herb)	Low	Patch 53, Patch X
<i>Tridax procumbens</i> Tridax Daisy (Herb)	Low	Patch 53, Lombadina-Djarindjin

Two very localized occurrences of Coffee Bush *Leucaena leucocephala* were recorded in Patch 04 and Patch 05. The latter, at James Price Point, occurred at a site of minor earth works and soil disturbance by heavy machinery. Although restricted to a small area at the time of survey, this weed was rated a high priority for eradication, as it is an opportune time to prevent it from spreading to a wider area.

Buffel Grass *Cenchrus ciliaris* and Birdwood Grass *C. setiger* are very widespread environmental weeds and were recorded at the edges of numerous vine thickets. Though impossible to eradicate at the broader scale, we still rated these perennial tussock grasses as medium priority weeds where they occurred adjacent to vine thickets because they provide a dense fuel load for wildfires.

The declared noxious weed Rubber Vine *Cryptostegia madagascariensis* was recorded in the town of Lombadina-Djarindjin. It is common in the Queensland tropics where it is currently prevalent along watercourses or in wooded areas. It has also established along the south bank of the Kimberley's Fitzroy River near Willare. A fast growing weed, Rubber Vine is known to climb up to 15 metres high and to smother and pull down vegetation. The potential of Rubber Vine to establish in the vine thickets of Dampier Peninsula is as yet unknown and should be monitored.

The climbing shrub Common Lantana *Lantana camara* is a severe weed of vine thickets in Queensland. Although we did not record it in vine thickets on Dampier Peninsula, we did find a few plants in gardens in Beagle Bay and One Arm Point and near Beagle Bay in Broome Pindan Wattle *Acacia eriopoda* tall shrubland. Small numbers of Lantana plants have previously been recorded in Broome Pindan Wattle *Acacia eriopoda* tall shrubland and at the margin of permanently wet springs on the coastal plain near Beagle Bay, and in One Arm Point as far back as 1993 (Western Australian Herbarium 2006). Its potential ability to establish in vine thickets on the Peninsula is unknown and should be monitored.

Horticultural planting was recorded within Patches 41 and 50. Respectively these comprised garden plants such as Golden Cane Palm and ferns, and a Neem Tree *Azadirachta indica*. Neem Trees had also been planted in gardens not far from Patch 60, from where they would have the potential to spread unassisted by people. One Boab Tree *Adansonia gregorii* was recorded in Patch 04 and it is likely that it was planted by people. While indigenous to the Kimberley and known to occur naturally in the southeast corner of Dampier Peninsula, Boabs are not considered local to this part of the Peninsula (Kenneally *et al.* 1996).

3.6.2 Fire

Fire damage was recorded in 20 out of 62 (32%) surveyed vine thicket patches as well as at two patches that were visited but not surveyed. Nine of these patches were recorded as having recent severe fire damage well into the stand, including burnt-out trees (Appendix 1: Photo 9) and evidence of patch retreat or contraction (Patches 03, 23, 26, 31, 36, 43, 44, 47, 53).

An observation of interest to us was that the pindan vegetation occurring between Patches 21 and 22 at Cape Borda, contained scattered vine thicket species (including evergreen trees) through it, but all the larger trees and shrubs had been damaged by

fire and were not thriving. Unlike Patches 21 and 22, this area of vegetation lacked protective sand dunes on its eastern side (Appendix 1: Photo 2). This vegetation pattern appears to be the same in aerial photographs dating back to 1949 (Pender SVY 762/E51/2 8 July 1949 25000 ft run 10 frame 5051).

3.6.3 Clearing and development

A current and serious potential threat to vine thickets is clearing for the expansion of urban developments, and the construction of buildings, tracks and campsites at more remote outstation settlements. Thus far, most clearing has been associated with urban expansion around Broome and One Arm Point, and the recent establishment of coastal outstation settlements and ecotourism ventures on small parcels of land (typically five-acre lots) leased from the Aboriginal Lands Trust (ALT). Although the amount of clearing at the time of survey was estimated at around 5% of the former total area of vine thickets (ie. Pre-European extent), clearing is a relatively new threat and was escalating with increasing rates of development.

Using aerial photographs it was estimated that at least 50 ha of the original 200 ha of Patch 71 had been cleared (25%) for urban or residential development at One Arm Point (Appendix 1: Photo 10). In Broome, there has also been some clearing of vegetation with vine thicket elements and possibly pockets of true vine thickets. However, more detailed survey and research are required to determine accurate estimates of the original and current extent of vine thickets within Broome, including the extent of ecotonal vegetation at thicket margins and areas of transitional vegetation containing vine thicket elements in the understorey.

As vine thicket vegetation provides dense shade in a hot climate, it is particularly sought after for camping. At Patch 72 around 10 ha out of an original 12 ha (83%) had been cleared for the construction of a campsite. Small clearings for the construction of buildings were recorded in at least four other patches (Patches 28, 41, 53, and 58), and at least twelve patches had vehicle tracks constructed through them (Patches 03, 04, 05, 18, 23, 25, 28, 30, 35, 50, 52 and 62). A further three patches had suffered disturbance from the construction of temporary camps within them (Patches 18, 50 and 62).

In Patch 39 which occurs on freehold land, about 10 ha out of 80 ha (12.5 %) had been cleared and planted to Birdwood Grass *Cenchrus setiger* as pasture for cattle.

3.6.4 Altered hydrology caused by roads and urban infrastructure

Concentrated stormwater runoff redirected from formed and sealed roads was having a significant impact on Patch 01 in Broome and at Patch 05. This was also a potential threat in the unsurveyed Patch 71 that surrounds One Arm Point.

As described by Willing (2001), suburban drains flowing into Gubinge Road and into Patch 01 at Broome, are sources of weed seed and have initiated undesirable ecological changes in Minyirr Coastal Park, both in and around the vine thicket area. Important vine thicket species, particularly Helicopter Trees *Gyrocarpus americanus*, have failed to adapt to the changed drainage regime (increased periods of flooding) and died.

Storm water damage and related weed infestation caused by concentrated runoff from the Manari Road was recorded in Patch 05 at 409598 E, 8064790 N, map zone 51.

3.6.5 Tourism and recreational impacts

Despite the work implemented by Goolarabooloo people and the Kimberley Land Council, Waterbank Station and the vine thickets on it (Patches 03, 04, 05, 62, and 60) were under intense tourism and camping pressure. Vine thickets appeared to be sought out as areas to camp (Appendix 1: Photo 11). Vehicle access compacts the soil, damages vegetation, opens up the canopy, and may spread weeds. We also recorded evidence of campers having collected fallen timbers and cut branches off vine thicket vegetation for firewood. These impacts were most prevalent in parts of Patch 05.

In the town of Broome (Patch 01 and 02) and the settlement at One Arm Point (Patch 38), parts of vine thickets had been impacted by trampling by pedestrians.

3.6.6 Feral and domestic cattle

Former pastoral operations on Dampier Peninsula have been terminated and the area destocked of cattle. Remaining feral cattle are much sought after by local hunters for meat and are not abundant. However, sign and minor impacts of feral cattle were recorded in 24 out of 62 surveyed vine thicket patches (39%). This included dung, tracks of individual animals, and occasional dust-bathing pits. In addition, a small herd of domestic cattle were present in Patch 41 at the time of survey, although they were contained in a paddock with access to a wider area than the thicket. Moderate impacts were recorded in Patch 41, including dung, pads, litter and soil disturbance particularly in dust-bathing pits, broken branches (first stages of opening the vine thicket canopy), and grazing of *Capparis sepiaria* (climber), *Glycosmis* sp. (shrub), and *Luvunga monophylla* (shrub). Patch 41 occurs on freehold land that is the terrestrial part of an Oyster and Pearl license area. It appeared that cattle did not access two other vine thickets on the property, Patches 39 and 40. At two settlements near Patches 46 and 58, Aboriginal custodians kept small numbers of cattle (some of which were caught or tamed from feral stock). At the time of survey one family had two free-ranging cattle and the other around 30 paddocked cattle.

3.6.7 Feral or domestic pigs

Impacts of free-ranging domestic pigs were recorded at two thickets, Patches 29 and 31. Damage consisted of areas of diggings where soil and plant roots were disturbed on the margins of thickets. At Patch 31 this damage was severe and extensive.

3.6.8 Rubbish dumping

Significant rubbish dumping was recorded in two vine thickets, Patches 50 and 53. This included pits full of food and drink cans, car bodies, corrugated iron and old electrical goods. A rubbish dump heavily infested with the weed Horehound *Hyptis suaveolens* was located within a few hundred metres of Patch 29. Patch 05 contained a light scattering of litter, mainly toilet paper, around informal campsites.

3.6.9 Soil erosion and deposition

Minor soil erosion was recorded at Patch 60 near James Price Point. This was an anomalous patch occurring on red pindan soil above cliffs, and was located adjacent to a major road where runoff was accelerated.

At the time of survey, vine thicket Patch 28, at Midarlon, was in the process of being buried under a large mobile sand dune. A few trees at one end of the thicket were buried up to the middle of their trunks in pink sand.

3.6.10 Forest product harvesting

One record was made of evidence of forest product harvesting at Patch 44, where an Ebony Wood *Diospyros humilis* tree had been cut down. Ebony Wood *Diospyros humilis* is coveted as a craft wood and is utilised at Lombadina, especially. The potential for any broadscale exploitation of this species (such as by the forest industry) should be monitored. Re-planting should be encouraged and the establishment of separate plantations considered if harvesting escalates.

We were surprised by the absence of Ebony Wood in vine thickets along the north shore of Beagle Bay and speculated on the possibility that this could be a result of past exploitation by Beagle Bay Mission.

3.6.11 Storm damage

No storm damage was recorded at any of the vine thicket patches surveyed.

3.6.12 Threats to country outside vine thickets

Aside from direct clearing of vine thickets, there had been a proliferation of vehicle tracks constructed through other vegetation types on Dampier Peninsula. Of concern are the wide unformed vehicle tracks constructed by clearing vegetation and topsoil using a bulldozer or grader with the blade down. Our observation is that where the soil surface is removed, these tracks quickly form pockets of fine silt or 'bulldust' blow outs. In addition they do not hold up well if driven-on after rain. Consequently, the tracks become unpassable in places and new lengths of track are created alongside parts of the original, increasing the area of disturbance, increasing the risk of soil erosion, and adding to the great 'eye-sore' originally created. By contrast tracks created without removing topsoil (by driving through the bush and possibly slashing or cutting down the occasional shrub or small tree if required) remain intact and are in keeping with the aesthetics of the sought-after wilderness experience on Dampier Peninsula (Appendix 1: Photo 12).

3.7 Management at the time of survey

At the time of survey the only obvious formal, coordinated and direct management of vine thicket patches was applied to Patch Group B patches in the southern part of Dampier Peninsula. On the former Waterbank Station in an area that is a Proposed Reserve for Conservation and Aboriginal Heritage (currently Unallocated Crown Land), Goolarabooloo people, assisted by the Kimberley Land Council, were actively

implementing some management at coastal tourist nodes in the area of Quondong Point (Patches 03, 04, 05 and 62). Work activities had included production and erection of interpretive signage, revegetation, fire management, rubbish and weed removal, and construction of barriers to sensitive access routes. However, some of the access barriers had been driven around and the area remained subject to the impacts of heavy tourism.

The Rubibi Aboriginal Land, Heritage and Development Council had also implemented management actions to address some of the threatening processes impacting on Patch 01 in Broome's Minyirr Coastal Park. For example, they commissioned a comprehensive survey and report on the environmental weeds of the Park, and implemented some weed control activities. Further work and an ongoing commitment to management were still required as most weed species had not been eradicated.

However, we did find that the one freehold landowner and a few of small leaseholders we met with worked hard individually to prevent late dry season wildfires from entering their land holdings and surrounding areas, albeit with variable success. A freehold landholder had been resident for long enough and was sufficiently successful at managing fire that the vine thicket patches on their property had not suffered fire damage in a long time and were in exceptionally good condition (except for some impact of cattle at one patch).

3.8 Priorities for reservation and/or conservation management

3.8.1 Prioritisation of patches for reservation and conservation

Given that they function as an ecological network, all vine thicket patches should be protected and managed for conservation and, because of the need to maintain connectivity, the critical clusters of vine thicket patches (identified in Section 3.1) must be conserved. However, given the limited resources for conservation, we have prioritised some individual patches for targeted conservation management based on: patch size; outstanding structure; presence of regionally and locally significant flora (either within the canopy limits or at their edge); species-richness; and representation of the four patch-groups defined by floristic analyses (giving preference to patches in good condition, and including a representative range of dominants and structural variations). It was beyond the scope of this project to research or include Indigenous cultural values. Prioritised patches are:

1. All six unusually large vine thicket patches are a high priority. By chance, each of the four vine thicket patch groups (classified according to similarities in perennial plant species) is represented in these patches:
 - Patch 05: 190 ha (patch Group B)
 - Patch 71: 150 ha post clearing (patch Group C)
 - Patch 20: 150 ha (patch Group D)
 - Patch 22: 130 ha (patch Group E)
 - Patch 47: 110 ha (patch Group C)
 - Patch 39: 90 ha (patch Group C)

Patch 05 is a linear patch stretching from near Quondong Point to James Price Point, on Unallocated Crown Land in the Proposed Waterbank Reserve for Conservation and Aboriginal Heritage. As well as being large, Patch 05 is the most species-rich patch in Patch Group B, as well as one of the best structured, being dominated by Goonj *Celtis philipensis* (also see point 3 regarding a rare species). Patches 20 and 22 occurred on Unallocated Crown Land in the Proposed Borda Nature Reserve, which had been proposed since 1983. Patch 71 at One Arm Point and Patch 47 at Gallen were in Aboriginal Reserves, were not included in proposed conservation reserves and are a high priority for protection. (Given that Patch 71 has very high cultural significance for Aboriginal people and that general access is barred, reservation as an Indigenous Protected Area could be considered). While Patch 71 was unsurveyed, Patch 47 was found to be species-rich comprising 42 species. Patch 39 occurred on freehold land (also see point 6).

2. Vine thicket Patch 21 (60 ha) is a high priority for its unusual structure. It lies in the lee of a high dune, is dominated by tall evergreen trees with touching to overlapping crowns, and has little understorey. Patch 21 is located on Unallocated Crown Land within the Proposed Borda Nature Reserve.
3. The two vine thicket Patches 05 and 14 containing the tree *Pittosporum moluccanum* should be a high priority. *P. moluccanum* is a Priority 4 species that, in the Kimberley, is restricted to Dampier Peninsula either in or near vine thickets. Also of importance is Patch 11 with the Garnboorr *Melaleuca dealbata* woodland adjacent to it, along with the other transitional vegetation in which *P. moluccanum* occurs. Patches 14 (Patch Group D) and 11 (Patch Group C) also contained other locally restricted species. These patches were located in an Aboriginal Reserve.
4. Two other priorities among the Group D patches are Patch 06 and Patch 10. At the time of survey, Patch 10 (20 ha) was a healthy well-structured patch dominated by Ebony Wood *Diospyros humilis* and containing locally restricted species. Patch 06 contains 25 taxa in a 15 ha area, including locally restricted species. The remaining Group D patches are more depauperate in species composition and structure. Patches 06 and 10 were located in an Aboriginal Reserve.
5. All the well-structured, species-rich Group C patches are a high priority for conservation. Along with those listed above, particular emphasis could be placed on Patch 25 which comprises 41 species; Patch 28 comprising 47 species; and Patch 26 comprising 38 species (all three contain locally restricted species); along with Patches 42, 30, 43, 55, 37, 36 and 52 all of which comprise over 35 species. Patches 25 and 26 occurred on Lombadina Grazing Lease, Patches 52 and 55 on Unallocated Crown Land in Proposed Cygnet Bay Nature Reserve, and the remaining patches were in Aboriginal Reserves.
6. Patches 39, 40 and 41 and significant buffer areas around them should be protected. Patches 39 and 40 were the only two patches at which we recorded (at the edge) the shrub *Helicteres rhynhocarpa*, a Kimberley endemic restricted to woodland or open areas adjacent to vine thickets. *Trophis scandens* was recorded adjacent to Patch 41; this record is disjunct from its known distribution in the north Kimberley. Patch 39 which is unusually large (see point 1), was a well-structured vine thicket that at the time of survey was in particularly good condition

as the landholder had protected the area from fire over a long period of time. Patches 39, 40 and 41 all occur on freehold land.

7. In addition to Patch 05, two other priorities for Patch Group B are Patches 15 and 18 in the small cluster of vine thickets north of Beagle Bay. These are also well structured examples of this patch group that are dominated by Goonj *Celtis phillipensis*. Patch 59 is the only well formed Group B patch in the cluster from near Deep Water point to Goodenough Bay.
8. Patch 45, a patch dominated by Mamajen *Mimusops elengi* over Currant or Coffee Fruit *Grewia breviflora* and *Croton habrophyllus*, could also be prioritised in order to represent the diversity within Patch Group E. Patch 24 could also be important but was inadequately surveyed due to restrictions on access permission.

3.8.2 Suggested conservation reserve boundaries for vine thickets

Ideally, if competing land use considerations could be resolved, the whole of the northern end of Dampier Peninsula (north of the southern Lombadina Grazing Lease boundary) should be reserved for conservation as this includes all the most northern vine thicket patches (the most species-rich) in a tight cluster along the coastline, along with a substantial area of intervening habitats. In lieu of this, as much of the northern Peninsula as possible should be protected with the aim of including those vine thickets not currently proposed for reservation. These are:

- (i) Vine thickets on Lombadina Grazing Lease from just south of Chile Creek then north through Lombadina-Djarindjin to Kooljaman (Patches 24 to 68); and
- (ii) Vine thickets on Aboriginal Reserve 20927 (One Arm Point lands) from Kooljaman (Patch 69) northeast to Swan Point (Patch 33), and south through One Arm Point (Patch 71) to Gallen (Patch 47) and Miligoon (Patch 51). This includes three patches currently on freehold land.

To protect the cluster of ten vine thicket patches on coastal dune formations between Cape Baskerville and Baldwin Creek (Patches 06 to 14, and 62), on Aboriginal Reserve 22615 (Beagle Bay lands), a protected area could encompass all of Baldwin Creek including its mangroves and tidal mudflats to the low tide line, Bundabunda Spring and the intertidal mudflats of Carnot Bay, the rock outcrops King Peaks and Carnot Peaks, and interspersed woodlands. This could be accomplished by drawing a circle of 15 km in radius around Patch 08.

The cluster of four vine thicket patches north of Beagle Bay from East Sandy Point to Cliff Point (Patches 15, 16, 17 and 18) on Aboriginal Reserve 1834 (Beagle Bay lands) could be reserved within a circular boundary with a radius of about 7 km from the southern end of Patch 16. This would include Tappers Inlet in the conservation reserve.

A similar strategy could be applied for reserving the cluster of vine thickets between Cape Boileau and James Price Point area (Patches 05, 04, 03, 62 and 60), with particular emphasis on Patch 05.

More detailed mapping may be required to more adequately reserve or protect the two main vine thicket patches in Broome (Patches 01 and 02 at Gubinge Road and Hidden Valley) with buffers including extensive areas of transitional vegetation.

4 DISCUSSION

4.1 Extent, patch size and distribution of vine thickets

We identified 72 patches of vine thickets associated with dunes and other coastal landforms on Dampier Peninsula, confirmed the existence of 68 of these patches, and surveyed 62 patches for flora and condition. Prior to this study, the extent of the vine thickets was unknown, with only four patches formally surveyed and documented by Kenneally *et al.* (1991) as part of the multidisciplinary 'Kimberley Rainforests' project coordinated by McKenzie *et al.* (1991).

We estimated the total area of the vine thickets on Dampier Peninsula at around 2300 hectares. While this only represents 0.1% of the Peninsula's land mass, the area is significant given that the total area of all rainforest types in the Kimberley has previously been estimated at around 7000 ha (Kimber *et al.* 1991).

Vine thicket patches ranged in size from clumps of a few trees up to one patch of almost 200 ha. The four vine thicket patches previously surveyed by Kenneally *et al.* (1991) were reported as 1, 3, 12 and 60 hectares in size. While our study demonstrated the existence of five patches in excess of 100 ha in size, given the median patch size of 20 ha and mode of 10 ha, we believe the vine thickets of Dampier Peninsula still fit the general description of small and isolated in their distribution. The large patches should be treated as rare.

We confirmed the previously described distribution of vine thickets as scattered from Broome north along the west coast to the tip of Dampier Peninsula at Swan Point, and to a much shorter distance south along the east coast to Goodenough Bay. As expected, this distribution reflects that of dunes. In addition, we showed that these vine thicket patches are distributed in five main clusters with the largest cluster of 52 patches occurring within a 50 km radius of Swan Point on the northern tip of the Peninsula.

As previously known, the two southern-most patches of vine thickets are located within the town of Broome close to the 600 mm rainfall isohyet. This is consistent with the suggestion of Webb (1968) and of Webb and Tracey (1981) that Australian tropical rainforests form a sequence along a precipitation gradient and are ultimately replaced by savanna at around 600 mm annual rainfall (Bowman 2000). Russell-Smith (1991) also found that the arid limit of rainforest in the Northern Territory was about 600 mm per annum.

Since our survey was conducted, at least five additional small patches of vine thicket have been identified by aerial survey (ENV Australia 2008a, 2008b). One was a very small patch at Chile Creek in an area of restricted access. Four were between Beagle Bay and Pender Bay, in a small area that was not covered by our aerial photography set. However, at least two patches that we discounted as transitional vegetation

(characterized by vine thicket flora in the understorey but not dominated by it in the canopy) were counted as true vine thicket by others and vice versa. In addition, the mapping of patch boundaries varied slightly between surveys, probably largely a reflection of the different methodologies used. Along with the nine vine thicket patches that we identified but did not have time to survey, these observations indicate the need for further survey and mapping to refine our work, as well as the need to describe transitional vegetation types in comparison with more true vine thicket patches.

4.2 Flora and vegetation

The vine thickets make a considerable contribution to the floristic diversity of Dampier Peninsula at around 23% of the total number of native vascular plant species. This is a similar proportion to that Kenneally *et al.* (1991) reported as occurring in rainforests across the Kimberley as a whole. Furthermore, in their occurrence on Dampier Peninsula, 25% of the native vascular plant species that we recorded in vine thickets are known to be mostly or wholly confined them.

The four records of the rare tree *Pittosporum moluccanum* on Dampier Peninsula, of which we added two, are all from vine thickets or transitional vegetation. The shrub *Helicteres rhynchocarpa*, a Kimberley endemic restricted to areas adjacent to vine thickets, was found at only two of the 62 patches surveyed. These observations demonstrate the importance of maintaining thicket margins and adequate buffers in adjacent vegetation, and wherever possible, conserving transitional vegetation.

While forming a unique ecological community on the dunes and other coastal landforms of Dampier Peninsula, most of the plants recorded in the vine thickets are widely distributed across tropical Australia with many extending into Asia. Russell-Smith and Dunlop (1987) noted that such vagile rainforest species often occur on relatively recently evolved landforms. Kenneally *et al.* (1991) went on to explain that these species could be expected to occur in situations where they are afforded some protection from the elements, including fire, provided that the overall climate is satisfactory. More recently, Bowman (2000) has collated a large body of evidence indicating that fire plays a major role in controlling rainforest boundaries, with the *frequency* of fire in the landscape being the most critical factor.

Vine thicket patches of the same floristic classification grouping (based on perennial plant species composition) tended to be clustered together in their distribution, and outliers generally occurred on atypical landforms. While no attempt was made to include environmental correlates in our analyses, this result and field observations suggest a relationship between patch grouping and topography (such as variations in dune formation and height, or in dune system area) and possibly also soil type. This supports the general observation of Kenneally *et al.* (1996) that Dampier Peninsula's vine thicket communities are best developed towards the north, where larger dune systems provide conditions suitable for better structure and greater diversity of species.

We found no apparent relationship between patch size and species composition. Large vine thicket patches occurred in three of the four patch groups where extensive dune habitats were present. Unlike in the Kimberley Rainforests study (Kenneally *et al.*

1991), we found only a very loose correlation between patch size and perennial plant species richness. Higher species richness within Group C vine thicket patches at the northern end of Dampier Peninsula might be explained by the increasing precipitation gradient from south to north. However, some examples of the more depauperate Patch Group B thickets also occur towards the northern end of the Peninsula on the east coast where dunes are poorly formed. Bowman (2000) has argued that while it is true that variation in moisture supply influences species composition and structure of rainforest vegetation, even this relationship is complicated by the effects of soils, topography and fire history.

In addition to vine thickets, McKenzie and Kenneally (1983) and Kenneally *et al.* (1996) described the occurrence of closed vine forests along the foot of the leeward slopes of larger dune systems on Dampier Peninsula. Particularly, where these dunes truncate coastal drainage areas. Vine forests were reported as reaching 15 m in height and as including the tall trees Cadjeput *Melaleuca cajuputi* and Broad-leaved Paperbark *M. viridiflora* among the principal upper tree species. However, we distinguish vegetation of this description as belonging to a separate ecological community associated with ephemeral swamps and a high groundwater table. Often occurring adjacent to vine thickets, some of this *Melaleuca* dominated vegetation was ecotonal or transitional, comprising abundant vine thicket species in the understorey. By contrast, vine thickets did not occur on wet or damp lands and their occurrence did not appear to be closely associated with a high groundwater table.

While some rock outcrop vegetation is also loosely referred to as vine thicket, it usually looks quite different and our preliminary floristic analyses clearly distinguished a sample of rock outcrop patches as separate types of vegetation communities to the vine thickets associated with coastal land forms. Rock outcrop vegetation could be the subject of future studies on Dampier Peninsula.

At the time of survey, we found that many local people did not readily recognise which vegetation community was referred to by the term 'vine thickets' and some conjured pockets of vegetation infested with climbing weeds in which the canopy is obviously overwhelmed (by species such as Siratro *Macroptilium atropurpureum*, Wild Passionfruit *Passiflora foetida* var. *hispida*, and Hairy Morning Glory *Merremia dissecta*). This led to an attempt to use 'Monsoon thickets' instead. However, while the term 'monsoon' is useful academically in encapsulating the vine thickets as a group of largely tropical species, it doesn't help the layman much with field identification of the vegetation type or ecological community. Given a local history of use of the term 'vine thicket', it may be more appropriate for this to be retained.

We noticed that many local Aboriginal people tended to refer to place names in identifying areas, rather than relating to vegetation types. However, some older Bardi people referred to thick scrub generally as 'boordan' (as in Aklif 1999) and advised us that vine thickets would have been referred to as bush fruit country or 'mayi boordan'. 'Mayi' referring to either plant food or fruit (Aklif 1999). The education of all local people in recognising vine thickets would be a necessary starting point for any future public awareness raising programs.

4.3 Threatening processes

At the time of survey, threats to the integrity of the vine thickets of Dampier Peninsula were found to be at a point of escalation with the increasing human population and visitation. Associated with this population increase were changing settlement patterns and land use practices, and subsequent increased rates of clearing, development and disturbance. If the proposed development of a gas processing plant at James Price Point is implemented (as currently supported by the State Government), these threats will be magnified.

Clearing is a relatively new and increasing threat to Dampier Peninsula's vine thickets. So far, most clearing has been associated with urban expansion around Broome and One Arm Point, as well as newly established outstation settlements and ecotourism ventures on small parcels of coastal land (typically five-acre lots) leased from the Aboriginal Lands Trust (ALT). While lessees, mainly Aboriginal organisations and family groups, are now required to comply with the recently prepared 'Land use and development policy on ALT land', development had proceeded without any effective process of environmental impact assessment and planning, or process of enhancing community awareness as to the significance and value of vine thicket vegetation. This report will provide a valuable resource for use in future environmental planning.

At the time of survey, there appeared to be little local awareness of the fact that clearing without a permit was illegal under changes made in 2004 to the State Government's *Environmental Protection Act 1986* and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

During field survey, we gained direct experience of the increasing rate of settlement on Dampier Peninsula. At the outset of the project in 2000, we commenced field survey at vine thicket patches that were easily accessed by vehicle and on foot, but made plans to charter a boat to remotely located patches in the final survey year in 2002. However, by 2002 so many new tracks had been bull-dozed or graded into new coastal settlements that no remote parts of the Peninsula remained. By this time, all patches could be accessed either directly by vehicle or by hiking from the nearest vehicle access point.

The great speed at which weeds can become established and the degree of threat that weeds pose to vine thickets are dramatically illustrated in the badly degraded Minyirr Coastal Park example (Patch 01) in Broome. In a 1988 survey by Trudgeon (1988), the only weeds reported in this vine thicket and surrounding parts of Minyirr Coastal Park were Kapok Bush *Aerva javanica* and Wild Passionfruit *Passiflora foetida* var. *hispida*, both low priority weeds. By 2001, when Willing (2001) conducted a detailed survey of the park, the impacts of weeds, particularly the rampant climber Siratro *Macropodium atropurpureum*, were reported as severe and warranting urgent attention. Other high priority weeds at this patch are the invasive trees Neem Tree *Azadirachta indica* and Yellow Poinciana *Peltophorum pterocarpum*, the shrub Horehound *Hyptis suaveolens*, and the climber Darwin Pea *Clitoria ternatea*. Despite the implementation of some weed control work at the site, weed infestation was still severe when we surveyed the patch in 2002. Willing (2001) attributed the rapid infestation and spread of weeds since 1988 to increased visitor numbers and vehicle

impacts associated with the explosive growth of Broome as a tourist destination, suburban expansion into the Minyirr Coastal Park drainage catchment, and above average rainfall trends in recent years.

These observations highlight the urgent need to prevent disturbance to other vine thickets, for containment of recent weed infestations now recorded elsewhere on the Peninsula (both in and adjacent to thickets), and for the introduction of weed hygiene measures such as washdown facilities for vehicles and heavy machinery. North of Broome, targeted weed control should commence immediately, before small infestations become uncontrollable. Priority actions for weed control are outlined in our Recommendations section.

During the Kimberley Rainforests survey conducted between 1987 and 1989, McKenzie *et al.* (1991) recorded cattle impacts at the three vine thicket patches visited on the Peninsula as 'widespread and severe', and as 'evident' in Broome's Minyirr Coastal Park patch. However, by 2000 when our survey commenced, pastoralism or broad-scale cattle grazing had become a relatively insignificant activity on Dampier Peninsula, and feral cattle numbers were few due to their being hunted by local people for meat. However, a small number of domestic cattle were still present and land use practices were rapidly changing with new patterns of settlement. If more of the now numerous small leaseholders on the Peninsula take up keeping small herds, there is the potential for cattle to become a more significant threat all over again. Similarly, a small number of free-ranging domestic pigs are kept and significant impacts of pig activity were observed at two vine thicket patches.

Just over one-third of the 68 vine thicket patches we visited between 2000 and 2002 had been severely damaged by fire. Russell-Smith and Bowman (1992) found the same proportion of 1220 rainforest sites they surveyed in the Northern Territory had boundaries severely degraded by fire. During our liaisons, some local people claimed that vine thickets 'did not want to burn'. This appeared to be true for low intensity fires carried in adjacent vegetation early in the dry season. However, the effectiveness of this barrier diminishes as plant fuels desiccate, and late in the dry season vine thickets on unprotected terrain do become vulnerable to fire damage. Bowman (2000) described rates of desiccation as varying from site to site and from year to year.

Bowman (2000) has documented considerable evidence to show that the maintenance of diversity in modern Australian vegetation, including rainforests, requires that humans actively influence the distribution and frequency of fire. Bowman's description of fire management in northern Australia as typically consisting of broadscale 'controlled' burning early in the dry season (usually achieved by dropping incendiaries during traverses by helicopters or fixed-wing aircraft) is an accurate reflection of fire management on Dampier Peninsula as conducted by State Government agencies. However, he and Russell-Smith and Bowman (1992) have argued that the inescapable conclusion for managers is that patches of rainforest require individual attention when it comes to fire management, and that this must be balanced with the need to manage entire landscapes. This conclusion points to the need for the recognition and support of the potential role of interested leasehold and freehold coastal land holders, along with other local people, in managing individual patches as part of a coordinated and strategic fire management program for the Peninsula.

4.4 Conservation management

Previous consideration of the conservation requirements of rainforest patches in northern Australia has largely focused on the management of fire, feral animals and weeds (e.g. McKenzie 1991, Russell-Smith and Bowman 1992). Price (2004) advocates that the focus should henceforth also consider protecting networks of patches and (in common with McKenzie 1983) adjacent vegetation types. Price's strategies are based on extensive research in the Northern Territory highlighting the need to maintain connectivity of patches through ecological processes, particularly plant pollination and seed dispersal through fruit-eating fauna (mainly birds and bats). For Dampier Peninsula, we would also add strategic land use planning across the Peninsula, and environmental impact assessment prior to all future developments, whether residential or commercial, with a ban on clearing vine thickets.

The major focus of reserve design for protection of rainforest patches in the Northern Territory is the selection of clusters in which all the rainforest patches and adjacent habitat types within a circle of a given radius are protected (Price *et al.* 1998). Should new reserves or reserve boundaries be proposed, the clustered distribution of vine thicket patches on Dampier Peninsula would lend itself to this approach.

At present the vine thickets of Dampier Peninsula are effectively unrepresented in the reserve system with one highly degraded urban patch at the extreme southern end of their range in Broome's Minyirr Coastal Park. Of the three areas for which nature reserves were proposed as far back as 1983 (McKenzie 1983), only the Proposed Borda Nature Reserve remained largely free of subsequent settlements at the time of our survey. The Proposed Leveque Nature Reserve is now known to be an area with extremely high Aboriginal cultural heritage value and access issues. A key issue in environmental planning for Dampier Peninsula will be to progress the reconciliation of proposed nature reserves with current Aboriginal native title, land management and employment aspirations (possibly as Indigenous Protected Areas).

While the reservation of vine thickets or other rainforest types within formal parks and reserves provides legal benefits, it does not guarantee effective conservation management, particularly for vine thickets and other types of rainforest which are highly fragmented in their distribution (Russell-Smith and Bowman 1992). Numerous authors have testified as to the necessity for the consideration of management at the landscape scale as well as the local scale, for conserving ecological processes, and for the importance of off-reserve conservation in the development and implementation of threat management plans, which must be integrated across all land tenures and uses (e.g. Russell-Smith and Bowman 1992, Smith *et al.* 1993, Morton *et al.* 1995, Price *et al.* 1998, Price *et al.* 1999, Woinarski and Fisher 2003, Soule *et al.* 2004). In other words, conservation can realistically be achieved only with the cooperation of all land managers and users. Woinarski and Fisher (2003) described two serious impediments in achieving the goal of biodiversity conservation across the rangelands: the current lack of resources and of societal agreement. Money and personnel are required to develop conservation programs, and these programs must be both coordinated and strategic.

4.5 Conclusion

To keep abreast of escalating threats to this unique ecosystem, all stakeholders will need to work together, to be vigilant and active in their efforts, and to encourage widespread appreciation of the value and needs of the vine thickets of Dampier Peninsula. This could be coordinated through a recovery planning project. However, conservation of vine thickets also needs to be incorporated into a comprehensive planning strategy for Dampier Peninsula. Particular emphasis for the conservation management of vine thickets should be placed on: controls on clearing and development; weed control; vehicular access controls; localised and landscape-scale fire management; controls on and attention to the ecologically sustainable design and location of road and tracks; and containment of domestic livestock. Also important is an appreciation of the role of vine thickets in Indigenous culture and their potential for local low impact tourism enterprises, such as guided bushwalks.

All vine thicket patches along with adequate buffer zones should be protected through conservation management and preferably reserved. This requires maintenance of connectivity through preservation of the network of critical clusters of vine thicket patches. Ideally, the various adjacent habitats should also be retained in their original proportions.

Through mapping and describing the full distribution and extent of the vine thickets of Dampier Peninsula, demonstrating patterns of floristic composition among them, and describing the threatening processes to which they are subject, this study provides a necessary basis for the assessment of their conservation status, for planning and prioritising conservation management, for strategic planning, and for future research and monitoring. Recommendations for management are provided in the following section.

5 RECOMMENDATIONS

Community-based stakeholders and appropriate government agencies to:

1. (a) Nominate the vine thickets on coastal sand dunes of Dampier Peninsula for listing as a threatened ecological community under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*; and
(b) Review the category of threat assigned to the vine thickets as a WA State listed threatened ecological community ('Monsoon [vine] thickets on coastal sand dunes of Dampier Peninsula') with a view to changing it from Vulnerable to Endangered.
2. Develop and implement a planning strategy for the whole of Dampier Peninsula.
3. Implement environmental impact assessment and planning processes for all developments on Dampier Peninsula. Particular urgency applies to the expansion of the major settlements (now towns) of One Arm Point and Lombadina-Djarindjin, and the establishment and expansion of outstation settlements and ecotourism ventures, where clearing and the construction of buildings, campsites

and access tracks are having significant impacts on vine thickets and surrounding country.

Urgently required as a basis for urban planning, are fine-scaled surveys and detailed mapping of the extent and boundaries of vine thickets in and adjacent to Broome, One Arm Point and Lombadina-Djarindjin (including Patches 01, 02, 65, 71). This should include the extent of any transitional vegetation at vine thicket margins and areas of vegetation containing significant vine thicket elements. True vine thicket patches should be retained for conservation along with a 500 m buffer zone extending into adjacent vegetation. Ideally transitional vegetation containing vine thicket species in the understorey, occurring outside such buffer zones, should also be retained.

4. Establish a recovery team to develop and oversee the implementation of a recovery plan for the vine thickets as a Threatened Ecological Community.
5. Establish a program to implement on-ground management of vine thickets and adjacent vegetation. This could include the employment of a coordinator and the appointment and training of local Aboriginal 'Rangers' to implement recovery actions on site.
6. Initiate a program of community liaison and education to increase awareness of the significance and conservation management requirements of Dampier Peninsula's vine thickets, as well as any potential legal implications for activities impacting on vine thickets.

As a priority this includes liaising with the many leaseholders on Aboriginal leasehold land lots, and the few owners and managers on freehold land (oyster and pearl license areas), but it should also extend to the general community of Dampier Peninsula.

7. Act to declare previously proposed conservation reserves and implement appropriate conservation management. The Proposed Borda Nature Reserve (12302 ha) is a particularly high priority and has been proposed since 1983. It contains six vine thicket patches, two of which are unusually large in area. Other proposed reserves are the Proposed Cygnet Bay Nature Reserve (15805 ha), the Proposed Reserve for Conservation and Aboriginal Heritage (Waterbank) (92234 ha), the Proposed Minyirr Coastal Park Stage 2 (approximately 50 ha), and the Proposed Leveque Nature Reserve (1010 ha). This would involve renegotiation and reconciliation of proposed nature reserves with current Aboriginal native title, settlement, land management, and employment aspirations (possibly as Indigenous Protected Areas).
8. Add to the proposed conservation reserve system and/or manage vine thickets for conservation based on: (1) the conservation priorities identified in Section 3.8 of this report; and (2) the following principles:
 - (a) All vine thicket patches should be protected and preferably reserved. Research in the Northern Territory has shown that vine thickets function as a network of patches and that the loss of any single vine thicket patch can affect all of the

- others in the network. In addition, each patch should be protected by a 500 m buffer zone extending into adjacent vegetation;
- (b) Because of the need to maintain connectivity, critical clusters of vine thicket patches must be reserved and conserved; and
 - (c) Considerable areas of all habitats adjacent to vine thickets should be reserved and managed for conservation. These act as buffers and provide resources for animals like birds and bats that maintain the ecological function of vine thickets. Reserve boundaries should extend to the low tide line so as to include mangroves and tidal mudflats, as much of Dampier Peninsula's species richness comes from species dependent on these littoral areas. Ideally, the various adjacent habitats should be retained in their original proportion.
9. The majority of vine thicket patches should be protected from high rates of public access and usage because small or narrow linear patches are highly vulnerable to disturbance. In particular, vehicular access should be minimized and restricted to existing tracks. However, the public should have the opportunity to walk in vine thickets and ecologically sensitive ecotourism ventures could cater to this. Where vine thickets are declared Nature Reserves (rather than National Parks) they should remain open to Aboriginal usage for traditional purposes such as ceremonial use of sacred sites.
 10. Establish and promote standards and guidelines for access track construction on Dampier Peninsula in order to prevent excessive land degradation. In particular, unformed access tracks should not be graded or bulldozed, rather their construction should include driving over or removal and slashing of vegetation where necessary, such that soil surfaces remain intact. On the Peninsula, blade-down clearing for track construction is not necessary or ecologically sustainable, and detracts from the wilderness experience required for ecotourism. Discrete bush tracks work well in comparison.
 11. (a) Implement fire management to protect individual vine thicket patches from intense late dry-season fires; and
(b) Develop an integrated community-based fire management program for Dampier Peninsula.
 12. Implement washdown hygiene to minimize the transport of weeds on heavy earth-moving equipment around Broome, between Broome and Dampier Peninsula, and between locations on the Peninsula. This should be strictly applied to the movement of equipment from Broome to the Peninsula.
 13. Survey and map weed infestations, and as a matter of urgency, implement control of very high and high priority weeds in vine thickets and in settlements/town sites. Particularly at One Arm Point, Lombadina-Djarindjin and Broome which are adjacent to vine thickets, but also at Beagle Bay as people travel between there and vine thickets. Monitor weed infestations (species present, species abundance, and extent of area of infestation) and their response to management regimes. While the seeds of many weed species are wind and bird dispersed, they can also be transported by water so catchment areas draining into vine thickets should be surveyed for weeds.

The highest priority weed to target for vine thicket conservation is Siratro or Black Pea *Macroptilium atropurpureum* (vine), which at the time of survey occurred at Broome, James Price Point, and in two patches near One Arm Point. New infestations are a higher priority than those in the already severely degraded Gubinge Road vine thicket (Patch 01) in Minyirr Coastal Park.

High priority weeds are: Darwin Pea *Clitoria ternatea* (vine) at Broome and One Arm Point; Hairy Morning Glory *Merremia dissecta* (vine) at Broome and Quondong Point; Coffee bush *Leucaena leucocephala* (tree) in two localized stands at James Price Point and north of Quondong Point; Neem trees *Azadirachta indica*; Rubber vine *Cryptostegia madagascariensis* (vine) recorded in Lombadina-Djarindjin; Horehound *Hyptis suaveolens* (herb) at Broome and in one patch near One Arm Point; and Yellow Poinciana *Peltophorum pterocarpum* (tree) at Broome only. Note that Neem trees had so far only been recorded in one vine thicket at Broome. However, the species had been planted in gardens at some Peninsula outstations from where it had the potential to spread into vine thickets.

Medium priority weeds include Buffel Grass *Cenchrus ciliaris* and Birdwood Grass *Cenchrus setiger* at numerous locations. Although widespread and difficult to eradicate, these grasses provide dense fuel for fires right up to the edge of vine thickets.

14. Apply restrictions to the cultivation and selling of potential weeds among horticultural species in Kimberley nurseries (such as Rubber Vine *Cryptostegia madagascariensis*, Neem Trees *Azadirachta indica*, Lantana *Lantana camara*, and Yellow Poinciana *Peltophorum pterocarpum*), and raise public awareness as to the potential for these species to become weeds so as to discourage the planting of them. In addition, discourage the public from dumping garden prunings (or other rubbish) in the bush, especially not in the vicinity of vine thickets.
15. Manage domestic and feral or exotic animals on Dampier Peninsula. Domestic cattle and pigs should be excluded from vine thickets by containing them in separate paddocks or yards. At the time of survey, the number of feral cattle and domestic cattle and pigs on the Peninsula was low. However, as more people take up residential leasehold blocks on Aboriginal land, these numbers could potentially increase.
16. Implement management for ecologically sustainable forest product harvesting in vine thickets (e.g. craft wood timbers), including monitoring, regulation, and development of guidelines for sustainable use and practices. For example, encourage replanting of harvested trees and consider establishing separate plantations if harvesting escalates.
17. Implement and plan for ecologically sustainable management of tourism and recreational impacts on vine thickets and surrounding vegetation.
18. Protect all Banyan or Strangler Fig *Ficus virens* trees, Jalgir *Canarium australianum*, Marool or Blackberry *Terminalia petiolaris* and its hybrids with Red Gubinge *Terminalia ferdinandiana* on Dampier Peninsula, and where possible buffer each within a protected radius of 250 m. Also plant or encourage

the growth of these trees in towns. Studies in the Northern Territory have shown that several vine thicket trees (particularly Banyan or Strangler Fig *Ficus virens*) produce abundant fruit for fruit-eating birds and bats (flying foxes) that are the agents of dispersal for the seeds of most vine thicket plants. As well as occurring in vine thickets these four species may be found in woodland and are scattered (albeit thinly) throughout the landscape, thereby providing alternative food resources and acting as stepping-stones for birds and bats travelling between vine thicket patches. Plant these tree species, along with Mamajen *Mimusops elengi* and Ebony Wood *Diospyros humilis* in settlements and towns.

19. Identify and protect all known flying fox roost sites on Dampier Peninsula. Studies in the Northern Territory recommend including roosts within reserves and buffering them by 500 m.
20. Protect and manage Bundabunda Spring to conserve the only occurrence of 'wet rainforest' on Dampier Peninsula. Bach and Price (2005) found that among rainforest patches in the Northern Territory, each of 16 study patches had different patterns of fruit availability and this difference was most marked between 'wet' rainforest and 'dry' rainforest types such as vine thickets. Given the individuality of each patch, any one can become an important food resource and habitat for fruit-eating fauna at some time of the year. Therefore, it is important to conserve the existing diversity of rainforest types on Dampier Peninsula.
21. Review the conservation status of *Pittosporum moluccanum* which is currently a Priority Four Rare species, if the recently proposed gas processing plant development at James Price Point is approved. Priority Four (P4) Rare taxa are defined as: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
22. Establish a program to monitor the condition and extent of vine thicket patches on Dampier Peninsula in response to current and new management regimes. As a bare minimum, this should include the refinement of boundaries mapped under this project, and the investigation of possible patch boundary retreat (or expansion) over time, through further 'ground-truthing' survey work and the use of spatially rectified digital aerial photographs.
23. Conduct further survey, mapping and ecological research, including:
 - a) Refinement of our vine thicket patch boundary maps, such as through: (i) the use of spatially rectified digital aerial photographs at a scale finer than 1:20 000; and (ii) a much greater investment in the ground-truthing of boundaries mapped from aerial photographs. As a basis for planning and environmental impact assessment, particular urgency applies to Patch 05 at James Price Point, and vine thickets and transitional vegetation in and adjacent to the towns of Broome, One Arm Point and Lombadina-Djarindjin (including Patches 01, 02, 65, 71).;
 - b) Completion of botanical and condition survey for the few remaining identified but unsurveyed patches on Dampier Peninsula;

- c) Conduct aerial surveys to check for any further vine thicket patches not identified in this survey. Include the description and identification of numerous patches of transitional vegetation. Follow with ground survey of any remaining patches.
 - d) Identification of vine thicket patches most at risk from fire damage;
 - e) Document the remaining knowledge of Aboriginal people in relation to vine thickets on Dampier Peninsula, such as their cultural values, uses, ecology, and traditional management. Examine the priorities for protection and management of vine thicket patches based on indigenous cultural values;
 - f) Survey for flying fox roost sites on Dampier Peninsula;
 - g) Survey of frugivorous (fruit-eating) bird species on Dampier Peninsula (we have recorded the presence of two species in numerous patches: the Rose-crowned fruit-dove and the Great Bowerbird);
 - h) Research on the ecology of frugivorous birds and bats on Dampier Peninsula, their role in vine thicket seed dispersal, and the implications of these relationships for local conservation management (including the complementary roles of other habitats in the provision of resources for mobile frugivore species);
 - i) Review the conservation status of *Parsonsia kimberleyensis*; and,
 - j) Taxonomic studies of *Capparis* aff. *jacobsii* on Dampier Peninsula in order to determine its conservation status.
24. Consider and plan for the impacts of climate change by reserving, protecting and managing for conservation, as many vine thicket patches and as much of the intervening habitat on Dampier Peninsula as possible. The larger reserves are, the better the chances of maintaining a diversity of species, ecological communities (ecosystems) and ecological processes under fluctuating climatic conditions. As well as changes in ecology and species composition, many vine thicket patches may be at risk from cyclone damage and inundation by rising sea levels.

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APPENDICES

Appendix 1. Photographs of the vine thickets on coastal sand dunes of Dampier Peninsula, West Kimberley, surveyed between 2000 and 2002.



Photo 1. Under the shady vine thicket canopy of vine thicket Patch 18 (20 ha). Most patches have a significant layer of leaf litter on the soil surface (August 2002).

Appendix 1. (continued).



Photo 2. Aerial view of unusually large vine thicket patches in Cape Borda area. Patches 20 and 22 at 150 ha and 130 ha. These patches are sheltered by sand dunes on both their eastern side and western sides. Part of Patch 21 shows in foreground (September 2008).



Photo 3. Vines or lianas are a feature of Australian monsoon vine forests and thickets. In the vine thickets of Dampier Peninsula they are more visible from within the canopy than on the outer canopy surface (August 2002).

Appendix 1. (continued).



Photo 4. Vine thicket Patch 41 (10 ha) south of One Arm Point in the northern end of Dampier Peninsula. It extended from the lee of a dune downslope onto a headland, and was classified as Patch Group C (August 2002).



Photo 5. Patch 22 (130 ha) occurs in a swale between high dunes and is in the north of Dampier Peninsula. The tall closed canopy forms a low forest and contrasts with the open thicket in Photos 6 and 7. It was classified as Patch Group E (July 2001).

Appendix 1. (continued).



Photo 6. An aerial view of vine thicket Patch 05 between James Price and Quondong Point. It is unusually large at 190 ha and is a particularly well developed example of Patch Group B (September 2008).



Photo 7. Vine thicket Patch 03 (60 ha) in the Barred Creek area immediately south of Patches 04 and 05 and also classified as Patch Group B. This view shows the low, shrubby and comparatively open structure of the canopy (September 2002).

Appendix 1. (continued).



Photo 8. The weed Siratro *Macropodium atropurpureum* is a fast growing climber capable of overwhelming tree and shrub canopies. This infestation was in vine thicket Patch 05 at the edge of the Manari Road (the red coloration is dust from the road) (September 2002).

Appendix 1. (continued).



Photo 9. This Mamajen *Mimusops elengi* tree (a slow growing species) was burnt right through at the base as a result of a severe fire in vine thicket Patch 26 (50 ha) (August 2002).

Appendix 1. (continued).



Photo 10. Clearing vine thicket vegetation for urban or residential development at One Arm Point (July 2000).



Photo 11. Providing dense shade, vine thickets are sought out as areas to camp. The impacts of vehicle access were most prevalent between James Price Point and Barred Creek (Patches 03, 04, 05 and 62) (September 2002).

Appendix 1. (continued).



Photo 12. A low impact vehicle track on Dampier Peninsula created without removing topsoil (September 2002).

Appendix 2. Location, land tenure, survey date, and size of each identified patch of vine thicket on coastal dunes of Dampier Peninsula, West Kimberley, surveyed between 2000 and 2002.

OMMITTED (CONFIDENTIAL DATA)

Appendix 3. Vine thicket patch boundaries. Courtesy of Department of Environment and Conservation (WA) (formerly CALM).

OMMITTED (CONFIDENTIAL DATA)

Appendix 4. Perennial plants recorded in vine thickets on coastal sand dunes of Dampier Peninsula, West Kimberley, surveyed in 2000 to 2002. Plants are listed by life-form and arranged alphabetically by genus. Species restricted or mostly restricted to thickets are annotated as either evergreen, deciduous, or semi-deciduous.

<i>Species</i>	Family	Deciduous or Evergreen	Restricted to thickets
*denotes weeds, (A) annuals, and (E) plants recorded only on the edges of vine thicket patches or in open groves.			
Trees			
<i>Acacia neurocarpa</i>	Fabaceae		No
<i>Acacia tumida</i> Wongai	Fabaceae		No
<i>Adansonia gregorii</i> (one - cultivated?) Boab	Malvaceae		No
<i>Atalaya hemiglauca</i> Western Whitewood	Sapindaceae		No
<i>Atalaya variifolia</i> Wingleaf Whitewood	Sapindaceae	Evergreen	MOSTLY
* <i>Azadirachta indica</i> Neem Tree	Meliaceae		No
<i>Bauhinia cunninghamii</i> Bauhinia or Jigal	Fabaceae		No
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i> Northern Kurrajong	Malvaceae		No
<i>Canarium australianum</i> Styptic Tree	Burseraceae	Semi	MOSTLY
* <i>Carica papaya</i> Pawpaw	Caricaceae		No
<i>Celtis australiensis</i> Goonj	Cannabaceae	Semi	YES
<i>Corymbia bella</i> Weeping Ghost Gum	Myrtaceae		No
<i>Corymbia flavescens</i> Apple, Cabbage or Bastard Ghost Gum	Myrtaceae		No
<i>Corymbia greeniana</i> Dampier's Bloodwood	Myrtaceae		No
<i>Corymbia opaca</i> (E)	Myrtaceae		No
<i>Corymbia polycarpa</i> Long-fruited Bloodwood	Myrtaceae		No
<i>Cupaniopsis anacardioides</i> Tuckeroo	Sapindaceae	Evergreen	YES
<i>Diospyros humilis</i> Ebony Wood	Ebenaceae	Evergreen	YES
<i>Ehretia saligna</i> Native Willow / Peachwood	Boraginaceae		No
<i>Erythrophleum chlorostachys</i> (E) Ironwood	Fabaceae		No
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusata</i> River Red Gum	Myrtaceae		No
<i>Eucalyptus miniata</i> (E) Woollybutt or Manowan	Myrtaceae		No
<i>Eucalyptus tectifica</i> Grey Box or Darwin Box	Myrtaceae		No
<i>Exocarpos latifolius</i> Mistletoe Tree	Santalaceae	Evergreen	YES
<i>Ficus virens</i> Banyan or Strangler Fig	Moraceae	Deciduous	MOSTLY
<i>Grevillea pyramidalis</i> (E) Caustic Tree/Maangga	Proteaceae		No
<i>Grewia breviflora</i> Currant or Coffee Fruit	Malvaceae	Deciduous	YES
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i> Helicopter Tree, Stinkwood, Coolaman Tree	Hernandiaceae		No
<i>Hakea arborescens</i> Yellow Hakea / Tree Hakea	Proteaceae		No
<i>Hakea macrocarpa</i>	Proteaceae		No
* <i>Leucaena leucocephala</i> Coffee Bush	Fabaceae		No
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i> Lardik	Myrtaceae		No
<i>Mallotus nesophilus</i> Yellow Ball Flower	Euphorbiaceae	Semi	YES
<i>Melaleuca alsophila</i> Saltwater Paperbark	Myrtaceae		No
<i>Melaleuca dealbata</i> Garnboorr	Myrtaceae		No
<i>Mimusops elengi</i> Mamajen	Sapotaceae	Evergreen	YES
<i>Pandanus spiralis</i> Iidool or Common Srewpine	Pandanaceae		No
<i>Parinari nonda</i> Nonda	Chrysobalanaceae		No

Appendix 4. (continued).

<i>Species</i>	Family	Deciduous or Evergreen	Restricted to thickets
*denotes weeds, (A) annuals, and (E) plants recorded only on the edges of vine thicket patches or in open groves.			
<i>*Peltophorum pterocarpum</i> Yellow Poinciana	Fabaceae		No
<i>Persoonia falcata</i> Wild Pear or Geebung	Proteaceae		No
<i>Pittosporum moluccanum</i> (P4)	Pittosporaceae	Evergreen	MOSTLY
<i>Planchonia careya</i> Cocky Apple	Lecythidaceae		No
<i>Premna acuminata</i> Firestick Tree	Lamiaceae		No
<i>Santalum lanceolatum</i> Tropical Sandalwood	Santalaceae		No
<i>*Senna surattensis subsp. sulfurea</i>	Fabaceae		No
<i>Sersalisia sericea</i> Mangarr	Sapotaceae		No
<i>Syzygium eucalyptoides subsp. bleeseri</i> Wild Apple	Myrtaceae		No
<i>Terminalia canescens</i> Wingnut Tree	Combretaceae		No
<i>Terminalia ferdinandiana</i> Gubinge	Combretaceae		No
<i>T. ferdinandiana x T. petiolaris (hybrid)</i> Red Gubinge	Combretaceae		No
<i>Terminalia petiolaris</i> Marool or Blackberry Tree	Combretaceae	Semi	YES
<i>Thespesia populneoides</i>	Malvaceae		No
<i>Ventilago viminalis (E)</i> Medicine Bark or Supplejack	Rhamnaceae		No
Shrubs or subshrubs			
<i>Abutilon indicum</i> Indian Lantern Flower	Malvaceae		No
<i>Acacia bivenosa</i> Cable Beach or Dune Wattle	Fabaceae		No
<i>Acacia colei</i> Candelabra, Soap or Cole's Wattle	Fabaceae		No
<i>Acacia eriopoda (E)</i> Broome Pindan Wattle	Fabaceae		No
<i>Acacia monticola</i> Red Wattle	Fabaceae		No
<i>Acacia monticola aff. (E)</i>	Fabaceae		No
<i>Acacia platycarpa</i> Ghost Wattle	Fabaceae		No
<i>Acacia wickhamii (E)</i>	Fabaceae		No
<i>Adriana tomentosa var. hookeri</i>	Euphorbiaceae		No
<i>*Aerva javanica</i> Kapok Bush or Pillow Weed	Amaranthaceae		No
<i>Breynia cernua</i>	Phyllanthaceae	Deciduous	YES
<i>Bridelia tomentosa</i>	Phyllanthaceae	Semi	YES
<i>Calytrix exstipulata</i> Kimberley Heath/Turkey Bush	Myrtaceae		No
<i>Carissa spinarum</i> Conkerberry	Apocynaceae		No
<i>Clerodendrum floribundum var. ovatum</i>	Lamiaceae		No
<i>Clerodendrum tomentosum var. mollissima</i>	Lamiaceae		No
<i>Codonocarpus cotinifolius (E)</i> Desert Poplar	Gyrostemonaceae		No
<i>Crotalaria cunninghamii</i> Parrot Pea/Green Birdflower	Fabaceae		No
<i>Croton habrophyllus</i>	Euphorbiaceae	Deciduous	YES
<i>Cullen martinii</i>	Fabaceae		No
<i>Diospyros rugosula</i>	Ebenaceae	Evergreen	YES
<i>Distichostemon hispidulus (E)</i>	Sapindaceae		No
<i>Dodonaea platyptera</i> Broad-winged Hop Bush	Sapindaceae	Evergreen	MOSTLY
<i>Ficus aculeata</i> Sandpaper Fig	Moraceae	Evergreen	YES
<i>Flueggea virosa subsp. melanthesoides</i> Snowball Bush	Phyllanthaceae	Deciduous	MOSTLY
<i>Glycosmis sp.</i>	Rutaceae	Evergreen	YES
<i>Gossypium australe (E)</i>	Malvaceae		No
<i>Grevillea refracta (E)</i> Silverleaf Grevillea	Proteaceae		No
<i>Grewia retusifolia</i> Dog's Balls	Tiliaceae		No
<i>Gyrostemon tepperi (E)</i>	Gyrostemonaceae		No

Appendix 4. (continued).

<i>Species</i>	Family	Deciduous or Evergreen	Restricted to thickets
*denotes weeds, (A) annuals, and (E) plants recorded only on the edges of vine thicket patches or in open groves.			
<i>Helicteres rhynchocarpa</i> (E)	Malvaceae	Evergreen	YES (edges)
<i>Hibiscus apodus</i> (E) Yellow Hibiscus	Malvaceae		No
<i>Hibiscus</i> sp. (E)	Malvaceae		No
<i>Hypoestes floribunda</i> var. <i>varia</i> Musk-scented Plant	Acanthaceae	Evergreen	MOSTLY
* <i>Hyptis suaveolens</i> Horehound	Lamiaceae		No
<i>Luvunga monophylla</i>	Rutaceae	Evergreen	MOSTLY
<i>Myoporum montanum</i> Gawar, Boobialla, Native Myrtle	Scrophulariaceae		No
<i>Pavetta kimberleyana</i>	Rubiaceae		No
<i>Phyllanthus reticulatus</i>	Phyllanthaceae	Semi	YES
<i>Plumbago zeylanica</i>	Plumbaginaceae	Evergreen	MOSTLY
<i>Psychodra pendulina</i>	Rubiaceae	Evergreen	No
<i>Rulingia loxophylla</i> (E)	Malvaceae		No
<i>Senna costata</i> Ram's Horns	Fabaceae		No
<i>Sida hackettiana</i> (E) Golden Rod	Malvaceae		No
<i>Sida rohlenae</i> subsp. <i>occidentalis</i> (E)	Malvaceae		No
<i>Solanum cunninghamii</i> (E)	Solanaceae		No
<i>Tephrosia rosea</i> (E) Flinders River poison	Fabaceae		No
<i>Triumfetta</i> sp. (E)	Malvaceae		No
<i>Trophis scandens</i> (E)	Moraceae	Evergreen	YES (edge)
<i>Cyperus bulbosus</i> (E) Bush Onion	Cyperaceae		No
Climbers or vines			
<i>Abrus precatorius</i> Crabs Eye Bean	Fabaceae		No
<i>Adenia heterophylla</i> subsp. <i>australis</i>	Passifloraceae	Evergreen	YES
<i>Asparagus racemosus</i> Asparagus fern	Asparagaceae	Evergreen	MOSTLY
<i>Caesalpinia major</i>	Fabaceae	Evergreen	YES
<i>Canavalia rosea</i> (E) Jack Bean or Beach Bean	Fabaceae		No
<i>Capparis jacobsii</i> aff.	Capparaceae	Evergreen	YES
<i>Capparis lasiantha</i> Bush Caper	Capparaceae		No
<i>Capparis sepiaria</i>	Capparaceae	Evergreen	YES
<i>Cassytha capillaris</i> Slender Dodder	Lauraceae		No
<i>Cassytha filiformis</i> Yugulu	Lauraceae		No
* <i>Clitoria ternatea</i> Butterfly or Darwin Pea	Fabaceae		No
<i>Cucumis maderaspatanus</i>	Cucurbitaceae		No
<i>Cynanchum carnosum</i> (E)	Apocynaceae		No
<i>Flagellaria indica</i> Supplejack or Lawyer Vine	Flagellariaceae		YES
<i>Gymnanthera oblonga</i> Harpoon Bud	Apocynaceae		No
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> (E)			
Beach Morning Glory	Convolvulaceae		No
<i>Jacquemontia paniculata</i>	Convolvulaceae	Evergreen	YES
<i>Jasminum didymium</i>	Oleaceae		No
* <i>Macroptilium atropurpureum</i> Siratro	Fabaceae		No
* <i>Merremia dissecta</i> Hairy Morning Glory	Convolvulaceae		No
<i>Operculina aequisejala</i> (A)	Convolvulaceae		No
<i>Opilia amentacea</i>	Opiliaceae	Evergreen	YES
* <i>Passiflora foetida</i> var. <i>hispida</i> Wild Passionfruit	Passifloraceae		No
<i>Sarcostemma</i> sp.	Apocynaceae	Leafless	?

Appendix 4. (continued).

<i>Species</i>	Family	Deciduous or Evergreen	Restricted to thickets
*denotes weeds, (A) annuals, and (E) plants recorded only on the edges of vine thicket patches or in open groves.			
<i>Sarcostemma viminalis</i> Caustic Vine or Milkbush	Apocynaceae	Leafless	YES
<i>Secamone timoriensis</i>	Apocynaceae	Semi	YES
<i>Tinospora smilacina</i> Snake Vine	Menispermaceae		No
<i>Tylophora cinerascens</i> Oyster-catcher Bill	Apocynaceae	Evergreen	YES
<i>Tylophora flexuosa</i>	Apocynaceae	Evergreen	YES
<i>Vigna vexillata</i> var. <i>angustifolia</i> Wild Cowpea	Fabaceae		No
Hemiparasites (Mistletoes)			
<i>Amyema benthamii</i>	Loranthaceae		No
<i>Amyema bifurcata</i>	Loranthaceae		No
<i>Amyema sanguinea</i> var. <i>sanguinea</i> Christmas Mistletoe	Loranthaceae		No
<i>Cassytha capillaris</i> (also under climbers)	Lauraceae		No
<i>Cassytha filiformis</i> (also under climbers)	Lauraceae		No
<i>Dendrophthoe acacioides</i> subsp. <i>acacioides</i>	Loranthaceae		No
<i>Lysiana spathulata</i> subsp. <i>spathulata</i>	Loranthaceae		No
<i>Santalum lanceolatum</i> (also under trees)	Santalaceae		No
Epiphytes			
<i>Cymbidium canaliculatum</i> Tree Orchid	Orchidaceae		No
Herbs			
<i>Achyranthes aspera</i> Chaff Flower	Amaranthaceae		No
<i>Amaranthus</i> sp. (A, E)	Amaranthaceae		No
<i>Boerhavia</i> sp. (A, E)	Nyctaginaceae		No
<i>Cleome viscosa</i> (A, E) Tick Weed or Mustard Bush	Cleomaceae		No
<i>Crotalaria crispata</i> (E) Walkabout	Fabaceae		No
<i>Indigofera linifolia</i> (A)	Fabaceae		No
<i>Polycarpaea</i> sp. (E)	Caryophyllaceae		No
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i> (E) Pink Mulla Mulla	Amaranthaceae		No
<i>Ptilotus polystachyus</i> (E) Green MullaMulla/Seedy Head	Amaranthaceae		No
<i>Sida</i> sp.	Malvaceae		No
<i>Spermacoce auriculata</i> (E)	Rubiaceae		No
* <i>Stylosanthes hamata</i> Caribbean Stylo	Fabaceae		No
<i>Tacca leontopetaloides</i> (A)	Taccaceae		No
<i>Trianthema portulacastrum</i> Giant Pigweed	Aizoaceae		No
<i>Trichodesma zeylanicum</i> (E) Camel Bush	Boraginaceae		No
* <i>Tridax procumbens</i> Tridax Daisy	Asteraceae		No
Graminoids (Grasses)			
* <i>Cenchrus biflorus</i> Gallon's Curse	Poaceae		No
* <i>Cenchrus ciliaris</i> Buffel Grass	Poaceae		No
<i>Cenchrus elymoides</i> (E)	Poaceae		No
* <i>Cenchrus setiger</i> Birdwood Grass	Poaceae		No
* <i>Chloris virgata</i> Feathertop Rhodes Grass	Poaceae		No
<i>Chrysopogon pallidus</i> (E) Ribbon Grass	Poaceae		No
<i>Cymbopogon</i> sp. (E)	Poaceae		No
<i>Enneapogon pallidus</i> (E) Conetop Nineawn	Poaceae		No

Appendix 4. (continued).

<i>Species</i>	Family	Deciduous or Evergreen	Restricted to thickets
<i>Heteropogon contortus</i> (E) Bunch or Black Speargrass	Poaceae		No
<i>Spinifex longifolius</i> (E) Beach Spinifex	Poaceae		No
<i>Triodia bitextura</i> (E)	Poaceae		No
<i>Triodia microstachya</i> (E)	Poaceae		No
<i>Triodia sp.</i> (E)	Poaceae		No
<i>Whiteochloa airoides</i> (E) Creeping Panic	Poaceae		No

Appendix 5. List of vascular plant species recorded in each vine thicket patch on coastal sand dunes of Dampier Peninsula, West Kimberley, surveyed between 2000 and 2002. Plants are listed by life-form and arranged alphabetically by genus. Weeds are distinguished by *, annuals by the suffix (A), and plants recorded on the edge of the patch or in open groves by the suffix (E).

Patch 01 (60 ha)

Trees

* <i>Azadirachta indica</i>	Neem Tree
* <i>Carica papaya</i>	Pawpaw
* <i>Peltophorum pterocarpum</i>	Yellow Poinciana
<i>Atalaya hemiglauca</i>	Western Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

* <i>Aerva javanica</i>	Kapok Bush or Pillow Weed
* <i>Hyptis suaveolens</i>	Horehound
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia bivenosa</i>	Cable Beach or Dune Wattle
<i>Adriana tomentosa</i> var. <i>hookeri</i>	
<i>Breynia cernua</i>	
<i>Bridelia tomentosa</i>	
<i>Carissa spinarum</i>	Conkerberry
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Crotalaria cunninghamii</i>	Parrot Pea or Green Birdflower
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Hypoestes floribunda</i> var. <i>varia</i>	Musk-scented Plant
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Pavetta kimberleyana</i>	
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

* <i>Clitoria ternatea</i>	Butterfly or Darwin Pea
* <i>Macroptilium atropurpureum</i>	Siratro
* <i>Merremia dissecta</i>	Hairy Morning Glory
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	

Appendix 5. (continued).

<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha capillaris</i>	Slender Dodder
<i>Cassytha filiformis</i>	Yugulu
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Opilia amentacea</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Trichodesma zeylanicum</i> (E)	Camel Bush

Graminoids (Grasses)

* <i>Cenchrus biflorus</i>	Gallon's Curse
* <i>Cenchrus ciliaris</i>	Buffel Grass
* <i>Cenchrus setiger</i>	Birdwood Grass
* <i>Chloris virgata</i>	Feathertop Rhodes Grass
<i>Spinifex longifolius</i> (E)	Beach Spinifex
<i>Triodia</i> sp. (E)	
<i>Whiteochloa airoides</i> (E)	Creeping Panic

Patch 02 (40 ha)

Trees

<i>Atalaya hemiglauca</i>	Western Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia bivenosa</i>	Cable Beach or Dune Wattle
<i>Adriana tomentosa</i> var. <i>hookeri</i>	
<i>Breynia cernua</i>	
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	

Appendix 5. (continued).

<i>Crotalaria cunninghamii</i>	Parrot Pea or Green Birdflower
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Pavetta kimberleyana</i>	

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Achyranthes aspera Chaff Flower

Graminoids (Grasses)

* <i>Cenchrus biflorus</i>	Gallon's Curse
* <i>Cenchrus ciliaris</i>	Buffel Grass
* <i>Cenchrus setiger</i>	Birdwood Grass

Patch 03 (60 ha)

Trees

<i>Acacia platycarpa</i>	Ghost Wattle
<i>Acacia tumida</i> (E)	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i> (E)	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea arborescens</i> (E)	Yellow Hakea or Tree Hakea
<i>Hakea macrocarpa</i> (E)	
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Lardik
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca dealbata</i> (E)	Garnboorr
<i>Pandanus spiralis</i>	Iidool or Common Srewpine
<i>Planchonia careya</i> (E)	Cocky Apple
<i>Premna acuminata</i>	Firestick Tree

Appendix 5. (continued).

<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
<i>Ventilago viminalis (E)</i>	Medicine Bark or Supplejack
Shrubs or subshrubs	
* <i>Aerva javanica</i>	Kapok Bush or Pillow Weed
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia bivenosa</i>	Cable Beach or Dune Wattle
<i>Acacia coleii</i>	Candelabra, Soap/Cole's Wattle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum var. mollissima</i>	
<i>Croton habrophyllus</i>	
<i>Cullen martinii</i>	
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Gossypium australe (E)</i>	
<i>Grewia retusifolia</i>	Dog's Balls
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Tephrosia rosea (E)</i>	Flinders River poison
Climbers or vines	
* <i>Passiflora foetida var. hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Herbs	
<i>Crotalaria crispata (E)</i>	Walkabout
Graminoids (Grasses)	
* <i>Cenchrus ciliaris</i>	Buffel Grass
* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon sp. (E)</i>	
<i>Enneapogon pallidus (E)</i>	Conetop Nineawn
<i>Heteropogon contortus (E)</i>	Bunch or Black Speargrass

Appendix 5. (continued).

Patch 04 (40 ha)

Trees

* <i>Adansonia gregorii</i> (cultivated?)	Boab
<i>Acacia tumida</i>	Wongai
<i>Atalaya variifolia</i>	Wingleaf Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i> (E)	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Corymbia greeniana</i>	Dampier's Bloodwood
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Erythrophleum chlorostachys</i> (E)	Ironwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Persoonia falcata</i> (E)	Wild Pear or Geebung
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia coleii</i>	Candelabra, Soap/Cole's Wattle
<i>Acacia eriopoda</i> (E)	Broome Pindan Wattle
<i>Acacia monticola</i> (E)	Red Wattle
<i>Acacia platycarpa</i>	Ghost Wattle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Codonocarpus cotinifolius</i> (E)	Desert Poplar
<i>Croton habrophyllus</i>	
<i>Distichostemon hispidulus</i> (E)	
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Gossypium australe</i> (E)	
<i>Grewia retusifolia</i>	Dog's Balls
<i>Gyrostemon tepperi</i> (E)	
<i>Myoporum montanum</i>	Gawar, Boobiella, Native Myrtle
<i>Triumfetta</i> sp. (E)	

Climbers or vines

* <i>Merremia dissecta</i>	Hairy Morning Glory
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	

Appendix 5. (continued).

<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	Christmas Mistletoe
Herbs	
* <i>Stylosanthes hamata</i>	Caribbean Stylo
Graminoids (Grasses)	
* <i>Cenchrus ciliaris</i>	Buffel Grass
* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon</i> sp. (E)	

Patch 05 (190)

Trees	
* <i>Leucaena leucocephala</i>	Coffee Bush
<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i> (E)	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Corymbia polycarpa</i> (E)	Long-fruited Bloodwood
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Erythrophleum chlorostachys</i> (E)	Ironwood
<i>Eucalyptus miniata</i> (E)	Woollybutt or Manowan
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grevillea pyramidalis</i> (E)	Caustic Tree or Maangga
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i> (E)	
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Lardik
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Parinari nonda</i> (E)	Nonda
<i>Persoonia falcata</i> (E)	Wild Pear or Geebung
<i>Pittosporum moluccanum</i> (P4)	
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i> (E)	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Appendix 5. (continued).

<i>Ventilago viminalis</i> (E)	Medicine Bark or Supplejack
Shrubs or subshrubs	
* <i>Aerva javanica</i>	Kapok Bush or Pillow Weed
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia coleii</i>	Gawar, Boobialla, Native Myrtle
<i>Acacia eriopoda</i> (E)	Broome Pindan Wattle
<i>Acacia monticola</i> (E)	Red Wattle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Croton habrophyllus</i>	
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Grevillea refracta</i> (E)	Silverleaf Grevillea
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Plumbago zeylanica</i>	
<i>Solanum cunninghamii</i> (E)	
Climbers or vines	
* <i>Macropodium atropurpureum</i>	Siratiro
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
<i>Lysiana spathulata</i> subsp. <i>spathulata</i>	
Epiphytes	
<i>Cymbidium canaliculatum</i>	Tree Orchid
Herbs	
<i>Hypoestes floribunda</i> var. <i>varia</i> (E)	Musk-scented Plant
<i>Ptilotus polystachyus</i> (E)	Green Mulla Mulla/Seedy Head
Graminoids (Grasses)	
* <i>Cenchrus ciliaris</i>	Buffel Grass
* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon</i> sp. (E)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn

Appendix 5. (continued).

Patch 06 (20 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Lardik
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Hypoestes floribunda</i> var. <i>varia</i>	Musk-scented Plant
<i>Plumbago zeylanica</i>	

Climbers or vines

<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis jacobsonii</i> aff.	
<i>Jasminum didymum</i>	
<i>Opilia amentacea</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
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Patch 07 (10 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
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Appendix 5. (continued).

<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Croton habrophyllus</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Jasminum didymum</i>	
<i>Operculina aequisejala</i> (A)	
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower

Patch 08 (3 ha)

Trees	
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Myoporum montanum</i>	Gawar, Boobiella, Native Myrtle
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper

Appendix 5. (continued).

<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Patch 10 (20 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Cynanchum carnosum</i> (E)	
<i>Jacquemontia paniculata</i>	
<i>Opilia amentacea</i>	
<i>Sarcostemma</i> sp.	

Hemiparasites (Mistletoes)

<i>Amyema benthamii</i>	
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Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i> (E)	Pink Mulla Mulla

Graminoids (Grasses)

* <i>Cenchrus setiger</i>	Birdwood Grass
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Appendix 5. (continued).

Patch 11 (6 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca alsophila</i>	Saltwater Paperbark
<i>Mimusops elengi</i>	Mamajen
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Clerodendrum tomentosum var. mollissima</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Phyllanthus reticulatus</i>	

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis jacobsonii aff.</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Cynanchum carnosum (E)</i>	
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Cleome viscosa (A, E)</i>	Tick Weed or Mustard Bush

Patch 12 (20 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Eucalyptus tectifica</i>	Grey Box or Darwin Box
<i>Grewia breviflora</i>	Currant or Coffee Fruit

Appendix 5. (continued).

<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Plumbago zeylanica</i>	
<i>Tephrosia rosea (E)</i>	Flinders River poison

Climbers or vines

<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Herbs

<i>Crotalaria crispata (E)</i>	Walkabout
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Patch 13 (10 ha)

Trees

<i>Acacia tumida (E)</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mimusops elengi</i>	Mamajen
<i>Persoonia falcata</i>	Wild Pear or Geebung
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
<i>Ventilago viminalis (E)</i>	Medicine Bark or Supplejack

Shrubs or subshrubs

<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Glycosmis sp.</i>	
<i>Pavetta kimberleyana</i>	
<i>Tephrosia rosea (E)</i>	Flinders River poison

Appendix 5. (continued).

Herbs

<i>Crotalaria crispata</i> (E)	Walkabout
<i>Plumbago zeylanica</i>	

Patch 14 (30 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Pittosporum moluccanum</i> (P4)	
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Hypoestes floribunda</i> var. <i>varia</i>	Musk-scented Plant
<i>Plumbago zeylanica</i>	
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Capparis jacobsii</i> aff.	

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Cleome viscosa</i> (A, E)	Tick Weed or Mustard Bush

Graminoids (Grasses)

<i>Enneapogon pallidus</i> (E)	Conetop Nineawn
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Patch 15 (20 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood

Appendix 5. (continued).

<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Planchonia careya</i> (E)	Cocky Apple
<i>Sersalisia sericea</i>	Mangarr
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
* <i>Aerva javanica</i>	Kapok Bush or Pillow Weed
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i> (E)	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Plumbago zeylanica</i>	
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Crotalaria crispata</i> (E)	Walkabout
Graminoids (Grasses)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn
<i>Spinifex longifolius</i> (E)	Beach Spinifex

Appendix 5. (continued).

Patch 16 (20 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Hakea arborescens</i>	Yellow Hakea or Tree Hakea
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Lardik
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca alsophila</i>	Saltwater Paperbark
<i>Melaleuca dealbata</i>	Garnboorr
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Tephrosia rosea</i> (E)	Flinders River poison
<i>Hibiscus apodus</i> (E)	Yellow Hibiscus

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Hemiparasites (Mistletoes)

<i>Amyema benthamii</i>	
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Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Crotalaria crispata</i> (E)	Walkabout

Graminoids (Grasses)

* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon</i> sp. (E)	

Appendix 5. (continued).

Enneapogon pallidus (E)

Conetop Nineawn

Patch 17 (10 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Sersalisia sericea</i>	Mangarr
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Myoporum montanum</i>	Gawar, Boobialla, Native Myrtle
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Crotalaria crispata</i> (E)	Walkabout

Appendix 5. (continued).

Graminoids (Grasses)

Cymbopogon sp. (E)

Enneapogon pallidus (E)

Heteropogon contortus (E)

Spinifex longifolius (E)

Conetop Nineawn

Bunch or Black Speargrass

Beach Spinifex

Patch 18 (20 ha)

Trees

Bauhinia cunninghamii

Celtis australiensis

Exocarpos latifolius

Grewia breviflora

Hakea arborescens

Mallotus nesophilus

Sersalisia sericea

Santalum lanceolatum

Terminalia petiolaris

Bauhinia

Goonj

Mistletoe Tree

Currant or Coffee Fruit

Yellow Hakea or Tree Hakea

Yellow Ball Flower

Mangarr

Tropical Sandalwood

Marool or Blackberry Tree

Shrubs or subshrubs

Abutilon indicum

Acacia colei

Bridelia tomentosa

Clerodendrum tomentosum var. mollissima

Crotalaria cunninghamii (E)

Croton habrophyllus

Dodonaea platyptera

Flueggea virosa subsp. melanthesoides

Myoporum montanum

Tephrosia rosea (E)

Indian Lantern Flower

Gawar, Boobiella, Native Myrtle

Parrot Pea or Green Birdflower

Broad-winged Hop Bush

Snowball Bush

Gawar, Boobiella, Native Myrtle

Flinders River poison

Climbers or vines

**Passiflora foetida var. hispida*

Abrus precatorius

Caesalpinia major

Capparis lasiantha

Jacquemontia paniculata

Jasminum didymum

Cucumis maderaspatanus

Tinospora smilacina

Wild Passionfruit

Crabs Eye Bean

Bush Caper

Snake Vine

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Crotalaria crispata (E)

Walkabout

Graminoids (Grasses)

**Cenchrus biflorus*

Gallon's Curse

Appendix 5. (continued).

Cenchrus elymoides (E)
Spinifex longifolius (E) Beach Spinifex

Patch 19 (10 ha)

Trees

Acacia tumida Wongai
Bauhinia cunninghamii Bauhinia
Celtis australiensis Goonj
Grewia breviflora Currant or Coffee Fruit
Gyrocarpus americanus subsp. pachyphyllus Helicopter Tree or Stinkwood
Mallotus nesophilus Yellow Ball Flower
Terminalia petiolaris Marool or Blackberry Tree

Shrubs or subshrubs

Flueggea virosa subsp. melanthesoides Snowball Bush

Climbers or vines

**Passiflora foetida* var. *hispida* Wild Passionfruit
Asparagus racemosus Asparagus fern
Capparis lasiantha Bush Caper
Tylophora cinerascens Oyster-catcher Bill

Herbs

Achyranthes aspera Chaff Flower

Patch 20 (150 ha)

Trees

Acacia tumida Wongai
Bauhinia cunninghamii Bauhinia
Celtis australiensis Goonj
Corymbia bella Weeping Ghost Gum
Diospyros humilis Ebony Wood
Grewia breviflora Currant or Coffee Fruit
Gyrocarpus americanus subsp. pachyphyllus Helicopter Tree or Stinkwood
Mallotus nesophilus Yellow Ball Flower
Mimusops elengi Mamajen
Sersalisia sericea Mangarr
Terminalia petiolaris Marool or Blackberry Tree

Shrubs or subshrubs

Abutilon indicum Indian Lantern Flower
Bridelia tomentosa
Dodonaea platyptera Broad-winged Hop Bush
Flueggea virosa subsp. melanthesoides Snowball Bush

Appendix 5. (continued).

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Jasminum didymum</i>	
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Plumbago zeylanica</i>	

Patch 21 (60 ha)

Trees

<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Lardik
<i>Mallotus nesophilus</i>	
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Jasminum didymum</i>	

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
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Patch 22 (130 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj

Appendix 5. (continued).

<i>Corymbia bella</i> (E)	Weeping Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i> (E)	Helicopter Tree or Stinkwood
<i>Hakea arborescens</i> (E)	Yellow Hakea or Tree Hakea
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca alsophila</i> (E)	Saltwater Paperbark
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Breynia cernua</i>	
<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Luvunga monophylla</i>	
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i> (E)	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Gymnanthera oblonga</i> (E)	Harpoon Bud
<i>Jacquemontia paniculata</i>	
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Plumbago zeylanica</i> (E)	
Graminoids (Grasses)	
<i>Cymbopogon</i> sp. (E)	
<i>Spinifex longifolius</i> (E)	Beach Spinifex

Patch 23 (30 ha)

Trees

<i>Acacia tumida</i>	Wongai
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Appendix 5. (continued).

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mimusops elengi</i>	Mamajen
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia coleii</i>	Gawar, Boobialla, Native Myrtle
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Pavetta kimberleyana</i>	
<i>Plumbago zeylanica</i>	
<i>Sida hackettiana</i> (E)	Golden Rod
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Graminoids (Grasses)	
* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon</i> sp. (E)	
<i>Heteropogon contortus</i> (E)	Bunch or Black Speargrass
Sedges	
<i>Cyperus bulbosus</i> (E)	Bush Onion

Patch 24 (10 ha)

Trees	
<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum

Appendix 5. (continued).

<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Diospyros humilis</i>	Ebony Wood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Hakea arborescens</i>	Yellow Hakea or Tree Hakea
<i>Hakea macrocarpa</i>	
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
Shrubs or subshrubs	
<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Pavetta kimberleyana</i>	
<i>Sida rohlenae</i> subsp. <i>occidentalis</i> (E)	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Epiphytes	
<i>Cymbidium canaliculatum</i>	Tree Orchid
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Tacca leontopetaloides</i> (A)	
Graminoids (Grasses)	
<i>Cymbopogon</i> sp. (E)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn

Patch 25 (40 ha)

Trees	
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree

Appendix 5. (continued).

<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Planchonia careya</i>	Cocky Apple
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Psydrax pendulina (E)</i>	
<i>Terminalia ferdinandiana x T. petiolaris (hybrid)</i>	Red Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobiolla, Native Myrtle
<i>Breynia cernua</i>	
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Luvunga monophylla</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Asparagus racemosus (E)</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jacquemontia paniculata</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Secamone timoriensis</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Herbs	
* <i>Stylosanthes hamata</i>	Caribbean Stylo
<i>Achyranthes aspera</i>	Chaff Flower
Graminoids (Grasses)	
* <i>Cenchrus ciliaris</i>	Buffel Grass
<i>Cymbopogon sp. (E)</i>	

Appendix 5. (continued).

Patch 26 (50 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i> (E)	Weeping Ghost Gum
<i>Corymbia polycarpa</i> (E)	Long-fruited Bloodwood
<i>Cupaniopsis anarcardioides</i>	
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Persoonia falcata</i>	Wild Pear or Geebung
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Hibiscus</i> sp. (E)	
<i>Luvunga monophylla</i>	
<i>Plumbago zeylanica</i>	
<i>Triumfetta</i> sp. (E)	

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Jasminum didymum</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	

Appendix 5. (continued).

Hemiparasites (Mistletoes)

Amyema benthamii

Epiphytes

Cymbidium canaliculatum (E) Tree Orchid

Herbs

Crotalaria crispata (E) Walkabout

Graminoids (Grasses)

Enneapogon pallidus (E) Conetop Nineawn

Triodia sp. (E)

Patch 27 (10 ha)

Trees

Acacia tumida Wongai
Canarium australianum Styptic Tree
Cupaniopsis anacardioides Tuckeroo
Diospyros humilis Ebony Wood
Grewia breviflora Currant or Coffee Fruit
Gyrocarpus americanus subsp. pachyphyllus Helicopter Tree or Stinkwood
Lophostemon grandiflorus subsp. grandiflorus Lardik
Melaleuca dealbata Garnboorr
Planchonia careya Cocky Apple
Sersalisia sericea Mangarr
Terminalia ferdinandiana Gubinge

Shrubs or subshrubs

Acacia colei Gawar, Boobialla, Native Myrtle
Croton habrophyllus
Dodonaea platyptera Broad-winged Hop Bush
Flueggea virosa subsp. melanthesoides Snowball Bush
Pavetta kimberleyana
Phyllanthus reticulatus
Rulingia loxophylla (E)

Climbers or vines

Abrus precatorius Crabs Eye Bean
Adenia heterophylla subsp. australis
Cassytha filiformis Yugulu
Flagellaria indica Supplejack or Lawyer Vine

Herbs

**Stylosanthes hamata* Caribbean Stylo
Achyranthes aspera Chaff Flower

Appendix 5. (continued).

Patch 28 (50 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Hakea arborescens</i>	Yellow Hakea or Tree Hakea
<i>Hakea macrocarpa</i>	
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Pandanus spiralis</i>	Iidool or Common Srewpine
<i>Planchonia careya</i>	Cocky Apple
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Syzygium eucalyptoides</i> subsp. <i>bleeseri</i>	Wild Apple
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Acacia coleii</i>	Gawar, Boobiella, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i> (E)	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Hypoestes floribunda</i> var. <i>varia</i>	Musk-scented Plant
<i>Luvunga monophylla</i>	
<i>Sida hackettiana</i> (E)	Golden Rod

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jasminum didymum</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush

Appendix 5. (continued).

<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	
<i>Vigna vexillata</i> var. <i>angustifolia</i>	Wild Cowpea

Hemiparasites (Mistletoes)

Amyema benthamii

Epiphytes

Cymbidium canaliculatum Tree Orchid

Herbs

Achyranthes aspera Chaff Flower
Spermacoce auriculata (E)

Graminoids (Grasses)

Enneapogon pallidus (E) Conetop Nineawn
Triodia sp. (E)

Patch 29 (20 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
<i>Thespesia populneoides</i>	

Shrubs or subshrubs

<i>Clerodendrum floribundum</i> var. <i>ovatum</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Hibiscus</i> sp. (E)	
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	

Appendix 5. (continued).

Climbers or vines

<i>*Passiflora foetida var. hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tylophora flexuosa</i>	

Patch 30 (50 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Pandanus spiralis</i>	Iidool or Common Srewpine
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Syzygium eucalyptoides subsp. bleeseri</i>	Wild Apple
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Breynia cernua</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	
<i>Plumbago zeylanica</i>	
<i>Sida hackettiana (E)</i>	Golden Rod
<i>Tephrosia rosea (E)</i>	Flinders River poison
<i>Triumfetta sp. (E)</i>	

Appendix 5. (continued).

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Caesalpinia major</i>	
<i>Canavalia rosea (E)</i>	Jack Bean or Beach Bean
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Ipomoea pes-caprae subsp. brasiliensis (E)</i>	Beach Morning Glory
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Cleome viscosa (A, E)</i>	Tick Weed or Mustard Bush
<i>Crotalaria crispata (E)</i>	Walkabout
<i>Indigofera linifolia (A)</i>	
<i>Ptilotus exaltatus var. exaltatus (E)</i>	Pink Mulla Mulla

Graminoids (Grasses)

* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon sp. (E)</i>	
<i>Triodia sp. (E)</i>	

Patch 31 (1 ha)

Trees

<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree

Shrubs or subshrubs

<i>Breynia cernua</i>	
<i>Croton habrophyllus</i>	

Appendix 5. (continued).

<i>Diospyros rugosula</i>	Snowball Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
<i>Hibiscus</i> sp. (<i>E</i>)	
<i>Senna costata</i>	Ram's Horns
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Graminoids (Grasses)	
* <i>Cenchrus setiger</i>	Birdwood Grass

Patch 32 (60 ha)

Trees

<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca dealbata</i>	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Breynia cernua</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Pavetta kimberleyana</i>	

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper

Appendix 5. (continued).

<i>Capparis sepiaria</i>	Yugulu
<i>Cassytha filiformis</i>	Supplejack or Lawyer Vine
<i>Flagellaria indica</i>	Beach Morning Glory
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> (E)	
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

<i>Achyranthes aspera</i>	Chaff Flower
<i>Boerhavia</i> sp. (E, A)	

Patch 33 (<0.1 ha)

Trees

<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

Diospyros rugosula

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	

Patch 34 (<0.1 ha)

Trees

<i>Canarium australianum</i>	Styptic Tree
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Appendix 5. (continued).

Shrubs or subshrubs

Bridelia tomentosa

Diospyros rugosula

Flueggea virosa subsp. *melanthesoides*

Plumbago zeylanica

Snowball Bush

Climbers or vines

Abrus precatorius

Adenia heterophylla subsp. *australis*

Capparis sepiaria

Tinospora smilacina

Crabs Eye Bean

Snake Vine

Herbs

Achyranthes aspera

Chaff Flower

Patch 35 (50 ha)

Trees

Celtis australiensis

Diospyros humilis

Exocarpos latifolius

Grewia breviflora

Mallotus nesophilus

Mimusops elengi

Sersalisia sericea

Terminalia petiolaris

Goonj

Ebony Wood

Mistletoe Tree

Currant or Coffee Fruit

Yellow Ball Flower

Mamajen

Mangarr

Marool or Blackberry Tree

Shrubs or subshrubs

Breynia cernua

Diospyros rugosula

Climbers or vines

Abrus precatorius

Asparagus racemosus

Caesalpinia major

Capparis sepiaria

Cassytha filiformis

Flagellaria indica

Gymnanthera oblonga

Jasminum didymum

Cucumis maderaspatanus

Sarcostemma viminale

Tinospora smilacina

Tylophora cinerascens

Crabs Eye Bean

Asparagus fern

Yugulu

Supplejack or Lawyer Vine

Harpoon Bud

Caustic Vine or Milkbush

Snake Vine

Oyster-catcher Bill

Herbs

Achyranthes aspera

Chaff Flower

Appendix 5. (continued).

Patch 36 (20 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Atalaya variifolia</i>	Wingleaf Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia opaca</i> (E)	
<i>Corymbia polycarpa</i> (E)	Long-fruited Bloodwood
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Grewia retusifolia</i>	Dog's Balls
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	
<i>Plumbago zeylanica</i>	

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i> (E)	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	

Appendix 5. (continued).

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Cleome viscosa (A, E)

Tick Weed or Mustard Bush

Crotalaria crispata (E)

Walkabout

Graminoids (Grasses)

Enneapogon pallidus (E)

Conetop Nineawn

Patch 37 (10 ha)

Trees

Acacia tumida

Wongai

Atalaya variifolia

Wingleaf Whitewood

Bauhinia cunninghamii

Bauhinia

Canarium australianum

Styptic Tree

Celtis australiensis

Goonj

Corymbia flavescens

Apple or Cabbage Ghost Gum

Corymbia polycarpa

Long-fruited Bloodwood

Diospyros humilis

Ebony Wood

Ehretia saligna

Native Willow or Peachwood

Exocarpos latifolius

Mistletoe Tree

Grewia breviflora

Currant or Coffee Fruit

Gyrocarpus americanus subsp. pachyphyllus

Helicopter Tree or Stinkwood

Mallotus nesophilus

Yellow Ball Flower

Mimusops elengi

Mamajen

Parinari nonda

Nonda

Sersalisia sericea

Mangarr

Premna acuminata

Firestick Tree

Santalum lanceolatum

Tropical Sandalwood

Terminalia canescens (E)

Wingnut Tree

Terminalia ferdinandiana

Gubinge

Terminalia petiolaris

Marool or Blackberry Tree

Shrubs or subshrubs

Abutilon indicum

Indian Lantern Flower

Acacia wickhamii (E)

Breynia cernua

Bridelia tomentosa

Croton habrophyllus

Diospyros rugosula

Dodonaea platyptera

Broad-winged Hop Bush

Flueggea virosa subsp. melanthesoides

Snowball Bush

Plumbago zeylanica

Solanum cunninghamii (E)

Appendix 5. (continued).

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine

Hemiparasites (Mistletoes)

Amyema benthamii

Graminoids (Grasses)

Chrysopogon pallidus (E) Ribbon Grass

Patch 38 (10 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Atalaya variifolia</i>	Wingleaf Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

* <i>Aerva javanica</i>	Kapok Bush or Pillow Weed
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Luvunga monophylla</i>	

Climbers or vines

**Clitoria ternatea* Butterfly or Darwin Pea

Appendix 5. (continued).

<i>*Passiflora foetida var. hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine

Hemiparasites (Mistletoes)

Dendrophthoe acacioides subsp. acacioides

Herbs

<i>*Stylosanthes hamata</i>	Caribbean Stylo
<i>Sida sp.</i>	

Graminoids (Grasses)

<i>*Cenchrus setiger</i>	Birdwood Grass
<i>Chrysopogon pallidus (E)</i>	Ribbon Grass

Patch 39 (90 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius subsp. diversifolius</i>	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Corymbia flavescens</i>	Apple or Cabbage Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mimusops elengi</i>	Mamajen
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Acacia monticola</i>	Red Wattle
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Helicteres rhynhocarpa (E)</i>	
<i>Luvunga monophylla</i>	

Climber

<i>*Macroptilium atropurpureum</i>	Siratro
<i>Abrus precatorius</i>	Crabs Eye Bean

Appendix 5. (continued).

<i>Adenia heterophylla subsp. australis</i>	
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Herbs	
* <i>Stylosanthes hamata</i>	Caribbean Stylo

Patch 40 (20 ha)

Trees	
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
* <i>Hyptis suaveolens</i>	Horehound
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Glycosmis sp.</i>	
<i>Hibiscus sp. (E)</i>	
<i>Luvunga monophylla</i>	
Climbers or vines	
* <i>Macroptilium atropurpureum</i>	Siratro
<i>Adenia heterophylla subsp. australis</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower

Appendix 5. (continued).

Patch 41 (10 ha)

Trees

<i>Acacia neurocarpa</i> (E)	
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Melaleuca alsophila</i> (E)	Saltwater Paperbark
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i> (E)	Tropical Sandalwood
<i>Terminalia ferdinandiana</i> (E)	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Bridelia tomentosa</i>	
<i>Carissa spinarum</i> (E)	Conkerberry
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Helicteres rhynchocarpa</i> (E)	
<i>Hibiscus</i> sp. (E)	
<i>Luvunga monophylla</i>	
<i>Pavetta kimberleyana</i>	
<i>Plumbago zeylanica</i>	
<i>Sida hackettiana</i> (E)	Golden Rod
<i>Trophis scandens</i> (E)	

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jasminum didymum</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	

Appendix 5. (continued).

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

**Stylosanthes hamata*

Caribbean Stylo

Achyranthes aspera

Chaff Flower

Graminoids (Grasses)

**Cenchrus setiger*

Birdwood Grass

Chrysopogon pallidus (E)

Ribbon Grass

Triodia microstachya (E)

Patch 42 (60 ha)

Trees

Acacia neurocarpa (E)

Wongai

Acacia tumida

Bauhinia

Bauhinia cunninghamii

Canarium australianum

Styptic Tree

Celtis australiensis

Goonj

Corymbia bella

Weeping Ghost Gum

Corymbia polycarpa

Long-fruited Bloodwood

Diospyros humilis

Ebony Wood

Ehretia saligna

Native Willow or Peachwood

Exocarpos latifolius

Mistletoe Tree

Ficus virens

Banyan or Strangler Fig

Grewia breviflora

Currant or Coffee Fruit

Gyrocarpus americanus subsp. *pachyphyllus*

Helicopter Tree or Stinkwood

Hakea arborescens (E)

Yellow Hakea or Tree Hakea

Hakea macrocarpa

Mallotus nesophilus

Yellow Ball Flower

Mimusops elengi

Mamajen

Pandanus spiralis

Idool or Common Srewpine

Sersalisia sericea

Mangarr

Premna acuminata

Firestick Tree

Santalum lanceolatum

Tropical Sandalwood

Terminalia ferdinandiana

Gubinge

Terminalia petiolaris

Marool or Blackberry Tree

Shrubs or subshrubs

Acacia colei

Gawar, Boobialla, Native Myrtle

Bridelia tomentosa

Croton habrophyllus

Diospyros rugosula

Dodonaea platyptera

Broad-winged Hop Bush

Ficus aculeata

Sandpaper Fig

Flueggea virosa subsp. *melanthesoides*

Snowball Bush

Glycosmis sp.

Phyllanthus reticulatus

Appendix 5. (continued).

Plumbago zeylanica
Tephrosia rosea (E)

Flinders River poison

Climbers or vines

**Passiflora foetida* var. *hispida*
Abrus precatorius
Adenia heterophylla subsp. *australis*
Asparagus racemosus
Caesalpinia major
Canavalia rosea (E)
Capparis lasiantha
Capparis sepiaria
Cassytha filiformis
Flagellaria indica
Jacquemontia paniculata
Jasminum didymum
Cucumis maderaspatanus
Tinospora smilacina
Tylophora cinerascens
Tylophora flexuosa

Wild Passionfruit
Crabs Eye Bean

Asparagus fern

Jack Bean or Beach Bean
Bush Caper

Yugulu
Supplejack or Lawyer Vine

Snake Vine
Oyster-catcher Bill

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

**Stylosanthes hamata*
Achyranthes aspera
Boerhavia sp. (E, A)
Cleome viscosa (A, E)

Caribbean Stylo
Chaff Flower

Tick Weed or Mustard Bush

Graminoids (Grasses)

Triodia microstachya (E)

Patch 43 (30 ha)

Trees

Acacia tumida
Canarium australianum
Celtis australiensis
Corymbia bella
Diospyros humilis
Ehretia saligna
Exocarpos latifolius
Ficus virens
Grewia breviflora
Gyrocarpus americanus subsp. *pachyphyllus*
Hakea arborescens
Hakea macrocarpa
Mallotus nesophilus

Wongai
Styptic Tree
Goonj
Weeping Ghost Gum
Ebony Wood
Native Willow or Peachwood
Mistletoe Tree
Banyan or Strangler Fig
Currant or Coffee Fruit
Helicopter Tree or Stinkwood
Yellow Hakea or Tree Hakea

Yellow Ball Flower

Appendix 5. (continued).

<i>Melaleuca alsophila</i>	Saltwater Paperbark
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
<i>Thespesia populneoides</i> (E)	
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobialla, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Phyllanthus reticulatus</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Cynanchum carnosum</i> (E)	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Epiphytes	
<i>Cymbidium canaliculatum</i>	Tree Orchid
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Amaranthus</i> sp. (A, E)	
<i>Boerhavia</i> sp. (E, A)	
Graminoids (Grasses)	
<i>Spinifex longifolius</i> (E)	Beach Spinifex
<i>Triodia</i> sp. (E)	

Appendix 5. (continued).

Patch 44 (10 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mimusops elengi</i>	Mamajen
<i>Planchonia careya (E)</i>	Cocky Apple
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Phyllanthus reticulatus</i>	
<i>Plumbago zeylanica</i>	

Climbers or vines

* <i>Passiflora foetida var. hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Misteltoes</i>	
<i>Amyema benthamii</i>	

Graminoids (Grasses)

* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Chrysopogon pallidus (E)</i>	Ribbon Grass

Patch 45 (5 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree

Appendix 5. (continued).

<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Acacia coleii</i>	Gawar, Boobialla, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	
Graminoids (Grasses)	
<i>Triodia sp. (E)</i>	

Patch 46 (10 ha)

Trees	
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Calytrix exstipulata</i>	Kimberley Heath/Turkey Bush
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Glycosmis sp.</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>*Passiflora foetida var. hispida</i>	Wild Passionfruit

Appendix 5. (continued).

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Sarcostemma viminale</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Crotalaria crispata (E) Walkabout

Graminoids (Grasses)

Triodia sp. (E)

Patch 47 (110 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius subsp. diversifolius</i>	Northern Kurrajong
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Ficus aculeata</i>	Sandpaper Fig
<i>Glycosmis sp.</i>	

Appendix 5. (continued).

<i>Grewia retusifolia</i>	Dog's Balls
<i>Pavetta kimberleyana</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla subsp. australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Epiphytes	
<i>Cymbidium canaliculatum</i>	Tree Orchid
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Amaranthus sp. (A, E)</i>	
<i>Boerhavia sp. (E, A)</i>	
<i>Cleome viscosa (A, E)</i>	Tick Weed or Mustard Bush
<i>Crotalaria crispata (E)</i>	Walkabout
Graminoids (Grasses)	
* <i>Cenchrus ciliaris</i>	Buffel Grass
<i>Cymbopogon sp. (E)</i>	
<i>Enneapogon pallidus (E)</i>	Conetop Nineawn
<i>Spinifex longifolius (E)</i>	Beach Spinifex
<i>Triodia sp. (E)</i>	
<hr/> Patch 48 (20 ha) <hr/>	
Trees	
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood

Appendix 5. (continued).

<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
* <i>Senna surattensis</i> subsp. <i>sulfurea</i>	
<i>Acacia coleii</i>	Gawar, Boobiella, Native Myrtle
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Croton habrophyllus</i>	
<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
<i>Tylophora flexuosa</i>	
Herbs	
<i>Crotalaria crispata</i> (E)	Walkabout
Graminoids (Grasses)	
<i>Triodia</i> sp. (E)	

Patch 49 (5 ha)

Trees	
<i>Acacia neurocarpa</i>	
<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Corymbia polycarpa</i>	Long-fruited Bloodwood
<i>Diospyros humilis</i>	Ebony Wood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Persoonia falcata</i>	Wild Pear or Geebung
<i>Sersalisia sericea</i>	Mangarr

Appendix 5. (continued).

Terminalia ferdinandiana
Terminalia petiolaris

Gubinge
Marool or Blackberry Tree

Shrubs or subshrubs

Bridelia tomentosa
Croton habrophyllus
Dodonaea platyptera
Ficus aculeata
Flueggea virosa subsp. *melanthesoides*

Broad-winged Hop Bush
Sandpaper Fig
Snowball Bush

Climbers or vines

Tylophora flexuosa

Hemiparasites (Mistletoes)

Amyema bifurcata

Graminoids (Grasses)

Triodia sp. (E)

Patch 50 (10 ha)

Trees

Bauhinia cunninghamii
Celtis australiensis
Diospyros humilis
Ehretia saligna
Exocarpos latifolius
Grewia breviflora
Gyrocarpus americanus subsp. *pachyphyllus*
Melaleuca alsophila
Mimusops elengi
Sersalisia sericea
Premna acuminata
Terminalia petiolaris

Bauhinia
Goonj
Ebony Wood
Native Willow or Peachwood
Mistletoe Tree
Currant or Coffee Fruit
Helicopter Tree or Stinkwood
Saltwater Paperbark
Mamajen
Mangarr
Firestick Tree
Marool or Blackberry Tree

Shrubs or subshrubs

**Senna surattensis* subsp. *sulfurea*
Abutilon indicum
Acacia colei
Bridelia tomentosa
Croton habrophyllus
Diospyros rugosula
Dodonaea platyptera
Flueggea virosa subsp. *melanthesoides*
Plumbago zeylanica

Indian Lantern Flower
Gawar, Boobiolla, Native Myrtle

Broad-winged Hop Bush
Snowball Bush

Climbers or vines

Abrus precatorius
Adenia heterophylla subsp. *australis*

Crabs Eye Bean

Appendix 5. (continued).

<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Amaranthus sp. (A, E)

Cleome viscosa (A, E)

Tick Weed or Mustard Bush

Graminoids (Grasses)

Heteropogon contortus (E)

Triodia sp. (E)

Bunch or Black Speargrass

Patch 51 (40 ha)

Trees

Acacia tumida

Wongai

Atalaya variifolia

Wingleaf Whitewood

Bauhinia cunninghamii

Bauhinia

Brachychiton diversifolius subsp. *diversifolius* (E)

Northern Kurrajong

Canarium australianum

Styptic Tree

Celtis australiensis

Goonj

Corymbia bella

Weeping Ghost Gum

Erythrophleum chlorostachys (E)

Ironwood

Eucalyptus tectifica (E)

Grey Box or Darwin Box

Exocarpos latifolius

Mistletoe Tree

Grevillea pyramidalis (E)

Caustic Tree or Maangga

Grewia breviflora

Currant or Coffee Fruit

Gyrocarpus americanus subsp. *pachyphyllus*

Helicopter Tree or Stinkwood

Hakea macrocarpa (E)

Mimusops elengi

Mamajen

Persoonia falcata (E)

Wild Pear or Geebung

Sersalisia sericea

Mangarr

Premna acuminata

Firestick Tree

Syzygium eucalyptoides subsp. *bleeseri* (E)

Wild Apple

Terminalia ferdinandiana

Gubinge

Terminalia petiolaris

Marool or Blackberry Tree

Shrubs or subshrubs

Abutilon indicum

Indian Lantern Flower

Acacia monticola aff (E)

Croton habrophyllus

Appendix 5. (continued).

<i>Diospyros rugosula</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Glycosmis</i> sp.	
<i>Hibiscus</i> sp. (E)	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Tylophora flexuosa</i>	
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Graminoids (Grasses)	
* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Heteropogon contortus</i> (E)	Bunch or Black Speargrass

Patch 52 (10 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Mallotus nesophilus</i> (E)	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Planchonia careya</i> (E)	Cocky Apple
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Syzygium eucalyptoides</i> subsp. <i>bleeseri</i>	Wild Apple
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia coleii</i>	Gawar, Boobiella, Native Myrtle
<i>Acacia monticola</i> (E)	Red Wattle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum floribundum</i> var. <i>ovatum</i>	
<i>Croton habrophyllus</i>	

Appendix 5. (continued).

<i>Diospyros rugosula</i> (E)	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Glycosmis</i> sp.	
<i>Phyllanthus reticulatus</i>	
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis sepiaria</i>	
<i>Cynanchum carnosum</i> (E)	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
Graminoids (Grasses)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn
<i>Spinifex longifolius</i> (E)	Beach Spinifex
<hr/>	
Patch 53 (10 ha)	
<hr/>	
Trees	
<i>Acacia tumida</i> (E)	Wongai
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia coleii</i>	Gawar, Boobiella, Native Myrtle

Appendix 5. (continued).

<i>Bridelia tomentosa</i>	
<i>Carissa spinarum</i> (E)	Conkerberry
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Myoporum montanum</i>	Gawar, Boobiolla, Native Myrtle
<i>Phyllanthus reticulatus</i>	
<i>Sida hackettiana</i> (E)	Golden Rod
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Capparis sepiaria</i>	
<i>Cassytha filiformis</i>	Yugulu
<i>Cynanchum carnosum</i> (E)	
<i>Flagellaria indica</i>	Supplejack or Lawyer Vine
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> (E)	Beach Morning Glory
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

* <i>Stylosanthes hamata</i>	Caribbean Stylo
* <i>Trianthema portulacastrum</i>	Giant Pigweed
* <i>Tridax procumbens</i>	Tridax Daisy
<i>Amaranthus</i> sp. (A, E)	
<i>Cleome viscosa</i> (A, E)	Tick Weed or Mustard Bush
<i>Polycarpaea</i> sp. (E)	
<i>Sida</i> sp. (E)	

Graminoids (Grasses)

* <i>Cenchrus setiger</i>	Birdwood Grass
<i>Cymbopogon</i> sp. (E)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn
<i>Heteropogon contortus</i> (E)	Bunch or Black Speargrass
<i>Triodia bitextura</i> (E)	

Patch 54 (50 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia

Appendix 5. (continued).

<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusata</i>	River Red Gum
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobiella, Native Myrtle
<i>Breynia cernua</i>	
<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Epiphytes	
<i>Cymbidium canaliculatum</i>	Tree Orchid

Patch 55 (60 ha)

Trees

<i>Acacia tumida</i>	Wongai
<i>Atalaya variifolia</i>	Wingleaf Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood

Appendix 5. (continued).

<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i> (E)	Lardik
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Melaleuca alsophila</i>	Saltwater Paperbark
<i>Melaleuca dealbata</i> (E)	Garnboorr
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Croton habrophyllus</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Pavetta kimberleyana</i>	
<i>Phyllanthus reticulatus</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Cynanchum carnosum</i> (E)	
<i>Gymnanthera oblonga</i>	Harpoon Bud
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Cucumis maderaspatanus</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema benthamii</i>	
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Plumbago zeylanica</i>	

Patch 56 (30 ha)

Trees

<i>Acacia tumida</i>	Wongai
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Appendix 5. (continued).

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius</i> subsp. <i>diversifolius</i>	Northern Kurrajong
<i>Canarium australianum</i>	Styptic Tree
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Corymbia polycarpa</i>	Long-fruited Bloodwood
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Mimusops elengi</i>	Mamajen
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia ferdinandiana</i> x <i>T. petiolaris</i> (hybrid)	Red Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Pavetta kimberleyana</i>	
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Caesalpinia major</i>	
<i>Capparis lasiantha</i>	Bush Caper
<i>Jasminum didymum</i>	
<i>Sarcostemma viminalis</i>	Caustic Vine or Milkbush
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Hemiparasites (Mistletoes)	
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	Christmas Mistletoe
Herbs	
<i>Achyranthes aspera</i>	Chaff Flower
<i>Plumbago zeylanica</i>	
Graminoids (Grasses)	
<i>Enneapogon pallidus</i> (E)	Conetop Nineawn
<i>Triodia bitextura</i> (E)	

Appendix 5. (continued).

Patch 57 (4 ha)

Trees

<i>Acacia neurocarpa</i>	
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea arborescens</i>	Yellow Hakea or Tree Hakea
<i>Melaleuca alsophila</i>	Saltwater Paperbark
<i>Pandanus spiralis</i>	Iidool or Common Srewpine
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush
<i>Psydrax pendulina</i>	
<i>Tephrosia rosea (E)</i>	Flinders River poison

Climbers or vines

* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Tinospora smilacina</i>	Snake Vine

Patch 58 (10 ha)

Trees

<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Brachychiton diversifolius subsp. diversifolius</i>	Northern Kurrajong
<i>Celtis australiensis</i>	Goonj
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus subsp. pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Mallotus nesophilus</i>	Yellow Ball Flower
<i>Sersalisia sericea</i>	Mangarr
<i>Premna acuminata</i>	Firestick Tree
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Bridelia tomentosa</i>	
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Flueggea virosa subsp. melanthesoides</i>	Snowball Bush

Appendix 5. (continued).

<i>Myoporum montanum</i>	Gawar, Boobiella, Native Myrtle
<i>Tephrosia rosea</i> (E)	Flinders River poison
Climbers or vines	
* <i>Passiflora foetida</i> var. <i>hispida</i>	Wild Passionfruit
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Caesalpinia major</i>	
<i>Canavalia rosea</i> (E)	Jack Bean or Beach Bean
<i>Cassytha filiformis</i>	Yugulu
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> (E)	Beach Morning Glory
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora cinerascens</i>	Oyster-catcher Bill
Graminoids (Grasses)	
<i>Spinifex longifolius</i> (E)	Beach Spinifex

Patch 59 (20 ha)

Trees

<i>Atalaya variifolia</i>	Wingleaf Whitewood
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Corymbia bella</i>	Weeping Ghost Gum
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Pandanus spiralis</i>	Iidool or Common Srewpine
<i>Sersalisia sericea</i>	Mangarr
<i>Psydrax pendulina</i> (E)	
<i>Santalum lanceolatum</i>	Tropical Sandalwood
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree

Shrubs or subshrubs

<i>Abutilon indicum</i>	Indian Lantern Flower
<i>Acacia colei</i>	Gawar, Boobiella, Native Myrtle
<i>Bridelia tomentosa</i>	
<i>Crotalaria cunninghamii</i> (E)	Parrot Pea or Green Birdflower
<i>Dodonaea platyptera</i>	Broad-winged Hop Bush
<i>Myoporum montanum</i>	Gawar, Boobiella, Native Myrtle
<i>Tephrosia rosea</i> (E)	Flinders River poison

Climbers or vines

<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Adenia heterophylla</i> subsp. <i>australis</i>	
<i>Caesalpinia major</i>	

Appendix 5. (continued).

<i>Capparis lasiantha</i>	Bush Caper
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> (E)	Beach Morning Glory
<i>Jacquemontia paniculata</i>	
<i>Tinospora smilacina</i>	Snake Vine
<i>Tylophora flexuosa</i>	
Herbs	
<i>Crotalaria crispata</i> (E)	Walkabout
Graminoids (Grasses)	
<i>Chrysopogon pallidus</i> (E)	Ribbon Grass
<i>Cymbopogon</i> sp. (E)	

Patch 60 (1 ha)

Trees	
<i>Acacia tumida</i>	Wongai
<i>Bauhinia cunninghamii</i>	Bauhinia
<i>Celtis australiensis</i>	Goonj
<i>Diospyros humilis</i>	Ebony Wood
<i>Ehretia saligna</i>	Native Willow or Peachwood
<i>Exocarpos latifolius</i>	Mistletoe Tree
<i>Grewia breviflora</i>	Currant or Coffee Fruit
<i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>	Helicopter Tree or Stinkwood
<i>Hakea macrocarpa</i>	
<i>Mimusops elengi</i>	Mamajen
<i>Persoonia falcata</i>	Wild Pear or Geebung
<i>Sersalisia sericea</i>	Mangarr
<i>Terminalia ferdinandiana</i>	Gubinge
<i>Terminalia petiolaris</i>	Marool or Blackberry Tree
Shrubs or subshrubs	
<i>Acacia colei</i>	Gawar, Boobiella, Native Myrtle
<i>Acacia monticola</i>	Red Wattle
<i>Bridelia tomentosa</i>	
<i>Clerodendrum tomentosum</i> var. <i>mollissima</i>	
<i>Croton habrophyllus</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	Snowball Bush
<i>Myoporum montanum</i>	Gawar, Boobiella, Native Myrtle
<i>Plumbago zeylanica</i>	
Climbers or vines	
<i>Abrus precatorius</i>	Crabs Eye Bean
<i>Asparagus racemosus</i>	Asparagus fern
<i>Capparis lasiantha</i>	Bush Caper
<i>Cassytha filiformis</i>	Yugulu
<i>Jacquemontia paniculata</i>	
<i>Jasminum didymum</i>	
<i>Tinospora smilacina</i>	Snake Vine

Appendix 5. (continued).

Hemiparasites (Mistletoes)

Amyema benthamii

Herbs

Achyranthes aspera

Chaff Flower

Graminoids (Grasses)

**Cenchrus setiger*

Birdwood Grass

Enneapogon pallidus (E)

Conetop Nineawn

Patch 61 (<0.1 ha)

Trees

Celtis australiensis

Goonj

Corymbia polycarpa

Long-fruited Bloodwood

Diospyros humilis

Ebony Wood

Exocarpos latifolius

Mistletoe Tree

Ficus virens

Banyan or Strangler Fig

Grewia breviflora

Currant or Coffee Fruit

Gyrocarpus americanus subsp. *pachyphyllus*

Helicopter Tree or Stinkwood

Mimusops elengi

Mamajen

Santalum lanceolatum

Tropical Sandalwood

Terminalia petiolaris

Marool or Blackberry Tree

Shrubs or subshrubs

Abutilon indicum

Indian Lantern Flower

Acacia colei

Gawar, Boobialla, Native Myrtle

Bridelia tomentosa

Croton habrophyllus

Dodonaea platyptera

Broad-winged Hop Bush

Climbers or vines

Abrus precatorius

Crabs Eye Bean

Adenia heterophylla subsp. *australis*

Caesalpinia major

Capparis sepiaria

Jacquemontia paniculata

Operculina aequisejala (A)

Tinospora smilacina

Snake Vine

Herbs

Amaranthus sp. (A, E)

Cleome viscosa (A, E)

Tick Weed or Mustard Bush

Graminoids (Grasses)

Enneapogon pallidus (E)

Conetop Nineawn

Appendix 5. (continued).

Patch 64 (<0.1 ha)	(Surveyed but not in analysis)
<i>Trees</i>	
<i>Acacia tumida</i>	Wongai
<i>Diospyros humilis</i> (dominant)	Ebony Wood
<i>Ficus virens</i>	Banyan or Strangler Fig
<i>Terminalia petiolaris</i> (one specimen and dead)	Marool or Blackberry Tree
