

# Biological inventory of Koolan Island, Western Australia

## 1. Flora and vegetation

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**Abstract** - A total of 282 plant taxa have been recorded from five major vegetation units on Koolan Island at the head of the Yampi Peninsula. This represents over a quarter of the flora recorded for the Fitzgerald Botanical District. A total of 12 new naturalised weeds were recorded from the island. The closure of the iron ore mine on Koolan Island and the removal of the town will provide opportunities to study both weed invasion and persistence and the establishment of a large permanent wetland in a sub-humid tropical environment.

### INTRODUCTION

A biological survey of Koolan Island was undertaken over a week during the wet season of February 1993. This survey was supplemented by herbarium records and previous collections by KFK and AAM. This paper describes the flora and vegetation of the island, while a subsequent paper will describe the island's fauna. This work will provide a benchmark against which to measure the rehabilitation of the island following closure of the major iron ore mine in October 1993 after 29 years of operation. Despite a long history of exploration and mining on the island its flora and vegetation have been little studied, with the earliest collections in the Western Australian Herbarium (PERTH) dating from the mid 1960s (also see Beard 1979).

### STUDY AREA

Koolan Island is located 130 km north of Derby at the northern end of the Yampi Peninsula. It is separated from the mainland by a channel 1 km wide. The island is 13 km long and 5.5 km wide at its widest point, with the long axis of the island orientated NW - SE (Figure 1). Koolan is one of the many islands of the Buccaneer Archipelago. This area experiences a monsoonal climate with an annual rainfall of about 960 mm with most falling between December and March. Mean summer temperatures for Derby (some 130 km to the south) range from 35 to 37 degrees with high relative humidities (Bureau of Meteorology 1975).

The island is essentially a series of parallel flat-

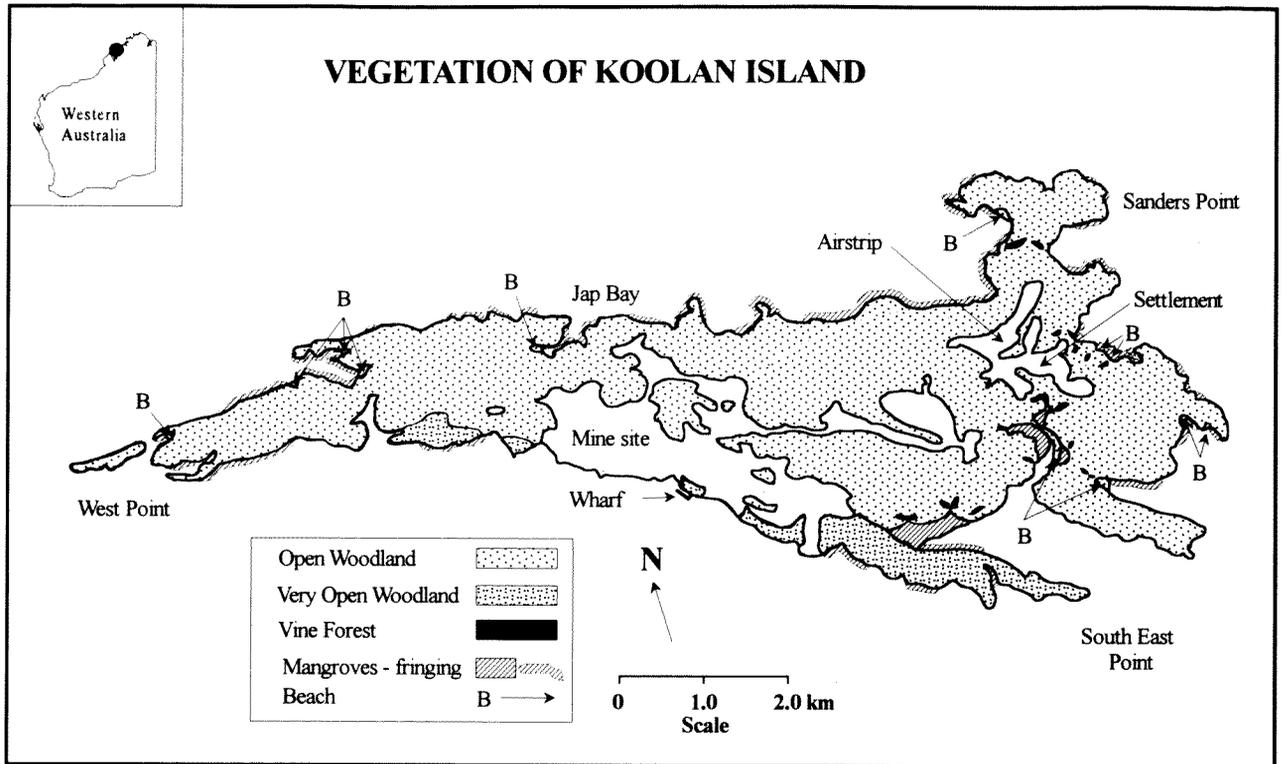
topped ridges formed from steeply dipping beds of the resistant Warton and Pentecost Sandstones and a series of deeply incised creeks through softer Elgee Siltstone (Tyler and Griffin 1993). The adjacent mainland has essentially similar geology and geomorphology. The basal part of the Pentecost Sandstone on Koolan Island is composed of high grade haematite (iron ore) and was mined from 1965 until 1993.

This ore proved to be of very high grade (average 65% iron) with over 50 million tonnes having been extracted. A smaller mine operated on nearby Cockatoo Island between 1957 and 1986. The main pit on Koolan Island is 1.5 km long, 45 m wide and was mined at the eastern end to a depth of 80 m below sea level. This pit will fill with fresh water from a natural aquifer once mining operations cease.

The town associated with this mine was located at the eastern end of the island and had a population of 850 people. Most of the towns people left in October 1992 with complete closure planned by October 1993. It is planned that all buildings will be removed and all road surfaces removed and ripped. Only the airstrip will be left intact.

### METHODS

During the wet season survey most of the field work was concentrated on the eastern two thirds of the island along roads and down creek lines. The area of Warton Sandstone along the southern edge of the island, supporting very open eucalypt woodland (Figure 1), was not visited due to time



**Figure 1** Map of Koolan Island, showing major vegetation types and location of town, airstrip and mine.

and access limitations. Voucher collections were made of all fertile plants found and notes made on their distribution and abundance. While detailed searches were undertaken for naturalised weed taxa, due to time limitations no attempt was made to record all exotic taxa found in the townsite. Vouchers were lodged in PERTH. Nomenclature largely follows Wheeler *et al.* (1992). Additional records were available from previous visits by KFK and AAM as well as other collections lodged in PERTH.

A structural vegetation map was compiled from field notes and a 1: 30 000 colour mosaic based on August 1992 photography (Figure 1).

## RESULTS AND DISCUSSION

### Flora

Two hundred and eighty-two taxa (species, subspecies and varieties) were recorded from 79 families. Forty-three of these were exotic taxa from 19 different families; three of these families (Moringaceae, Solanaceae and Turneraceae) were only represented by introduced taxa. The most well represented families were the Poaceae (22 native, 11 naturalised taxa), Papilionaceae (15 native, 5 naturalised taxa), Euphorbiaceae (15 native, 3 naturalised taxa), and Myrtaceae (11 native taxa) (Appendix 1). Species composition clearly shows the tropical nature of the flora with high proportions of grasses and Euphorbiaceae. It

is, however, a sub-humid tropical flora sharing only 12% of the evergreen tropical flora of Christmas Island (Gentili 1972, Du Puy 1993). Approximately half of the species co-occurring between the two islands are pan-tropical weeds.

Koolan Island falls on the western margin of the Fitzgerald Botanical District which covers some 83,330 km<sup>2</sup> (Beard 1979). The flora of this area is still poorly known. Hnatiuk (1990) recorded 842 taxa from this region while the recently completed Kimberley Flora (Wheeler *et al.* 1992) record 1030 taxa. The present survey has added a further 24 taxa. Thus, 27% of the flora of the entire Fitzgerald Botanical District has been recorded on Koolan Island although the island represents less than 0.1% of the land area of this District.

### Weeds

Several weed taxa were largely restricted to the six steep gullies north and south of the townsite down which the treated sewage was discharged (Figure 2). In particular *Euphorbia cyathophora* and *Clitoria ternatea* were common and locally dominant in the bottoms of these gullies. In Creeks 1 and 2 on the north side of the settlement *Senna alata*, a garden escape, has become wide spread, reaching heights of 4 m. This is the first record of this species naturalised in Western Australia. It is also naturalised in the Darwin area. Another garden escape which has become widespread along the road verges and in the creeks is *Turnera*

*ulmifolia*, a small yellow flowering herb. This taxa has also not previously been recorded elsewhere in Western Australia.

In a vegetated valley near the southern boundary of the town site, a small but vigorous population of rubber vine (*Cryptostegia madagascariensis*) was found. The creek line running south from this valley (Creek 4) was dominated by *Leucaena leucocephala*. The Poinciana (*Delonix regia*) was also found in this area and is the first time this taxon has been recorded as naturalised in Western Australia. The *Leucaena leucocephala* and *Delonix regia* were also found in the two smaller creek lines (Creeks 5 and 6) at the south west end of town.

Eleven species of grass have become naturalised including buffel grass (*Cenchrus ciliaris*). This species has become a very serious weed at Cape Range (near Exmouth) where it was planted along the coastal flats as improved pasture and has subsequently spread through most of the plant communities of the area (Keighery and Gibson 1993).

Currently all the weeds are restricted to the settlement area (including creek lines and sewerage outfalls) and road verges. With closure of the town supplementary irrigation and sewerage output will cease. This is likely to lead to long term loss of weed taxa given the extended dry season in this area. Weedy tree species may persist but success of

further recruitment is uncertain. Experience in areas such as Cape Range suggests some of the exotic grasses will persist. The current distribution of *Cryptostegia madagascariensis* elsewhere in Australia suggests that this species will also persist and spread unless efforts are made to eradicate it. It should be noted that of the several hundred taxa present in the town gardens, only 44 have become naturalised (Appendix 1).

**Vegetation**

Five major vegetation units were found on the island. There were also several minor units but these occupied areas too small to map (Figure 1).

The most widespread community was the *Eucalyptus miniata* - *Eucalyptus confertiflora* open woodlands generally over *Triodia* hummock grassland. The understorey was composed of a diverse herb layer with species such as *Tacca leontopetaloides* and *T. maculata* being common. The density of shrubs in this community is variable but several species of *Terminalia* and *Acacia* are common (Appendix 1). This vegetation type covers about 80% of the non-disturbed area of the island and is the common vegetation type on the adjacent mainland (Beard 1979). The floristics of this community are fairly consistent, however there is considerable local change in dominance across the island. This floristic variation did not appear to be

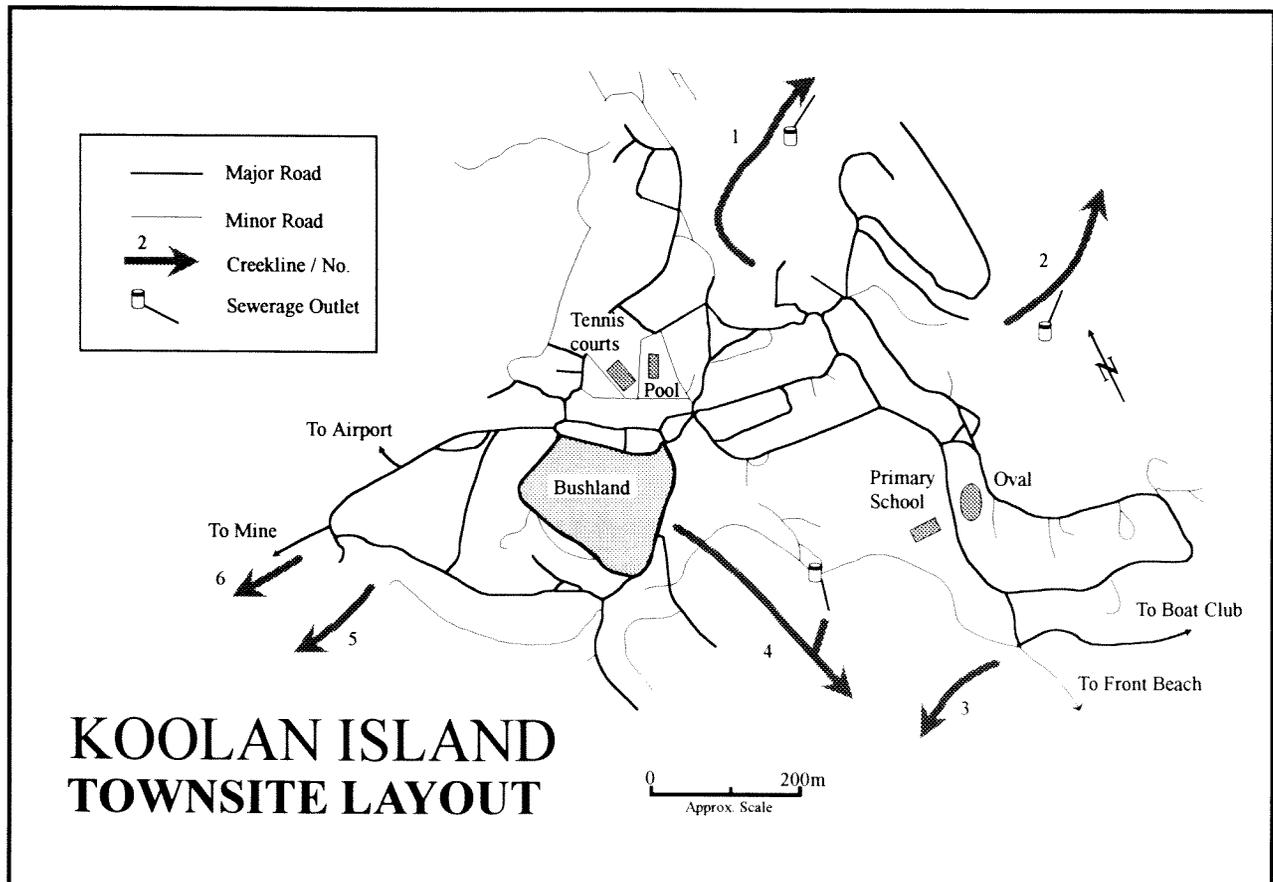


Figure 2 Map of the townsite showing location of creek lines and sewerage outfalls.

correlated to slope or aspect and occurred on both the Pentecost Sandstone and the Elgee Siltstone. In places it gave way to small groves of *Callitrix intratropica* with understoreys dominated by *Calytrix exstipulata*. This community type has previously been recorded on the nearby Cockatoo, Irvine, Bathurst and Kingfisher Islands (previously known as the Wood Islands) some 30 km to the east on the same lithologies (Burbidge *et al.* 1978; K.F. Kenneally, unpub).

Aerial photographs show a very open eucalypt woodland along the southern edge of the island coincident with the Warton Sandstone (Tyler and Griffin 1993). This area was not surveyed due to both time and access limitations. Woodlands on this substrate type have been described for Augustus, Heywood, Champagny, Unwins and Saint Andrew Islands of the Bonaparte Archipelago lying some 130 km to the north east (Burbidge *et al.* 1978) and for an area in the proposed Prince Regent National Park (Miles *et al.* 1975). The composition of the woodlands on the Warton Sandstone is similar to the *Eucalyptus miniata* - *Eucalyptus confertiflora* open woodlands described above, but commonly also including *Eucalyptus perfoliata*, *Plectrarchne pungens*, and less commonly *Eucalyptus ferruginea* and *Acacia stipulosa*.

Large mangrove communities occur in two sheltered bays south of the settlement. In addition, much of the coastline of the island supports a narrow mangrove fringe (Figure 1). Four species of mangrove were recorded from the large stand immediately south of the settlement: *Avicennia marina*, *Camptostemon schultzei*, *Excoecaria agallocha* and *Rhizophora stylosa*. The mangrove communities are small and species poor compared to the much more extensive mangrove stands on the nearby mainland (Kenneally 1982).

Small patches of vine forest dominated by *Canarium australianum* were found in the steep creek lines on the eastern end of the island (Figure 1). Patch size ranges from just a few trees to several hectares in extent. The patches shown in Figure 1 are those that were visited on the ground and / or were discernible on the photo-mosaic. There are undoubtedly more smaller patches than could be mapped at this scale. Koolan Island is at the south western edge of the main area of occurrence of rainforest in the Kimberley. The only patches further to the south west are those on the northern shore of King Sound and the coastal areas of the Dampier Peninsula (McKenzie 1991).

More than 1500 patches of rainforest are scattered across the Kimberley. These range in size from a few tree crowns to more than 100 ha (McKenzie 1991). Kenneally *et al.* (1991) in a study of 99 Kimberley rainforests (largely vine forest) recorded 575 species. Only one of these species was endemic to the rainforest, with most species

occurring widely in a number of habitats across northern Australia. The reason for the widespread nature of most of these species appears to be both their ability to cope with nutrient-poor substrates and propagule dispersal by birds and bats (McKenzie 1991). Our data are consistent with this hypothesis. One hundred and one of the 575 species recorded from Kimberley rainforest patches are found on Koolan Island.

Koolan Island shares 45.5 and 52.1% of the taxa recorded from the two closest rainforest patches studied by Kenneally *et al.* (1991) (02/3 and 25/3 on Yampi Peninsula, some 50 km to the east south east, with 33 and 46 species respectively). These data further indicate the widespread nature of the Kimberley rainforest flora.

Twelve small beaches occurred in protected bays around Koolan Island. Most of the beaches are adjacent to mangrove community but, in addition, a distinct community develops on the mobile sands. Common components of these beach communities include *Spinifex longifolius*, *Commelina ensifolia*, *Ipomoea pes-caprae* and *Abrus precatorius*. Two beaches to the south east of the settlement and another north of the airfield were frequently used by the residents for recreation and were serviced by gravel roads.

Minor vegetation units include the narrow fringing vegetation of *Melaleuca viridiflora* along some of the larger creek lines, and the *Callitrix intratropica* stands. Species-poor haematite scree communities, seen at several locations. These were dominated by combinations of trees and / or shrubs. Common species included *Callitrix intratropica*, *Canarium australianum*, *Pouteria sericea*, *Vitex acuminata* and *Pavetta kimberleyana*. All of these units are restricted to a few hectares in extent.

## DISCUSSION

The flora and vegetation of Koolan Island is very similar to both the adjacent mainland and nearby Cockatoo Island. It is a sub-humid tropical sandstone flora which is widespread across northern Australia. Twelve new naturalised weeds for Western Australia were recorded from the island (*Allamanda cathartica*, *Antigon leptopus*, *Cascabela thevetia*, *Cassia fistula*, *Delonix regia*, *Gliricidia sepium*, *Moringa oleifera*, *Peltophorum pterocarpa*, *Ruellia tuberosa*, *Senna alata*, *Tecoma stans*, *Turnera ulmifolia*). *Antigon leptopus*, *Delonix regia*, *Tecoma stans*, and *Turnera ulmifolia* are also common weeds on Christmas Island.

One native species was found to be restricted to Koolan Island. This was an apparently undescribed species of smooth, white barked eucalypt (*E. aff. cadophora* Keighery and Gibson 15 and 95). This taxon was found occasionally across the island.

None of the native taxa reached their range ends on Koolan Island.

Koolan Island presents an excellent opportunity for long term monitoring of weed invasion and persistence following major disturbance in an isolated sub-humid tropical environment. The townsite will also allow an opportunity to study the fate of the introduced garden species following the removal of town infrastructure and supplementary watering.

One major new habitat created by the mine will be an extensive, deep permanent freshwater wetland in the bottom of the major pit (next to the loading jetty, Figure 1) which has intersected a shallow aquifer. We are unaware of any similar habitat on the sandstone areas of the adjacent mainland. The colonisation of this wetland will add significant numbers of new taxa to the flora of the island. At the date of the present survey the pit was bare of all vegetation and water levels were being kept artificially low by continuous pumping.

#### ACKNOWLEDGEMENTS

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#### APPENDIX 1

Flora list of 282 taxa recorded from Koolan Island, Western Australia. Collection numbers refer to specimens lodged in PERTH. \* indicates a naturalised weed and "sr" indicates a sight record.

##### Family Acanthaceae

- Dicliptera armata* F.Muell.  
*Hypoestes* sp.  
 \* *Ruellia tuberosa*

- Vernon 40  
 Vernon 51  
 L. Mitchell 3118

- Family Adiantaceae  
*Cheilanthes brownii* (Kuhn) Domin Keighery/Gibson 249  
*Cheilanthes caudata* R.Br. Keighery/Gibson 250  
*Cheilanthes sieberi* Kunze Keighery sr  
*Cheilanthes tenuifolia* (Burm.f.) Sw. Keighery sr
- Family Aizoaceae  
*Sesuvium portulacastrum* (L.) L. Keighery sr  
*Zaleya galericulata* (Melville) H. Eichler Keighery sr
- Family Amaranthaceae  
*Achyranthes aspera* L. Keighery sr  
*Amaranthus pallidiflorus* F. Muell. Keighery sr  
\* *Amaranthus viridis* L. Keighery/Gibson 131  
*Gomphrena* sp. Keighery/Gibson 128  
*Ptilotus exaltatus* Nees in Lehm. Keighery/Gibson 210  
*Ptilotus fusiformis* (R.Br.) Steud. var. *gracilis* (R.Br.) Benl Vernon 43
- Family Anacardiaceae  
*Buchanania obovata* Engl. Kenneally sr
- Family Apiaceae  
*Trachymene didiscoides* (F. Muell.) B. L. Burtt Fryxell 3915, Vernon 06
- Family Apocynaceae  
\* *Allamanda cathartica* L. Keighery/Gibson 91  
\* *Cascabela thevetia* L. Mitchell 3116, Keighery/Gibson 28  
\* *Catharanthus roseus* (L.) G. Don Keighery/Gibson 30  
*Tabernaemontana pandacaqui* Lam. Keighery/Gibson 47  
*Wrightia saligna* (R.Br.) Benth. Vernon 23, Keighery/Gibson 02, 211
- Family Asclepiadaceae  
*Cynanchum carnosum* (R.Br.) Schltr. Keighery/Gibson 46  
*Cynanchum puberulum* F. Muell. ex Benth. Vernon 62  
*Gymnema stenophyllum* A. Gray Keighery/Gibson 134  
*Marsdenia viridiflora* R.Br. Keighery/Gibson 62  
*Sarcostemma viminale* subsp. *australe* (R.Br.) P. I. Forst. Vernon sn  
*Secamone timoriense* Decne. Keighery/Gibson 40  
*Tylophora flexuosa* R.Br. Keighery/Gibson 88  
\* *Cryptostegia madagascariensis* Bojer ex Decne. Mitchell 2276, 3117, Keighery/Gibson 26
- Family Asparagaceae  
*Protasparagus racemosus* (Willd.) Oberm. Keighery sr
- Family Asteraceae  
\* *Bidens bipinnata* L. Kenneally sr, Keighery sr  
*Chrysogonum eclipoides* (F. Muell.) F. Muell. Kenneally sr  
*Pterocaulon sphacelatum* (Labill.) F. Muell. Vernon 72  
\* *Tridax procumbens* L. Marchant 72/1, Keighery/Gibson 129  
*Vernonia cinerea* (L.) Less. Vernon 20, k127
- Family Avicenniaceae  
*Avicennia marina* (Forssk.) Vierh. Keighery/Gibson 212
- Family Bignoniaceae  
*Dolichandrone heterophylla* (R.Br.) F. Muell. Keighery/Gibson 105  
\* *Tecoma stans* (L.) Juss. ex Kunth Keighery/Gibson 32
- Family Bombacaceae  
*Camptostemon schultzei* Mast. Keighery sr
- Family Boraginaceae  
*Heliotropium glabellum* "yellow variant" Keighery sr  
*Heliotropium glabellum* R.Br. Sands 4984, 4976, Keighery/Gibson 145  
*Trichodesma zeylanicum* (Burm.f.) R.Br. Keighery sr

- Family Burseraceae  
*Canarium australianum* F.Muell. Keighery/Gibson 48, 68, 136
- Family Byblidaceae  
*Byblis liniflora* Salisb. Vernon 31
- Family Caesalpiniaceae  
\* *Cassia fistula* L. Mitchell sr  
*Chamaecrista mimosoides* (L.)Greene Keighery/Gibson 213  
\* *Delonix regia* (Bojer ex Hook.) Rafin. Keighery/Gibson 59  
*Erythrophleum chlorostachys* (F.Muell.)Baill. Vernon 12  
*Lysiphyllum cunninghamii* (Benth.)de Wit Vernon 04  
\* *Peltophorum pterocarpa* (DC)Backer ex K. Heyner Keighery sr  
\* *Senna alata* (L.)Roxb. Keighery/Gibson 77, Mitchell 3111  
*Senna goniodes* (A.Cunn.ex Benth.)Randell Vernon 42, Keighery/Gibson 109
- Family Capparaceae  
*Capparis lasiantha* R.Br.ex DC. Keighery/Gibson 214, 248  
*Capparis sepiaria* L. Keighery sr  
*Capparis spinosa* L. var. *nummularia* (DC.)Bailey Vernon 64  
*Cleome viscosa* L. Keighery sr
- Family Caryophyllaceae  
*Polycarpaea spirostylis* F.Muell. Keighery sr
- Family Celastraceae  
*Denhamia obscura* (A.Rich.)Meisn. Keighery/Gibson 215A, 215B
- Family Chenopodiaceae  
*Salsola kali* L. Kenneally sr  
*Suaeda arbusculoides* L.S.Sm. Keighery sr
- Family Combretaceae  
*Terminalia canescens* (DC.)Radlk. Vernon 27, Keighery/Gibson 41  
*Terminalia latipes* Benth. subsp. *psilocarpa* Pedley Vernon 10, Keighery/Gibson 87  
*Terminalia platyphylla* F.Muell. Keighery sr
- Family Commelinaceae  
*Cartonema spicatum* R.Br. Vernon 30, Keighery/Gibson 247  
*Commelina ensifolia* R.Br. Vernon 29, Keighery/Gibson 37  
*Murdannia graminea* (R.Br.)G.Brueckn. Vernon 38
- Family Convolvulaceae  
*Evolvulus alsinoides* (L.)L. Vernon 33  
*Ipomoea* sp. Vernon 48  
*Ipomoea pes-caprae* (L.)R.Br. Keighery sr  
\* *Ipomoea quamoclit* L. Mitchell 2272, Keighery/Gibson 05,  
*Jacquemontia paniculata* (Burm.f.)Hallier Vernon 47, Fryxell 4598,  
Keighery/Gibson 119  
\* *Merremia dissecta* (Jacq.)Hallier Keighery/Gibson 50  
*Operculina brownii* Ooststr. Fryxell 4607  
*Polymeria ambigua* R.Br. Keighery/Gibson 113  
*Xenostegia tridentata* (L.) D.Austin et Staples  
subsp. *hastata* (Desr.) Ooststr. Keighery/Gibson 216
- Family Cucurbitaceae  
\* *Cucumis melo* L. subsp. *agrestis* (Naudin)Grebensc. Keighery/Gibson 57  
*Mukia maderaspatana* (L.)M.Roem. Keighery sr  
*Trichosanthes cucumerina* L. var. *cucumerina* Keighery/Gibson 135
- Family Cupressaceae  
*Callitris intratropica* (F.Muell.)R.T.Baker and H.G.Sm. Keighery/Gibson 67
- Family Cyperaceae  
*Cyperus bulbosus* M.Vahl Keighery/Gibson 217  
*Fimbristylis cymosa* R.Br. Keighery/Gibson 94, 150

- Family Dilleniaceae  
*Hibbertia oblongata* R.Br.ex DC. Vernon 57, Fryxell 4592,  
Keighery/Gibson 112
- Family Dioscoreaceae  
*Dioscorea bulbifera* L. Keighery/Gibson 17
- Family Droseraceae  
*Drosera lanata* Kondo Keighery sr  
*Drosera petiolaris* R.Br.ex DC. Vernon "a"
- Family Ebenaceae  
*Diospyros maritima* Blume Keighery/Gibson 31, 152
- Family Elatinaceae  
*Bergia pusilla* Benth. Keighery/Gibson 289
- Family Euphorbiaceae  
*Croton* sp. Keighery sr  
*Breynia cernua* (Poir.)Muell.Arg. Keighery/Gibson 110  
*Bridelia tomentosa* Blume Vernon 02  
*Euphorbia australis* Boiss. Keighery sr  
*Euphorbia coghlanii* Bailey Keighery sr  
\* *Euphorbia cyathophora* Murray Keighery/Gibson 04, Handasyde 01  
*Euphorbia drummondii* Boiss. Keighery sr  
\* *Euphorbia hirta* L. Keighery/Gibson 06  
*Euphorbia kimberleyensis* B.G.Thomson Fryxell 4582  
*Excoecaria agallocha* L. Keighery/Gibson 55  
*Flueggea virosa* (Willd.)F.Voigt subsp. *melanthesoides*  
(F.Muell.)G.L.Webster Keighery/Gibson 156  
\* *Jatropha gossypifolia* L. Keighery/Gibson 100  
*Petalostigma pubescens* Domin Vernon 22, Keighery/Gibson 66, 218  
*Petalostigma quadriloculare* F.Muell. Mitchell 2280, 3114  
*Phyllanthus amarus* Schumach. Keighery/Gibson 44  
*Phyllanthus maderaspatensis* L. Keighery/Gibson 19  
*Phyllanthus virgatus* G.Forst. Keighery/Gibson 54  
*Sebastiania chamelaea* (L.)Muell.Arg. Vernon 21, Keighery/Gibson 121
- Family Goodeniaceae  
*Goodenia sepalosa* F.Muell.ex Benth. Vernon 19, Fryxell 4599,  
Mitchell 2265, Keighery/Gibson 20  
*Scaevola macrostachya* (de Vriese)Benth. Vernon 07, Keighery/Gibson 157
- Family Gyrocarpaceae  
*Gyrocarpus americanus* Jacq. Keighery sr
- Family Haloragaceae  
*Gonocarpus leptothecus* (F.Muell.)Orchard Keighery/Gibson 219A
- Family Lamiaceae  
*Anisomeles malabaricum* (L.)R.Br.ex Sims Mitchell 3112  
\* *Hyptis suaveolens* (L.)Poit. Keighery sr
- Family Lauraceae  
*Cassytha aurea* J.Z.Weber Keighery/Gibson 153  
*Cassytha capillaris* Meisn. Keighery/Gibson 149  
*Cassytha filiformis* L. Keighery sr
- Family Loganiaceae  
*Mitrasacme connata* R.Br. Vernon 36  
*Strychnos lucida* R.Br. Keighery sr
- Family Loranthaceae  
*Amyema bifurcata* (Benth.)Tiegh. Keighery/Gibson 291  
*Amyema miquelii* (Lehm.ex Miq.)Tiegh. Keighery sr  
*Amyema thalassium* Barlow Keighery/Gibson 147  
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*Lagerstroemia archeriana* Bailey Keighery sr
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*Abutilon indicum* (L.) Sweet Keighery/Gibson 33  
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*Hibiscus leptocladus* Benth. Vernon 55, Keighery/Gibson 53, 159  
*Thespesia thespesioides* (Benth.) Fryxell Keighery sr
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*Owenia vernicosa* F. Muell. Keighery/Gibson 111
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*Tinospora smilacina* Benth. Keighery sr
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*Acacia ampliceps* Maslin Keighery/Gibson 108  
*Acacia hippuroides* Heward ex Benth. Vernon 04, Vernon 55, Sands 4973  
*Acacia holosericea* A. Cunn. ex G. Don Kenneally sr  
*Acacia multisiliqua* (Benth.) Maconochie Vernon 01, Fryxell 4605, Sands 4975,  
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 \* *Acacia tumida* F. Muell. ex Benth. Vernon 70, Kenneally 8531, Sands 4950  
 \* *Leucaena leucocephala* (Lam.) de Wit Keighery/Gibson 18  
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 \* *Moringa oleifera* Lam. Keighery/Gibson 230
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*Eucalyptus dampieri* D. J. Carr and S. G. M. Carr White 11  
*Eucalyptus miniata* A. Cunn. ex Schauer Kenneally sr  
*Eucalyptus perfoliata* R. Br ex Benth. Kenneally sr  
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*Boerhavia* sp. Keighery sr  
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*Abrus precatorius* L. Keighery sr  
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*Canavalia rosea* (Sw.)DC. Fryxell 4587, Keighery/Gibson 84, 122  
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 \* *Desmodium tortuosum* (Sw.)DC. Keighery/Gibson 114, Mitchell 2267, 2275  
*Galactia tenuiflora* (Klein ex Willd.)Wight and Arn. Fryxell 4614  
 \* *Gliricidia sepium* (Jacq.)Kunth ex Walp. Mitchell 2277, Handysyde 02  
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 \* *Stylosanthes guianensis* (Aubl.)Sw. Keighery/Gibson 27  
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*Digitaria bicornis* (Lam.)Roem. and Schult. Keighery sr  
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