

**FLORA AND VEGETATION OF THE
MUNGARI NORTH PROJECT AREA**

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SUMMARY

Mattiske Consulting Pty Ltd was commissioned by Dames and Moore Pty Ltd to undertake a flora and vegetation survey within part of the area known as Mungari North on behalf of the Proponent, Landcorp. Two botanists carried out the field survey over a period of two days in October 1995. Detailed recording sites and opportunistic sites were assessed during this time. The field survey work concentrated on the proposed Solid Waste Disposal Site in the south-east corner of the Mungari North area. Vegetation in the surrounding area was also mapped from general and opportunistic observations. The total survey area was approximately 300 hectares.

A total of 94 vascular plant species or 97 taxa (including subspecies and varieties) from 57 genera and 26 families was recorded for the Mungari North Project Area. This total included 6 introduced species; one of these, **Cucumis myriocarpus*, is a declared weed in Western Australia. The dominant families recorded were Asteraceae (17 species), Chenopodiaceae (10 species), Myrtaceae (10 species), Poaceae (10 species) and Myoporaceae (9 species). No flora species designated as either Declared Rare flora or Priority flora by the Department of Conservation and Land Management (1995) were located within the survey area in October 1995. One sub-species recorded, *Eremophila parvifolia* ssp. *auricampa*, was a Priority One species prior to the survey, but since September 1995 this sub-species has been removed from the listing by the Department of Conservation and Land Management as more information has become available on its distribution.

A total of 10 plant communities were defined and mapped for the Mungari North Project Area. These communities ranged from Eucalypt and *Casuarina* Woodlands to Shrublands and Thickets of *Acacia acuminata* ssp. *burkittii*. Of these ten plant communities, two were considered to be locally and regionally significant:

. Plant Community 1e - Broad valley area characterized by a Woodland of *Eucalyptus transcontinentalis*, *Eucalyptus salubris* var. *salubris*, *Eucalyptus salmonophloia* and *Eucalyptus melanoxydon* over *Santalum spicatum*, *Eremophila scoparia*, *Senna artemisioides* ssp. *filifolia* and *Olearia muelleri* over mixed grasses and Asteraceae spp. on red sands. This community is considered to be poorly represented within the region as *Eucalyptus melanoxydon* was not recorded within the extensive Broad Valley systems surveyed by McKenzie and Hall (1992). It is also not represented within the nearby Goongarrie National Park.

. Plant Community 1g - Broad depression dominated by an Open Woodland of *Casuarina obesa* hybrid, with scattered *Eucalyptus griffithsii* and *Eucalyptus yilgarnensis* mallees, over *Senna artemisioides* ssp. *filifolia*, *Eremophila oldfieldii* ssp. *angustifolia* and *Eremophila scoparia* over mixed shrubs and Chenopods on red sandy-loam. This community could not be correlated with any of the site types of Beard (1981) or McKenzie and Hall (1992) and hence may be regionally significant. *Casuarina obesa* was only recorded by McKenzie and Hall (1992) in salt lake areas.

Both these plant communities are located outside the proposed Solid Waste Disposal Site in the south-east corner of the Mungari North area, however these areas should be protected wherever possible by minimizing unnecessary clearing.

LIST OF PARTICIPANTS

Principal Ecologist:	Dr E M Matiske
Principal Botanist:	Dr E Bennett
Senior Biologist:	Mrs D Woodman
Biologist:	Mrs C McChesney
Map Production:	Mr A White - CAD Resources

1. INTRODUCTION

1.1 Location of Project Area

Mattiske Consulting Pty Ltd was commissioned by Dames and Moore Pty Ltd to undertake a flora and vegetation survey of the Mungari North Project Area for Landcorp. It is proposed to use a portion of the site for the Mungari Industrial Park Solid Waste Disposal Area.

The project area is located in the Goldfields area of Western Australia, approximately 20 kilometres south-west of Kalgoorlie. The proposed disposal site is expected to encompass a 60 hectare area within the south-eastern corner of the site known as Mungari North. Various other projects are proposed for the remaining area.

1.2 Flora and Vegetation

The project area lies near the northern boundary of the Swan natural region, within the Southwestern Interzone Botanical Province as defined by Beard (1981). The Southwestern Interzone Botanical Province is characterized by plants predominantly from the families Mimosaceae (*Acacia* spp.), Myrtaceae (Eucalypts), Myoporaceae (*Eremophila* spp.), Chenopodiaceae (Samphires, Bluebushes), Asteraceae (Daisies) and Poaceae (grasses).

The vegetation of the project area lies near the northern boundary of the Coolgardie Botanical District. It is heavily influenced by the Eremaean Botanical District which lies to the north-east. The vegetation in the Kalgoorlie area of this region is predominantly open sclerophyll woodlands dominated by *Eucalyptus lesouefii*, *Eucalyptus salmonophloia* and *Eucalyptus transcidentalis* (Beard 1972). These areas are interspersed by Mulga and *Casuarina* low woodlands on the plains and dense thickets on the ironstone ridges (Beard 1990).

1.3 Topography and Soils

The Project Area lies within the Coolgardie Plateau of the Coolgardie Region physiographic unit (Beard 1981). This area is dominated by an extensive greenstone belt, consisting of an area of low hills and broad valleys leading to salt lakes. Typical soils of this unit are neutral red earths on the plains, calcareous loams and brown calcareous earths in the more hilly portions and saline soils in and around playa lakes. Drainage is in a northeasterly direction terminating in an extensive series of salt lakes. The project area lies within a broad valley dominated by red earths and brown loams.

2. OBJECTIVES

The general objective of this study was to define and describe the botanical values of the survey area known as Mungari North.

The specific objectives of this flora and vegetation study were to:

- . collect and identify the vascular plant species in the Project Area,
- . search for any rare, endangered or significant flora species,
- . review the conservation status of the plant species recorded on the basis of the Department of Conservation and Land Management, Declared Rare and Priority Flora List (September 1995),
- . identify any weed species which are known or expected to occur in the Project Area,
- . define and map the vegetation within the Project Area,
- . review the local and regional significance of the flora and vegetation, and
- . evaluate the ecological significance of the Project Area.

3. METHODS

3.1 Flora

The flora of the Project Area was described and collected during a survey conducted by two botanists during October 19 and 20 1995. The area was traversed on foot and by vehicle with all flora species collected at each vegetation mapping site and at each opportunistic site.

An initial search for Declared Rare and Priority Flora species potentially located in the Project Area was made, using the database held by the Department of Conservation and Land Management (1995), prior to the field work.

All plant specimens collected during the field survey were dried and fumigated in accordance with the requirements of the Western Australian Herbarium, and then sorted in preparation for identification. The plant specimens were identified by keying out and by comparison with the named specimens held at the Western Australian Herbarium. Where appropriate, other botanists and plant taxonomists with specialist skills were consulted. Nomenclature of species described follows Green (1985) and updates of the Census database from the Western Australian Herbarium.

3.2 Vegetation

The plant communities in the Project Area were defined and mapped for the proposed Solid Waste Disposal Site by systematic coverage of the area using foot and vehicle traverses. As time permitted vegetation in the majority of the wider area known as Mungari North was also mapped and searched for Rare and Priority Flora to accommodate any future changes to location of the Solid Waste Disposal Site. The total area surveyed was approximately 300 hectares.

Detailed recordings were taken throughout the Project Area in the different plant communities noted by the survey team. A general site description was recorded at each site which included a location using a hand-held Global Positioning System (GPS), soil colour and type, time since last fire and litter type and quantity. This information was used in definition of the plant community. Ten detailed recording sites were sampled as well as numerous opportunistic sites which were surveyed for additional plant community information and Declared Rare and Priority Flora.

The plant communities of the Project Area were then mapped at a scale of 1:5000 using the information collected in the field as well as aerial photography supplied by Dames and Moore Pty Ltd.

4. RESULTS

4.1 Flora

A total of 94 vascular plant species or 97 taxa (including subspecies and varieties) from 57 genera and 26 families was recorded for the Mungari North Project Area (Appendix A). This total included 6 introduced species. One of these, **Cucumis myriocarpus*, is a declared weed in Western Australia (Parsons and Cuthbertson 1992). The dominant families were:

Asteraceae	-	17 species
Chenopodiaceae	-	10 species
Myrtaceae	-	10 species
Poaceae	-	10 species
Myoporaceae	-	9 species

These groups contributed to 60% of the flora collected in the area, and the representation is typical of the contribution of these families to the flora of the Coolgardie Botanical District. A review of species richness for various study areas in the Eastern Goldfields (Mattiske Consulting Pty Ltd 1995) indicates that this figure is relatively low. This is likely to be a reflection of the relatively small size of the survey area rather than an indication of low species richness. McKenzie and Hall (1992) found that species richness varied between 51 and 89 at sites surveyed in the same vegetation type as the Project Area (Broad Valleys).

The distribution of the vascular plant species recorded during the survey area is presented in Appendix B. Table 1 shows the relative species richness for each of the

plant communities recorded. Community 1f recorded the highest number of vascular plant species.

Table 1: Comparison of Species Richness of the Plant Communities Within the Project Area

	Plant Community									
Community	1a	1b	1c	1d	1e	1f	1g	2a	2b	2c
No. of Species	30	31	26	27	24	33	25	28	22	22

4.2 Rare and Priority Flora

No Declared Rare Flora which are listed in the Wildlife Conservation (Rare Flora) Notice July 1995, gazetted pursuant to subsection (2) of section 23F of the Wildlife Conservation Act, 1950 - 1980 were located within the Project Area during this survey.

No flora species listed as Priority species by the Department of Conservation and Land Management (1995) were located within the survey area in October 1995. The species *Eremophila parvifolia* ssp. *auricampa* which appeared on earlier listings of the Department of Conservation and Land Management database as a Priority One species was recorded within the survey area. However since September 1995, this sub-species has been deleted from the list as it is now not believed to be threatened or endangered.

4.3 Vegetation

The vegetation of the Project Area was characterized by Eucalypt Woodlands interspersed by occasional *Acacia acuminata* ssp. *burkittii* Shrublands. A total of 10 plant communities were defined and mapped for the area surveyed at Mungari North in October 1995. The area was mapped at a scale of 1:5000 (see enclosed Map 1). The site of the proposed Solid Waste Disposal Site is outlined in the south-east section of the area illustrated in Map 1.

The plant communities were compared with surveys by Beard (1981) and McKenzie and Hall (1992) to assess the relative ecological significance in a regional context. The plant communities are described below.

Woodlands

Community 1a

Broad valley areas which were characterized by an Open Woodland of *Eucalyptus salmonophloia* and occasional *Eucalyptus lesoeufii* over mixed Chenopods on red sandy-loam. Understorey species included *Maireana georgei*, *Senna artemisioides* ssp. *filifolia*, *Rhagodia preissii* and various grass species, with the dominant grass being *Stipa trichophylla*.

This community is very widespread both locally and regionally (Beard 1981) and is likely to be represented in the nearby Kurrawang Nature Reserve.

Community 1b

Flat valley areas consisting of a Woodland of occasional *Eucalyptus salmonophloia* over *Eucalyptus griffithsii* mallees over mixed shrubs and Asteraceae spp. on red sandy-loam. Midstorey and understorey species included *Eremophila scoparia*, *Olearia muelleri*, *Melaleuca ?lasiandra* and *Santalum spicatum*. The herb layer consisted of grass and daisy species including *Stipa elegantissima*, *Brachyscome pusilla*, *Podolepis capillaris* and *Stipa scabra*.

This community is not very wide spread regionally as *Eucalyptus griffithsii* is restricted to a small area in the central goldfields and is not generally found in broad valleys (McKenzie and Hall 1992).

Community 1c

Flat valley areas consisting of a Woodland of *Eucalyptus transcontinentalis*, *Eucalyptus lesoeufii* and *Eucalyptus salubris* var. *salubris*, with occasional emergent *Eucalyptus salmonophloia*, over mixed low shrubs on red sands. The understorey areas were relatively sparse and dominated by species including *Zygophyllum auranticum*, *Chenopodium curvispicatum* and *Ptilotus exaltatus*. Shallow drainage lines devoid of vegetation were also present within this plant community.

This community is widespread locally within the Project Area and regionally throughout the Coolgardie Plateau (Beard 1981) and is likely to be present in the Kurrawang Nature Reserve.

Community 1d

Flat valley areas of a Woodland of *Eucalyptus yilgarnensis*, *Eucalyptus transcontinentalis* and occasional *Eucalyptus salmonophloia* over mixed low shrubs on red sandy-loam. The understorey was dominated by chenopods including *Maireana sedifolia*, *Maireana tomentosa* and *Chenopodium curvispicatum*, as well as low shrubs of *Olearia muelleri* and *Exocarpos aphyllus*. There was very little herb layer present with only two grass and daisy species recorded.

This community is relatively widespread within the Project Area although it is not common regionally as *Eucalyptus yilgarnensis* is more often found in the Wheatbelt (Brooker and Kleinig 1990).

Community 1e

Broad valley area characterized by a Woodland of *Eucalyptus transcontinentalis*, *Eucalyptus salubris* var. *salubris*, *Eucalyptus salmonophloia* and *Eucalyptus melanoxylon* over *Santalum spicatum*, *Eremophila scoparia*, *Senna artemisioides* ssp. *filifolia* and *Olearia muelleri* over mixed grasses and Asteraceae spp. on red sands. Very little bare ground was present with a herb layer including *Ptilotus obovatus*, *Podolepis capillaris*, *Stipa scabra*, **Salvia verbanaca* and *Stipa nitida* recorded.

This community is not common within the Project Area although is well represented regionally (without the *Eucalyptus melanoxylon*) north of the Project Area (McKenzie and Hall 1992). The presence of *Eucalyptus melanoxylon* may increase the significance of this plant community as this species has only scattered distribution throughout the Goldfields (Brooker and Kleinig 1990).

Community 1f

Stoney valley area characterized by an Open Woodland of *Eucalyptus griffithsii* over *Acacia acuminata* ssp. *burkittii* and *Eremophila scoparia* over mixed low shrubs on red calcareous loam. Only a small pocket of this area was mapped in the western corner of the proposed Solid Waste Disposal Site. Other understorey species included *Eremophila alternifolia*, *Maireana sedifolia*, *Dodonaea ptarmicaefolia* and *Olearia muelleri*, with a herb layer including *Hyalosperma glutinosum* ssp. *glutinosum*, *Athrixia athrixoides*, *Stipa nitida*, *Stipa* aff. *eremophila* and *Stipa trichophylla*.

This community is not well represented locally as it was only recorded in a small pocket in the western corner of the proposed Solid Waste Disposal site. It has been recorded regionally, although it is not represented within the Kurrawang Nature Reserve or Goongarrie National Park (McKenzie and Hall 1992).

Community 1g

Broad depression dominated by an Open Woodland of *Casuarina obesa* hybrid, with scattered *Eucalyptus griffithsii* and *Eucalyptus yilgarnensis* mallees, over *Senna artemisioides* ssp. *filifolia*, *Eremophila oldfieldii* ssp. *angustifolia* and *Eremophila scoparia* over mixed shrubs and Chenopods on red sandy-loam. Understorey species included *Sclerolaena obliquicuspis*, *Maireana georgei*, *Lycium australe* and herbs such as *Cephalopterum drummondii* and *Rhodanthe floribunda*. *Casuarina obesa* occasionally hybridises with *Casuarina pauper* in Western Australia (Wilson and Johnson 1989) and this hybrid appears to be present in the survey area.

This community is poorly represented both locally and regionally and was not noted either by Beard (1981) or McKenzie and Hall (1992).

Shrublands

Community 2a

Thick Shrubland of *Acacia acuminata* ssp. *burkittii* with scattered *Eucalyptus griffithsii* over grasses and Asteraceae spp. on brown loams in a drainage line running in a northeasterly direction. The vegetation in this area is very thick which limited the number of species present due to light restriction by the *Acacia* stands. The middle shrub layer was almost absent with only a few species such as *Eremophila drummondii* and *Eremophila decipiens* recorded. The majority of species recorded were present in the herb layer and included *Aristida contorta*, *Cheilanthes sieberi*, *Rostraria pumila* and *Schoenia cassiniana*.

This community is well represented locally within the Project Area although its regional distribution is unknown. However as it occurs within the Broad Valley systems present in the Goongarrie National Park and Kurrawang Nature Reserve it is likely to be well represented regionally (McKenzie and Hall 1992).

Community 2b

Low-lying Thicket of *Acacia acuminata* ssp. *burkittii*, *Grevillea nematophylla* and *Eremophila drummondii* over mixed low shrubs, grasses and Asteraceae spp. on brown loams bordering the drainage line of Community 2a. Other species recorded included *Goodenia havilandii*, *Maireana georgei* and *Velleia rosea*.

This community is widespread within the Project Area although its regional distribution is unknown. However as it occurs within the Broad Valley systems present in the Goongarrie National Park and Kurrawang Nature Reserve it is likely to be well represented regionally (McKenzie and Hall 1992).

Community 2c

Low lying section in west of Project Area characterized by a Shrub Steppe of *Acacia acuminata* ssp. *burkittii*, *Eremophila oldfieldii* ssp. *angustifolia*, *Melaleuca uncinata* and *Prostanthera grylloana*, with scattered *Eucalyptus griffithsii* over *Triodia scariosa*, mixed low shrubs and Asteraceae spp. on brown loam. Very little bare ground was recorded with a herb layer dominated by *Goodenia havilandii*, *Chrysocephalum semicalvum*, *Stipa eremophila* and *Stipa elegantissima* present.

Although only occurring within one pocket in the Project Area this community is very widespread regionally (Beard 1981).

4.4 Local and Regional Significance of the Plant Communities

The plant communities of the Project Area are a result of the local underlying geology, landforms, soils and hydrogeological conditions. The significance of the plant communities have been defined in a local and regional context by comparison with historical and recent regional surveys (Beard 1981; McKenzie and Hall 1992).

The following two plant communities within the Project Area have been identified as both locally and regionally significant.

. Broad valley area characterized by a Woodland of *Eucalyptus transcontinentalis*, *Eucalyptus salubris* var. *salubris*, *Eucalyptus salmonophloia* and *Eucalyptus melanoxyton* over *Santalum spicatum*, *Eremophila scoparia*, *Senna artemisioides* ssp. *filifolia* and *Olearia muelleri* over mixed grasses and Asteraceae spp. on red sands. Very little bare ground was present with a herb layer including *Ptilotus obovatus*, *Podolepis capillaris*, *Stipa scabra*, **Salvia verbanaca* and *Stipa nitida* recorded. Plant Community 1e, present in the northern section of the Project Area. This community is considered to be poorly represented within the region as *Eucalyptus melanoxyton* was not recorded within the extensive Broad Valley systems surveyed by McKenzie and Hall (1992). It is also not represented within the nearby Goongarrie National Park.

. Broad depression dominated by an Open Woodland of *Casuarina obesa* hybrid, with scattered *Eucalyptus griffithsii* and *Eucalyptus yilgarnensis* mallees, over *Senna artemisioides* ssp. *filifolia*, *Eremophila oldfieldii* ssp. *angustifolia* and *Eremophila scoparia* over mixed shrubs and Chenopods on red sandy-loam. Understorey species included *Sclerolaena obliquicuspis*, *Maireana georgei*, *Lycium australe* and herbs such as *Cephalopterum drummondii* and *Rhodanthe floribunda*. Plant Community 1g, located on the western edge of the project area. This community could not be correlated with any of the site types of Beard (1981) or McKenzie and Hall (1992) and hence may be regionally significant. *Casuarina obesa* was only recorded by McKenzie and Hall (1992) in salt lake areas.

5. DISCUSSION

The Project Area lies within the Broad Valley Vegetation Type as defined by McKenzie and Hall (1992). This type is widespread throughout the area and is represented within the Goongarrie National Park and Kurrawang Nature Reserve. Overall species richness is generally low due to past disturbances and the poor quality of the soil (Beard 1981). This is reflected by the relatively low number of plant species recorded within the Project Area.

A low number of weed species were recorded within the project area. One of these, **Cucumis myriocephalus*, is a declared weed in Western Australia. It was recorded only once beneath the powerline in Community 2a. Through the *Agriculture and Related Resources Protection Act 1976*, landowners are responsible for notifying the Agriculture Protection Board of the presence of these declared plants and for controlling them. Management of the project should therefore include a strategy to stop the spread of weed species.

The vegetation of the Project Area is largely typical of the Coolgardie Botanical District. Only two of the plant communities mapped are thought to be both locally and regionally significant, Community 1e and Community 1g. Both these plant communities are located outside the proposed Solid Waste Disposal Site in the south-east corner of the Mungari North area. Neither of these were recorded by either Beard (1981) or McKenzie and Hall (1992) and are not represented in the Goongarrie National Park. They may be present in the nearby Kurrawang Nature Reserve although this area has not been mapped in detail to allow determination of this. It is recommended that areas of these plant communities are therefore disturbed as little as possible via the definition of precise clearing boundaries prior to earthworks.

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**APPENDIX A: Vascular Plant Species Recorded in the Mungari North
Project Area, 1995**

FAMILY	GENUS	SPECIES
ADIANTACEAE	<i>Cheilanthes</i>	<i>sieberi</i>
POACEAE	* <i>Aira</i>	<i>caryophylllea</i>
	<i>Aristida</i>	<i>contorta</i>
	<i>Bromus</i>	<i>sp.</i>
	<i>Rostraria</i>	<i>pumila</i>
	<i>Stipa</i>	<i>elegantissima</i>
	<i>Stipa</i>	<i>aff. eremophila</i>
	<i>Stipa</i>	<i>nitida</i>
	<i>Stipa</i>	<i>scabra</i>
	<i>Stipa</i>	<i>trichophylla</i>
	<i>Triodia</i>	<i>scariosa</i>
ANTHERICACEAE	<i>Thysanotus</i>	<i>manglesianus</i>
CASUARINACEAE	<i>Casuarina</i>	<i>obesa (hybrid)</i>
PROTEACEAE	<i>Grevillea</i>	<i>nematophylla</i>
SANTALACEAE	<i>Exocarpos</i>	<i>aphyllus</i>
	<i>Santalum</i>	<i>spicatum</i>
CHENOPODIACEAE	<i>Atriplex</i>	<i>vesicaria</i>
	<i>Chenopodium</i>	<i>curvispicatum</i>
	<i>Maireana</i>	<i>georgei</i>
	<i>Maireana</i>	<i>pentatropis</i>
	<i>Maireana</i>	? <i>pentatropis</i>
	<i>Maireana</i>	<i>sedifolia</i>
	<i>Maireana</i>	<i>tomentosa</i>
	<i>Rhagodia</i>	<i>preissii</i>
	<i>Sclerolaena</i>	<i>diacantha</i>
	<i>Sclerolaena</i>	<i>obliquicuspis</i>
AMARANTHACEAE	<i>Ptilotus</i>	<i>exaltatus</i>
	<i>Ptilotus</i>	<i>holosericeus</i>
	<i>Ptilotus</i>	<i>obovatus</i>
CAPPARACEAE	<i>Cleome</i>	<i>viscosa</i>
BRASSICACEAE	* <i>Carrichtera</i>	<i>annua</i>

**APPENDIX A: Vascular Plant Species Recorded in the Mungari North
Project Area, 1995**

FAMILY	GENUS	SPECIES
MIMOSACEAE	<i>Acacia</i>	<i>acuminata ssp. burkittii</i>
	<i>Acacia</i>	<i>collettioides</i>
	<i>Acacia</i>	<i>hemiteles</i>
	<i>Acacia</i>	<i>tetragonophylla</i>
CAESALPINIACEAE	<i>Senna</i>	<i>artemisioides ssp. artemisioides</i>
	<i>Senna</i>	<i>artemisioides ssp. filifolia</i>
	<i>Senna</i>	<i>cardiosperma ssp. cardiosperma</i>
PAPILIONACEAE	<i>Swainsona</i>	<i>canescens</i>
ZYGOPHYLLACEAE	<i>Zygophyllum</i>	<i>apiculatum</i>
	<i>Zygophyllum</i>	<i>aurantiacum</i>
	<i>Zygophyllum</i>	<i>idiocarpum</i>
SAPINDACEAE	<i>Dodonaea</i>	<i>ptarmicaefolia</i>
MYRTACEAE	<i>Eucalyptus</i>	<i>griffithsii</i>
	<i>Eucalyptus</i>	<i>lesouefii</i>
	<i>Eucalyptus</i>	<i>melanoxylon</i>
	<i>Eucalyptus</i>	<i>salmonophloia</i>
	<i>Eucalyptus</i>	<i>salubris var. salubris</i>
	<i>Eucalyptus</i>	<i>transcontinentalis</i>
	<i>Eucalyptus</i>	<i>yilgarnensis</i>
	<i>Melaleuca</i>	<i>?lasiandra</i>
	<i>Melaleuca</i>	<i>sheathiana</i>
	<i>Melaleuca</i>	<i>uncinata</i>
HALORAGACEAE	<i>Haloragis</i>	<i>gossei</i>
APIACEAE	<i>Daucus</i>	<i>glochidiatus</i>
PRIMULACEAE	* <i>Anagallis</i>	<i>arvensis</i>
BORAGINACEAE	<i>Halgania</i>	<i>rigida</i>
LAMIACEAE	<i>Prostanthera</i>	<i>grylloana</i>
	<i>Prostanthera</i>	<i>wilkieana</i>
	* <i>Salvia</i>	<i>verbenaca</i>
	<i>Westringia</i>	<i>dampieri</i>

**APPENDIX A: Vascular Plant Species Recorded in the Mungari North
Project Area, 1995**

FAMILY	GENUS	SPECIES
SOLANACEAE	<i>Lycium</i>	<i>australe</i>
	<i>Solanum</i>	<i>lasiophyllum</i>
	<i>Solanum</i>	<i>nummularium</i>
MYOPORACEAE	<i>Eremophila</i>	<i>alternifolia</i>
	<i>Eremophila</i>	<i>decipiens</i>
	<i>Eremophila</i>	<i>dempsteri</i>
	<i>Eremophila</i>	<i>drummondii</i>
	<i>Eremophila</i>	<i>ionantha</i>
	<i>Eremophila</i>	<i>oldfieldii</i> ssp. <i>angustifolia</i>
	<i>Eremophila</i>	<i>parvifolia</i> ssp. <i>auricampa</i>
	<i>Eremophila</i>	<i>psilocalyx</i>
	<i>Eremophila</i>	<i>scoparia</i>
CUCURBITACEAE	* <i>Cucumis</i>	<i>myriocarpus</i>
GOODENIACEAE	<i>Goodenia</i>	<i>havilandii</i>
	<i>Goodenia</i>	aff. <i>mimuloides</i>
	<i>Goodenia</i>	<i>pinnatifida</i>
	<i>Scaevola</i>	<i>spinescens</i>
	<i>Velleia</i>	<i>rosea</i>
ASTERACEAE	<i>Angianthus</i>	<i>tomentosus</i>
	<i>Athrixia</i>	<i>athrixioides</i>
	<i>Brachyscome</i>	<i>pusilla</i>
	* <i>Centaurea</i>	<i>melitensis</i>
	<i>Cephalipterum</i>	<i>drummondii</i>
	<i>Chrysocephalu</i>	<i>semicalvum</i>
	<i>Cratystylis</i>	<i>concephala</i>
	<i>Cratystylis</i>	<i>microphylla</i>
	<i>Hyalosperma</i>	<i>glutinosum</i> ssp. <i>glutinosum</i>
	<i>Olearia</i>	<i>muelleri</i>
	<i>Olearia</i>	<i>pimeleoides</i>
	<i>Podolepis</i>	<i>capillaris</i>
	<i>Rhodanthe</i>	<i>floribunda</i>
	<i>Schoenia</i>	<i>cassiniana</i>
	<i>Senecio</i>	<i>quadridentatus</i>
<i>Triptilodiscus</i>	<i>pygmaeus</i>	
<i>Waitzia</i>	<i>acuminata</i>	

**APPENDIX B: Distribution of Plant Species Recorded in the Mungari North
Project Area, 1995**

Species	Plant Community									
	1a	1b	1c	1d	1e	1f	1g	2a	2b	2c
<i>Olearia muelleri</i>		+	+	+	+	+	+			+
<i>Olearia pimeleoides</i>								+		+
<i>Podolepis capillaris</i>		+			+	+	+	+	+	+
<i>Prostanthera grylloana</i>										+
<i>Prostanthera wilkieana</i>										+
<i>Ptilotus exaltatus</i>	+		+	+	+	+	+			
<i>Ptilotus holosericeus</i>										
<i>Ptilotus obovatus</i>	+	+	+	+	+	+	+	+		+
<i>Rhagodia preissii</i>	+									
<i>Rhodanthe floribunda</i>						+	+			
<i>Rostraria pumila</i>								+		
* <i>Salvia verbenaca</i>	+		+	+	+			+	+	
<i>Santalum spicatum</i>	+	+	+	+	+		+		+	+
<i>Scaevola spinescens</i>						+				
<i>Schoenia cassiniana</i>								+	+	
<i>Sclerolaena diacantha</i>		+	+	+	+	+	+		+	
<i>Sclerolaena obliquicuspis</i>							+			
<i>Senecio quadridentatus</i>								+		
<i>Senna artemisioides ssp. artemisioides</i>						+				
<i>Senna artemisioides ssp. filifolia</i>	+	+	+	+	+	+	+			
<i>Senna cardiosperma ssp. cardiosperma</i>				+						
<i>Solanum lasiophyllum</i>	+	+			+	+		+	+	
<i>Solanum nummularium</i>	+									
<i>Stipa aff. eremophila</i>	+	+			+	+		+		
<i>Stipa elegantissima</i>	+	+		+				+	+	+
<i>Stipa nitida</i>					+	+				
<i>Stipa scabra</i>		+			+		+			+
<i>Stipa trichophylla</i>	+	+				+			+	
<i>Swainsona canescens</i>	+		+							
<i>Thysanotus manglesianus</i>		+						+		
<i>Triodia scariosa</i>										+
<i>Triptilodiscus pygmaeus</i>								+		
<i>Velleia rosea</i>	+							+	+	+
<i>Waitzia acuminata</i>							+	+	+	+
<i>Westringia dampieri</i>		+								
<i>Zygophyllum apiculatum</i>				+			+			+
<i>Zygophyllum auraniticum</i>	+		+		+	+			+	
<i>Zygophyllum idiocarpum</i>	+		+			+				