Appendix H
Flora

Contents

Appendix H Flora

Appendix H.1
Vegetation Sampling Locations

Table of Vegetation Sampling Locations – McArthur River

Flora Sampling Site	Site No. [#]	Date 2003	Eastings WGS 84	Northings WGS 84	Wpt	Notes
Quadrat	MR1	2/4	619311	8183839	253	McArthur River riverine habitat, diversion area
Quadrat	MR2	2/4	619280	8183983	256	Mt Stubbs, hill woodland
Quadrat	MR3	2/4	619355	8184064	258	Mt Stubbs, hill woodland
Quadrat	MR4	3/4	620000	8183614	267	*E. microtheca* open woodland
Quadrat	MR5	3/4	619772	8183708	269	McArthur River riverine habitat, diversion area
Quadrat	MR6	3/4	619948	8183360	270	*E. microtheca/ Casuarina* woodland
Quadrat	MR7	3/4	621221	8181623	272	Hill woodland – between McArthur and Glyde River
Quadrat	MR8	3/4	622723	8180676	274	Sandstone habitat - between McArthur and Glyde River
Quadrat	MR9	7/4	618728	8180703	276	*E. tectifica/E. chlorophylla* lowland
Quadrat	MR10	7/4	617039	8181778	279	McArthur River riverine habitat, start of diversion area
Quadrat	MR11	7/4	617198	8180751	280	Floodplain area – Bauhinia woodland
Quadrat	MR12	3/4	616348	8179414	281	*E. microtheca* open woodland. Tailings dam area
Quadrat	MR13	3/4	612855	8183156	295	*E. chlorophylla* open woodland. Tailings dam area
Quadrat	MR14	3/4	612200	8183519	296	*E. chlorophylla* open woodland Tailings dam area
Quadrat	MR15	24/2	612154	8184010	297	Eucalypt woodland. Tailings dam area
Quadrat	MR16	24/2	612987	8185426	298	*C. terminalis* woodland. Tailings dam area
Quadrat	MR17	24/2	615969	8185586	301	**Fauna Site Waste Rock 1.** Waste rock disposal area
Quadrat	MR18	24/2	617579	8185323	302	**Fauna Site Waste Rock 2.** *E. microtheca* open woodland
Quadrat	MR19	7/4	616724	8183459	309	Barney Creek (within diversion area)
Quadrat	MR20	7/4	618748	8185128	310	*Bauhinia/Atalaya* very low open woodland
Quadrat	MR21	7/4	617301	8187520	315	*E. grandifolia* woodland
Quadrat	MR22	7/4	613297	8180762	342	*E. bella* open woodland
50m Transect	T9	2/4	619750	8183700	276	Riverbank – McArthur River (diversion area)
50m Transect	T10	3/4	617039	8181778	279	Riverbank – McArthur River (diversion area)
50m Transect	T11	7/4	616724	8183459	309	Riverbank – Barney Creek (within diversion area)

[#.] Figure 13.1

Table of Vegetation Sampling Locations – Glyde River

Flora Sampling Site	Site No.*	Date 2003	Eastings WGS 84	Northings WGS 84	Wpt	Notes
Quadrat	GR1	20/2	0626709	8163332	191	Sandstone plateau habitat – Glyde River Transect site (T1)
Quadrat	GR2	21/2	0627040	8177027	192	Riverbank – East Branch Riverine Transect site (T2)
Quadrat	GR3	21/2	0624631	8177151	195	**Fauna Site #1** – 'Radiator Rock', Riverbank – Glyde River Riverine Transect site (T3)
Quadrat	GR4	21/2	0624807	8177201	196	Sandstone slope habitat
Quadrat	GR5	22/2	0626191	8173486	199	Sandstone plateau habitat
Quadrat	GR6	22/2	0627209	8173455	201	Sandstone plateau habitat
Quadrat	GR7	22/2	0627071	8173818	202	Narrow secondary tributary creek – wet chasm
Quadrat	GR8	22/2	0626341	8173834	206	Tributary creek – eastern side of Glyde Riverine Transect site (T4)
Quadrat	GR9	22/2	0626072	8173699	-	**Fauna Site #2** - Riverine transect site (T5). Confluence of Glyde & eastern side creek
Quadrat	GR10	22/2	0625731	8173126	207	Riverbank – Glyde River (west branch)
Quadrat	GR11	23/2	0626321	8163877	210	Sandstone plateau habitat
Quadrat – **Monitoring plot**	GR12	23/2	0626134	8163778	211	Glyde River – upstream control site, upper flood limit
Quadrat – **Monitoring plot**	GR13	23/2	0626127	8163845	212	Glyde River – upstream control site, upper flood limit
Quadrat – **Monitoring plot**	GR14	23/2	0626203	8163760	215	Glyde River – upstream control site, upper flood limit
Quadrat	GR15	23/2	0626006	8172783	217	Riverbank – Glyde River, west branch
Quadrat	GR16	23/2	0626012	8172942	220	Overflow channel – Glyde River
Quadrat	GR17	24/2	0628617	8174539	223	Sandstone habitat – East Branch
Quadrat	GR18	24/2	0628390	8174379	224	Riverbank – East Branch
Quadrat	GR19	24/2	0628534	8174670	225	Riverbank – East Branch
Quadrat	GR20	24/2	0628696	8174746	228	Riverbank – East Branch Riverine transect site
Quadrat	GR21	24/2	0628692	8174747	231	Glyde River. Proposed dam site
Quadrat – **Monitoring plot**	GR22	24/2	0623848	8180789	232	Glyde River – downstream impact site
Quadrat – **Monitoring plot**	GR23	24/2	0623803	8180835	235	Glyde River – downstream impact site
Quadrat - **Monitoring plot**	GR24	24/2	0623764	8180874	237	Glyde River – downstream impact site
Quadrat	GR25	25/2	0625551	8173273	239	**Fauna Site #2** - Riverine transect site (western side)
Quadrat	GR26	25/2	0625365	8173299	242	Riverbank – tributary on eastern side of Glyde
Quadrat	GR27	25/2	0625066	8172721	246	Sandstone habitat - eastern side of Glyde
Quadrat	GR28	25/2	0628980	8174090	-	Riverbank – East Branch
50m Transect	T1	20/2	0626712	8163337	191	Glyde River – Upstream location
50m Transect	T2	21/2	0627033	8177037	192	Riverbank – East Branch
50m Transect	T3	21/2	0624635	8177123	194	Riverbank – Glyde River
50m Transect	T4	22/3	0626341	8173834	206	Tributary creek – eastern side of Glyde, GR8
50m Transect	T5	22/3	0626072	8173699	-	Slightly downstream of GR9
50m Transect	T6	24/2	0628696	8174746	228	Riverbank – East Branch at GR20
50m Transect	T7	25/2	0625551	8173273	239	Riverbank – Western Tributary creek at GR25
50m Transect	T8	25/2	0628744	8174684	247	Riverbank – East Branch

* Figure 13.2

Appendix H.2

Plant Species List

Appendix H.2
Flora

Plant species recorded during field surveys of the McArthur and Glyde River project area from 20 February to 8 April 2003, listed according to Dunlop et al. (2003).

A annual
P perennial

Tr tree
Sh shrub
Aq aquatic
Fo forb
Fe fern
Vn vine

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ne -not evaluated
upper case -endemic
dd - data deficient
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Plant Species - McArthur River Mine Project Area						Vegetation Community							
						1	2	3	4	5	6	7	8
Family	**Species**	**Weed**	**Perennial/ Annual**	**Lifeform**	**Conservation Status**	**Sandstone plateau**	**Hill woodland**	**Vine thicket**	**Inland bloodwood**	**Bauhinia/ Atalaya**	**Corymbia bella w'land**	**Riverine woodland**	**Riverine corridor**
ACANTHACEAE	Dicliptera sp.		A	Fo	-	*							*
ACANTHACEAE	Hygrophila angustifolia		A	Fo	lc								*
ACANTHACEAE	Nelsonia campestris		A	Fo	lc			*				*	*
ACANTHACEAE	Rostellularia adscendens subsp. indeterminate		A	Fo	lc					*		*	*
ADIANTACEAE	Cheilanthes brownii		P	Fe	lc	*		*					
ADIANTACEAE	Cheilanthes contigua		P	Fe	lc		*						
AIZOACEAE	Trianthema portulacastrum	X	A	Fo	lc			*					*
AMARANTHACEAE	Achyranthes aspera		A	Fo	lc					*			*
AMARANTHACEAE	Alternanthera denticulata		A	Fo	lc			*					*
AMARANTHACEAE	Alternanthera nana		A	Fo	lc				*				
AMARANTHACEAE	Alternanthera nodiflora		A	Fo	lc							*	*
AMARANTHACEAE	Amaranthus pallidiflorus		A	Fo	lc								*
AMARANTHACEAE	Gomphrena flaccida		A	Fo	lc	*							
AMARANTHACEAE	Gomphrena floribunda		A	Fo	NE			*					
AMARANTHACEAE	Gomphrena lanata		A	Fo	lc	*							

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AMARANTHACEAE	Ptilotus corymbosus var. indeterminate		A	Fo	lc		*		*				
AMARANTHACEAE	Ptilotus fusiformis var. indeterminate		P	Fo	lc				*				
AMARANTHACEAE	Ptilotus polystachyus var. indeterminate		A	Fo	lc	*							
AMARANTHACEAE	Ptilotus spicatus subsp. indeterminate		A	Fo	lc					*			
ANACARDIACEAE	Buchanania obovata		P	Tr	lc	*		*					
APIACEAE	Trachymene sp.		P	Fo	-			*					
APOCYNACEAE	Carissa lanceolata		P	Sh	lc				*	*	*		
APONOGETONACEAE	Aponogeton vanbruggenii		P	Aq	lc								*
ASCLEPIADACEAE	Gymnanthera oblonga		P	Vn	lc								*
ASCLEPIADACEAE	Sarcostemma viminale subsp. indeterminate		P	Fo	lc			*					
ASCLEPIADACEAE	Tylophora flexuosa		P	Vn	lc			*					
ASTERACEAE	Bidens bipinnata	X	A	Fo	lc		*			*			
ASTERACEAE	Blumea saxatilis		A	Fo	lc			*					
ASTERACEAE	Pterocaulon sphacelatum		A	Fo	lc		*		*				
ASTERACEAE	undetd sp.		A	Fo	-	*							

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ASTERACEAE	Xanthium strumarium	X	A	Sh	lc			*		*		*	*
BIGNONIACEAE	Dolichandrone heterophylla		P	Tr	lc				*				
BIXACEAE	Cochlospermum fraseri subsp. indeterminate		P	Sh	lc		*						
BIXACEAE	Cochlospermum gillivraei		P	Sh	lc		*						
BIXACEAE	Cochlospermum gregorii		P	Sh	lc	*		*	*				
BORAGINACEAE	Ehretia saligna var. indeterminate		P	Sh	lc		*			*			
BORAGINACEAE	Heliotropium indicum	X	A	Fo	lc							*	*
BORAGINACEAE	Heliotropium sp.		A	Fo	-	*							
BORAGINACEAE	Heliotropium tenuifolium		A	Fo	lc						*		
BORAGINACEAE	Trichodesma zeylanicum var. indeterminate		P	Fo	lc				*	*			
BYBLIDACEAE	Byblis liniflora		A	Fo	lc	*							
CAESALPINIACEAE	Bauhinia cunninghamii		P	Tr	lc		*		*	*	*		
CAESALPINIACEAE	Chamaecrista absus var. absus		A	Fo	lc		*						
CAESALPINIACEAE	Erythrophleum chlorostachys		P	Tr	lc		*		*				
CAESALPINIACEAE	Parkinsonia aculeata	X	P	Sh	lc								*

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CAESALPINIACEAE	Senna venusta		A	Fo	lc	*		*					
CAPPARACEAE	Capparis lasiantha		P	Vn	lc					*			
CAPPARACEAE	Cleome cleomoides		P	Fo	lc			*					
CAPPARACEAE	Cleome microaustralica		A	Fo	LC	*		*	*				
CAPPARACEAE	Cleome viscosa		A	Fo	lc		*						
CARYOPHYLLACEAE	Polycarpaea corymbosa var. indeterminate		A	Fo	lc				*				*
CARYOPHYLLACEAE	Polycarpaea spirostylis		A	Fo	lc	*							
CASUARINACEAE	Casuarina cunninghamiana subsp. miodon		P	Tr	lc							*	*
CELASTRACEAE	Maytenus cunninghamii		P	Tr	lc				*				
CHARACEAE	Chara sp.		A	Aq	-								*
COMBRETACEAE	Terminalia bursarina		P	Tr	lc							*	*
COMBRETACEAE	Terminalia canescens		P	Sh	lc		*		*				
COMBRETACEAE	Terminalia platyphylla		P	Tr	lc								*
COMBRETACEAE	Terminalia volucris		P	Sh	lc				*		*		*
COMMELINACEAE	Commelina ciliata		A	Fo	lc					*			

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COMMELINACEAE	Commelina ensifolia		A	Fo	lc	*	*						
COMMELINACEAE	Murdannia graminea		P	Fo	lc				*				
CONVOLVULACEAE	Bonamia pannosa		A	Fo	lc	*		*	*				
CONVOLVULACEAE	Evolvulus alsinoides var. indeterminate		A	Fo	lc		*		*				
CONVOLVULACEAE	Ipomoea coptica		P	Vn	lc					*			
CONVOLVULACEAE	Ipomoea eriocarpa		P	Vn	lc				*				
CONVOLVULACEAE	Ipomoea polymorpha		P	Vn	lc	*			*				
CONVOLVULACEAE	Ipomoea sp.		P	Vn	-								*
CONVOLVULACEAE	Operculina aequisepala		P	Vn	lc					*			*
CONVOLVULACEAE	Polymeria ambigua		P	Fo	lc				*				
CONVOLVULACEAE	Polymeria longifolia		P	Fo	lc					*			
CONVOLVULACEAE	Xenostegia tridentata		P	Vn	lc	*	*		*				
CUCURBITACEAE	Cucumis melo		A	Vn	lc			*					
CUCURBITACEAE	Cucumis melo subsp. indeterminate		A	Vn	lc		*		*			*	*
CUCURBITACEAE	Trichosanthes cucumerina		A	Vn	lc			*					

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CYPERACEAE	Bulbostylis barbata		A	Se	lc	*	*	*	*				*
CYPERACEAE	Cyperus castaneus		A	Se	lc	*							
CYPERACEAE	Cyperus cuspidatus		A	Se	lc	*		*					
CYPERACEAE	Cyperus difformis		A	Se	lc			*					
CYPERACEAE	Cyperus iria		A	Se	lc								*
CYPERACEAE	Cyperus microcephalus subsp. saxicola		P	Se	lc	*							
CYPERACEAE	Cyperus portae-tartari		A	Se	lc			*					
CYPERACEAE	Cyperus pulchellus		A	Se	lc	*		*					
CYPERACEAE	Cyperus sp.		A	Se	-			*		*		*	
CYPERACEAE	Cyperus squarrosus		P	Se	lc	*		*					
CYPERACEAE	Fimbristylis depauperata		A	Se	lc			*					
CYPERACEAE	Fimbristylis littoralis		A	Se	lc			*					
CYPERACEAE	Fimbristylis rupestris		A	Se	lc		*						
CYPERACEAE	Fimbristylis sp.		A	Se	-	*							*
CYPERACEAE	Fimbristylis sphaerocephala		A	Se	lc	*		*					

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CYPERACEAE	Fimbristylis trigastrocarya		A	Se	lc	*							
CYPERACEAE	Fuirena ciliaris		A	Se	lc						*		
CYPERACEAE	Rhynchospora exserta		A	Se	lc						*		
CYPERACEAE	Scleria sp.		A	Se	-	*							
CYPERACEAE	undetd sp.		A	Se	-								*
DAVALLIACEAE	Nephrolepis arida		P	Fe	dd			*					
DILLENIACEAE	Hibbertia lepidota		P	Fo	lc	*							
DROSERACEAE	Byblis liniflora		A	Fo	lc	*		*					
ERIOCAULACEAE	Eriocaulon patericola		A	Aq	lc	*							
ERYTHROXYLACEAE	Erythroxylum ellipticum		P	Tr	lc				*				
EUPHORBIACEAE	Antidesma ghesaembilla		P	Sh	lc			*	*				*
EUPHORBIACEAE	Antidesma parvifolium		P	Sh	lc			*					*
EUPHORBIACEAE	Breynia cernua		P	Tr	lc			*					*
EUPHORBIACEAE	Euphorbia armstrongiana		A	Fo	LC	*		*					
EUPHORBIACEAE	Euphorbia mitchelliana		A	Fo	LC				*				

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EUPHORBIACEAE	Euphorbia schultzii		A	Fo	lc	*			*				
EUPHORBIACEAE	Euphorbia tannensis subsp. eremophila		A	Fo	lc	*							
EUPHORBIACEAE	Euphorbia vachellii		A	Fo	lc		*					*	*
EUPHORBIACEAE	Excoecaria parvifolia		P	Sh	lc				*	*		*	
EUPHORBIACEAE	Flueggea virosa subsp. melanthesoides		P	Sh	lc		*	*	*	*			*
EUPHORBIACEAE	Leptopus decaisnei		A	Fo	lc		*						
EUPHORBIACEAE	Mallotus nesophilus		P	Sh	lc		*						
EUPHORBIACEAE	Petalostigma pubescens		P	Sh	lc				*				
EUPHORBIACEAE	Phyllanthus carpentariae		A	Fo	lc	*		*					
EUPHORBIACEAE	Phyllanthus maderaspatensis var. angustifolius		A	Fo	lc					*		*	*
EUPHORBIACEAE	Phyllanthus minutiflorus		A	Fo	lc			*					
EUPHORBIACEAE	Phyllanthus reticulatus		P	Sh	lc								*
EUPHORBIACEAE	Sauropus rigidulus		P	Sh	LC	*							
EUPHORBIACEAE	Sauropus sp.		A	Fo	-				*				
FABACEAE	Aeschynomene indica		A	Sh	lc					*			

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FABACEAE	Alysicarpus muelleri		A	Fo	lc					*			
FABACEAE	Cajanus scarabaeoides var. indeterminate		P	Vn	lc	*		*	*	*			
FABACEAE	Cajanus sp.		A	Vn	-	*	*						
FABACEAE	Clitoria ternatea	X	P	Vn	lc					*			
FABACEAE	Crotalaria medicaginea		A	Fo	lc		*						
FABACEAE	Crotalaria montana		A	Fo	lc		*		*	*			
FABACEAE	Desmodium filiforme		A	Fo	lc			*					*
FABACEAE	Desmodium trichostachyum		A	Fo	lc	*							
FABACEAE	Flemingia pauciflora		P	Fo	lc					*	*		
FABACEAE	Galactia tenuiflora		P	Vn	lc		*		*				
FABACEAE	Indigofera colutea		A	Fo	lc	*	*		*				
FABACEAE	Indigofera haplophylla		A	Fo	lc	*							
FABACEAE	Indigofera hirsuta		A	Fo	lc				*				
FABACEAE	Indigofera linifolia		A	Fo	lc		*		*				
FABACEAE	Jacksonia dilatata		P	Sh	lc	*							

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Family	**Species**	**Weed**	**Perennial/ Annual**	**Lifeform**	**Conservation Status**	**Sandstone plateau**	**Hill woodland**	**Vine thicket**	**Inland bloodwood**	**Bauhinia/ Atalaya**	**Corymbia bella w'land**	**Riverine woodland**	**Riverine corridor**
FABACEAE	Jacksonia vernicosa		P	Sh	lc	*							
FABACEAE	Leptosema villosum		A	Fo	LC	*							
FABACEAE	Rhynchosia minima		P	Vn	lc				*	*			
FABACEAE	Rothia indica subsp. australis		A	Fo	DD								*
FABACEAE	Sesbania brachycarpa		A	Sh	lc					*			
FABACEAE	Stylosanthes hamata	X	P	Fo	lc				*				
FABACEAE	Templetonia hookeri		P	Sh	lc	*							
FABACEAE	Tephrosia brachyodon var. indeterminate		A	Sh	lc				*				
FABACEAE	Tephrosia conspicua		A	Sh	lc	*							
FABACEAE	Tephrosia D78772 Pentecost River		A	Sh	lc	*							
FABACEAE	Tephrosia leptoclada		P	Fo	lc		*						
FABACEAE	Tephrosia spechtii		A	Sh	lc	*		*					
FABACEAE	Uraria lagopodioides		A	Fo	lc		*						
FABACEAE	Vigna radiata var. sublobata		A	Vn	lc				*	*			
FABACEAE	Zornia muriculata subsp. angustata		A	Fo	lc		*						

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FABACEAE	Zornia prostrata var. indeterminate		A	Fo	lc	*							
GOODENIACEAE	Goodenia janamba		A	Fo	lc				*		*		
GOODENIACEAE	Goodenia pilosa		A	Fo	lc	*							
GOODENIACEAE	Scaevola revoluta subsp. revoluta		P	Sh	ne	*							
HAEMODORACEAE	Haemodorum sp.		P	Fo	-	*							
HALORAGACEAE	Gonocarpus leptothecus		A	Fo	lc	*							
HALORAGACEAE	Myriophyllum callitrichoides subsp. callitrichoides		A	Aq	lc	*							
HYDROCHARITACEAE	Blyxa sp.		A	Aq	-								*
LAMIACEAE	Basilicum polystachyon		A	Fo	lc								*
LAMIACEAE	Hyptis suaveolens	X	A	Fo	lc								*
LAURACEAE	Cassytha capillaris		P	Vn	lc	*							
LECYTHIDACEAE	Barringtonia acutangula subsp. acutangula		P	Sh	lc								*
LECYTHIDACEAE	Planchonia careya		P	Sh	lc				*				
LILIACEAE	Iphigenia indica		P	Fo	lc	*							
LOGANIACEAE	Mitrasacme connata		A	Fo	lc		*						

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LOGANIACEAE	Mitrasacme glaucescens		A	Fo	LC	*							
LOGANIACEAE	Mitrasacme scrithicola		A	Fo	lc			*					
LOGANIACEAE	Strychnos lucida		P	Sh	lc			*					*
LORANTHACEAE	Amyema bifurcata var. indeterminate		P	Ep	lc				*				
LYGODIACEAE	Lygodium microphyllum		P	Fe	lc			*					
LYTHRACEAE	Ammannia multiflora		A	Fo	lc			*		*		*	*
MALVACEAE	Abelmoschus ficulneus		A	Fo	lc					*			
MALVACEAE	Abutilon andrewsianum		A	Fo	lc		*		*	*			
MALVACEAE	Gossypium australe		P	Sh	lc				*				
MALVACEAE	Hibiscus leptocladus		A	Sh	lc	*							
MALVACEAE	Hibiscus meraukensis		A	Sh	lc		*						
MALVACEAE	Hibiscus panduriformis var. indeterminate		A	Sh	lc							*	
MALVACEAE	Hibiscus setulosus		A	Sh	ne	*		*					
MALVACEAE	Hibiscus zonatus		A	Sh	lc	*		*					
MALVACEAE	Sida sp.		A	Fo	lc	*							

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MALVACEAE	Sida spinosa		A	Fo	lc		*		*	*		*	
MELIACEAE	Owenia vernicosa		P	Tr	lc	*	*	*					
MENISPERMACEAE	Tinospora smilacina		P	Vn	lc			*					
MENYANTHACEAE	Nymphoides crenata		P	Aq	lc							*	
MIMOSACEAE	Acacia alleniana		P	Sh	lc	*		*					
MIMOSACEAE	Acacia colei		P	Sh	lc				*				
MIMOSACEAE	Acacia drepanocarpa subsp. drepanocarpa		P	Sh	lc	*		*					*
MIMOSACEAE	Acacia farnesiana		P	Sh	lc					*			
MIMOSACEAE	Acacia gonoclada		P	Sh	lc				*				
MIMOSACEAE	Acacia hammondii		P	Sh	lc	*							
MIMOSACEAE	Acacia latescens		P	Sh	lc	*		*					
MIMOSACEAE	Acacia latifolia		P	Sh	lc	*							
MIMOSACEAE	Acacia monticola		P	Sh	lc	*		*					
MIMOSACEAE	Acacia orthocarpa		P	Sh	lc	*							
MIMOSACEAE	Acacia platycarpa		P	Sh	lc	*		*					

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MIMOSACEAE	Acacia plectocarpa subsp. tanumbirinensis		P	Sh	lc			*					
MIMOSACEAE	Acacia sp.		P	Sh	-	*							
MIMOSACEAE	Acacia torulosa		P	Sh	lc	*		*					
MIMOSACEAE	Neptunia dimorphantha		P	Fo	lc				*	*			
MIMOSACEAE	Neptunia major		P	Fo	lc						*		
MORACEAE	Ficus aculeata var. aculeata		P	Sh	ne			*					*
MORACEAE	Ficus carpentariensis		P	Sh	ne	*		*					*
MORACEAE	Ficus cerasicarpa		P	Sh	lc	*		*					*
MORACEAE	Ficus coronulata		P	Sh	lc								*
MORACEAE	Ficus racemosa var. racemosa		P	Tr	lc								*
MORACEAE	Ficus subpuberula		P	Tr	lc			*					
MORACEAE	Ficus virens var. indeterminate		P	Tr	lc			*					
MYRTACEAE	Calytrix brownii		P	Sh	lc	*		*					
MYRTACEAE	Calytrix exstipulata		P	Sh	lc	*		*	*				
MYRTACEAE	Corymbia aspera		P	Tr	lc	*		*					

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MYRTACEAE	Corymbia bella		P	Tr	lc						*		*
MYRTACEAE	Corymbia capricornia		P	Tr	lc	*	*						
MYRTACEAE	Corymbia confertiflora		P	Tr	lc				*				
MYRTACEAE	Corymbia grandifolia subsp. indeterminate		P	Tr	lc				*				
MYRTACEAE	Corymbia terminalis		P	Tr	lc				*		*		
MYRTACEAE	Eucalyptus camaldulensis subsp. indeterminate		P	Tr	lc							*	*
MYRTACEAE	Eucalyptus chlorophylla		P	Tr	lc				*				
MYRTACEAE	Eucalyptus herbertiana		P	Tr	lc	*		*					
MYRTACEAE	Eucalyptus leucophloia subsp. euroa		P	Tr	lc		*						
MYRTACEAE	Eucalyptus microtheca var. microtheca		P	Tr	lc					*		*	*
MYRTACEAE	Eucalyptus miniata		P	Tr	lc	*							
MYRTACEAE	Eucalyptus phoenicea		P	Tr	lc	*	*						
MYRTACEAE	Eucalyptus tectifica		P	Tr	lc				*				
MYRTACEAE	Lithomyrtus hypoleuca		P	Sh	lc	*							
MYRTACEAE	Lophostemon grandiflorus subsp. indeterminate		P	Tr	lc							*	*

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MYRTACEAE	Melaleuca argentea		P	Tr	lc								*
MYRTACEAE	Melaleuca bracteata		P	Tr	lc				*				
MYRTACEAE	Melaleuca citrolens		P	Sh	lc				*				
MYRTACEAE	Melaleuca leucadendra		P	Tr	lc								*
MYRTACEAE	Melaleuca viridiflora		P	Tr	lc	*			*				
MYRTACEAE	Syzygium eucalyptoides subsp. eucalyptoides		P	Tr	lc								*
NAJADACEAE	Najas sp.				-								*
NO FAMILY	Herb sp.		A	Fo	-							*	*
NYCTAGINACEAE	Boerhavia schomburgkiana		A	Fo	lc			*				*	
NYMPHAEACEAE	Nymphaea sp.		P	Aq	-								*
OLEACEAE	Jasminum aemulum		P	Vn	lc			*					
OLEACEAE	Jasminum molle		P	Vn	lc				*				
ONAGRACEAE	Ludwigia octovalvis subsp. indeterminate		A	Fo	lc			*				*	*
ONAGRACEAE	Ludwigia perennis		A	Fo	lc			*		*		*	*
OPHIOGLOSSACEAE	Ophioglossum gramineum		A	Fe	nt	*							

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PANDANACEAE	Pandanus aquaticus		P	Tr	lc								*
PASSIFLORACEAE	Passiflora foetida	X	P	Vn	lc		*	*				*	*
PLUMBAGINACEAE	Plumbago zeylanica		P	Fo	lc		*			*			
POACEAE	Alloteropsis semialata		P	Gr	lc				*				
POACEAE	Aristida holathera var. indeterminate		A	Gr	lc				*				
POACEAE	Aristida latifolia		P	Gr	lc				*	*			
POACEAE	Astrebla elymoides		P	Gr	lc					*			
POACEAE	Astrebla lappacea		P	Gr	dd					*			
POACEAE	Astrebla squarrosa		P	Gr	lc					*			
POACEAE	Bothriochloa ewartiana		P	Gr	lc						*		
POACEAE	Brachyachne convergens		P	Gr	lc				*	*			
POACEAE	Chionachne hubbardiana	X	A	Gr	lc					*			
POACEAE	Chrysopogon elongatus		P	Gr	lc								*
POACEAE	Chrysopogon fallax		P	Gr	lc				*	*		*	
POACEAE	Cymbopogon procerus		P	Gr	lc		*						

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POACEAE	Dichanthium sericeum subsp. indeterminate		P	Gr	lc				*	*		*	
POACEAE	Digitaria bicornis	X	A	Gr	lc		*	*	*			*	*
POACEAE	Digitaria brownii		A	Gr	lc		*						
POACEAE	Echinochloa colona	X	A	Gr	lc			*				*	*
POACEAE	Ectrosia leporina		A	Gr	lc								*
POACEAE	Elytrophorus spicatus		A	Gr	lc				*				
POACEAE	Enneapogon decipiens		A	Gr	lc				*				
POACEAE	Eragrostis amabilis	X	A	Gr	lc								*
POACEAE	Eragrostis cumingii		A	Gr	lc			*	*			*	*
POACEAE	Eragrostis tenellula		A	Gr	lc			*	*	*		*	*
POACEAE	Eriachne avenacea		P	Gr	lc	*							
POACEAE	Eriachne ciliata		A	Gr	lc	*		*	*				
POACEAE	Eriachne obtusa		P	Gr	lc				*				
POACEAE	Eriachne pulchella subsp. dominii		A	Gr	lc				*				
POACEAE	Eriachne sp.		A	Gr	-	*							

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POACEAE	Eulalia aurea		P	Gr	lc		*		*	*	*		
POACEAE	Heteropogon contortus		P	Gr	lc		*		*				
POACEAE	Iseilema sp.		A	Gr	-				*	*	*		
POACEAE	Mnesithea formosa		A	Gr	lc		*		*				
POACEAE	Panicum decompositum var. indeterminate		P	Gr	lc				*	*			
POACEAE	Paspalidium jubiflorum		P	Gr	lc							*	*
POACEAE	Paspalidium rarum		A	Gr	lc	*			*				
POACEAE	Paspalum scrobiculatum		A	Gr	lc								*
POACEAE	Perotis rara		A	Gr	lc		*	*	*				
POACEAE	Schizachyrium D21454 wingless		A	Gr	lc	*							
POACEAE	Schizachyrium fragile		A	Gr	lc	*			*				
POACEAE	Sehima nervosum		P	Gr	lc				*	*			
POACEAE	Setaria apiculata		A	Gr	lc		*		*				
POACEAE	Sorghum timorense		A	Gr	lc						*		
POACEAE	Sporobolus australasicus		A	Gr	lc				*				

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POACEAE	Themeda triandra		P	Gr	lc				*				
POACEAE	Triodia affin. bynoei		P	Gr	ne	*							
POACEAE	Triodia bitextura		P	Gr	lc		*						
POACEAE	Triodia sp.		P	Gr	-	*		*					
POACEAE	undetd sp.		P	Gr	-								*
POACEAE	Urochloa pubigera		A	Gr	lc		*		*				
POACEAE	Urochloa reptans		A	Gr	lc					*		*	*
POACEAE	Urochloa subquadripara		A	Gr	lc		*						
POACEAE	Whiteochloa capillipes		A	Gr	lc							*	
POACEAE	Yakirra australiensis var. indeterminate		A	Gr	lc		*						
POACEAE	Yakirra pauciflora		A	Gr	lc				*				
POLYGALACEAE	Polygala arvensis		A	Fo	ne				*				
POLYGALACEAE	Polygala D19911 Top End		A	Fo	ne	*							
POLYGALACEAE	Polygala D25064 Mudginberri		A	Fo	lc		*		*				
POLYGALACEAE	Polygala exsquarrosa		A	Fo	lc	*	*						

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POLYGALACEAE	Polygala longifolia		A	Fo	lc				*				
POLYGALACEAE	Polygala rhinanthoides var. minor		A	Fo	lc				*	*			
PORTULACACEAE	Calandrinia quadrivalvis		A	Fo	lc	*							
PORTULACACEAE	Portulaca bicolor var. indeterminate		A	Fo	lc	*			*				
PORTULACACEAE	Portulaca oleracea		A	Fo	lc							*	*
PORTULACACEAE	Portulaca oligosperma		A	Fo	dd	*							
PORTULACACEAE	Portulaca pilosa	X	A	Fo	lc								*
PROTEACEAE	Grevillea decurrens		P	Sh	lc	*							
PROTEACEAE	Grevillea refracta subsp. indeterminate		P	Sh	lc	*							
PROTEACEAE	Grevillea refracta subsp. refracta		P	Sh	lc	*							
PROTEACEAE	Grevillea wickhamii subsp. aprica		P	Sh	lc	*							
PROTEACEAE	Hakea arborescens		P	Sh	lc				*				
RHAMNACEAE	Alphitonia excelsa		P	Tr	lc			*					
RUBIACEAE	Gardenia ewartii subsp. indeterminate		P	Sh	lc				*				
RUBIACEAE	Gardenia pyriformis subsp. indeterminate		P	Sh	lc			*					

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RUBIACEAE	Mitracarpus hirtus	X	A	Fo	lc							*	*
RUBIACEAE	Nauclea orientalis		P	Tr	lc								*
RUBIACEAE	Oldenlandia galioides		A	Fo	lc								*
RUBIACEAE	Oldenlandia mitrasacmoides subsp. indeterminate		A	Fo	lc	*	*						
RUBIACEAE	Oldenlandia sp.		A	Fo	-							*	
RUBIACEAE	Pavetta sp.		P	Sh	-			*					*
RUBIACEAE	Spermacoce A63546 lignosa		A	Fo	lc	*							
RUBIACEAE	Spermacoce dolichosperma		A	Fo	ne				*				
RUTACEAE	Boronia lanceolata		P	Sh	lc	*							
RUTACEAE	Boronia lanuginosa		P	Sh	lc	*							
SANTALACEAE	Santalum lanceolatum		P	Sh	lc			*					
SAPINDACEAE	Atalaya hemiglauca		P	Tr	lc				*	*			*
SAPINDACEAE	Distichostemon hispidulus var. indeterminate		P	Sh	lc	*							
SAPINDACEAE	Dodonaea physocarpa		P	Sh	lc				*				
SAPOTACEAE	Pouteria sericea		P	Tr	lc			*					*

Plant species recorded during field surveys of the McArthur and Glyde River project area from 20 February to 8 April 2003, listed according to Dunlop et al. (2003).

A annual
P perennial

Tr tree
Sh shrub
Aq aquatic
Fo forb
Fe fern
Vn vine

lc - least concern
ne -not evaluated
upper case -endemic
dd - data deficient
nt - near threatened

Plant Species - McArthur River Mine Project Area						Vegetation Community							
						1	2	3	4	5	6	7	8
Family	**Species**	**Weed**	**Perennial/ Annual**	**Lifeform**	**Conservation Status**	**Sandstone plateau**	**Hill woodland**	**Vine thicket**	**Inland bloodwood**	**Bauhinia/ Atalaya**	**Corymbia bella w'land**	**Riverine woodland**	**Riverine corridor**
SCROPHULARIACEAE	Adenosma muelleri		A	Fo	lc	*		*					
SCROPHULARIACEAE	Lindernia D46758 Open throated		A	Fo	ne	*							
SCROPHULARIACEAE	Lindernia lobelioides		A	Fo	lc	*							
SCROPHULARIACEAE	Peplidium sp.		A	Aq	ne	*							
SCROPHULARIACEAE	Scoparia dulcis	X	A	Fo	lc			*					
SCROPHULARIACEAE	Stemodia lythrifolia		A	Fo	lc	*		*					
SIMAROUBACEAE	Brucea javanica		P	Sh	lc			*					
SOLANACEAE	Physalis minima	X	A	Fo	lc		*	*				*	*
SOLANACEAE	Solanum echinatum		A	Fo	lc	*							
SOLANACEAE	Solanum sp.		A	Fo	-			*					
STACKHOUSIACEAE	Stackhousia intermedia		A	Fo	lc		*						
STERCULIACEAE	Brachychiton collinus		P	Tr	lc			*					
STERCULIACEAE	Brachychiton diversifolius subsp. diversifolius		P	Tr	lc				*				
STERCULIACEAE	Helicteres cana		P	Sh	lc				*				
STERCULIACEAE	Melhania oblongifolia		P	Fo	lc		*		*	*			

Plant species recorded during field surveys of the McArthur and Glyde River project area from 20 February to 8 April 2003, listed according to Dunlop et al. (2003).

A annual
P perennial

Tr tree
Sh shrub
Aq aquatic
Fo forb
Fe fern
Vn vine

lc - least concern
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Plant Species - McArthur River Mine Project Area						Vegetation Community							
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Family	**Species**	**Weed**	**Perennial/ Annual**	**Lifeform**	**Conservation Status**	**Sandstone plateau**	**Hill woodland**	**Vine thicket**	**Inland bloodwood**	**Bauhinia/ Atalaya**	**Corymbia bella w'land**	**Riverine woodland**	**Riverine corridor**
STERCULIACEAE	Melochia corchorifolia		A	Fo	lc					*		*	
STERCULIACEAE	Waltheria indica		P	Fo	lc				*				
TACCACEAE	Tacca leontopetaloides		P	Fo	lc	*		*					*
THELYPTERIDACEAE	Cyclosorus interruptus		P	Fe	lc			*					
THYMELAEACEAE	Thecanthes punicea		A	Fo	lc						*		
TILIACEAE	Corchorus aestuans		A	Fo	lc		*		*	*		*	*
TILIACEAE	Corchorus fascicularis		A	Fo	lc							*	
TILIACEAE	Corchorus olitorius	X	A	Fo	lc					*			
TILIACEAE	Corchorus pumilio		A	Fo	lc				*				
TILIACEAE	Corchorus sidoides subsp. Indeterminate		A	Fo	lc	*	*	*					
TILIACEAE	Grewia retusifolia		P	Sh	lc				*		*	*	
TILIACEAE	Triumfetta sp.		A	Fo	-								*
VERBENACEAE	Pityrodia angustisepala		P	Sh	LC	*							
VERBENACEAE	Pityrodia ternifolia		P	Sh	lc	*							
VERBENACEAE	Vitex glabrata		P	Tr	lc			*					*

Plant species recorded during field surveys of the McArthur and Glyde River project area from 20 February to 8 April 2003, listed according to Dunlop et al. (2003).

A annual
P perennial

Tr tree
Sh shrub
Aq aquatic
Fo forb
Fe fern
Vn vine

lc - least concern
ne -not evaluated
upper case -endemic
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Plant Species - McArthur River Mine Project Area						Vegetation Community							
						1	2	3	4	5	6	7	8
Family	**Species**	**Weed**	**Perennial/ Annual**	**Lifeform**	**Conservation Status**	**Sandstone plateau**	**Hill woodland**	**Vine thicket**	**Inland bloodwood**	**Bauhinia/ Atalaya**	**Corymbia bella w'land**	**Riverine woodland**	**Riverine corridor**
VIOLACEAE	Hybanthus enneaspermus		A	Fo	lc			*	*			*	*
VITACEAE	Cayratia trifolia		P	Vn	lc				*				*
VITACEAE	Cissus reniformis		P	Vn	lc	*							
ZYGOPHYLLACEAE	Tribulopis pentandra		A	Fo	lc		*		*				

Appendix H.3
Plant Communities

UPLAND COMMUNITIES

Map Unit No. 1 – Sandstone plateau

***Eucalyptus phoenicea/Corymbia capricornia* Open woodland**

This community occurs across the rugged sandstone plateau in the eastern section of the project area. Dominant tree species in the upper stratum include *Eucalyptus phoenicea, E. miniata,* and *Corymbia capricornia* (Appendix H.5 Photographs). Rocky terraces and sideslopes are characterised by scattered occurrences of *Eucalyptus aspera* and *Owenia vernicosa. Eucalyptus herberitana* and a range of *Acacia* species including *Acacia latescens, A. latifolia, A. platycarpa* and *A. monitcola* are also represented in the upper stratum in some areas.

Acacia species (including A. latescens, A. latifolia, A. platycarpa, A. monitcola, A. hammondii, and A. alleniana) were often common elements of the mid-stratum along with, Cochlospermum gregorii, Boronia lanceolata , Calytrix exstipulata, Tephrosia spp, Distichostemon hispidulus and Hibiscus zonatus

The ground stratum is often dominated by perennial spinifex grasses (*Triodia* spp.) but the overall composition of the ground layer varies enormously in response to local micro-topography and fire history. Common annual grasses in drier well-drained sites included *Erichne ciliata, E. avenaceae* and *Schizachyrium fragile*. The sedges around damp sandy depressions included *Bulbostylis barbata, Cyperus cuspidatus, C. pulchellus, C.squarrosa* and *Fimbristylis sphaerocephala*. The ground stratum also included a large variety of forbs including *Cleome microaustralica, Bonamia pannosa, Corchorus* spp. and *Sida spinosa*

Seasonally moist sand sheets were also habitat for a specialised suite of tiny ephemeral species including *Calandrinia quadrivalvis, Byblis liniflora, Zornia prostrata, Iphigenia indica, Desmodium trichostchyum* and *Ophioglossum gramineum* a near- threatened fern species. A diversity of forbs and sub-shrubs are also characteristic of these areas including species from the genera *Lindernia, Indigofera, Pityrodia, Heliotropium, Hibiscus* and *Oldenlandia* many of which are restricted to sandstone habitats (Appendix H.2 Plant Species List).

Calytrix exstipulata .and *Polycarpaea spirostylis* are species characteristic of exposed sandstone pavements and *Adenosma muelleri*, the fern *Cheilanthes brownii* and *Stemodia lythrifolia* were recorded from rock crevices and protected overhangs.

Map Unit No. 2 - Hill woodland

***Erythrophleum chlorostachys/Terminalia canescens* Low open Woodland**

Rocky slopes and hills including Mt Stubbs, Emu Hill and low, linear ranges in the south east of the project area typically support low woodland to low open woodland community with trees 2 to 6 m in height (Appendix H.5 Photographs). Ironwood (*Erythrophleum chlorostachys)* and *Terminalia canescens* are characteristic of this vegetation type with Kapok Tree *Cochlospermum fraseri* and *C. gillivraei* common low trees in rocky areas (Appendix H.4 Figure 13). The mid-stratum layer is typically absent or sparse and where present, often comprises mainly juvenile *Terminalia canescens.*

Ground layer grasses on rocky hills include *Triodia bitextura, Heteropogon contortus, Setaria apiculata* and *Mnesithea formosa* amongst a wide variety of herbaceous plants including species from the genera *Corchorus, Polygala, Abutilon* and *Crotalaria.* Several weed species were recorded within this habitat including *Bidens bipinnata, Passiflora foetida* and *Hyptis suaveolens.*

Map Unit No. 3 – Dry vine thicket

***Ficus* spp./ *Vitex glabrata/ Strychnos* Shrubland**

This community occurs as scattered, relatively small patches of species characteristic of monsoon vine-forest habitats. This community was the most diverse vegetation type with mean species richness of 25 (per 20m x 20m quadrat). The principal occurrences within the MRM project area are the fringes of riparian areas, particularly amongst boulders on protected slopes within the Glyde River gorge system (Appendix H.4 Figure 4) and associated with rocky outcrops within the McArthur River floodplain. Characteristic species include figs (*Ficus aculeata, F. cerasicarpa, F. carpentariensis* and *F. virens),* with *Pouteria sericea, Brachychiton collinus* and *Vitex glabrata* common low tree species (2 to 6m high). Typical shrub species include *Antidesma parvifolium, A. ghaesembilla, Breynia cernua, Pavetta* sp., *Alphitonia excelsa* and *Gardenia pyriformis.*

Abundant vines including Passiflora foetida, Tinospora smilacina, Cajanus scarabaeoides, Trichosanthes cucumerina and Xenostegia tridentata are also characteristic of this community. The yam, Tacca leontopetaloides and the ferns Cyclosorus interruptus, Nephrolepis arida and Lygodium microphyllum were recorded from within this vegetation type.

Map Unit No. 4 – Snappy Gum

***Eucalyptus leucophloia* low open woodland**

Although not sampled during this survey, low open woodland of *Eucalyptus leucophloia* (Snappy Gum) occurs on rocky slopes and foothills of the Bukalara range on the eastern boundary of the project area. This unit, sampled during two previous surveys, is largely restricted to sandy loam soils towards the Glyde River with minor pockets on low rises in the north of the survey area.

Scattered low shrubs may include *Terminalia canescens, Acacia umbellata* and *Maytenus ferdinandi.* Conkerberry *(Carissa lanceolata*), a spiny shrub, is the dominant mid-layer species (Duff and Orr 1992). Grasses characteristic of this habitat consist of *Heteropogon contortus, Chrysopogon fallax, Aristida* spp. and *Triodia* spp.

LOWLAND WOODLAND COMMUNITIES

Map Unit No. 5 – Inland Bloodwood

***Corymbia terminalis/Eucalyptus chlorophylla* Woodland to open woodland**

This grassy open woodland community is widely distributed within the western section of the MRM project area, occurring on clay loam soils on extensive flats and low rises. The tailings dam and associated facilities largely occurs within this community.

The upper stratum comprises mainly *Corymbia terminalis* (Inland Bloodwood) and *Eucalyptus chlorophylla* from 9-12 m high (Appendix H.5 Photographs). Dominance varies with local variations in soil type and drainage from *Corymbia terminalis* to *E. chlorophylla*, to co-dominance of the two species. Other sub-dominant canopy species included *Eucalyptus tectifica* and *Eucalyptus grandifolia* with occasional *E.confertiflora, Erythrophleum chlorostachys* and *Brachychiton diversifolius*.

The mid-stratum layer is typically very sparse with variable species composition. Low trees and shrubs recorded in this community include *Terminalia canescens, Petalostigma pubescens, Terminalia volucris, Flueggea virosa* and *Hakea arborescens* (Appendix H.4 Figure 12).

Ground cover was typically high (averaging 65%) with *Chrysopogon fallax* the dominant grass species. Other common perennial grasses included *Aristida holathera, Eulalia aurea* and *Sehima nervosum.* A total of 85 grass, forb and ground vine species were recorded within this vegetation type (mean community species richness of 15 per quadrat), reflecting the ground layer diversity in these savannah woodland assemblages. Appendix H.2 has a full listing of species recorded within this community.

Map Unit No. 6- Coolibah Woodland

***Bauhinia cunninghamii/Eucalyptus microtheca/Atalaya* Low open woodland to shrubland**

Extensive floodplains with cracking clays occur to the east and west of the McArthur River and support low open woodlands characterised by Coolibah (*Eucalyptus microtheca)* and *Bauhinia cunninghamii* (formerly known and *Lysiphyllum cunninghamii*). Mean tree height is 6m and dominance varies locally between *E. microtheca, Bauhinia cunninghamii* and *Atalaya hemiglauca* in response to subtle changes in soils and drainage (Appendix H.4 Figure 19).

Bauhinia is the most abundant species with mean cover values of 5.7% and 2.5% in the upper and mid-stratum layers respectively compared with *Eucalyptus microtheca* (3.7%) and *Atalaya hemiglauca* (1.3%). Whitewood (*Atalaya hemiglauca)* may be locally abundant to dominant in the mid to upper stratum. Tree species were generally relatively sparse and the only other upper stratum species recorded was Gutta Percha (*Excoecaria parvifolia)* which tends to form monospecific stands in blackwater swamps and local drainage depressions (Appendix H.4 Figure 21).

Needle Bush (*Acacia farnesiana)* is characteristic of this unit with other low shrubs including Conkerberry (*Carissa lanceolata), Flueggea virosa* and *Coonta (Ehretia saligna).* Areas of black soil grassland intergrade with shrubland and low open woodland in this community. The dominant grasses *(*Native Millet) *Panicum decompositum* and Silky Browntop (*Eulalia aurea)* both had an average of 6% cover in the ground layer with Queensland Bluegrass (*Dichanthium sericeum*) at 3.7%. Other grasses recorded in grassland areas included Flinders grass (*Iseilema* sp.*),* Feathertop (*Aristida latifolia)* and Curly Mitchell grass *(Astrebla lappacea).*

A wide variety of upright annual forbs occur in this floodplain vegetation unit including *Trichodesma zeylanicum, Sida spinosa, Sesbania brachycarpa* and *Abelmoschus ficulneus.* The latter two species may occur in very high densities (up to 7% cover). Together with perennial forbs including *Flemingia pauciflora* and *Polymeria longifolia* these plants may comprise a significant proportion of the ground layer. In the past this habitat has been heavily grazed within the MRM project area as evidenced by

severe erosion and dense infestations of several weed species including *Xanthium strumarium, Chionachne hubbardiana, Bidens bipinnata* and *Clitorea ternatea.*

Map Unit No. 7 – Ghost Gum Woodland

***Corymbia bella* Woodland to open woodland**

This distinctive community is found in the south western section of the survey area (Appendix H.4 Figure 14). The upper stratum comprises sparse Ghost Gum (*Corymbia bella)* to 10 m high with *Corymbia terminalis.* The mid-stratum layer is typically very sparse but where present usually inlcludes *Bauhinia cunninghamii,* Conkerberry (*Carissa lanceolata)* and Rosewood *(Terminalia volucris).*

Sorghum timorense is the dominant species in the ground layer (up to 50% cover) with *Bothriochloa ewartiana* and *Eulalia aurea* at around 10% cover. A diverse herb and forb layer occurs amongst the dense annual grasses including *Goodenia janamba, Heliotropium tenuifolium, Thecanthes punice, Neptunia major, Rhynchospora exserta, Flemingia pauciflora* and the sedge *Fuirena ciliaris.* This community is associated with the McArthur River floodplain and was the only community in which dense annual *Sorghum* was recorded.

RIVERINE COMMUNITIES

Map Unit No. 8- Riverine woodland

***Casuarina cunninghamii/Lophostemon grandiflorus* Woodland**

This variable woodland community is associated with the numerous drainage lines that transect the project area. It comprises broad, fringing woodland areas with *Casuarina cunninghamii* (to 13 m) and *Eucalyptus microtheca* (to 10 m) in woodland areas, overflow channels and on levees bordering the main channel of the McArthur River. This community also extends along Barney and Surprise Creeks (Figures 15, 16 and 20) where it occurs as relatively narrow, linear riverbank communities. Tree species characteristic of these ephemeral creek systems include *Eucalyptus camaldulensis*, *Terminalia bursarina, Excoecaria parvifolia* and *Lophostemon grandiflorus* (Appendix H.4 Figure 15).

The mid-stratum typically contains mainly juvenile canopy species with abundant *Terminalia bursarina.* In disturbed locations along the McArthur, the noxious weed Noogoora Burr (*Xanthium strumarium)* forms dense thickets over 2m high in Riverine Woodland (Appendix H.5, Photographs). Indeed, *Xanthium* was recorded at 70% cover to a height of 3 m at one site within the proposed river diversion area. Consequently this species may exclude the majority of other native species that may comprise the mid-and lower strata of vegetation.

Dominant grasses in riverine woodland include *Urochloa reptans,* Awnless Barnyard Grass (*Echinochloa colona,* an introduced species) and Delicate Lovegrass (*Eragrostis tenellula).* Other grasses recorded within riverine woodland habitat include Golden Beard Grass (*Chrysopogon fallax),* Warrego Grass *(Paspalidium jubiflorum)* and *Eragrostis cumingii.* Herb species typical of riverine woodland include *Ammannia multiflora, Hybanthus enneaspermus, Melochia corchorifolia,*

Boerhavia schomburgkiana, Alternanthera nodiflora and *Phyllanthus maderaspatensis.* Upright woody species include *Hibiscus panduriformis* and *Sida spinosa.*

Map Unit No. 9 – Riverine corridor

***Melaleuca argentea* Woodland to open woodland**

The primary channels of both the McArthur and Glyde River systems are characterised by a linear corridor of dense trees typically 12 to 23 m in height with *Melaleuca argentea* dominant throughout (Appendix H.5 Photographs). Overall, these main channels are characterised by just a few, widespread upper stratum species (*Melaleuca argentea, Lophostemon grandiflorus, Casuarina cunninghamii, Nauclea orientalis* and *Eucalyptus camaldulensis).* The mid-stratum is similarly species poor, with *Barringtonia acutangula* dominant and *Syzygium eucalyptoides* and *Pandanus aquaticus*. Indeed, the mean species richness (per quadrat) for this vegetation type was only 4, with a sample size of 20.

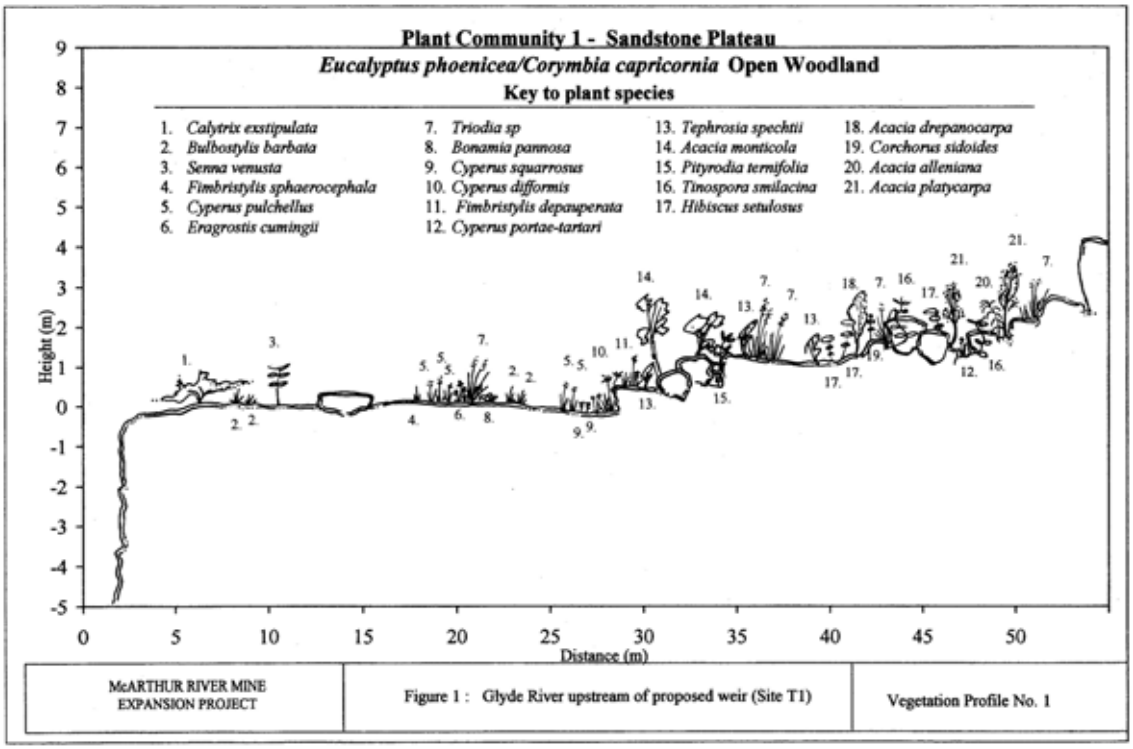
On the McArthur River, *Melaleuca argentea* was also the tallest and most common riparian species (Appendix H.4 Figure 18). However, this system supports a greater range of riparian species than the Glyde, with subdominant species including *Casuarina cunninghamii* and *Nauclea orientalis* and secondary trees including *Ficus racemosa, Melaleuca leucadendra, Corymbia bella, Terminalia platyphylla, Eucalyptus microtheca* and *Terminalia bursarina.* In contrast, these species were rarely found on the Glyde River and where tree species other than *Melaleuca argentea* did occur, (i.e. on the broader, rocky to sandy stream banks), they typically comprised *Eucalyptus camaldulenis, Lophostemon grandiflorus* and occasionally *Terminalia bursarina* (Appendix H.4 Figures 2 to 8).

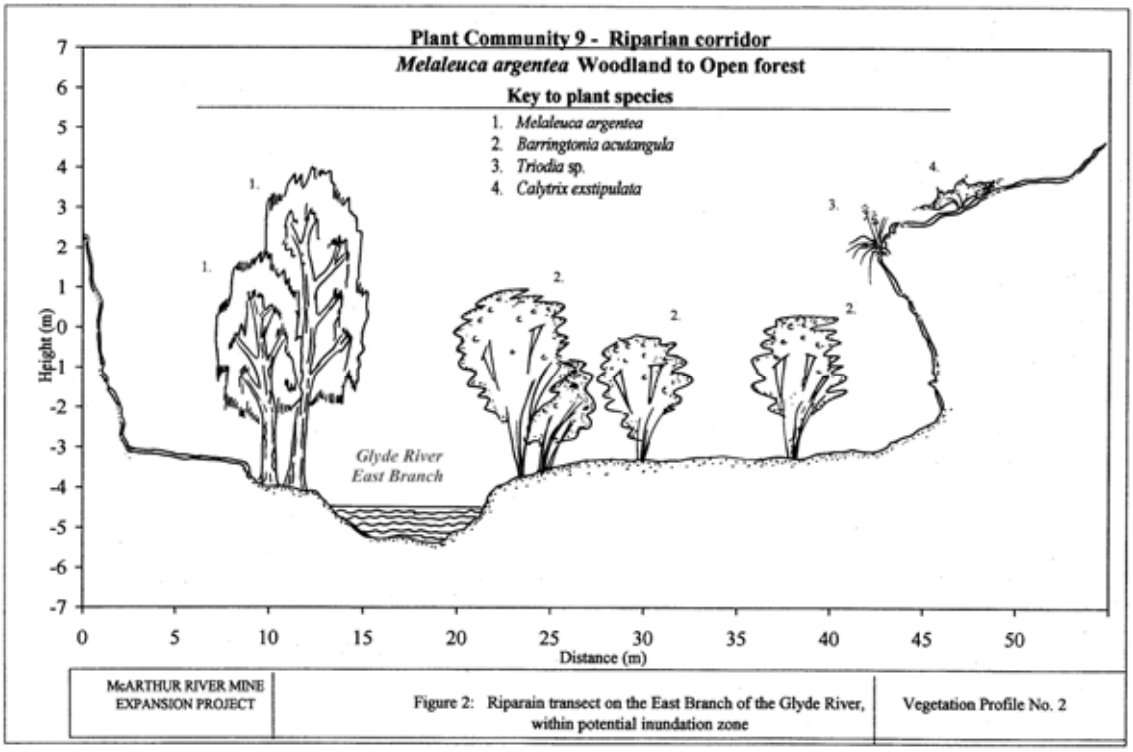
The riparian corridor is a dynamic environment subject to flood, drought, grazing, feral animals and periodic burning. Indeed, an intense rainfall event in January 2003 resulted in severe disturbance to this habitat. Major flooding had caused extensive damage to the riparian vegetation particularly within the Glyde River. Branch and bole damage was widespread with uprooting and death of trees also common. Other sections of the main channel had experienced heavy deposition of sand that had buried and killed entire sections of riparian vegetation. Extensive deposition was also evident in backwater areas associated with the small creek confluences. Consequently part of the usual riparian flora of the Glyde may have been absent at the time of the initial (February) survey and a second site visit was made in April especially to document regeneration and recolonisation of riparian species following scouring from wet season flooding.

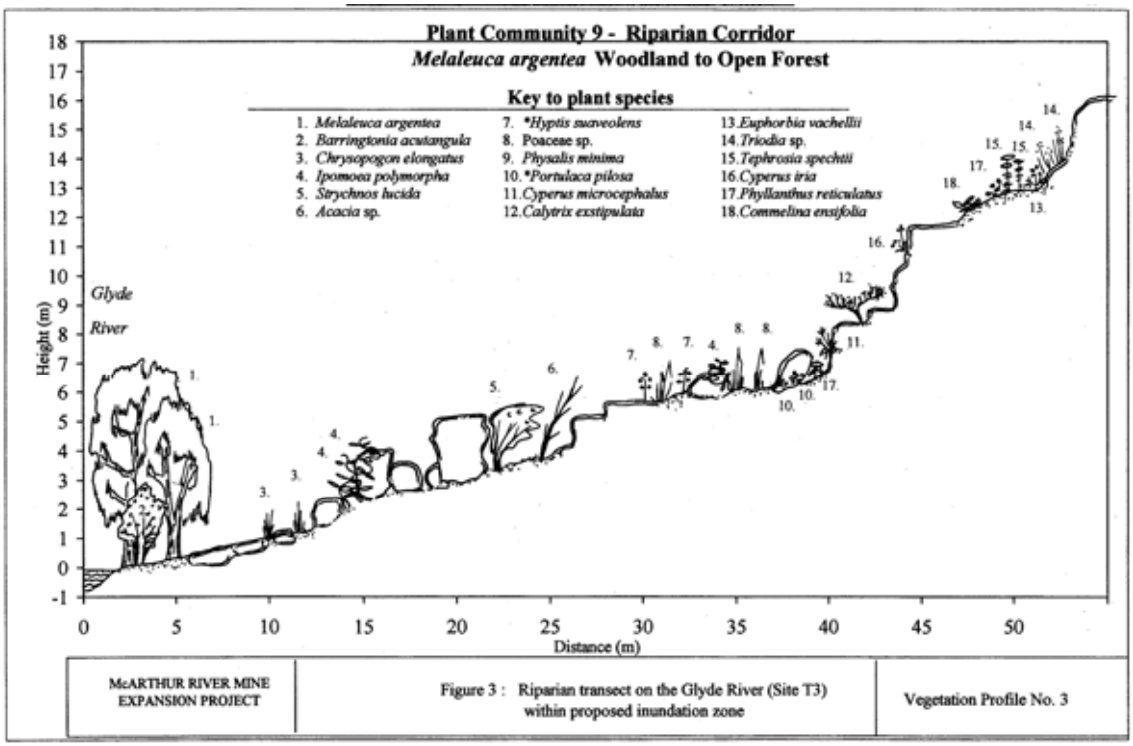
Overall, the riparian mid-stratum was dominated by the Freshwater Mangrove (*Barringtonia acutangula)* with sparse *Pandanus aquaticus* often growing within the river channel. Otherwise, immature canopy species typically comprised the mid-layer including young *Eucalyptus camaldulensis* and *Lophostemon grandiflorus. Ficus coronulata* was frequently recorded from both river systems with shrubs and low trees such as *Phyllanthus reticulatus, Syzygium eucalyptoides, Terminalia bursarina* and *Ficus carpentariensis.* The mid-stratum often comprised species characteristic of vine-forest associations, an assemblage that also favours the moist alluvial soils in riparian areas. The highest diversity and abundance of weeds was recorded from this community indicating high levels of disturbance.

Common grasses included *Urochloa reptans*, *Chrysopogon elongatus*, *Echinochloa colona*, *Paspalidium jubiflorum* and *Paspalum scrobiculatum.* Abundant herbs occur on the banks of both riverine corridors, many of which germinate from seeds washed in from upstream. For this reason, the management of weeds in this habitat is extremely difficult, particularly *Xanthium strumarium* which forms dense infestations along the McArthur River.

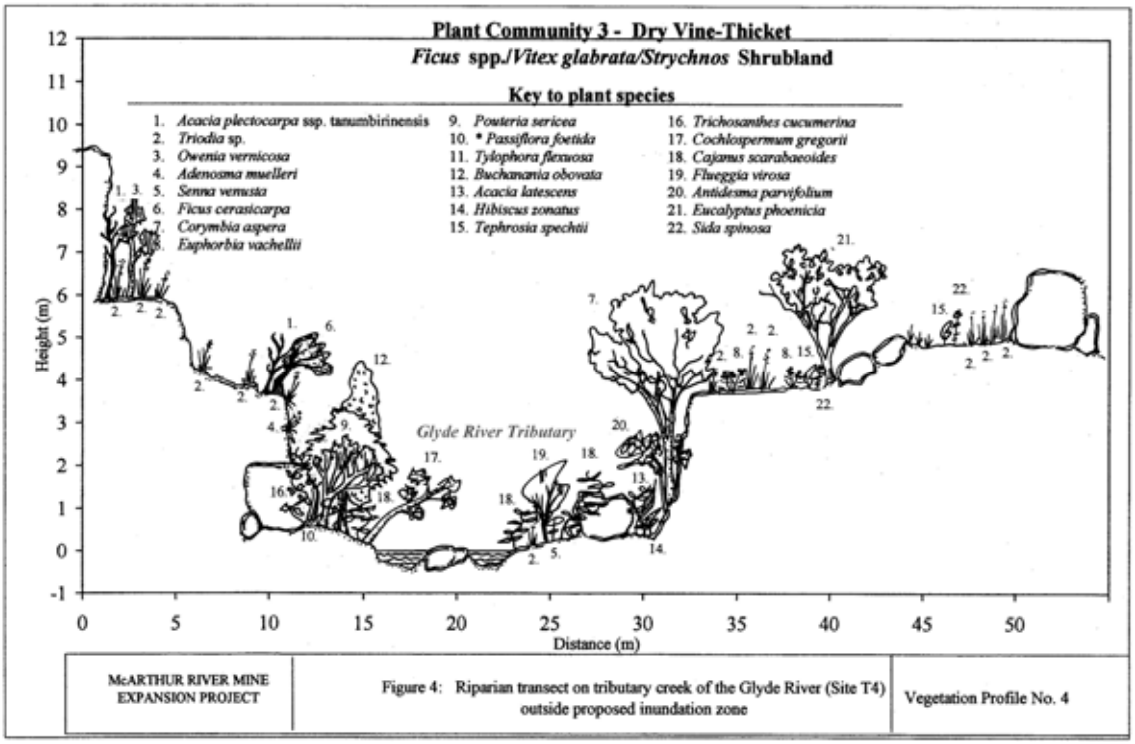
Appendix H.4
Profile Diagrams


Plant Community 1 - Sandstone Plateau
Eucalyptus phoenicea/Corymbia capricornia Open Woodland
Key to plant species
1. Calytrix exstipulata
2. Bulbostylis barbata
3. Senna venusta
4. Fimbristylis sphaerocephala
5. Cyperus pulchellus
6. Eragrostis cumingii
7. Triodia sp
8. Bonamia pannosa
9. Cyperus squarrosus
10. Cyperus difformis
11. Fimbristylis depauperata
12. Cyperus portae-tartari
13. Tephrosia specktii
14. Acacia monticola
15. Pityrodia termifolia
16. Tinospora smilacina
17. Hibiscus setulosus
18. Acacia drepanocarpa
19. Corchorus sidoides
20. Acacia alleniana
21. Acacia platycarpa
Height (m)
Distance (m)
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 1 : Glyde River upstream of proposed weir (Site T1)
Vegetation Profile No. 1

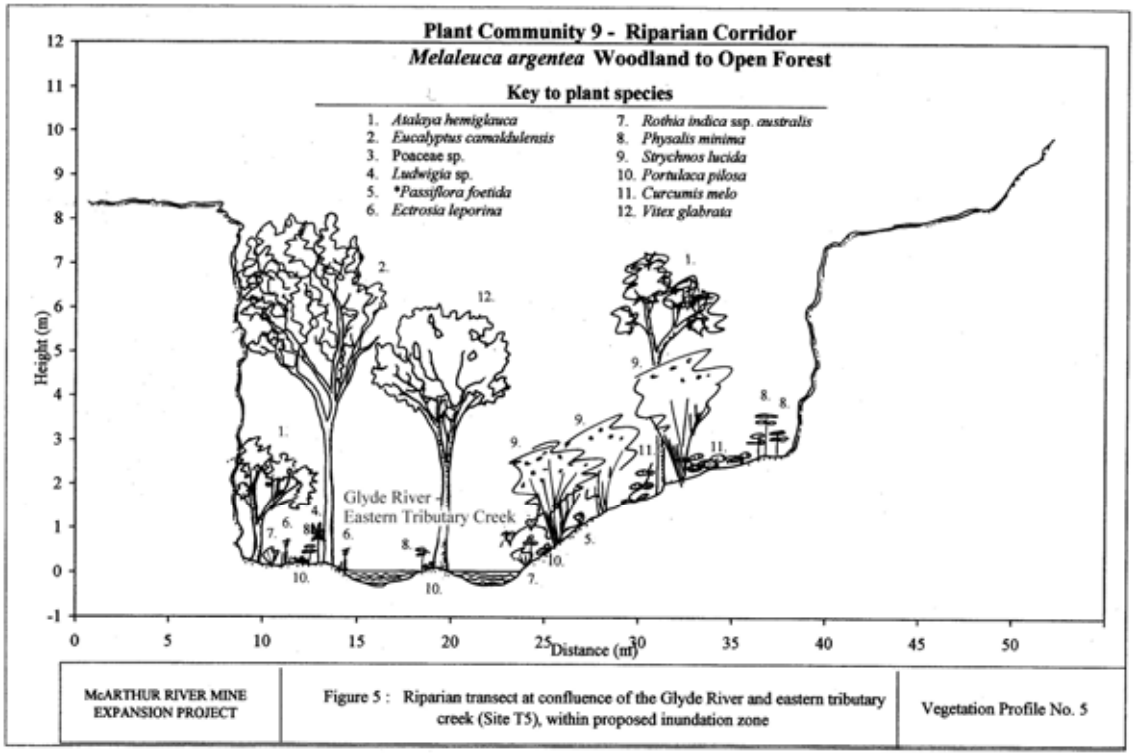

Plant Community 9 - Riparian corridor
Melaleuca argentea Woodland to Open forest
Key to plant species
1. Melaleuca argentea
2. Barringtonia acutangula
3. Triodia sp.
4. Calytrix exstipulata
Glyde River
East Branch
Height (m)
Distance (m)
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 2: Riparain transect on the East Branch of the Glyde River, within potential inundation zone
Vegetation Profile No. 2



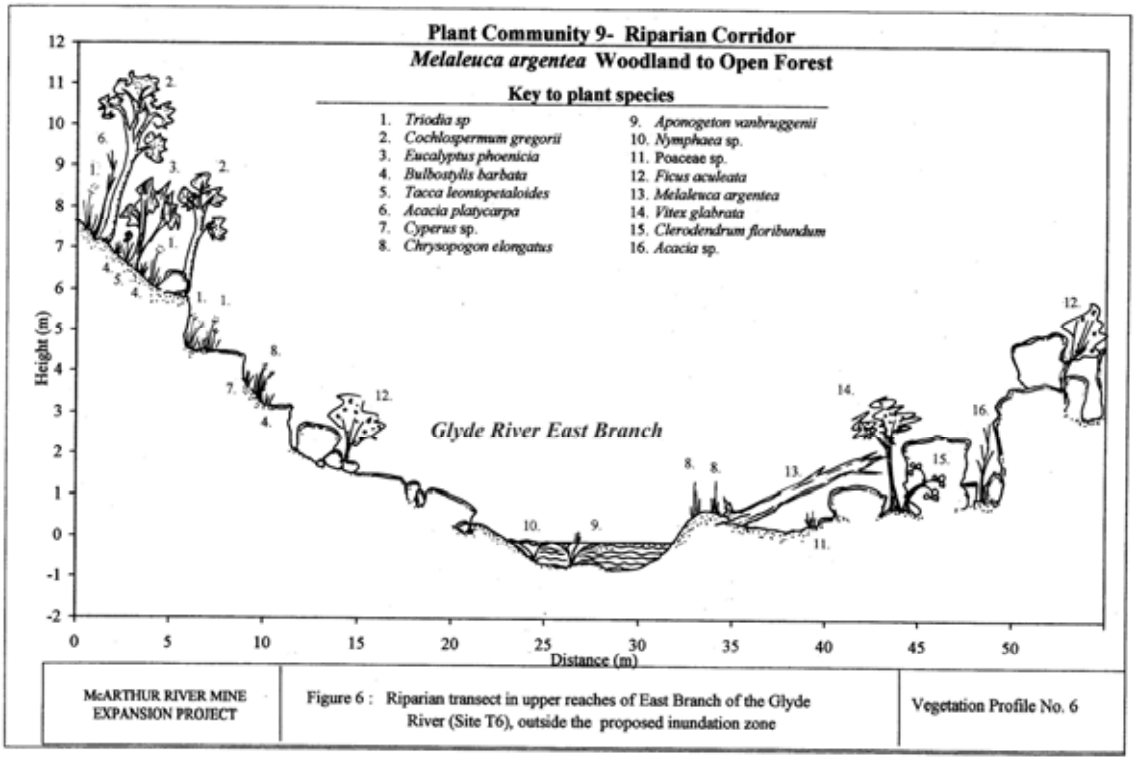
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 3 : Riparian transect on the Glyde River (Site T3) within proposed inundation zone	Vegetation Profile No. 3



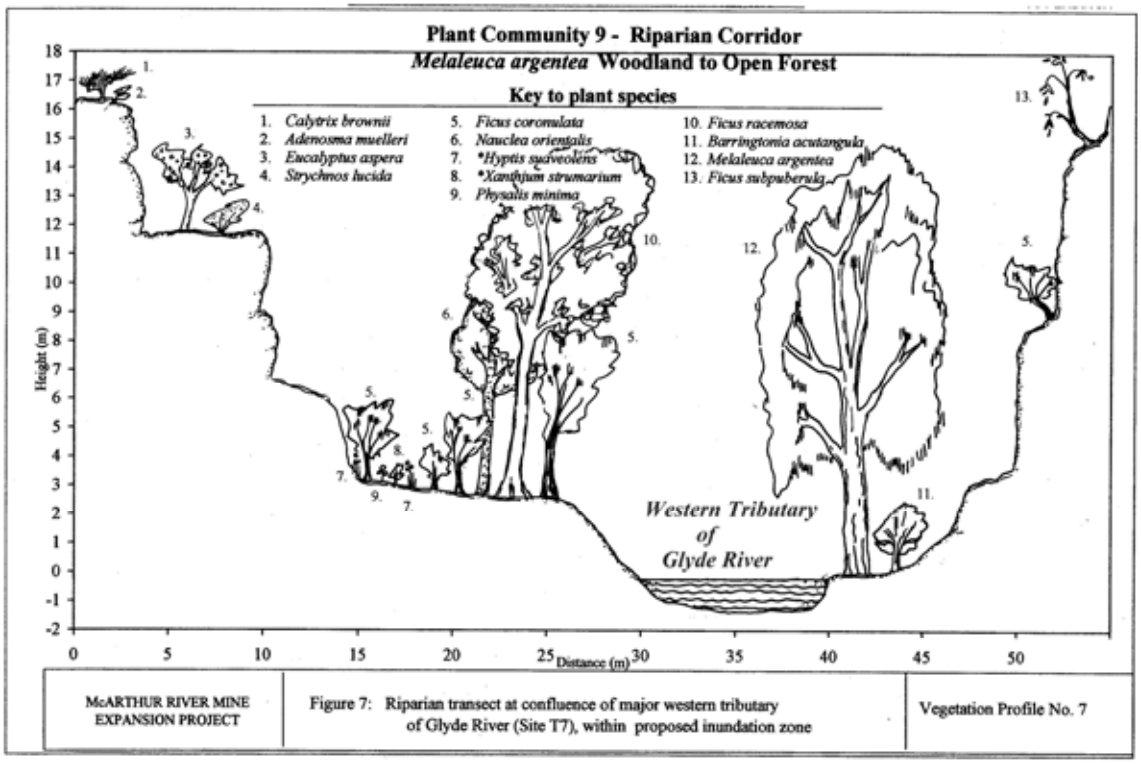
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 4: Riparian transect on tributary creek of the Glyde River (Site T4) outside proposed inundation zone	Vegetation Profile No. 4



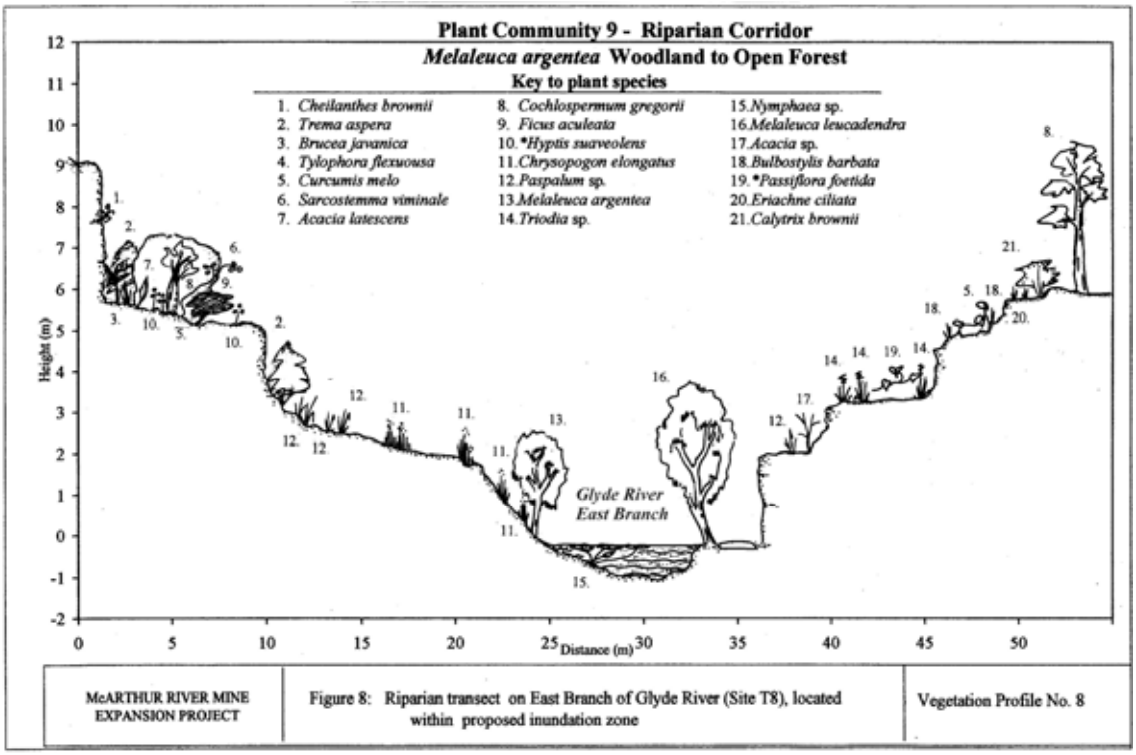
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 5 : Riparian transect at confluence of the Glyde River and eastern tributary creek (Site T5), within proposed inundation zone	Vegetation Profile No. 5



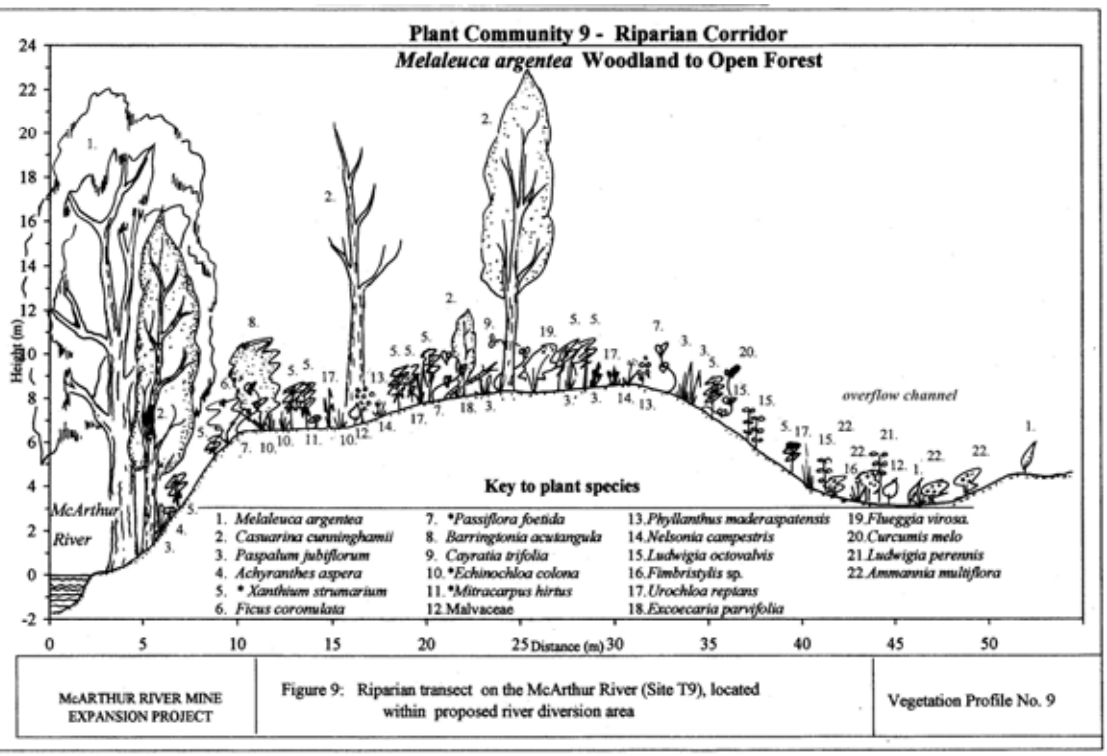
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 6 : Riparian transect in upper reaches of East Branch of the Glyde River (Site T6), outside the proposed inundation zone	Vegetation Profile No. 6



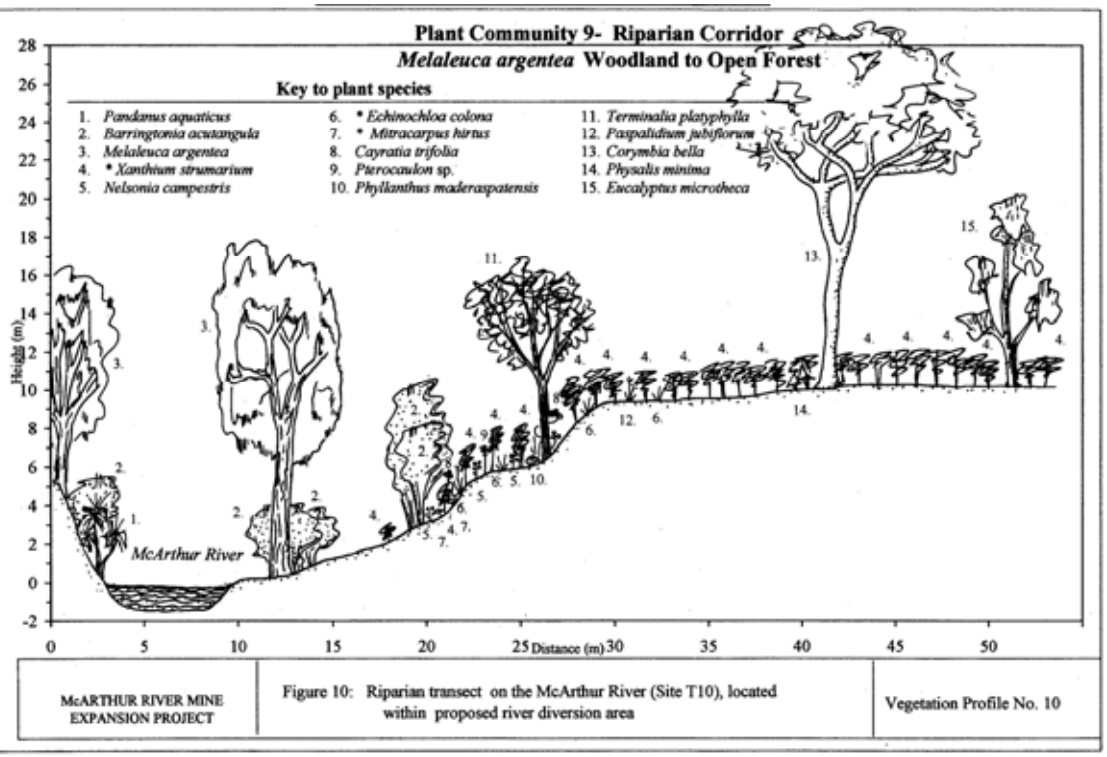
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 7: Riparian transect at confluence of major western tributary of Glyde River (Site T7), within proposed inundation zone	Vegetation Profile No. 7



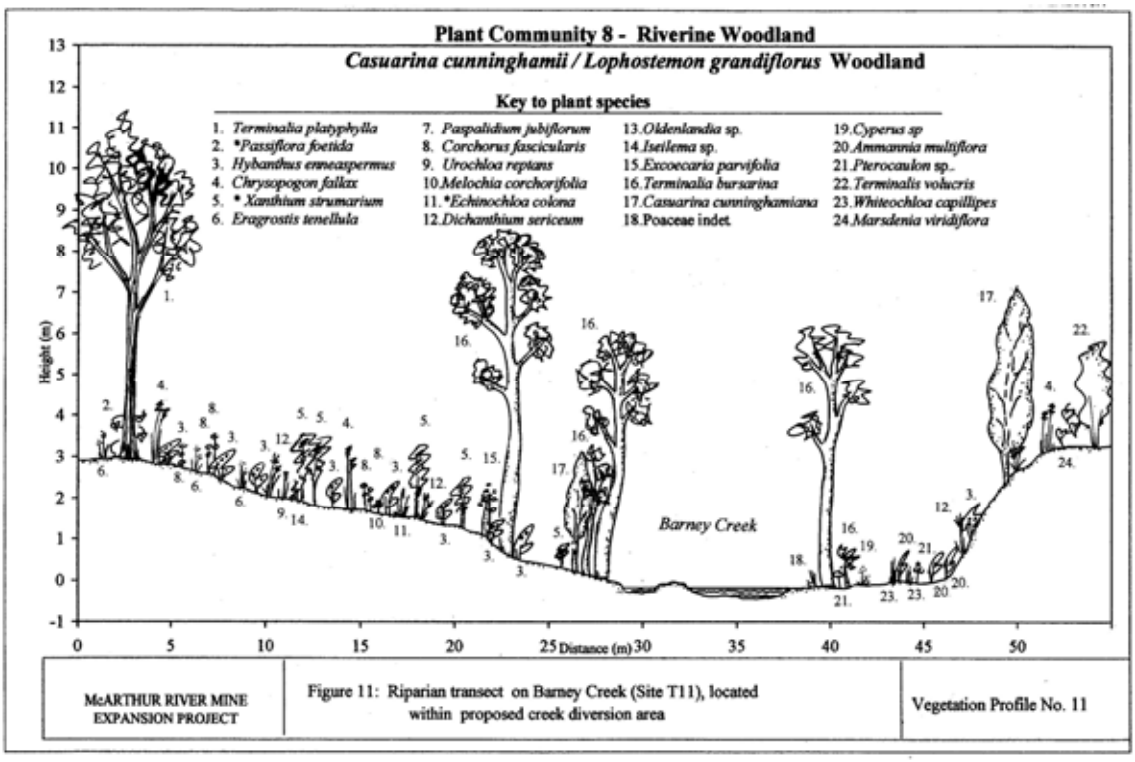
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 8: Riparian transect on East Branch of Glyde River (Site T8), located within proposed inundation zone	Vegetation Profile No. 8

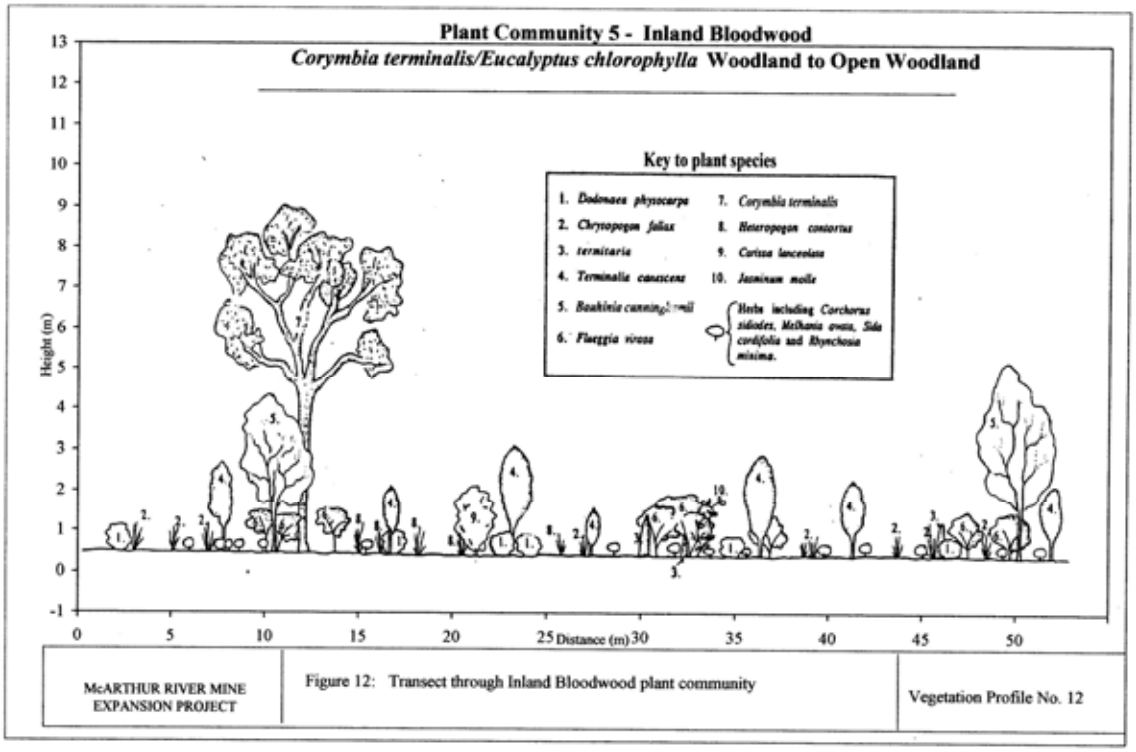


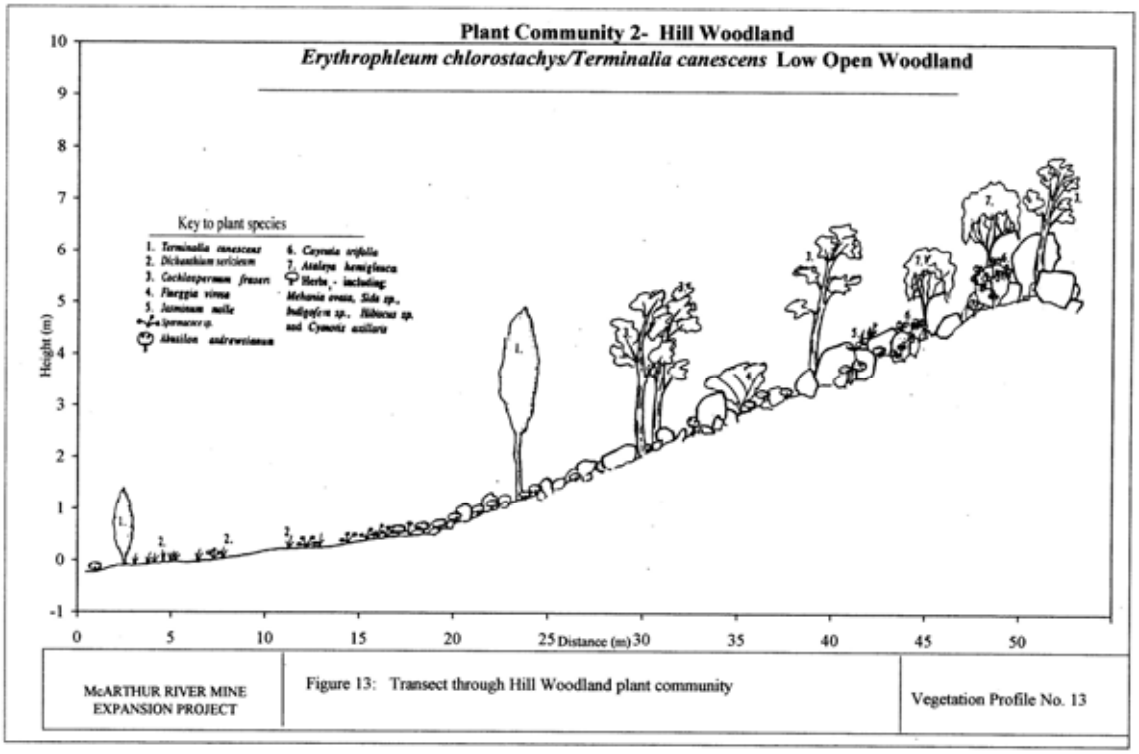
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 9: Riparian transect on the McArthur River (Site T9), located within proposed river diversion area	Vegetation Profile No. 9



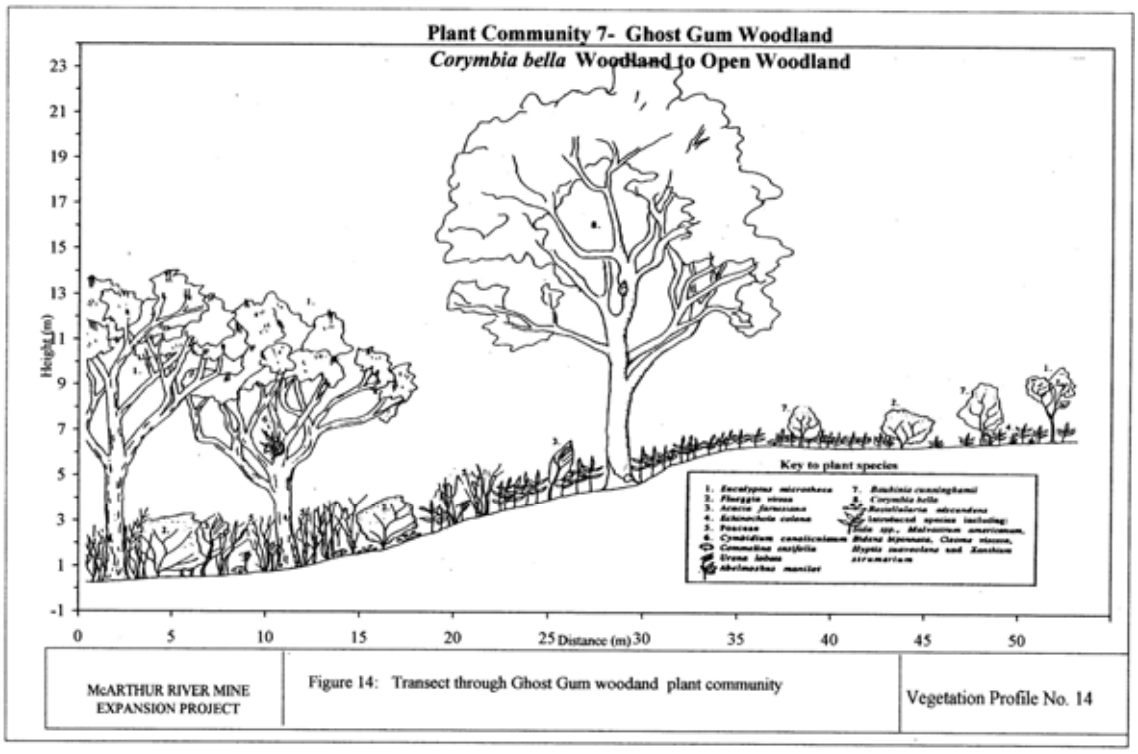
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 10: Riparian transect on the McArthur River (Site T10), located within proposed river diversion area	Vegetation Profile No. 10


Plant Community 8 - Riverine Woodland
Casuarina cunninghamii / Lophostemon grandiflorus Woodland
Key to plant species
1. Terminalia platyphylla
2. *Passiflora foetida
3. Hybanthus enneaspermus
4. Chrysopogon fallax
5. * Xanthium strumarium
6. Eragrostis tenellula
7. Paspalidium jubiflorum
8. Corchorus fascicularis
9. Urochloa reptans
10. Melochia corchorifolia
11. *Echinochloa colona
12. Dichanthium sericeum
13. Oldenlandia sp.
14. Isotoma sp.
15. Excoecaria parvifolia
16. Terminalia bursarina
17. Casuarina cunninghamiana
18. Poaceae indet.
19. Cyperus sp
20. Ammannia multiflora
21. Pterocaulon sp.
22. Terminalis volucris
23. Whiteochloa capillipes
24. Marsdenia viridiflora
Barney Creek
Height (m)
Distance (m)
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 11: Riparian transect on Barney Creek (Site T11), located within proposed creek diversion area
Vegetation Profile No. 11

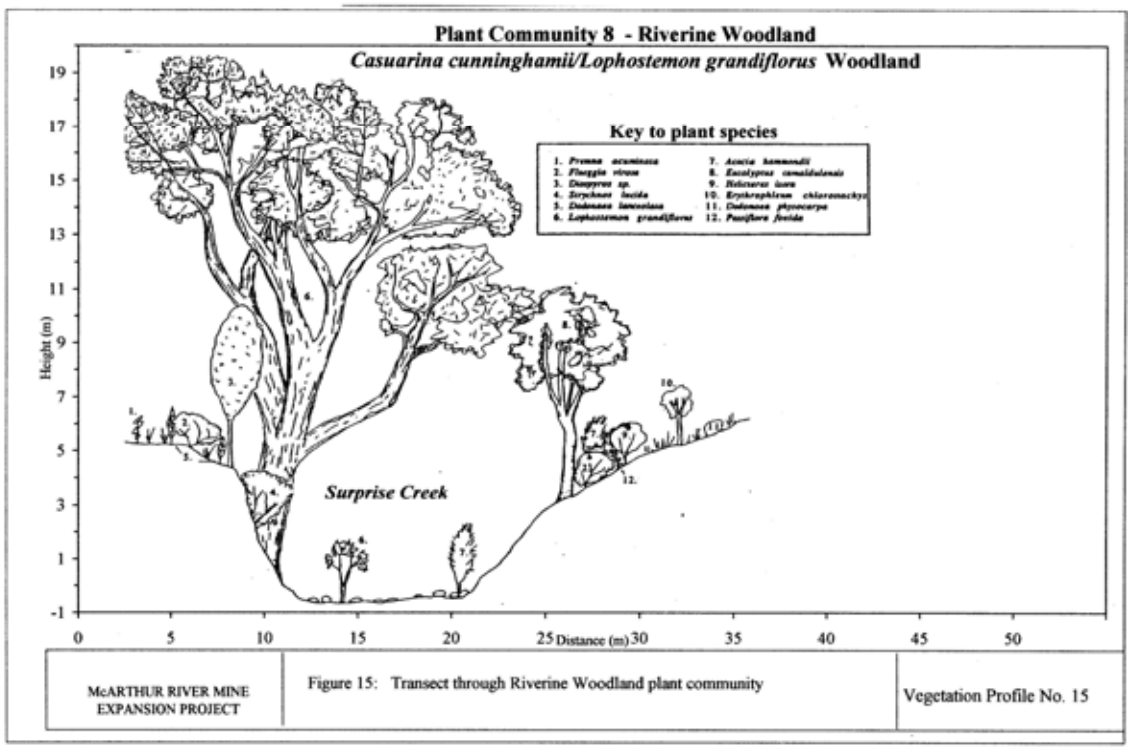

Plant Community 5 - Inland Bloodwood
Corymbia terminalis/Eucalyptus chlorophylla Woodland to Open Woodland
Key to plant species
1. Dodonaea physocarpa
2. Chrysopogon fallax
3. termitaria
4. Terminalia canescens
5. Bauhinia cunningh mii
6. Flueggia virosa
7. Corymbia terminalis
8. Heteropogon contortus
9. Carissa lanceolata
10. Jasminum molle
Herbs including Corchorus sidoides, Melhania ovata, Sida cordifolia and Rhynchosia minima.
Height (m)
Distance (m)
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 12: Transect through Inland Bloodwood plant community
Vegetation Profile No. 12



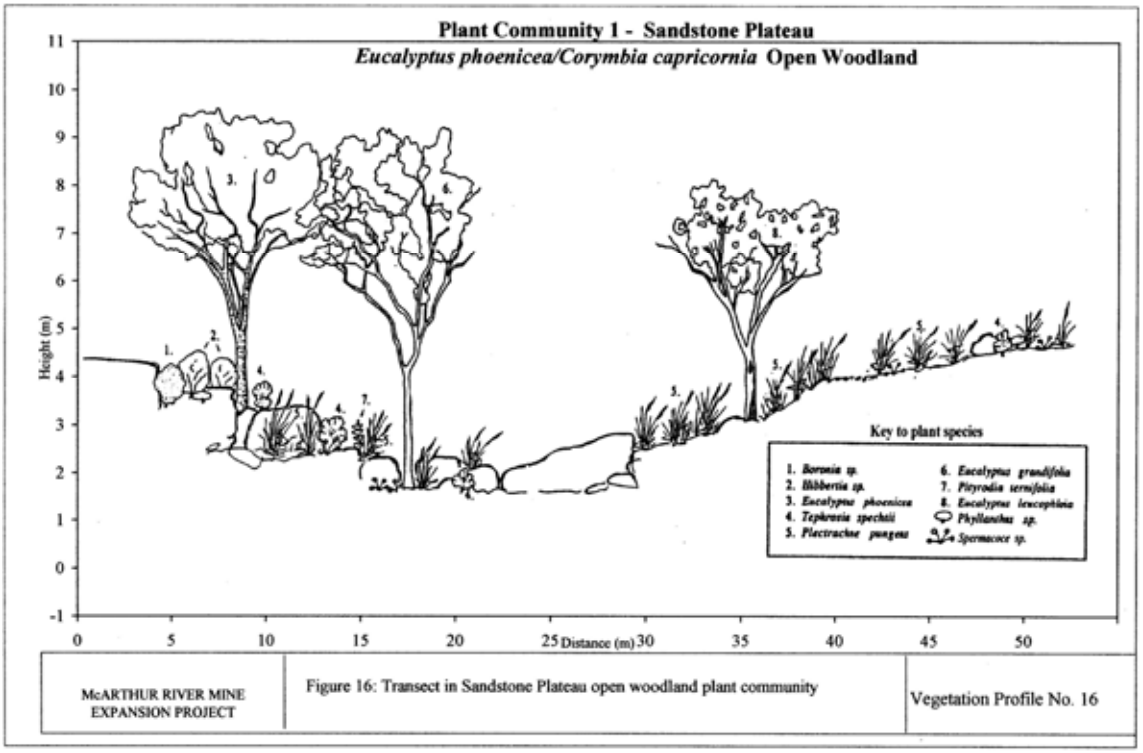
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 13: Transect through Hill Woodland plant community	Vegetation Profile No. 13



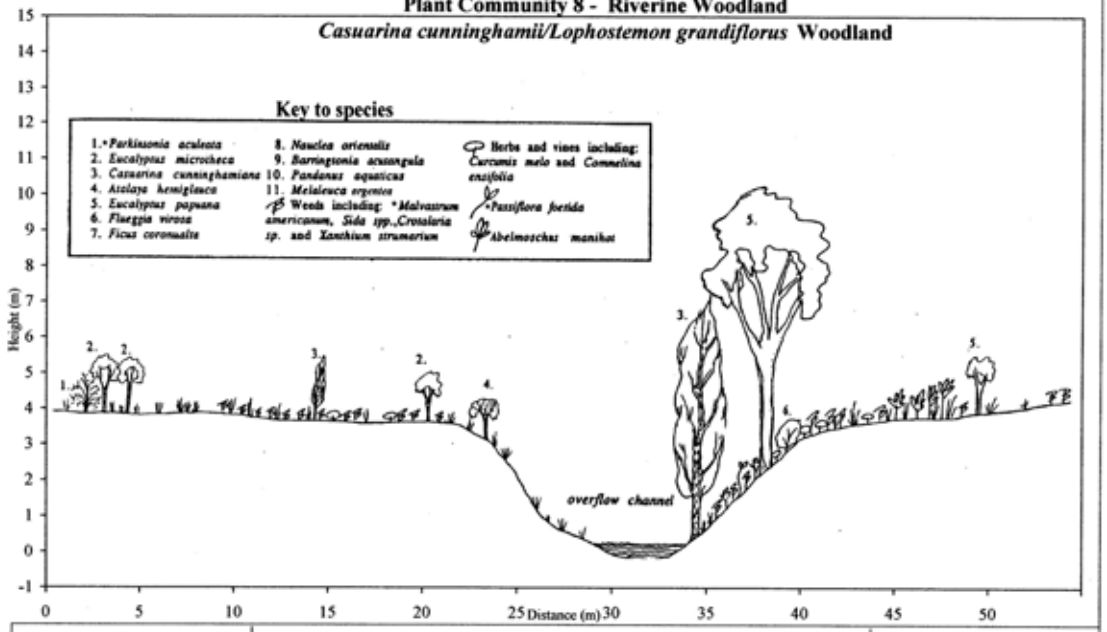
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 14: Transect through Ghost Gum woodand plant community	Vegetation Profile No. 14

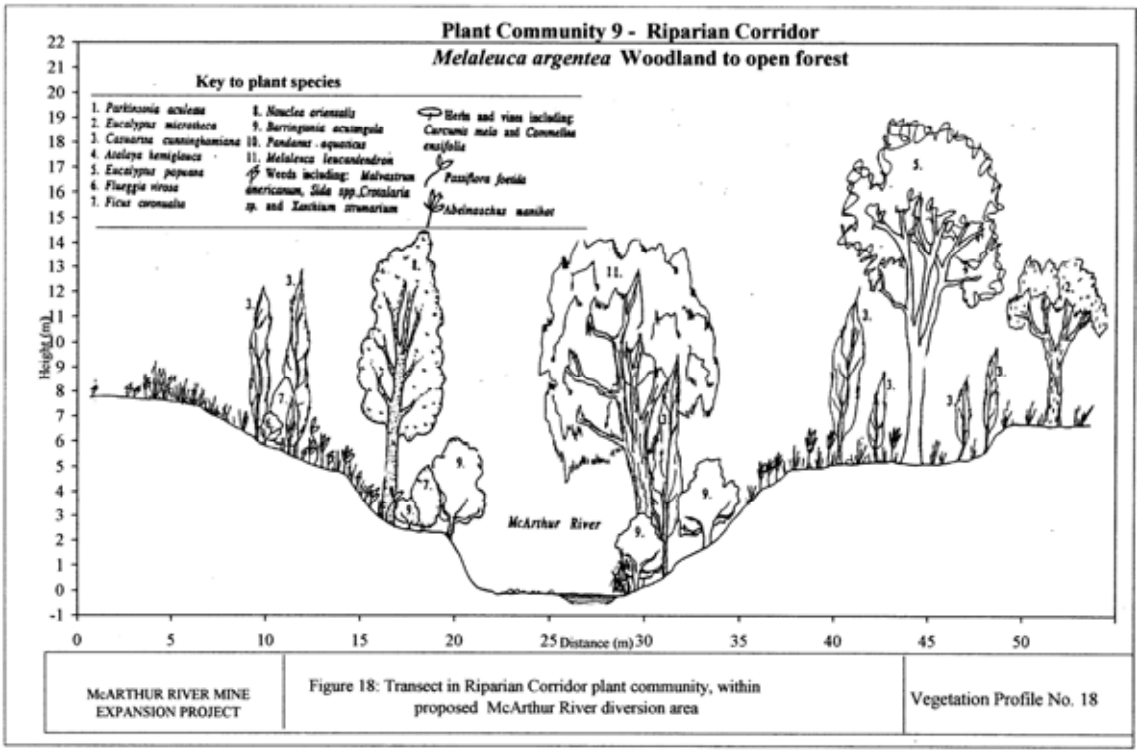


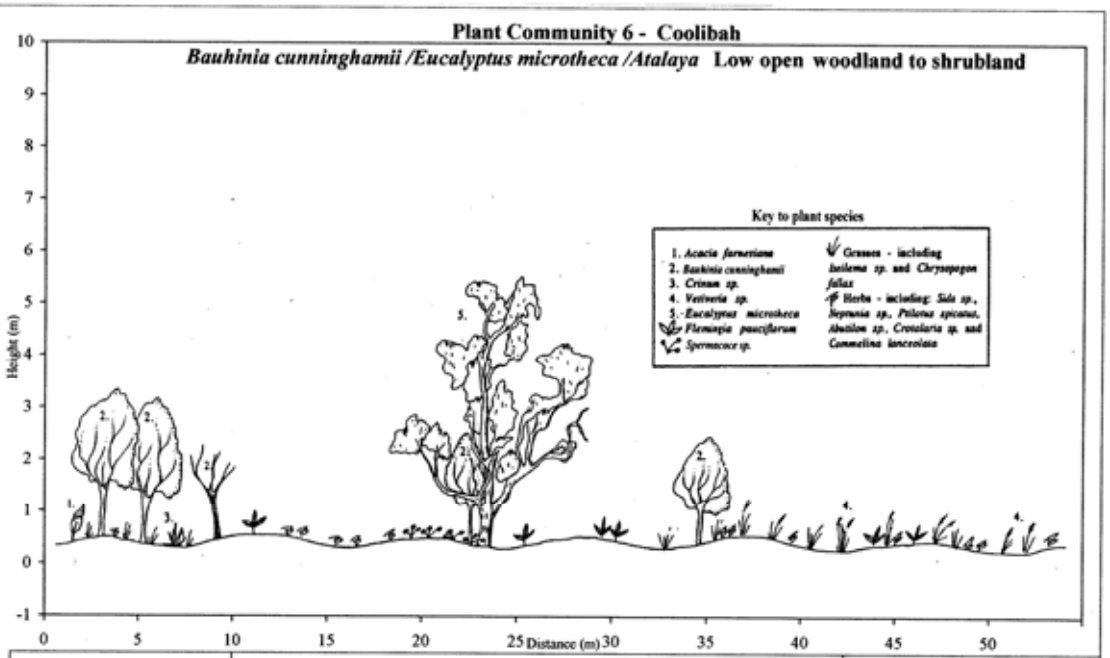
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 15: Transect through Riverine Woodland plant community	Vegetation Profile No. 15



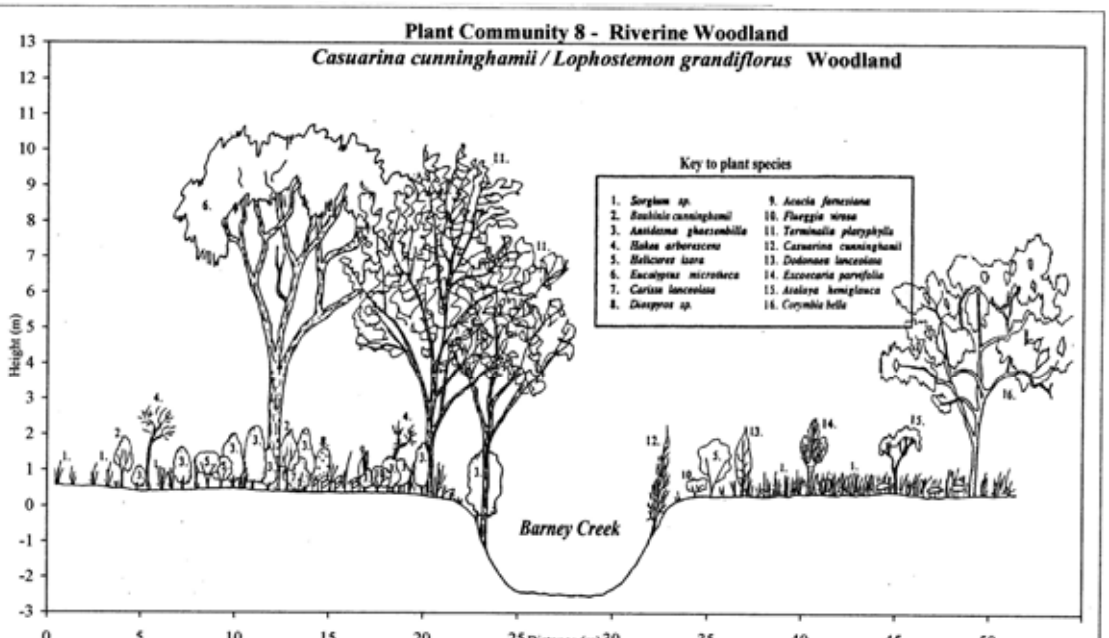
McARTHUR RIVER MINE EXPANSION PROJECT	Figure 16: Transect in Sandstone Plateau open woodland plant community	Vegetation Profile No. 16


Plant Community 8 - Riverine Woodland
Casuarina cunninghamii/Lophostemon grandiflorus Woodland
Key to species
1. *Parkinsonia aculeata
2. Eucalyptus microtheca
3. Casuarina cunninghamiana
4. Atalaya hemiglauca
5. Eucalyptus papuana
6. Flueggia virosa
7. Ficus coronulata
8. Nauclea orientalis
9. Barringtonia acutangula
10. Pandanus aquaticus
11. Melaleuca argentea
Weeds including: *Malvastrum americanum, Sida spp.,Crotalaria sp. and Xanthium strumarium
Herbs and vines including: Cucumis melo and Commelina ensifolia
*Passiflora foetida
Abelmoschus manihot
Height (m)
Distance (m)
overflow channel
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 17: Transect in Riverine Woodland plant community fringing the McArthur River
Vegetation Profile No. 17

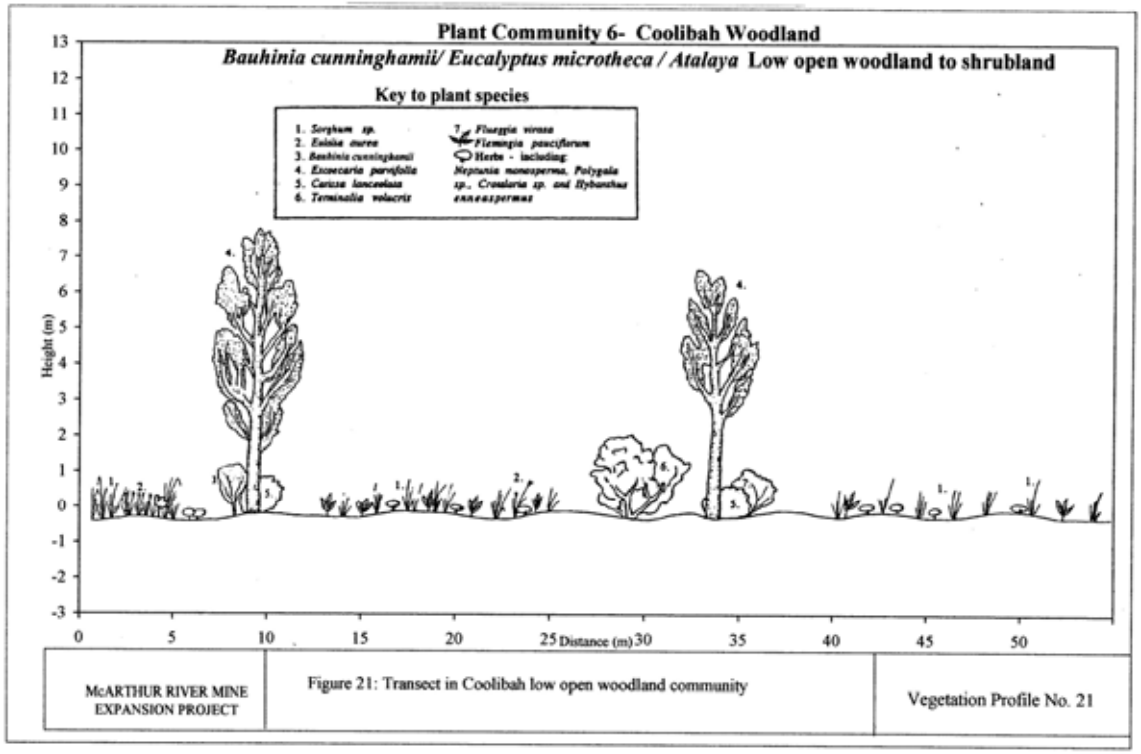

Plant Community 9 - Riparian Corridor
Melaleuca argentea Woodland to open forest
Key to plant species
1. Parkinsonia aculeata
2. Eucalyptus microtheca
3. Casuarina cunninghamiana
4. Atalaya hemiglauca
5. Eucalyptus papuana
6. Flueggia virosa
7. Ficus coronulata
8. Nauclea orientalis
9. Barringtonia acutangula
10. Pandanus aquaticus
11. Melaleuca leucadendron
Weeds including: Malvastrum americanum, Sida spp.,Crotalaria sp. and Xanthium strumarium
Herbs and vines including: Cucumis melo and Commelina ensifolia
Passiflora foetida
Abelmoschus manihot
Height (m)
Distance (m)
McArthur River
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 18: Transect in Riparian Corridor plant community, within proposed McArthur River diversion area
Vegetation Profile No. 18



McARTHUR RIVER MINE EXPANSION PROJECT	Figure 19: Transect in Coolibah open woodland community	Vegetation Profile No. 19



McARTHUR RIVER MINE EXPANSION PROJECT	Figure 20: Transect in Riverine Woodland community on Barney Creek, upstream of proposed creek diversion	Vegetation Profile No. 20


Plant Community 6- Coolibah Woodland
Bauhinia cunninghamii/ Eucalyptus microtheca / Atalaya Low open woodland to shrubland
Key to plant species
1. Sorghum sp.
2. Enteia aurea
3. Bauhinia cunninghamii
4. Excoecaria parvifolia
5. Carissa lanceolata
6. Terminalia volacris
7. Fluggia virosa
Flemingia pauciflorum
Herbs - including:
Heptunia monosperma, Polygala sp., Crotalaria sp. and Hybanthus enneaspermus
Height (m)
Distance (m)
McARTHUR RIVER MINE EXPANSION PROJECT
Figure 21: Transect in Coolibah low open woodland community
Vegetation Profile No. 21

Appendix H.5
Photographs

VEGETATION COMMUNITIES

UPLAND COMMUNITIES

Photo 1: Sandstone Plateau Open Woodland (Map Unit 1).

Photo 2: Hill Woodland (Map Unit 2) on Mt Stubbs, north-east of the mine.

LOWLAND WOODLAND COMMUNITIES

Photo 3: Dry Vine Thicket (Map Unit 3) on rocky outcrop.

Photo 4: Inland Bloodwood Woodland to Open Woodland (Map Unit 5).

Photo 5: Coolibah Low Open Woodland (Map Unit 6).

Photo 6: Ghost Gum Woodland to Open Woodland (Map Unit 7).

VEGETATION COMMUNITIES

DRAINAGE AREAS

Photo 7: Riverine Woodland (Map Unit 8).

Photo 8: Riparian Corridor (Map Unit 9).

McARTHUR RIVER LANDSCAPE

Photo 9: The McArthur River mine site and existing riparian corridor of the McArthur River (the location of the proposed open cut mine and river diversion).

LOWLAND WOODLAND COMMUNITIES (CONTINUED)

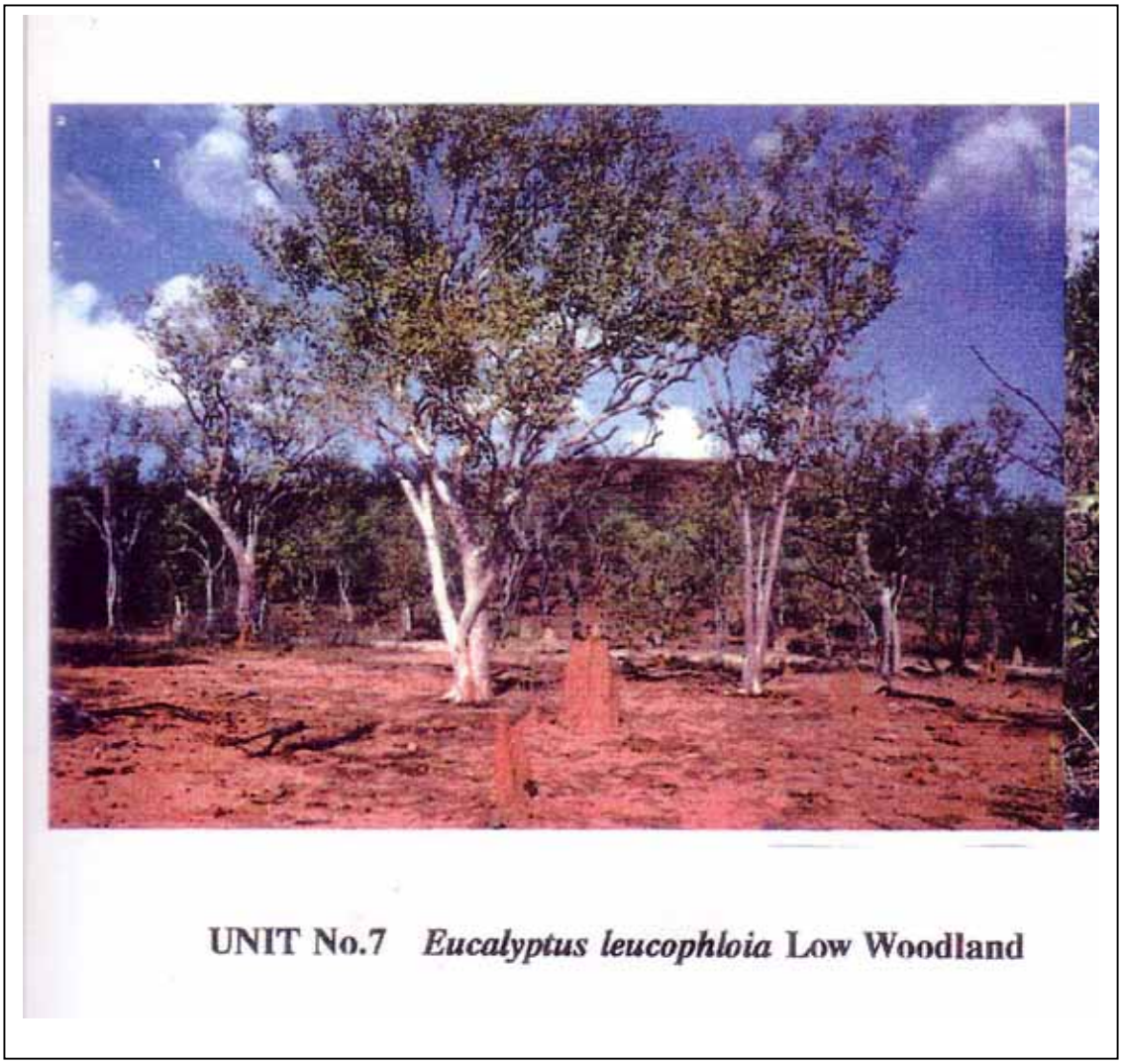


Photo 10: Snappy Gum (*Eucalyptus leucpholia)* low woodland (Map Unit 4).

Appendix H.6
Dendogram and Ordination of Vegetation Sampling Sites

There were 8 major vegetation communities defined from analysis of sample sites by species matrix derived from 50 vegetation quadrats. This community structure corresponded to a cut-off level on the classification dendrogram at around 20% site similarity (Figure H.6a below). Substructure amongst sites at higher levels of similarity was deemed to be of limited practical utility. The floral similarity between sites and the groups of sites in each community type is illustrated in the ordination plot (Figure H.6b below).

Figures H.6a and H.6b show that plant assemblages in sandstone environments (in the bottom half of the ordination, indicated by circular symbols) differ greatly from those in lowland environments along the McArthur River (in the top half of the ordination, with square symbols). Similarly, the plant composition of sites in dry upland areas is very different from those along creeks and rivers as shown by the gradient of site types from left to right across the ordination diagram.

Figure H.6a. Dendrogram of the classification of the vegetation at 50 survey sites showing the 20% site similarity cut level at which most of the 8 plant communities were defined.

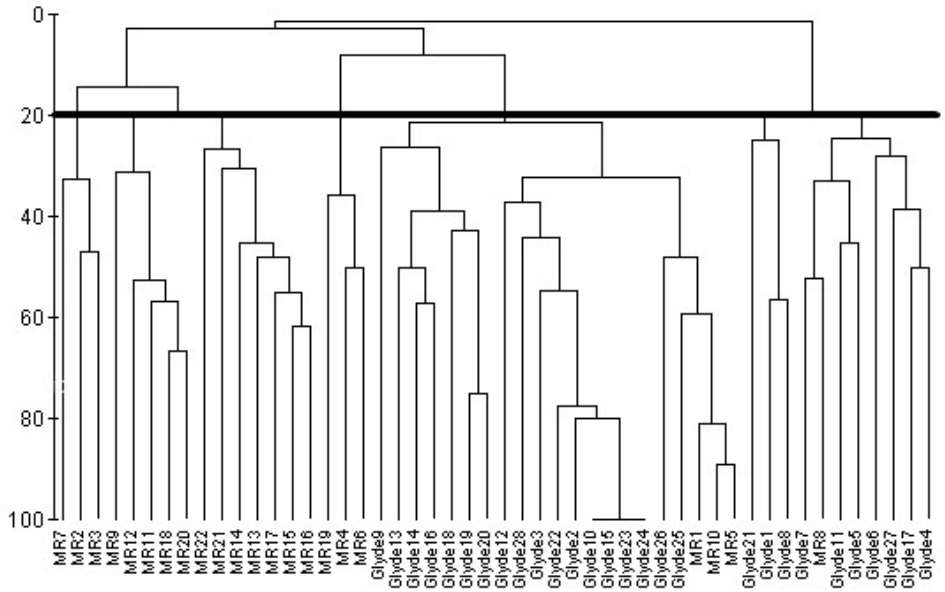
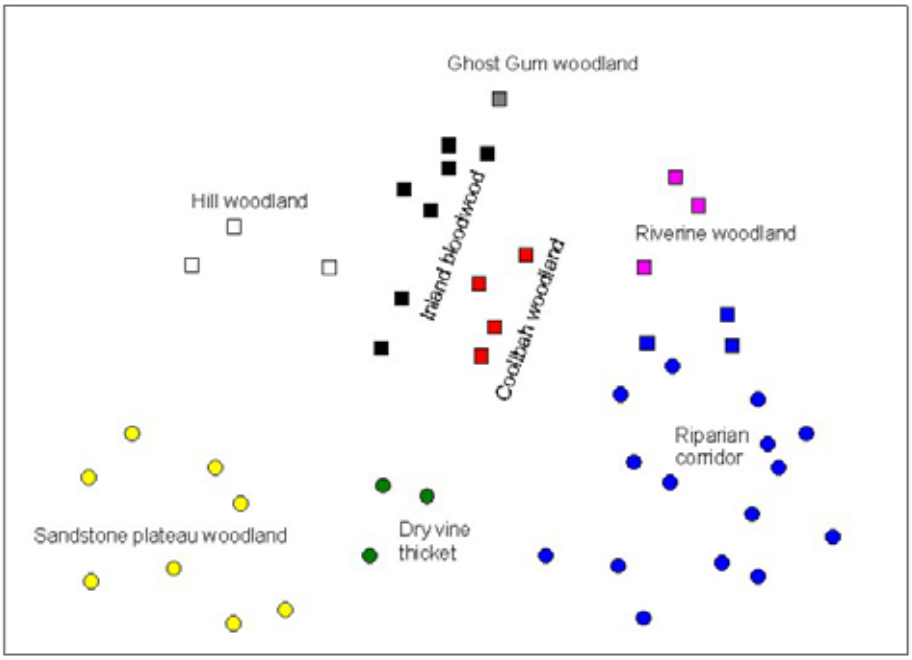


Figure H.6b Ordination plot showing the floristic relatedness between the survey sites and the community groups derived from the classification.



Sites with circular symbols are from sandstone environments along the Glyde River while those with square symbols are from smaller hills and lowlands along the McArthur River. The driest, highest sites are located to the left of the figure while the wetter riverine sites are clustered to the right.