MARANDOO

Biological Report

CRA SERVICES
Iron Ore Division

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The Brockman dominated plateau falls to the wide Fortescue valley to the north and to a series of narrower valleys to the south. Towards the south-east, these valleys feed the Ashburton River via Turee Creek. In the central area (near Marandoo), a watershed exists which feeds the Fortescue River through the South Fortescue River to the north and Ashburton/Turee system to the south. The eastern area is drained by the Hardy/Beasly River system and the Duck Creek system which drain into the Ashburton River downstream of the Turee Creek/Ashburton River confluence.

The valley system to the south of the plateau is generally fringed on its southern perimeter by a series of low Marra Mamba ridges. These ridges are about 50 metres high, with the north slopes forming gently undulating scree slopes to the valley floor. The south side of the ridge is often characterised by small cliff faces where the Marra Mamba Iron Formation abuts the Jeerinah Formation of the Fortescue group.

3.2 Marandoo Geology/Topography

The Marandoo Temporary Reserve traverses a Marra Mamba ridge that trends from west to east. Figure 2 indicates the stratigraphy of the area and the relationship of the ridge to Mt. Bruce, approximately 5km to the north. From this Figure, it can be seen that the Marra Mamba Iron Formation outcrops along the top of the ridge; to the north, the Formation is overlain by colluvial material. Towards the ridge top and on the steep slopes, the colluvium is of the quaternary period and is often termed "Scree", being coarse pebbly material. Towards the valley floor, the quaternary colluvium gives way to the older and finer tertiary colluvium which, in turn, is overlain by alluvium on the valley floor. To the south of the ridge is the Jeerinah Formation of the Fortescue group.

Visually, Mt. Bruce, 1,235m high (500m above the surrounding valley floor), dominates the surrounding landscape. The highest point on the Marandoo ridge is 837m ASL, whilst most of the ridge rises to approximately 800m ASL. Marandoo is at the watershed between the South Fortescue River to the west of Marandoo and the Turee Creek to the east. The Marandoo ridge is cut by numerous small gorges that have steep sides and exposed rock faces. These gorges offer distinct habitats due, in part, to their micro-climate which generally features increased moisture availability and to the shelter they offer from the prevailing winds.

To the east of Mt. Bruce is an extensive valley which is approximately 12km x 14km. This valley floor is extremely flat and is prone to flooding following periods of high rainfall. Of particular interest in this area is the small "coolibah" forest at the eastern side of the flats which contrasts with the sparsely vegetated western fringe of the flats (see Plates 7 and 8).

4. SOILS

A soils map of the Marandoo Temporary Reserve has been prepared and is given in Figure 3. Essentially, the soils follow the scheme outlined in the previous Section where the soils grade from the areas of outcropping ore on the ridge top to alluvial soil on the valley floor. In all, five major soil categories have been recognised and are outlined below.

(i) Outcrop - areas of low and sometimes extensive protrusion of either Banded Iron, Shale or Ore (Marra Mamba Iron Formation) or Jeerinah Formation associated usually with "scree" rocks approximately 0.5-5cm diameter and 70% + soil cover.* These are patches with a thin layer of subsoil, generally on areas of low incline such as are present on the ridge top plateau where rock formation constitutes the uppermost layer.

(ii) Pediment - areas usually on steady or steep inclines where stability of weathered outcrop material is low; presence of large rocks and boulders in association with either prominent or low lying outcrops. Usually thick and dense rock cover, size range 0.5-30+cm diameter. Very little subsoil. Areas of rapid water run-off.

(iii) Quaternary Colluvium - geologically recent loose and incoherent deposits at the foothills of the range slopes. Dense coverage (usually 70%+) of rocks, sometimes manganese, approximately ½-5cm. Usually dense "scree" subsoil.

(iv) Tertiary Colluvium - the oldest colluvium deposited as valley fill - represents the lowest parts of the tertiary landform before it was re-juvenated. Characterized by stony to sandy subsoil, sparse to moderate soil cover (50%) described as consolidated, uncemented valley-fill deposits containing boulders of limonite. Often associated with patchy pebble cover.

(v) Alluvium - soft, sedimentary, loamy or clayey when moist; deposited by rivers, creeks or by flood waters. A layer of deposited colluvium-type stones may be present. Distinguished by general absence of stone cover or subsoil stones; if stones present, then obviously situated via water-mediated deposition.

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*Soil cover is referred to as density of stones present on surface.

In addition two divisions, separate from the above, are also included because they represent a complex of more than one soil type within their recognised boundary.

(a) Tertiary Colluvium/Alluvium: where colluvium dominates but a dense matrix of alluvial soil infiltrates the area.

(b) Quaternary Colluvium/Alluvium: an outwash fan where alluvial deposition has caused minor outwashing of quaternary colluvium.

Diagrammatic representation of the five major categories of surface soils and their correlation to each other is shown in Figure 2.

The soils are typically low in nitrate/nitrogen and available phosphorus. The alluvial soils and areas of outcropping shale tended to have slightly higher phosphorus levels, although the values are still low by agricultural standards. The soils are rich in potassium and generally have adequate levels of the trace elements copper, zinc and manganese. The pH levels tend to vary from acidic on the ridge top and scree slopes to slightly alkaline on the valley floor.

Typical soil analyses from the Marandoo Temporary Reserve are given in Table 1.

6. BIOLOGICAL STUDIES

6.1 General

Prior to the commencement of the Marandoo environmental base line data collection programme, the knowledge of the area's Flora and Fauna was scant.

A species' inventory for Marandoo was, therefore, compiled from scratch. Considerable data has been collected by Company personnel which has expanded initial surveys to form comprehensive Flora and Fauna lists. For the Flora inventory, an initial survey was conducted by staff of the Herbarium in 1974 (Report dated 1975). This survey's results have been expanded and revised by subsequent Consultant and Company surveys and collection. These surveys are discussed in the following Section (6.2). An initial Fauna survey was conducted by W.H. Butler which formed the basis of the Marandoo Fauna inventory. This inventory has subsequently been expanded and revised by Company collections and with the assistance of visiting experts in various zoological fields.

To date, the Flora and Fauna effort has centred on Vascular plants and Vertebrate animals. There is currently an upswing of interest in invertebrates in Western Australia, particularly in regard to post-mine land rehabilitation. Unfortunately, little is known of the Pilbara invertebrates, with many species believed to be either undescribed or yet to be collected. John Major of the Western Australian Institute of Technology is currently incorporating Pilbara data in his work on classification of Western Australian Formicidae.

6.2 Vascular Plants

6.2.1 Flora Inventory

The original Flora survey of the Marandoo Temporary Reserve was conducted during September 1974 by staff of the Western Australian Herbarium. This survey produced a base line inventory which has subsequently been revised. The most notable contribution to the Flora revision has been by M.E. Trudgen who was retained as a Consulting Botanist. Trudgen's site visits during March 1977, October 1977 and February 1978 resulted in numerous collections and identifications. Company personnel have made extensive collections and, where possible, identifications; however, the bulk of the collected specimens were identified by Trudgen.

In addition to the above collections and identifications, site visits have been made by Dr. A. Weston and Ken Atkins, who have either collected further specimens or made identifications of specimens held on site. Dr. B. Maslin of the State Herbarium has assisted with the Acacia identifications and has visited Marandoo during a survey of the Pilbara region during 1980.

The Flora inventory, which represents a compilation of the above reports, contains 306 recognised species, of which 248 are identified to species level, 51 to generic level and seven to family level. The inventory is given in Appendix 1.

During a visit in December 1977, Dr. Weston conducted a survey of Adventive plants at Marandoo and this is discussed in Section 9.

6.2.2 Vegetation

A vegetation map has been prepared of the Marandoo Temporary Reserve (Figure 4). The map has followed Beard's Scheme, although Muir's Scheme would have probably been preferable. At Marandoo, mapping according to Beard or Muir yields very similar maps; however, should the mapping be expanded around Marandoo or used elsewhere in the Pilbara, a change to Muir's scheme should be considered.*

At Marandoo, the ridge/scree/valley floor system provides six broad habitats. These are:-

(i) Ridge top/Tree steppe
(ii) Rock outcrops and small cliff faces
(iii) Gullies/Creek beds
(iv) Scree slope/Shrub steppe
(v) Hummock grassland/Grass steppe
(vi) Alluvial flats/Low mulga woodland

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*An advantage of Beard's scheme is that it has already been applied in the mapping of the Pilbara region. By mapping Marandoo according to Beard, a basis has been set whereby Marandoo can be viewed in regional perspective (Section 8).

The following is an outline of the major habitats.

(i) Ridge top/Tree steppe

This area is characterized by poor soil coverage, with loose unconsolidated surface material rarely exceeding 20cm and commonly a veneer of only 10cm. Banded iron frequently outcrops the soil over large areas.

The dominant vegetation is a ground covering of Triodia sp (spinifex), with an upper storey of scattered Eucalyptus leucophloia (snappy gum). There are occasional discrete stands of Acacia aneura (mulga) and Acacia pruinocarpa (W.A. gidgee). Occasional thickets of Acacia stowardii, A. rhodophloia, A. hamersleyensis and A. rhodophloia x kempeana are encountered. (See Plate 1.)

(ii) Rock outcrops/Shallow cliff faces

Rock outcrops and shallow cliff faces are associated with the ridge top communities. These areas are characterized by a lack of topsoil and steep slopes.
The lack of topsoil has contributed to many interesting plants adapting to utilising rock fissures for obtaining moisture and stability, the most notable species being Astrotricha hamptonii (Iron ore plant).

The most common understorey species are the grasses Eriachne mucronata and sparsely distributed Triodia sp, with frequent ferns Cheilanthes spp and Gymnogramma being apparent after rainfall. The dominant shrubs are Dodonaea spp, notably D. attenuata, with Eremophila spp, Kallstroemia platyptera and occasional Acacia spp, including A. maitlandii and A. hamersleyensis.

(iii) Gullies/Creek beds

This community could be treated as two distinct areas: firstly are the deep gullies that dissect the ridges and secondly the creek beds as the creeks flow from the gullies onto the alluvial flats.

These tend to be the most dense vegetation communities and also support the tallest trees.

The upper gullies afford a specialised habitat, being more moist and humid than the surrounding country. This comparatively kind micro-climate supports such species as Brachychiton australe and climbers of the family ASCLEPIADACEAE.

The creeks, as they enter the alluvial flats, support a wide variety of shrubs and trees. The most notable shrubs associated with drainage systems are: Acacia farnesiana, A. citrino-viridis, Rulingia kempeana, Clerodendrum lanceolatum, Petalostylis labicheoides and Gossypium robinsonii. (See Plate 2.)

The larger creeks support Eucalyptus dicromophloia and occasional E. pattelaris, although the latter are noted to prefer the lower laying scree deposits adjacent to the creek beds. Tufted grasses line the drainage systems; these grasses include Cymbopogen ambiguus and species of the genera Enneapogon and Eragrostis.

(iv) Scree slope/Shrub steepe

This community covers the broad band between the Marra Mamba ridges and the alluvial/ colluvial flats. At Marandoo, this area constitutes a north facing slope that covers most of the minesite orebody.

The dominant vegetation is Triodia sp, mainly T. wiseana, (hummock grass or spinifex). The upper canopy consists of stands of Acacia pruinocarpa and A. aneura, with scattered Eucalyptus setosa, E. gamophylla, E. trivalvis and E. patellaris. E. leucophloia forms the upper canopy on the higher slopes.

The dominant shrubs tend to be Acacia spp, Cassia spp and Eremophilla spp. The most notable of these are: A. bivenosa, A. atkinseana, A. ancistrocarpa, A. pruinocarpa, C. glutinosa, C. oligophylla, C. pruinosa, C. sp (undescribed) = MET 2306 and Eremophila leucophylla.

The soil is deposited colluvial scree material and does not contain a developed A horizon. It is typically stoney and loose to around 5cm over a dense "scree" subsoil; towards the valley floor the surface becomes sandier and is characterized by patches of pebble material. (See Plate 3.)

(v) Hummock grasslands/Grass steepe

This type of vegetation generally occurs to the south of the Marandoo ridge, being typically associated with the Jeerinah Formation. The vegetation is sparse, and is dominated by Triodia wiseana with occasional scattered Eucalyptus leucophloia and Acacia spp bushes.

It has been noted that Eucalyptus leucophloia becomes more prominent in some localities, giving a more tree steppe or Parkland aspect. (See Plate 5.)

(vi) Alluvial flats/Low mulga woodland

There is a marked transitional zone between the vegetation associated with the colluvial and alluvial soils.

From the colluvial shrub steppe Triodia spp community, the vegetation becomes dominated by Plectrachne schinzii (feather top). There tends to be considerable overlap of these two species. Once the transition is complete, the Plectrachne schinzii becomes very dense with occasional Acacia pruinocarpa and A. aneura providing open middle and upper canopies. (See Plate 4.)

The Plectrachne schinzii abruptly gives way to mulga woodland (Acacia aneura) near the middle of the valley floor at a point more or less corresponding to the one in five year flood line.

The mulga woodland is characterized by sandy alluvial soils which support an understorey of tufted grass and winter flowering annuals. (See Plate 6.)

Additionally, a series of transects has been prepared that traverses northwards from the top of the Marandoo ridge to the valley floor between Mt. Bruce and Marandoo ridge. These transects are given in Appendix 2. They show typical plant associations and help correlate them to topography and soil types. The apparent "broad brush" ecological scheme at Marandoo is that communities run east-west, following the Marandoo ridge contours. That is, the scree slopes tend to be vegetated by shrub steppe communities with quaternary

colluvial soil. The ridge top is typically of Eucalypt dominated open woodland with spinifex ground cover over pediment that often gives way to outcropping Banded Iron. The major departure from the scheme is the series of creeks and gorges that traverse north/south which cut the above communities, offering narrow bands of specialised habitat.

Typical plant associations are also indicated in the 50 x 50m quadrats surveyed and listed in Appendix 4.

6.3 Vertebrate Fauna

The initial Fauna Report for the Marandoo area was prepared by W.H. (Harry) Butler, following a survey conducted during May 1976. This Report contained a comprehensive annotated vertebrate Fauna inventory which has formed the basis for subsequent revision and identifications.

Following Butler's visit, a series of animal pit fall traps were installed on the Marandoo minesite. The resultant Fauna captures were identified by the Western Australian Museum. Alex Baynes conducted a survey of the Reserve's bats which significantly enhanced the accuracy and completion of the bat inventory. Mr. Eric McCrumb assisted with the installation of some of the early traps and with identifications of the many avi-fauna species. The current Fauna inventory is given in Appendix 6. It contains:

32 species of Mammals, including 12 species of bats and 7 introduced species such as cows, horses and mice etc.

100 bird species.

3 species of Amphibians (frogs).

61 species of Reptiles; this includes one tortoise, 42 species of lizards and 18 species of snakes, of which 11 are poisonous including three species considered to be dangerous.

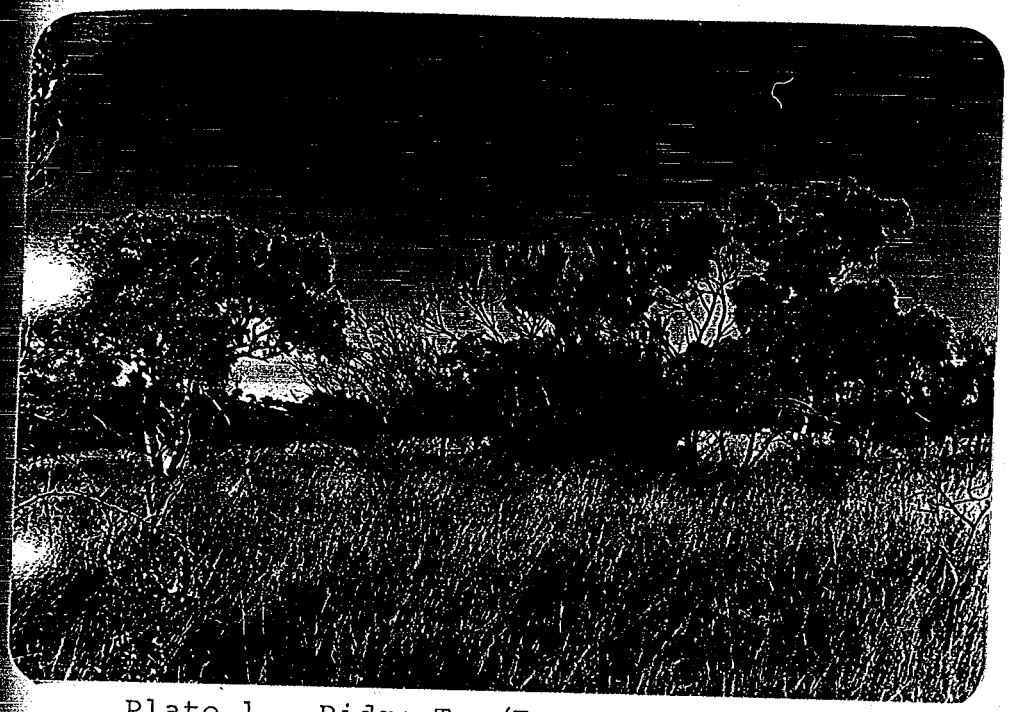


Plate 1. Ridge Top/Tree Steppe Community

This is typical Marra Mamba Ridge top type vegetation. The upper storey is dominated by Eucalyptus leucophloia with scattered Acacia aneura (mulga). The ground cover is predominately Triodia wiseana (spinifex) with occasional barren patches where Banded Iron outcrops coarse pedimentary soils.

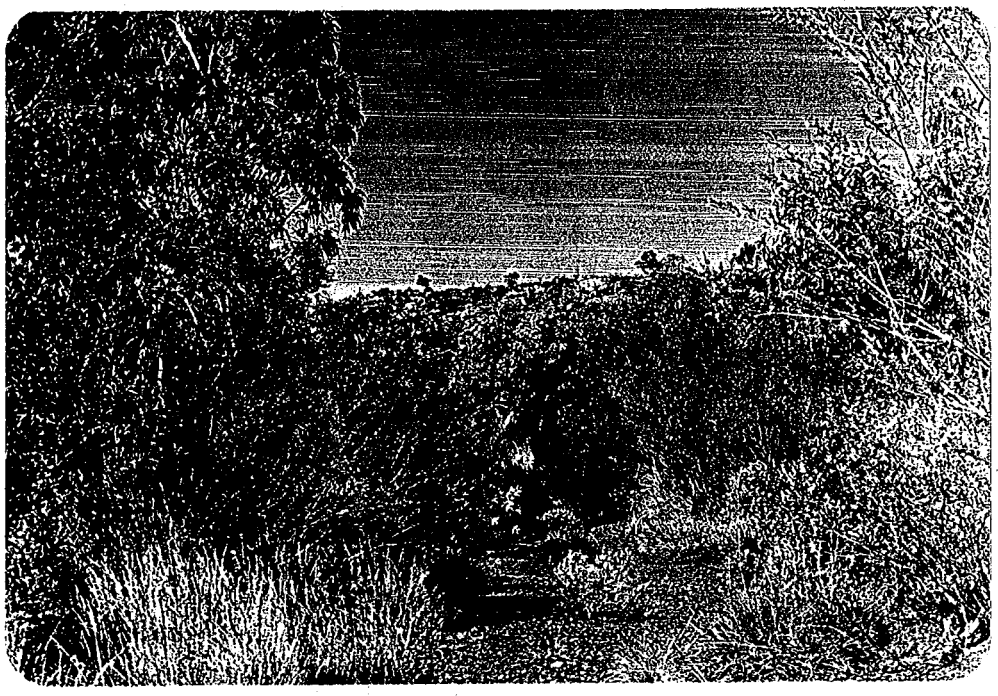


Plate 2. Gully Vegetation

The ridge is dissected by numerous gullies and gorges that flow into the flats to the North and South of the ridge.

These gullies are characterised by a more dense vegetation than is normally encountered in the surrounding countryside. In this view, the tall eucalypt is E. pattelaris, the acacia in the centre is A. citrinoviridis, whilst the shrubs lining the drainage channel are Petalostylis labicheoides.

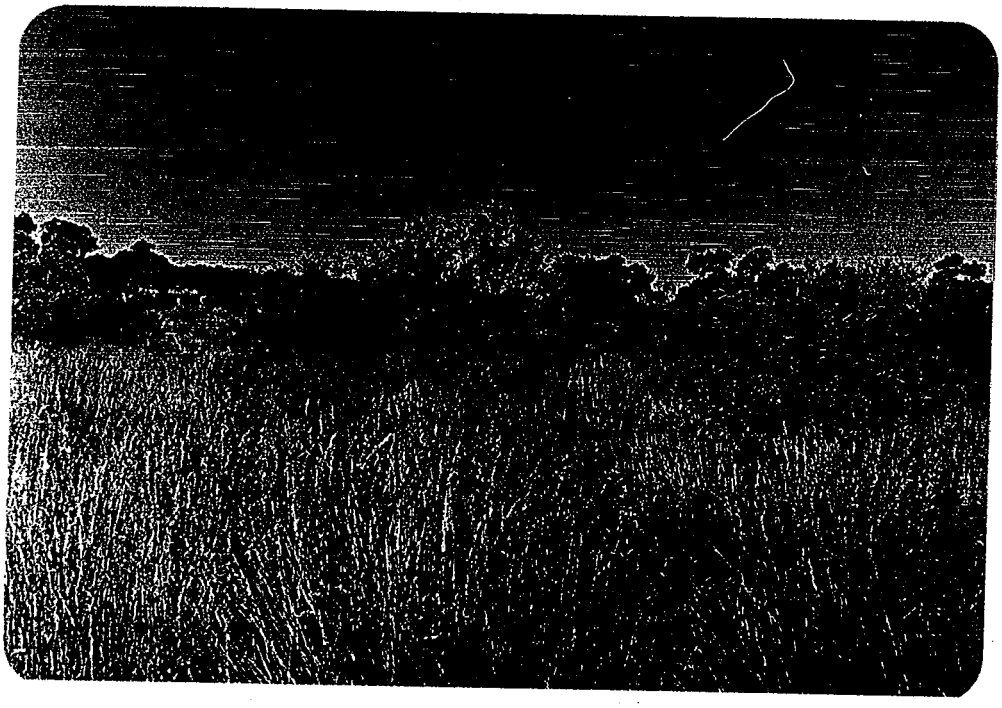


Plate 3. Scree Slope/Shrub Steppe Community

This community supports populations of scattered Eucalyptus spp. In the above, E. gamophylla, E. leucophloia and E. Setosa can be seen on the horizon and middle distance. Towards the foreground are Acacia shrubs which dominate the North facing screen slopes; these are A. pruinocarpa, A. atkinsiana, A. bivenosa and A. ancistrocarpa.

In the foreground can be seen flowering Triodia wiseana which is the dominant ground cover.

Plate 4. Plectrachne shinzii dominated transition zone between shrub steppe and low mulga woodland communities

Although providing a generally dense cover, the Plectrachne schinzii (Feathertop Spinifex) dominated community contains many areas of small, almost barren, patches of colluvial soil. To the South of this area, mulga (Acacia aneura) becomes more dominant until the mulga forms a woodland over annual grass with few, if any, remnant spinifex hummocks.

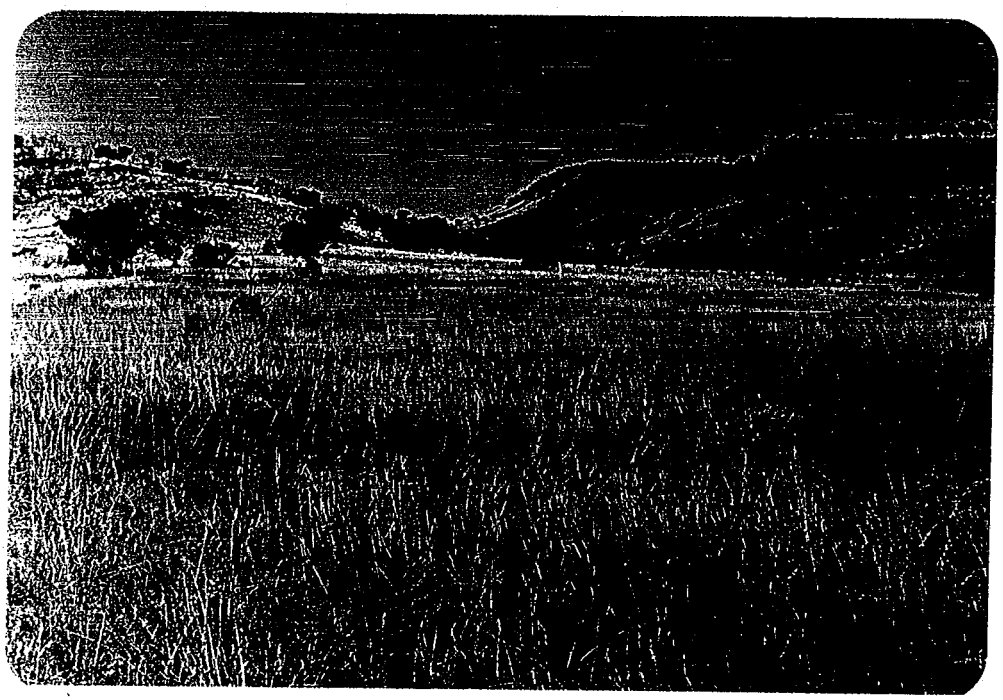


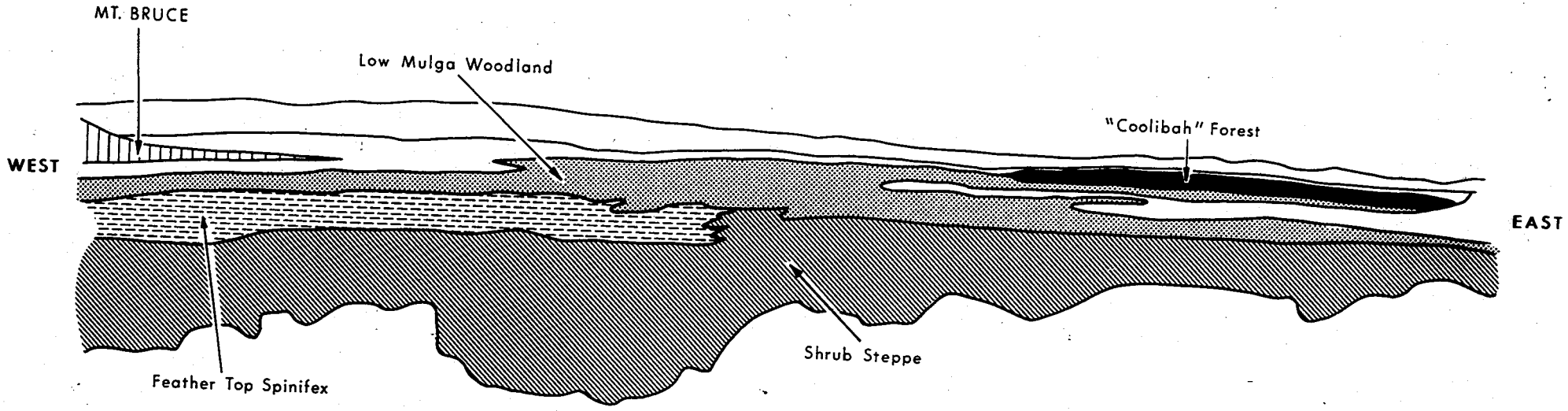
Figure 5. Grass Steppe

This community is typically located South of the Marra Mamba ridges that traverse the Central Hamersley Basin. The vegetation is sparse, being dominated by Triodia basedowii (spinifex) and scattered Eucalypts, usually E. leucophloia.

The more dense vegetation on top of the ridge, to the right of the above picture, is close to that shown in Plate 1 (open woodland).

Plate 6. Low Mulga Woodland

This community is sited in the lower laying area of the valley floor. The soils in this area are typically alluvial soils. The upper canopy is almost exclusively Acacia aneura with few mid storey shrubs. Following summer rainfall, this community supports lush annual grasses and, as shown in the above situation, MALVACEAE spp.



NOTE: Drainage is from West to East

over lay on plate 7.

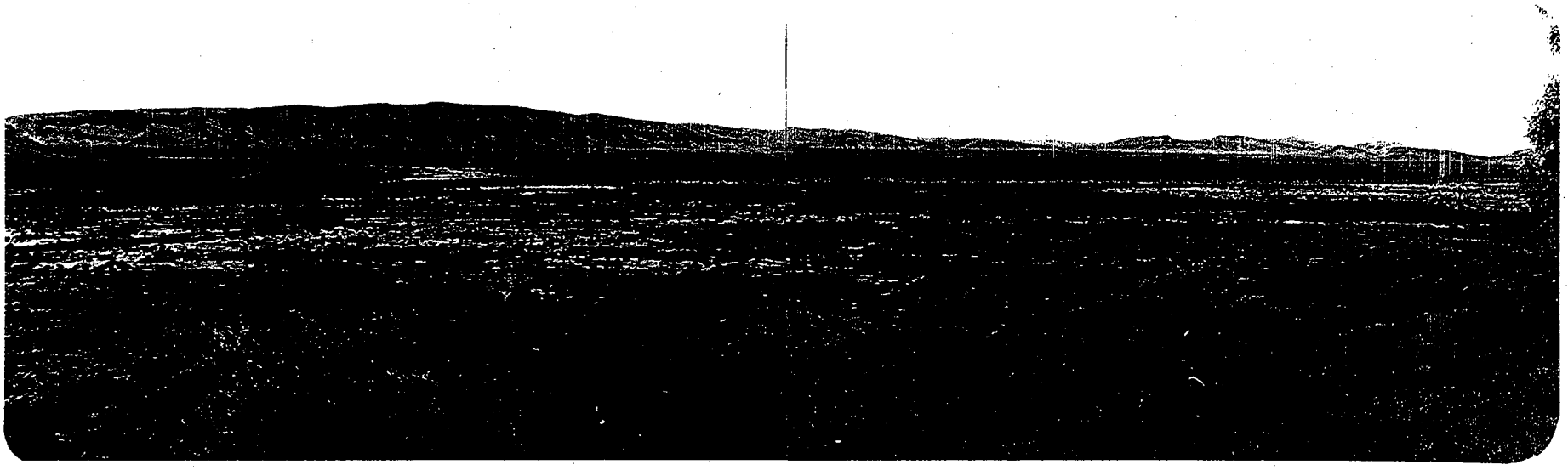


Plate 7. Panorama of the Alluvial Flats to the East of Mt. Bruce.

Plate 8. Eastern Fringe of Coolibah Forest

The upper canopy is provided by Eucalypts, although there are numerous mulga trees scattered throughout the open forest. The mulga trees are particularly noticeable around the fringes of the forest as shown in the above photograph. Hakea suberea (cork bark tree) is also common in this region.

The ground cover is predominately annual grass with occasional annual herbs and small shrubs.

9. ADVENTIVE PLANTS

Arthur Weston, during a site visit in 1977, compiled an inventory of species behaving as weeds within the Camp area. These species can be treated as being of one of two categories:

(1) Species also recorded on the Temporary Reserve.

(2) Species found only at the Campsite.

The former are by and large species native to the region or were established in the vicinity of Marandoo prior to any significant mineral exploration in the area. These species have responded to the increased water availability of the Camp environs by successfully competing with more desirable garden species.

The latter category is of more concern as their presence is due to the Camp's existence. There are numerous ways in which these species have found their way into Marandoo; these include:

(1) Seeds contained in soil of plants purchased in Perth and Tom Price.

(2) Seeds attached to vehicles, particularly travelling the short distance from other Pilbara towns.

In Appendix 7 Weston's list is reproduced. Note has subsequently been made of which species are also recorded in the remainder of the T.R. and which have been recorded on the mine restoration trial plots. The existence of adventive species in the trial plots, particularly the non-idigenous grass Cynodon dactylon (couch), is of concern due to its potential for establishment on the minesite during the mine rehabilitation programme. Such an event would be undesirable due, in part, to the Temporary Reserve's relationship with the Hamersley Range National Park where a responsibility exists to avoid the introduction of such species into the park area.

APPENDIX 1

MARANDOO FLORA INVENTORY

Included in the inventory is the following information.

1. Status on Temporary Reserve which is given as common, occasional or rare. An element of subjectivity has been necessary in classifying some species. In most instances, each species' status has been decided according to its status within its recognised habitat. For example, Eucalyptus leucophloia is common on ridges and is extremely rare on alluvial flats; because it is common on its ridge top habitat, it has been listed as common in the inventory. This information should only be used as a guide to a species' occurrence at Marandoo.

2. Habitats. The habitat classification follows the broad outline given in Section 6.2.2 of this Report.

3. Basis for inclusion. The principal records and collections are listed in order to assist confirmation of the inclusion of any of the listed species.

HERB	=	Recorded by the Herbarium (1975 Report).
MET	=	Records and collections made by M.E. Trudgen.
CGD	=	Collections made by Chris Dawe.
MND	=	Collections made under a general Marandoo Number. This includes collections made by A. Weston whilst at Marandoo..
Other	=	Principal collectors in this category are JP = Jack Paine and JB = John Burt whose specimens are with the general Marandoo collection.

MARANDOO FLORA LIST

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
ADIANTACEAE													
Cheilanthes	lasiophylla	c	*						*	*			
	tenuifolia	c	*						*	*			
Gymnogramma	sp.	c	*								*		*
POACEAE													
Aristida	anthoxanthides				*					*			
	contorta	c			*					2279			
	? nitidula	c			*					2299	110		
	? strigosa	c			*					2288			
Brachyachne	prostrata	o					*				127		
Cenchrus	ciliaris	o		*									
Chloris	sp.	r			*						175		
Chrysopogon	fallax	c		*	*					2290	138		
Cymbopogon	ambiguus	c	*	*	*	*	*		*	*			
Dactyloctenium	radulans	c			*						146	M129	
Dichanthium	affine	c			*					2286			
Digitaria	brownii	o			*					2291			
Enneapogon	caerulescens	c			*				*	*			
	pallidus	c			*					2285	106		
	sp.	c			*						168		
	sp.	c			*						154		
Eragrostis	dielsii	c			*						147		
	eriopoda	c			*					2289			
	falcata	c			*						145		
	pergracilis	c			*					2280		M128	
Eriachne	dominii	o	*			*					156		
	mucronata	c	*			*	*				128		
	pulchella	o	*				*			2276			
Paspalidium	clementii	c		*	*		*				131		
Perotis	rara	c		*	*		*				129		
Paraneuracne	muelleri	c			*		*			2269			
Plectrachne	schinzii	c			*		*		*	2276			
Schizachyrium	sp.	o					*				163		
Themeda	australis	c			*		*						
Tragus	australiensis	o			*						142		
Triodia	basedowii	o					*		*	*			
	wiseana	c	*	*		*	*	*	*	*			
	sp.	c	*	*			*	*					
Sp.	indet	o					*				122		
	indet	o		*			*				124		
	indet	o				*					134		
	indet	o		*							139		
	indet	o		*							143		
	indet	o		*							144		
	indet	r					*				150		

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
CYPERACEAE													
Bulbostylis	? barbata	r					*				108		
Cyperus	cunninghamii	o					*				132		
COMMELINACEAE													
Commelina	ensifolia	o			*						002		
MORACEAE													
Ficus	platypoda	o	*						*	*	087		
Parietaria	debilis	o	*	*					*	2256			
PROTEACEAE													
Grevillea	stenobotrya	c				*	*			*			
	wickhamii	o				*	*			*	006		
Hakea	suberea	c			*	*	*		*	*			
SANTALACEAE													
Anthobolus	leptomerioides	o				*	*		*	*			
Santalum	lanceolatum	o		*						*			JP032
	spicatum	o		*					*	*			
LORANTHACEAE													
Amyena	fitzgeraldii	c							*	*			JP054
	miguelli	o								*			
Diplatia	grandibracteata	c								*			JP030
Lysiana	murrayi	c								*			JP027
POLYGONACEAE													
Rumex	sp.	o				*	*			*			
CHENOPODIACEAE													
Atriplex	sp.	o			*				*	*			
Bassia aff.	brachyptera	c			*					2281			
	quinquecuspis	c			*				*				JP058
Chenopodium	inflatum	c		*	*	*	*			1811			
	melanocarpum	c		*	*	*	*			1810			
	rhadinostachyum	c		*	*	*	*		*	1808			
aff.	rhadinostachyum	c		*	*	*	*			1809			
Dysphania	littoralis	o			*					1817			
Maireana	villosa	c		*	*	*	*	*		*	019		
	sp.	c			*		*	*					
Salsola	kali	c			*		*			*			JP056

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
AMARANTHACEAE													
Achyranthes	aspera	o		*			*						*
Alternanthera	sp.	o		*			*			2248	137		
Amaranthus	mitchellii	o		*						2252			
	pallidiflorus	c		*	*		*			1806		M133	
	? viridis	o		*	*		*					M132	
Gomphrena	canescens	c			*		*			*			JP022
	cunninghamii	o					*				004		
Ptilotus	aervoides	o			*		*				023		
	calostachyus	c	*	*		*	*	*	*	*			
	clementii	c			*				*	*	014		
	exaltatus	c		*	*	*	*	*	*	*		M040	
	gaudichaudii	o		*	*					*	018		
	gomphrenoides	o		*	*		*			*	021		
	helipteroides	o			*		*			*	080		
	leucocoma	o					*			*	205		
	obovatus	c		*	*		*		*	*	031	M017	
	polystachyus	c		*	*		*			*			
	rotundifolius	o					*		*	*			
NYCTAGINACEAE													
Boerhavia	diffusa	c			*		*			1841	100		
	sp.	c			*		*			2249			
GYROSTEMONACEAE													
Codonocarpus	cotinifolius	o			*		*			*	192		JP047
PORTULACACEAE													
Calandrinia	ptychosperma	o			*					2287			
Portulaca aff.	oleracea	c		*	*						015		
	sp.	c		*	*						173		
CARYOPHYLLACEAE													
Polycarpaea	longiflora	o	*	*					*	*	027		
CAPPARACEAE													
Capparis	lasiantha	o		*	*		*		*	*			
	umbonata	o				*	*		*	*			
Cleome	oxalidea	o			*		*			*	135		
	viscosa	c		*	*	*	*			*			JP021

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
BRASSICACEAE													
Cuphanotus	andraeanus	o			*					2283			
Lepidium	sp. (1)	c			*					2277			
	sp. (2)	o			*					2272			
Stenopetalum	nutans	c			*					2275			
STYLOBASIACEAE													
Stylobasium	spathulatum	o					*						JP062
MIMOSACEAE													
Acacia	adoxa	c					*		*	*		M038	
	ancistrocarpa	c					*	*		*			JP050
aff.	ancistrocarpa	o					*					M153	
	aneura	c		*	*	*	*		*	*			
	arida	r					*					M035	
	atkinsiana	c				*	*					M154	
	bivenosa	c					*	*			188		
	citrino-viridis	o		*					*	*	025		
	daweana	r					*				210		
	dictyophleba	c					*						
	effusa	r					*				008		
	farnesiana	o		*						*	091		JP034
	hamersleyensis	c	*	*		*	*					M112	
	kempeana	r					*			*	165		
	kempeana x rhodophloia	o				*	*				189		
	maitlandii	c	*	*		*			*	*			JP051
	marra mamba	c				*	*		*				JSB011
	monticola	c	*	*		*				1295	158		
	pachyacra	c					*			*		M015	
	pruinocarpa	c			*	*	*		*	*			JP008
	pyrifolia	c	*	*		*	*	*	*	*			JP012
	rhodophloia	c				*	*				159		
	spondylophylla	r				*	*			*			
	stowardii	c				*	*				215		
	tenuissima	o		*		*	*				164		
	tetragonophylla	o				*	*		*	*	024		
	tumida	o			*		*						JP018
	victoriae	o		*			*			*			JP013
	xiphophylla	o					*		*	*			

c = common
o = occasional
r = rare

			STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
CAESALPINIACEAE														
Cassia	aff.	desolata	o					*		*				
	aff.	ferraria	o					*			*		M021	
		glutinosa	c		*	*	*	*	*	*	*		M001	
		helmsii	c			*		*		*	*		M005	
		leursenii	o					*			*			
		notabilis	c		*	*	*	*		*	*		M010	
		oligophylla	c		*		*	*			2264		M007	
	aff.	oligophylla	c		*		*	*		*	*			
		pleurocarpa	o					*					M004	
		pruinosa	c				*	*	*				M006	
	aff.	pruinosa	c				*	*	*				M022	
		sp.	c					*			2306			
		sp.	c					*			2307			
Petalostylis		labicheoides	c		*					*	*		M030	
FABACEAE														
Burtonia		polyzyga	c					*		*	*			
Crotalaria		novae-hollandiae	o					*						
		trifoliastrum	o		*						1813	011		
Glycine		tabacina	o		*						2267			
Indigofera	cf.	hirsuta	c			*		*			*	032	M039	
		monophylla	c			*	*	*	*	*	*	012	M043	
Mirbelia		viminalis	o					*			*			
Psoralea		pustulata	o					*			2266			
Swainsona		canescens	r			*					2292			
Templetonia		egena	o			*		*					M115	
Tephrosia		bidwillii	o		*							117		
		rosea	o		*						*		M024	
OXALIDACEAE														
Oxalis		sp.	o			*							M138	
ZYGOPHYLLACEAE														
Kallstroemia		platyptera	c	*			*	*		*	*			
Tribulus		astrocarpus	c		*	*		*			2250	102		
		terrestris	c		*	*		*			2251		M151	
Zygophyllum		iodocarpum	c			*					2271			

c = common
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r = rare

			STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
POLYGALACEAE														
Polygala		sp.	o					*			*	157		
EUPHORBIACEAE														
Andrachne		decaisnei	o			*					1301			
Chamaesyce	?	australis	c		*	*		*			2293			
		coghlanii	c		*	*					2268			
		sp.	c		*	*					2253			
		sp.	c	*	*						2296			
		sp.	o		*								M162	
Euphorbia		atoto ?	c		*	*						010		
		boophthona	o		*	*					*			
Phyllanthus	?	tuernrohrii	o								1302		M145	
CELASTRACEAE														
Maytenus		cunninghamii	r		*						2247			
STACKHOUSIACEAE														
Stackhousia	?	viminea	o					*		*	*	151		
SAPINDACEAE														
Diplopeltis		stuartii	c			*		*			*			JP048
Dodoneae		attenuata	c	*			*	*		*	*	058		
		lanceolata	o				*	*		*	*			
		peduncularis var. coriacea	c				*	*			*			JP042
		petiolaris	c		*		*	*		*	*	059		
TILIACEAE														
Corchorus		walcottii	c				*	*		*	*			
	aff.	walcottii	c				*	*			1837			
		sp.	c			*	*	*	*			140		
Triumfetta		micracantha	o	*	*						1623			
		sp. nov.	r		*					*	*			
MALVACEAE														
Abutilon		amplum	c			*		*			1801			
		cumminghamii	c			*		*			1803			
		fraseri	c		*						*			JP055
	var.	fraseri	c		*					*				
		sp.	c			*		*			1804			
		sp.	c		*	*		*			1803			

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
MALVACEAE (continued)													
Gossypium	australe	o		*						*			
	robinsonii	c		*		*			*	*		M031	
Hibiscus	coatesii	c		*	*		*		*	*		M037	
	sturtii	o		*	*		*						JP020
	sp.	c			*		*				144		
Malvastrum	spicatum	c			*		*		*	*	022		JP023
Sida	? cardiophylla	o	*				*			2260	130		
	echinocarpa	c		*			*	*	*	*			
	inclusa	o									176		JP031
	aff. virgata	?							*	*			JP029
	sp.	c			*		*			1840			
	sp.(spreading)	c			*		*					M155	
	sp.	c					*					*	
	sp.	r					*?			*			
STERCULIACAEA													
Brachychiton	australe	r		*						*			JSB
Keraudrenia	nephrosperma	c		*			*		*	*			JP037
Melhania	sp.? incana	o		*			*				115		
Waltheria	indica	o				*	*				116		
	virgata	o				*	*		*	*	026		
Rulingia	kempeana	c		*						*			JSB002
VIOLACEAE													
Hybanthus	aurantiacus	r		*						*	103		
MYRTACEAE													
Calytris	longiflora	o					*			*			JSB001
Eucalyptus	dichromophloia	o		*									JSB010
	gamophylla	c					*	*		*			
	leucophloia	c	*			*	*	*	*	*			JSB009
	terminalis	o					*						
	patellaris	c					*		*				
	trivalvis	o					*		*	*			
	sp. (aff. aspera?)	o		*					*				
	setosa	c				*	*			*			
Melaleuca	sp.	r		*			*			*	*		
HALORAGACEAE													
Haloragis	gossei	o			*				*	*			

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
ARALIACEAE													
Astrotricha	hamptonii	c	*						*	*	057		
APIACEAE													
Trachymene	hermicarpa	c				*			*	*	034		
OLEACEAE													
Jasminum	lineare	o		*		*	*			*	107		
ASCLEPIADACEAE													
Cynanchum	floribundum	o		*						*			
Cantatropis	kempeana	o					*		*	*			
Carcostemma	australe	c				*	*		*	*			JP057
Asclepiadaceae	sp. (1)	o			*		*			2302			
	sp. (2)	r		*						*			
CONVOLVULACEAE													
Convolvulus	erubescens	o		*					*	1845		M139	
Evolvulus	alsinoides	c		*	*	*	*			*		M125	JP039
Merremia	tridentata	o		*						*		M139	
Polymeria	sp.	r		*						2303			
Florana	sericea	c			*	*	*		*	*	071		
Ipomoea	muelleri	o		*			*			*		M142	
BORAGINACEAE													
Heliotropium	bacciferum	o					*					M144	
	tenuifolium	?					*			*			
Trichodesma	zeylanicum	c		*		*	*		*	*		M023	
VERBENACEAE													
Clerodendrum	lanceolatum	o		*						*			
DICRASTYLIDACEAE													
Spartothamnella	teucriiflora	o		*		*				2294			
LAMIACEAE													
Prostanthera	striatiflora	c	*						*	2259			
SOLANCEAE													
Datura	leichardtii	c		*			*			*		M034	
Nicotiana	benthamiana	o	*	*						2258			
	occidentalis	o	*	*						2257			
	sp.	o		*						2274			

c = common
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r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
SOLANACEAE (continued)													
Solanum	? horridum	o			*		*		*	*			
	ferocissimum	o		*	*		*			2273			JP035
	lasiophyllum	c		*	*	*	*	*	*			M041	
	sturtianum	c				*	*		*				
	sp.	c			*	*	*			*			
SCROPHULARIACEAE													
Mimulus	gracilis	o		*			*			*			
Stemodia	sp.	o		*							055		
BIGNONIACEAE													
Pandorea	doratoxylon	?		*					*	*			
PEDALIACEAE													
Josephina	imperatricis	o			*		*			*	172		
ACANTHACEAE													
Dicladanthera	sp.	o		*						*			
Rostellularia ?	pogonanthera	r		*							104		
Ruellia	primulacea	o		*					*	*			
MYOPORACEAE													
Eremophila	cuneifolia	c				*	*		*	*			
	fraseri	o					*			*	007		
	freelingii	?							*	*			
	latrobei	c		*	*	*	*		*	*			
	leucophylla	c			*		*		*	*	181		
	aff. platycalyx	?								*			
	sp. "magnificus"	c				*					062		
	sp.	o			*						016		
	sp.	c				*	*						*
	sp.	r	*							2262			
RUBIACEAE													
Canthium	latifolia	c					*				005		
	lineare	o			*		*		*	*	119		
Oldenlandia	croughiana	c				*	*			1831			
Rubiaceae	sp.	o		*	*						194		

c = common
o = occasional
r = rare

		STATUS ON TR	ROCK OUTCROPS	GULLIES/CREEK BEDS	MULGA WOODLAND	RIDGE TOP OPEN WOODLAND	SHRUB STEPPE	HUMMOCK GRASSLAND	HERB.	MET.	CGD	MND	OTHER
CUCURBITACEAE													
Mukia	maderaspatama	o		*			*		*	2265	166		
Cucurbitaceae	sp.	o			*		*			*		*	
CAMPANULACEAE													
Wahlenbergia	tumidifructa	r			*					1839			
LOBELIACEAE													
Lobelia	sp.	r	*	*					*	2255			
GOODENIACEAE													
Dampiera	candicans	c					*		*	*	152		
Goodenia	? maideniana	c			*		*			2270			
	prostrata	c			*		*			*			
	scaevolina	c		*		*	*	*		*			JP049
	sp.	o					*				009		
	sp.	o		*	*					1867			
	sp.	c		*	*	*	*						
Velleia	discophora	c				*	*		*	*		M032	
BRUNONIACEAE													
Brunonia	australis	o					*				070		
ASTERACEAE													
Bidens	bipinata	c		*	*		*				169		
Brachycome	ciliocarpa	c			*					*			
	iberidifolia	c		*	*						017		
	sp.	o			*					*			
Calocephalus	sp.	o		*			*			*		M108	
Calotis	hispidula	c			*					2297			
	multicaulis	c			*					2278			
Centipeda	cunninghamii	r		*						2305			
Flaveria	australasica	o			*					*			JP038
Helichrysum	gilesii	c			*		*					M102	
Helipterum	floribundum	c			*					2284			
Olearia	sp.	o		*						2261			
	sp.	o			*						149		
Pterigon	decurrens	?							*	*			
Pterocaulon	sphacelatum	c		*	*		*		*	2304			
Rutidosis	helichrysoides	o		*					*	*		M107	
Senecio	magnificus	c		*			*				076		
Streptoglossa	decurens	o		*			*				217		
Vittadinia	sp.	o								2282			

APPENDIX 4

VEGETATION QUADRATS

The following Quadrats are located on Appendix 5. The Quadrats are intended to reinforce the trends of Plant association given in the Transects of Appendix 2.

The Grid References are taken from the 1:100,000 Nat. Map series.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160978 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 740m STRUCTURE eLr aSr tHe xHi

RECORDER C. DAWE SLOPE 10 to 15°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Trioda wiseana	3		
Cassia notablis	2		
Eucalyptus gamophylla	1		
Cassia glutinosa	1		
Burtonia polyzyga	1		
Acacia lysiphloia	1		
Acacia arida	+		
Acacia pruinocarpa	1		
Acacia daweana	+		
Trachymene hemicarpa	1		
Acacia hamersleyensis	+		
Vallia discophera	1		
Acacia rhodophloia x kempeana	+		
Solanum lasiophyllum	+		
Corchorus sp ≠ walcottii	+		
Hibiscus sturtii	+		
Cassia cardiosperma	+		
Hakea suberea	+		
Acacia adoxa	+		
Aristida strigosa	+		
Goodenia sp	+		
Schizachyrium sp	+		

STRATA	HEIGHT	% COVER
Eucalyptus gamophylla	3m	5%
Acacia upper story	2 to 3m	10%
Acacia lower story	1m	10%
Triodia		± 35%
Herbs (predoninately Cassia notablis)		± 15%

COMMENTS

Total vegetation cover 60%

Almost no dry litter on soil

Soil - colluvial scree ±70% gravel/pebble most pebbles approx. 2 to 3cm

After burning remnant burnt stumps of Acacias visually dominant with good carpet of Triodia seedlings and Cassia notablis (cockroach bush)

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160977 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 730m STRUCTURE aLr tHc

RECORDER C. DAWE SLOPE 2°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	2		
Plectrachne schinzii	3		
Acacia aneura	1		
Acacia pruinocarpa	1		
Cassia sp No.1	+		
Solanum lasiophyllum	+		
Eremophyla latrobeii	+		
Eragrotis sp.	+		
Paraneuracne muelleri	+		
Hakea suberea	+		
Acacia anicistrocarpa	+		
Cassia oligophylla	+		
Ptilotus obavatus	+		
Mirbelia viminalis	+		

STRATA	HEIGHT	% COVER
To North of plot		
A. aneura + pruinocarpa		5%
Triodia / Plectrachne		50%

COMMENTS

Soil - loamy sand - colluvial

occasional patches of scree pellets

Plectachne visually dominant

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160974 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 720m STRUCTURE cLr aSi tHc

RECORDER C.DAWE SLOPE 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Trioda wiseana	4		
Acacia ancistrocarpa	2		
A. pruinocarpa	2		
A bivenosa	1		
A, tenuissima	1		
Eucalyptus gamophylla	+		
Acacia aneura	1		
Maireana villosa	+		
Canthium lineare	+		
Glycine tabocina	+		
Hakea suberea	+		
Ptilotus rotunidifolium	+		
Cassia glutinosa	+		
C. priunosa	+		
Acacia hemersleyensis	+		

STRATA	HEIGHT	% COVER
Eucalyptus gamophylla	4m	+
Acacia trees	2 to 3	10%
A. shrub		25%
Triodia		60%

COMMENTS

Soil - colluvial soil - large pebbles to 10 cm with occasional rocks to 20cm over loamy sand.

Acacia shrubs ie. ancistrocarpa and bivenosa visually dominant.

CRA—IRON ORE DIVISION No.4

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160972 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 720m STRUCTURE e;aLr aSi tHi

RECORDER C. DAWE SLOPE 5 to 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Trioda wiseana	3		
Eucalyptus gamophylla	+		
Acacia aneura	+		
A. bivenosa	+		
A, dictyophleba	+		
A. ancistrocarpa	+		
A. pruinocarpa	+		
Cassia pruinosa	+		
C. oligophylla	+		
C. notablis	2		
Burtonia polyzyga	1		
Ptilotus calostachyus	+		
P. rotundifolium	+		
P exaltatus	+		
Acacia tenuissima	+		
Cassia glutinosa	+		
Eragrostis sp	+		
Capparis lasiantha	+		
Sida echinocarpa ?	+		

STRATA	HEIGHT	% COVER
East side of quad.		
2 E. gamophylla	3 + 4m	
Small stand Mulga	4 - 5m	
Acacia sp.	2 - 3m	20%
Triodia sp.		50%

COMMENTS

Soil - colluvial soil - large pebbles to 10cm over loamy sand.

Young "spinifex" and C. notablis visually dominant.

Clearly in "disclimax"

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160970 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 720m STRUCTURE aLi xGi

RECORDER C DAWE SLOPE NIL (valley floor)

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Acacia aneura	3		
Ptilotus obovatus	1		
Eragrostis eriopoda	1		
Cleome viscosa	+		
Maireana villosa	+		
Salsola kali	+		
Aristida nitidula	1		
Amaranthus pallidiflorus	+		
Chamaesyce	+		
Ptilotus gaudichaudii	+		
P. exaltatus	+		
Chorchorus sp ≠ walcottii	+		
Abutilon cunninghamii	+		
Enneapogon caerulescens	1		
Eragrostis sp.	1		
Chrysopogon jallox	1		
Grass sp?	1		
Pterocaulon sphaceolatum	+		

STRATA	HEIGHT	% COVER
Mulga	4m+	20 to 30%
Over bunch grasses		+ − 60%

COMMENTS

Soil - Red sandy loam

Dead grasses forming litter with broken mulga branches.

Scattered termite mounds to 1m

Mulga dominant - apparantly in climax state

Note: lack of "spinifex"

CRA—IRON ORE DIVISION No.6

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160965 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 720m STRUCTURE aLr xHe

RECORDER C. DAWE SLOPE $< 5^{\circ}$

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Plectrachne schinzii	4		
Acacia pruinocarpa	1		
A. aneura	+		
Maireana villosa	+		
Acacia pachyacra	+		
Eremophila leucophylla	+		

STRATA	HEIGHT	% COVER
Occasional Acacia trees ie. A. ameura + A. priunocarpa	4m	5%
Plectachne schinzii		60%

COMMENTS

Soil - loamy sand - patches of scree pebble

"feather top" spinifex dominant

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 150977 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 730m STRUCTURE eLi aSr tHi

RECORDER C DAWE SLOPE 5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Eucalyptus leucophloia	3	Themeda australis	+
Triodia wiseana	3	Ptilotus obovatus	+
Acacia hamersleyensis	1	Trachymene hemicarpa	+
Cassia notablis	1	Trichodesma zeylanicum	+
Ptilotus rotundifolius	+	Acacia pachyacra	+
P. calostachyus	—	Maireana sp. No.1	+
P. exaltatus	+	Acacia marramamba	+
Acacia pruinocarpa	+	Burtonia polyzyga	+
Cassia pruinosa	+	Mirbelia viminalis	+
C. glutinosa	+	Templetonia egena	+
Solanum lasiophyllum	+		
Chorchorus sp ≠ walcottii	+		
Indigofera monophylla	+		
Sida echinocarpa	+		
Sida sp. No.1,	+		
Sida sp. No.3	+		
Eriachne sp	+		
Amaranthus pallidiflorus	+		
Capparis lasiantha	+		
Jasminium lineare	+		
Chamaesyce sp1 No.1	+		

STRATA	HEIGHT	% COVER
E. leucophloia	to 6m	25%
A. hamersleyensis	2.5m	5%
T. wiseana		40%

COMMENTS

Soil - loamy sand with surface rocks and pebbles.

Small creek on eastern side of quad. Eucalyptus leucophloia visually dominant stand of Acacia hamersleyensis following drainage channel on east side - lower strata in state of disclimax.

CRA—IRON ORE DIVISION No.8

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 161958 AREA 50 x 50m

DATE 8.8.81 ALTITUDE 735m STRUCTURE eLr axSr tHc

RECORDER C DAWE SLOPE ± 20°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	4		
Eucalyptus leucophloia	1		
Acacia pruinocarpa	1		
A. marramamba	+		
A. Aneura	+		
A. sp. No.1	+		
Cassia glutinosa	+		
C. sp. No.2	+		
Sarcostemma australe	+		
Ptilotus calostachyus	+		
Acacia rhodophloia	+		
Eriachne mucronata	+		
Eremophila latrobeii	+		
Kallstroemia platyptera	+		
Mirbelia viminalis	+		
Diplatia grandibracteata	+		
Abutilon sp. No.1	+		
Sida sp. No.4	+		
Acacia rhodophloia x kempeana	+		
Eremophila leucophylla	+		
Canthium lineare	+		

STRATA	HEIGHT	% COVER
Upper canopy of E. leucophloia & A. priunocarpa	±4m	10%
Cassia spp.	1m	5%
Triodia wiseana		±60%
Total cover		±70%

COMMENTS

Soil - scree slope course sand with pebbles outcropping BIF

Eucalyptus leucophloia in centre of plot visually dominant

Triodia dominant sp.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160955 AREA 50 x 50m

DATE 9.8.81 ALTITUDE 760m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 10 to 15°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Eucalyptus leucophloia	1		
Acacia aneura	2		
Triodia wiseana	3		
Acacia marramamba	1		
Cassia glutinosa	+		
Dodoneae petiolaris	+		
Kallstroemia platyptera	+		
Eremophila latrobeii	+		
E. leucophylla	+		
Dodoneae attenuatta	+		
Indegofera monophylla	+		
Ereachne mucronata	+		
Acacia rhodophloia	+		
Streptoglossa decumens	+		
Capparis lasiantha	+		
Polycarpaea longiflora	+		
Cymbopogon ambiguus	+		
Cassia sp. No.1	+		
Diplatia grandibracteata	+		
Sida sp. No.2	+		

STRATA	HEIGHT	% COVER
4. E. leucophloia	to 5m	+-5%
Acacia shrub	2.5 to 3m	10%
Triodia wiseana		50%
Barren		+-35%

COMMENTS

Soil - poor gravely soil thinly dispersed between area of outcropping BIF.

North of small gorge

E. leucophloia visually dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160952 AREA 50 x 50m

DATE 9.8.81 ALTITUDE 765m STRUCTURE eLr aSi tHi

RECORDER C DAWE SLOPE mainly flat S.W cnr small drops of 3m

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Eucalyptus leucophloia	+	Tephrosia bidwillii	+
Acacia aneura	1	Pterocaulon sphacelatum	+
Grevillea stenobotrya	+	Solanum ferocissimum	+
Dodoneae attenuate	1	Cleome viscosa	+
Dodoneae lanceolata	1	Melhania sp.	+
Dodoneae preduncularis	1	Abutilon fraseri	+
Dodeneae petiolaris	1	Hibiscus coatesii	+
Triodia wiseana	2	Kallstroemia platyptera	+
Cymbopogon ambiguus	1	Abutilon sp. No.1	+
Acacia marramamba	1	Eremophila sp. No.1	+
A. rhodophloia	+	Sarcostemma australe	+
A. pruinocarpa	+	Glycine tabacina	+
Sida sp. No.3	+	Senecio magnificus	+
Mukia maderaspatama	+	Sp. indet	+
Polycarpeae loniflora	+		
Eriachne mucronata	+		
Porana sericea	+		
Cassia sp. No.1	+		
C. sp. No.2	+		
C. glutinosa	+		
Acacia hamersleyensis	+		
Capparis lasiantha	+		

STRATA	HEIGHT	% COVER
Mulga, Eucalyptus, Grevillea		10%
Dense stand of Dodemeae spp. & A. marramamba	1to2m	20%
Total cover		60%

COMMENTS

Head of small gorge

Soil - patches of scree soil 50% outcropping material

Rock shelters in S.E. of quad.

Dense material of shrubs & climbers visually donimant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160952 AREA 50 x 50m

DATE 9.8.81 ALTITUDE 765m STRUCTURE eLr aSi tHi

RECORDER C DAWE SLOPE mainly flat S.W cnr small drops of 3m

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Eucalyptus leucophloia	+	Tephrosia bidwillii	+
Acacia aneura	1	Pterocaulon sphacelatum	+
Grevillea stenobotrya	+	Solanum ferocissimum	+
Dodoneae attenuate	1	Cleome viscosa	+
Dodoneae lanceolata	1	Melhania sp.	+
Dodoneae preduncularis	1	Abutilon fraseri	+
Dodeneae petiolaris	1	Hibiscus coatesii	+
Triodia wiseana	2	Kallstroemia platyptera	+
Cymbopogon ambiguus	1	Abutilon sp. No.1	+
Acacia marramamba	1	Eremophila sp. No.1	+
A. rhodophloia	+	Sarcostemma australe	+
A. pruinocarpa	+	Glycine tabacina	+
Sida sp. No.3	+	Senecio magnificus	+
Mukia maderaspatama	+	Sp. indet	+
Polycarpeae loniflora	+		
Eriachne mucronata	+		
Porana sericea	+		
Cassia sp. No.1	+		
C. sp. No.2	+		
C. glutinosa	+		
Acacia hamersleyensis	+		
Capparis lasiantha	+		

STRATA	HEIGHT	% COVER
Mulga, Eucalyptus, Grevillea		10%
Dense stand of Dodemeae spp. & A. marramamba	1to2m	20%
Total cover		60%

COMMENTS

Head of small gorge

Soil - patches of scree soil 50% outcropping material

Rock shelters in S.E. of quad.

Dense material of shrubs & climbers visually donimant.

CRA—IRON ORE DIVISION No.12

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160948 AREA 50 x 50m

DATE 9.9.81 ALTITUDE 790m STRUCTURE aLi aSi tHr

RECORDER C DAWE SLOPE 10° increasing to 25°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	2		
Acacia aneura	2		
A. rhodophloia	2		
A. rhodophloia x kempeana	1		
Eremophila leucophylla	+		
Grevillea stenobotrya	1		
Dodoneae attenuata	+		
Dodoneae petiolaris	+		
Polyearpeae longiflora	1		
Eucalyptus aspera x papuana	+		
Sarcostemma australe	+		
Cassia oligophylla	+		
Cymbopogon ambiguus	+		
Kallstroemia platyptera	+		
Solanum ferocissimum	+		
Sida sp. No.1	+		
Cassia sp. No.2	+		

STRATA	HEIGHT	% COVER
Mulga & Miniritchie giving dense mid story cover		40 to 50%
approx. 60 to 70% total cover.		

COMMENTS

Pockets of gravely soil between outcropping BIF.

Poor ground cover spinifex notably sparse.

Miniritchie visuallly dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 160945 AREA 50 x 50m

DATE 9.9.81 ALTITUDE 800m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 0

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Trioda wiseana	3		
Eucalyptus leucophloia	1		
Acacia sp. No.1	1		
A. pyrifolia	+		
Hakea suberea	+		
Grevellea wickhamii	+		
Cassia glutinosa	+		
Eremophila magnificus	+		
E. cuneifolia	+		
Acacia spondylophylla	+		
Burtonia polyzyga	+		
Indigofera monophylla	+		
Waltheria sp.	+		
Acacia marramamba	+		
Cassia sp. No.2	+		
Acacia aneura	+		
Cassia pruinosa	+		

STRATA	HEIGHT	% COVER
E. laucophloia	5m	5%
Acacia shrub	2m	10%
Triodia		50%
Total cover		60 to 70%

COMMENTS

Soil - scree meterial with outcropping ore, gravelly with rocks 5 to 15cm.
No litter on ground

Eucalyptus leucophloia visually dominant

CRA—IRON ORE DIVISION No.14

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF. 151957 AREA 50 x 50m

DATE 10.10.81 ALTITUDE 740m STRUCTURE eLi aSi tHc

RECORDER C DAWE SLOPE >5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	4	Santalum sp. No.1	+
Eucalyptus leucophloia	+	Hakea suberea	+
E. dicromopholia	1	Acacia pyrifolia	+
Acacia hamersleyensis	+	Eriachne mucronata	+
A. aneura	+	Cassia glutinosa	+
A. tetragonophylla	+	Indigofera monophylla	+
A. maitlandii	+	Hibiscus coatsii	+
A. pruinocarpa	+	Sida echinocarpa	+
A. bivenosa	+	Templetonia egena	+
Cassia pruinosa	+	Corchorus sp.	+
C. oligophylla	+		
Ptilotus obovatus	+		
Dodoneae petiolaris	+		
Clerodendrum lanceolatum	+		
Cassia helmsii	+		
Abutilon fraseri	+		
Capparis lasiantha	+		
Rulingia kempeana	+		
Pterocaulon sphacelatum	+		
Rulingia kempeana	+		
Themeda australa	+		
Gossypium robinsonii	+		
Acacia marramamba	+		
Petalostylis labicheoides	+		
Trichodesma zeylanicum	+		

STRATA	HEIGHT	% COVER
Eucalyptus spp.	6m	10%
Acacia shrub Riverine shrub	2+m	30%
Triodia		60%

COMMENTS

Large drainage system - near lower reaches of scree slopes - creek 10m wide.

Eucalyptus spp lining creek visually dominant - vegetation lining creek.

Considerably more dense than rest of quadrat.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 174944 AREA 50 x 50m

DATE 7.12.81 ALTITUDE 800m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	3		
Eucalyptus leucophloia	1		
Acacia aneura	1		
A. bevenosa	+		
A. marramamba	+		
A. priumocarpa	+		
A. pyrifolia	+		
A. sp. No.1	+		
Burtonia polyzyga	+		
Hakea suberea	+		
Cassia glutinosa	+		
Cassia sp. No.1	+		
Eriachne mucronata	+		
Eremophlila magnificus	+		
Dodoneae attenuata	+		
Grevillea wickhamii	+		

STRATA	HEIGHT	% COVER
E. laucophloia	5m	5%
Acacia shrub Gravillea shrub	1 to 3m	20%
Triodia		40%
Clear/Barren		25%

COMMENTS

Soil - sandy soil around outcropping ore near top of small ridge.

Eucalyptus & shrub visually dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 174946 AREA 50 x 50m

DATE 7.12.81 ALTITUDE 740m STRUCTURE aSi tHc

RECORDER C DAWE SLOPE 5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	3		
Acacia aneura	1		
A. marramamba	+		
A. pruinocarpa	+		
A. rhodophloia	+		
Eriachne mucronata	1		
Diplatia grandibracteata	+		
Dodoneae petiolaris	+		
Grevillea stenobotrya	+		
Solanum sturtianum	+		

STRATA	HEIGHT	% COVER
Acacia shrub	1 to 3.5m	20%
Triodia wiseana		50%

COMMENTS

Soil - scree

Acacia shrub visually dominant

Grevillea treated as Acacia in description.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 174950 AREA 50 x 50m

DATE 7.12.81 ALTITUDE 730m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia Wiseana	3		
Eucalyptus leucophloia	+		
Acacia aneura	1		
A. marramamba	I		
A. pruinocarpa	+		
A. pyrifolia	+		
A. sp. No.1	+		
Corchorus sp.	+		
Eremophila sp. No.1	+		
Indegofera hirsuta	+		
Solanum sturtianum	+		
Corchorus walcottii	+		

STRATA	HEIGHT	% COVER
E. Leucophloia	5m	+
Acacia shrub	1.5 to 3m	20%
Small shrubs (cassia etc)	<1m	10%
Triodia		40%

COMMENTS

Soil typical scree material - north facing slope of Marra Mamba ridge.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 179944 AREA 50 x 50m

DATE 7.12.81 ALTITUDE 740m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE <5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	4		
Eucalyptus leucophloia	+		
Acacia pruinocarpa	+		
A. rhodophloia	+		
A. sp. No.1	+		
Cassia glutinosa	+		

STRATA	HEIGHT	% COVER
E. leucophloia	4 to 5m	+
Acacia shrub	2m	15%
Triodia		60 to 70%
Barren		15 to 20%

COMMENTS

Soil - sandy scree material with patches of outcropping ore.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 175964 AREA 50 x 50m

DATE 10.12.81 ALTITUDE 715m STRUCTURE aSi xZr tHc

RECORDER C DAWE SLOPE <5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	+		
Plectrachne schinzii	4		
Acacia aneura	1		
Cassia obigophylla	1		
Ptilotus exaltatus	+		
Canthium lineare	+		
Sida sp. No.2	+		
Paraneuracne muelleri	+		

STRATA	HEIGHT	% COVER
Mulga	7m	5 to 10%
Small shrubs	<1m	5%
Triodia/Plectrachne		60%

COMMENTS

Soil - fine sandy material with scree pebbles.

Feathertop visually dominant - pockets of Triodia.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 177967 AREA 50 x 50m

DATE 10.12.81 ALTITUDE 715m STRUCTURE aLr tHc

RECORDER C DAWE SLOPE flat

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Plectrachne schinzii	4		
Acacia aneura	1		
Maireana villosa	+		
Chenapodium sp	+		
Tribulus	+		
Stackhousia viminea	+		

STRATA	HEIGHT	% COVER
Mulga	4 to 5m	5%
Plectrachne		60%

COMMENTS

Soil - sandy loam, deep colluvial soils
5 to 10% litter, broken branches etc.

Mulga over feathertop.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 123962 AREA 50 x 50m

DATE 10.12.81 ALTITUDE 735m STRUCTURE aSr tHc

RECORDER C DAWE SLOPE FLAT

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Plectrachne schinzii	4		
Acacia ancistrocarpa	+		
Acacia aneura	1		
Cassia glutinosa	+		
Maireana villosa	+		
Chenapodium sp.	+		

STRATA	HEIGHT	% COVER
Acacia shrub	1.5 to 2m	5%
Plectrachne		70%

COMMENTS

Soil - sandy colluvial loam.

Feathertop spinifex visually dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 185973 AREA 50 x 50m

DATE 10.12.81 ALTITUDE 820m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	2		
Eucalyptus leucophloia	+		
Acacia adoxa	+		
A. marramamba	+		
A. maitlandii	1		
A. pyrifolia	+		
A. sp. No.1	+		
A. rhodophloia x Kempeana	+		
Cassia glutinosa	1		
Eriachne mucronata	1		
Triodia sp.	2		

STRATA	HEIGHT	% COVER
E. leucophloia	5m	5%
Acacia shrub	1.5 to 2.5m	20%
Cassia shrub	1m	5%
Triodia		55%

COMMENTS

Soil - pediment

South facing slope on low ridge

CRA—IRON ORE DIVISION

No.23

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 176955 AREA 50 x 50m

DATE 10.12.81 ALTITUDE 715m STRUCTURE aLr aSr tHc

RECORDER C DAWE SLOPE 5^0

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	3	Enneapogon sp.	+
Plectrachne schinzii	2	Acacia tumida	+
Acacia aneura	1	Paraneuracne muelleri	1
A. bivenosa	+		
A. pachyaera	+		
A. pruinocarpa	—		
Cassia oligophylla	+		
Chrysopogon fallax	+		
Eriachne sp.	+		
Themeda australis	1		
Ptilotus exaltatus	+		
P. abovatus	+		
Sida sp. No.2	+		
Salsola kali	+		
Templetonia egéna	+		
Sida sp. No.5	+		
Kallstroemia platyptera	+		
Indegofera hirsuta	+		
Enneapogon pallidus	+		
Gomphrena canescens	+		
Cassia pleurocarpa	+		
Chamaesyce australis	+		
Keraudrenia nephrosperma	+		

STRATA	HEIGHT	% COVER
Mulga	4m	5%
Acacia shrub	2m	5%
Plectrachne/Triodia/ other grasses		80%

COMMENTS

Soil - sandy scree with large pebbles 10cm over shale material.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 175960 AREA 50 x 50m

DATE 14.12.81 ALTITUDE 715m STRUCTURE aSi tHc

RECORDER C DAWE SLOPE $< 5^{o}$

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Plectrachne schinzii	4		
Acacia aneura	1		
A. pachyacra	+		
A. pruinocarpa	+		
A. rhodophloia x Kempeana	+		
Ptilotus exaltatus	+		
Maireana villosa	+		
Salsola kali	+		
Chamaesyce sp. No.1	+		
Paraneurachne muelleri	+		
Ptilotus helipteroides	+		
Hibiscus sp.	+		

STRATA	HEIGHT	% COVER	COMMENTS
Mulga	3 to 4m	5 to 10%	Soil - alluvial sandy loam, occasional broken branches as litter.
Plectrachne		+ -70%	Plectrachne (feathertop spinifex) visually dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 173952 AREA 50 x 50m

DATE 14.12.81 ALTITUDE 725m STRUCTURE aLr aSi tHc

RECORDER C DAWE SLOPE 5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	4		
Acacia aneura	+		
A. pruinocarpa	+		
Solanum lasiophyllum	+		
Cassia cardiosperma	+		
Cassia glutinosa	+		
E. pruinosa	+		
Eriachne mucronata	+		
Ptilotus clostachyus	+		
P. exaltatus	+		
Canthium lineare	+		
Gossypium robinsonii	+		
Indegofera monophylla	+		
Solanum sturtianum	+		
Dampiera candicans	+		

STRATA	HEIGHT	% COVER
Acacia trees	4m	5%
Acacia/Cassia shrub	1 to 2.5m	20%
Triodia		60%

COMMENTS

Soil - scree material, sandy material over shale. North facing slope of low ridge.

Acacia shrub/
Triodia visually dominant

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 187942 AREA 50 x 50m

DATE 14.12.81 ALTITUDE 760m STRUCTURE eLr aSi tHc

RECORDER C DAWE SLOPE 5 to 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	4		
Eucalyptus	+		
Acacia aneura	1		
A. pruinocarpa	+		
A. rhodophloia	+		
Cassia glutinosa	1		
C. pruinosa	+		
Ptilotus calostachyus	+		
P. exaltatus	+		
Goodenia scaevolina	+		

STRATA	HEIGHT	% COVER
E. leucophloia	4 to 5m	5%
Acacia shrub	2 to 3m	20%
Triodia		60%

COMMENTS

Soil - scree material, sandy material over shale. North facing slope of ridge.

Acacia shrubs visually dominant.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 200941 AREA 50 x 50m

DATE 15.3.82 ALTITUDE 720m STRUCTURE aLr aSi tHc

RECORDER C DAWE SLOPE 10°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia wiseana	2		
T. sp.	2		
Eriachne dominii?	+		
E. mucronata	1		
Perotis rara	+		
Indet grass sp.	+		
Acacia aneura	+		
A. marramamba	+		
A. pruinocarpa	1		
A. rhodaphloia x kempeana	+		
A. sp. (seedlings)	+		
Cassia glutinosa	+		
C. pruinosa	+		
Maireana villosa	+		
Dodoneae attenuata	+		
Kallstroemia platyptera	+		
Corchorus sp.	+		
Gossypium robinsonii	+		
Sida echinocarpa	+		

STRATA	HEIGHT	% COVER
Acacia pruinocarpa	3m	5 - 10%
A. aneura	3m	
Shrubs	1m	10%
Triodia/grasses		50%
Total		70%

COMMENTS

Soil - pediment patches of outcropping ore/BIF.

North facing slope.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 176934 AREA 50 x 50m

DATE 15.3.82 ALTITUDE 760m STRUCTURE aSr tHc

RECORDER C. DAWE SLOPE 0°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia basedowii	3		
T. wiseana?	1		
Acacia pyrifolia	+		
Cassia pruinosa	+		
C. oligophylla	+		
Mirbelia viminalis	+		

STRATA	HEIGHT	% COVER
Shrub	1m	5%
Triodia		+ -60%

COMMENTS

Sparsely vegetated, typical Jeerinah type vegetation.

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 176935 AREA 50 x 50m

DATE 15.3.82 ALTITUDE 760m STRUCTURE eLr aSr tHc

RECORDER C DAWE SLOPE 0°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Triodia basedowii	3		
T. wiseana?	1		
Eucalyptus leucophloia	+		
Acacia pyrifolia	+		
A. tennuisima?	+		
Cassia pruinosa	+		
C. oligophylla	+		
Mirbelia viminalis	+		
Ptilotus calostachyus	+		
Maireana villosa	+		

STRATA	HEIGHT	% COVER
E. leucophloia	4m	5%
Shrub	1m	5%
Triodia		60%

COMMENTS

Open landscape except for spinifex sparsely vegetated.

Gravel soil - Jeerinah formation

VEGETATION RECORD SHEET

LOCATION MARANDOO GRID REF 243918 AREA 50 x 50m

DATE 16.3.82 ALTITUDE 710m STRUCTURE aLc aSi xGi tHi

RECORDER C. DAWE SLOPE 5°

SPECIES	ABUNDANCE	SPECIES	ABUNDANCE
Acacia aneura	2		
A. pruinocarpa	1		
Hakea suberea	+		
Triodia wiseana	1		
Plectrachne schinzii			
Enneapogon sp.	1		
Perotis rara	—		
Ptilotus obovatus	1		
Eremophila fraseri	+		
E. leucophylla	+		
Maireana villosa	+		
Ptilotus exaltatus	+		
Grass seedlings (indet)	1		
Cassia helmsii	+		
C. sp. No.1	+		
C. pleurocarpa	—		

STRATA	HEIGHT	% COVER
Acacia aneura/pruinocarpa	±4m	30%
Shrubs	0.5 to 1.5m	10%
Triodia		±10%
Small annuals & grasses		±20%

COMMENTS

Mulga woodland sandy loam soil (tert colluvium).

Large amount of litter - mainly mulga branches.