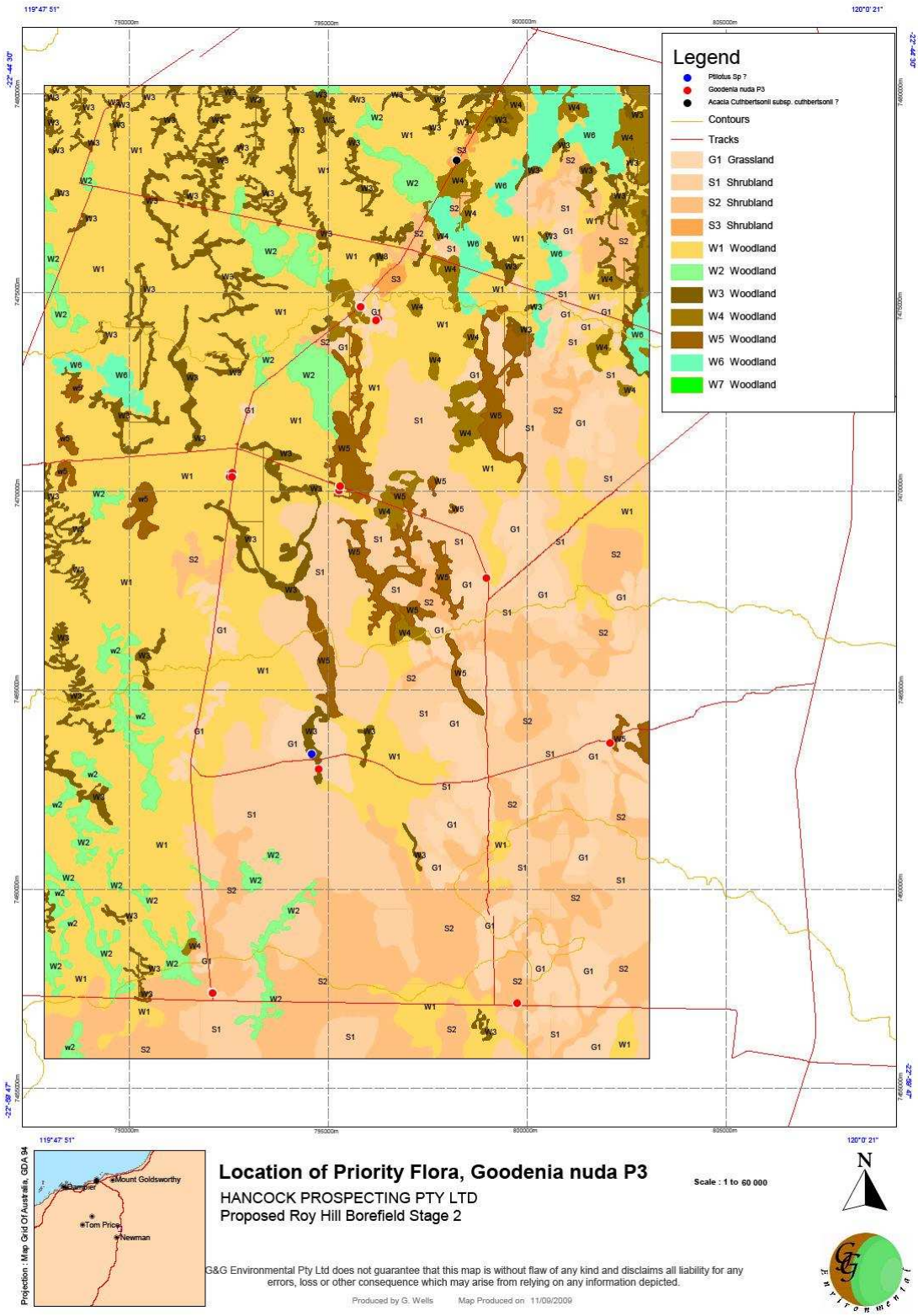
APPENDIX F

TABLE AND MAP OF PRIORITY FLORA LOCATIONS IN THE ROY HILL IRON ORE PROJECT BOREFIELD SURVEY AREA

Priority flora found by G&G Environmental in the proposed Roy Hill Borefield. Datum: GDA 94 Zone 50.

Species	Priority	Cover	Northing	Easting	Comment
Goodenia nuda	P3	1 individual	7470110.19	795273.49	in site existing bore 5 unit W1
Goodenia nuda	P3	2 individuals	7470022.75	795271.66	in site existing bore 5 unit W1
Goodenia nuda	P3	4 individuals	7470121.16	795295.29	in site existing bore 5 unit W1
Goodenia nuda	P3	1 individual	7470390.99	792589.38	near track in unit W1
Goodenia nuda	P3	1 individual	7470401.26	792590.63	near track in unit W1
Goodenia nuda	P3	1 individual	7470413.17	792597.00	near track in unit W1
Goodenia nuda	P3	3 individuals	7470459.17	792541.07	near track in unit W1
Goodenia nuda	P3	5 individuals	7470360.63	792523.97	near track in unit W1
Goodenia nuda	P3	8 individuals	7470463.59	792592.94	near track in unit W1
Goodenia nuda	P3	1 individual	7470369.34	792583.47	near track in unit W1
Goodenia nuda	P3	3 individuals	7457411.63	792086.77	in site HB45 unit W7
Goodenia nuda	P3	6 individuals	7457386.58	792093.86	in site HB45 unit W7
Goodenia nuda	P3	30 individuals	7457126.66	799741.13	in site HB35 unit S2
Goodenia nuda	P3	20 individuals	7463670.22	802076.67	in site HB30 unit W5
Goodenia nuda	P3	2 individuals	7467833.70	798971.10	in bore 7 unit W1
Goodenia nuda	P3	1 individual	7474366.42	796215.14	in unit W1
Goodenia nuda	P3	1 individual	7474338.44	796252.69	in unit W1
Goodenia nuda	P3	7 individuals	7474310.55	796200.03	in unit W1
Goodenia nuda	P3	2 individuals	7474635.56	795814.25	in unit W1
Goodenia nuda	P3	2 individuals	7474666.24	795788.97	in unit W1
Goodenia nuda	P3	7 individuals	7474639.39	795809.18	in unit W1
Goodenia nuda	P3	5 individuals	7463328.77	794659.45	in site HB28 unit W3
Ptilotus Sp ?			7463321.86	794652.58	in site HB28 unit W3
Acacia Cuthbertsonii subsp. cuthbertsonii ?			7478331.88	798220.56	in site HB4b unit S3


Legend
Ptilotus Sp ?
Goodenia nuda P3
Acacia Cuthbertsonii subsp. cuthbertsonii ?
Contours
Tracks
G1 Grassland
S1 Shrubland
S2 Shrubland
S3 Shrubland
W1 Woodland
W2 Woodland
W3 Woodland
W4 Woodland
W5 Woodland
W6 Woodland
W7 Woodland
119°47' 51"
120°0' 21"
Mount Goldsworthy
Tom Price
Newman
Projection : Map Grid Of Australia, GDA 94
Location of Priority Flora, Goodenia nuda P3
HANCOCK PROSPECTING PTY LTD
Proposed Roy Hill Borefield Stage 2
Scale : 1 to 60 000
N
G&G Environmental Pty Ltd does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.
Produced by G. Wells
Map Produced on 11/09/2009

APPENDIX G

REVIEW OF THE DITRIBUTION OF EACH SPECIES RECORDED IN THE ROY HILL IRON ORE PROJECT BOREFIELD SURVEY AREA

SPECIES	NatureMap records	Distribution Comments
Abutilon lepidum	80	Numerous records in vicinity of survey area
Abutilon otocarpum	80	Numerous records in vicinity of survey area
Acacia ancistrocarpa	260	Numerous records in vicinity of survey area
Acacia aneura var. *aneura*	229	Survey area within known distribution, occurs at northern-most section
Acacia citrinoviridis	117	Numerous records in vicinity of survey area
Acacia cuthbertsonii subsp. *cuthbertsonii* ?	132	Survey area within known distribution, occurs at northern-most section
Acacia pachyacra	86	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Acacia paraneura	97	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Acacia pruinocarpa	145	Numerous records in vicinity of survey area
Acacia rhodophloia	216	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Acacia sclerosperma subsp. *sclerosperma*	336	Numerous records in vicinity of survey area
Acacia tetragonophylla	407	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Acacia victoriae	65	Survey area well within known distribution
Ammannia multiflora	99	Survey area well within known distribution
Anthobolus leptomerioides	104	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Aristida contorta	422	Numerous records in vicinity of survey area
Aristida latifolia	71	Numerous records in vicinity of survey area
Boerhavia burbidgeana	49	Survey area well within known distribution
Bonamia rosea	149	Numerous records in vicinity of survey area

SPECIES	NatureMap records	Distribution Comments
Calandrinia quadrivalvis	67	Numerous records in vicinity of survey area
Calocephalus sp. Wittenoom	0	Florabase shows 10 locations the majority are grouped in the vicinity of the survey area
*Cenchrus ciliaris**	193	Numerous records in vicinity of survey area
*Chloris virgata**	65	Numerous records in vicinity of survey area
Chrysopogon fallax	114	Numerous records in vicinity of survey area
*Citrullus lanatus**	52	Survey area well within known distribution, however, few records for Pilbara region
Cleome viscosa	184	Numerous records in vicinity of survey area
Corchorus parviflorus	38	Survey area well within known distribution
Corymbia aspera	44	Survey area well within known distribution
Corymbia hamersleyana	181	Numerous records in vicinity of survey area
Cucumis maderaspatanus	168	Numerous records in vicinity of survey area
Cymbopogon obtectus	84	Numerous records in vicinity of survey area
Dichanthium sericeum subsp. *humilius*	67	Numerous records in vicinity of survey area
Dicrastylis cordifolia	94	Numerous records in vicinity of survey area
Dissocarpus paradoxus	92	Numerous records in vicinity of survey area
Dodonaea petiolaris	132	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Dysphania kalpari	94	Numerous records in vicinity of survey area
Enchylaena tomentosa var. *tomentosa*	180	Numerous records in vicinity of survey area
Enneapogon caerulescens	242	Numerous records in vicinity of survey area
Enteropogon ramosus	64	Survey area well within known distribution
Eragrostis eriopoda	227	Numerous records in vicinity of survey area
Eragrostis pergracilis	102	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Eragrostis setifolia	92	Numerous records in vicinity of survey area
Eremophila cuneifolia	140	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Eremophila forrestii	50	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Eremophila lanceolata	30	Numerous records in vicinity of survey area
Eremophila latrobei subsp. *filiformis*	49	Numerous records in vicinity of survey area

SPECIES	NatureMap records	Distribution Comments
Eremophila longifolia	226	Numerous records in vicinity of survey area
Eriachne aristidea	137	Numerous records in vicinity of survey area
Eriachne flaccida	107	Survey area well within known distribution
Eulalia aurea	160	Numerous records in vicinity of survey area
Euphorbia australis	272	Numerous records in vicinity of survey area
Euphorbia boophthona	124	Numerous records in vicinity of survey area
Euphorbia coghlanii	147	Numerous records in vicinity of survey area
Evolvulus alsinoides var. *villosicalyx*	74	Numerous records in vicinity of survey area
Fimbristylis microcarya	102	Numerous records in vicinity of survey area
Flaveria australasica	10	Survey area well within known distribution
Glycine canescens	168	Numerous records in vicinity of survey area
Gomphrena canescens	42	Survey area well within known distribution
Goodenia muelleriana	80	Numerous records in vicinity of survey area
Goodenia nuda P3	37	Numerous records in vicinity of survey area
Goodenia pascua	36	Numerous records in vicinity of survey area
Goodenia prostrata	63	Numerous records in vicinity of survey area
Goodenia stobbsiana	76	Numerous records in vicinity of survey area
Goodenia vilmoriniae	28	Survey area within known distribution, few records in Pilbara, survey area occurs at north-western-most section of known distribution
Hakea lorea	34	Survey area well within known distribution
Heliotropium heteranthum	93	Numerous records in vicinity of survey area
Heliotropium inexplicitum	38	Numerous records in vicinity of survey area
Hibiscus burtonii	67	Numerous records in vicinity of survey area, survey area occurs in northern-most section of known distribution
Hibiscus gardneri	54	Survey area within known distribution, occurs at northern-most section
Hibiscus sturtii	30	Survey area well within known distribution
Indigofera colutea	102	Survey area well within known distribution
Ipomoea diamantinensis	17	Survey area within known distribution, few records in Pilbara, survey area occurs at western-most section of known distribution
Ipomoea muelleri	136	Numerous records in vicinity of survey area
Keraudrenia velutina subsp. *elliptica*	223	Survey area well within known distribution
Leiocarpa semicalva	19	Numerous records in vicinity of survey area, survey area in northern-most section of known distribution

SPECIES	NatureMap records	Distribution Comments
Lepidium echinatum	41	Numerous records in vicinity of survey area
Maireana georgei	410	Numerous records in vicinity of survey area
Maireana planifolia	153	Numerous records in vicinity of survey area
Maireana tomentosa subsp. *tomentosa*	113	Survey area well within known distribution
Maireana triptera	153	Numerous records in vicinity of survey area, survey area in northern-most section of known distribution
Maireana villosa	162	Numerous records in vicinity of survey area
*Malvastrum americanum**	102	Numerous records in vicinity of survey area
Perotis rara	74	Survey area well within known distribution
*Portulaca oleracea**	82	Survey area well within known distribution
Portulaca pilosa	64	Survey area well within known distribution
Psydrax latifolia	78	Survey area within known distribution, occurs at northern-most section
Pterocaulon sphacelatum	169	Numerous records in vicinity of survey area
Ptilotus aervoides	158	Numerous records in vicinity of survey area
Ptilotus astrolasius	24	Survey area well within known distribution
Ptilotus exaltatus	118	Numerous records in vicinity of survey area
Ptilotus gaudichaudii	98	Numerous records in vicinity of survey area
Ptilotus gaudichaudii var. *gaudichaudii*	0	Florabase shows in excess of fifty records, numerous wihtin the vicinity of the survey area
Ptilotus gomphrenoides	55	Numerous records in vicinity of survey area
Ptilotus gomphrenoides var. *gomphrenoides*	42	Numerous records in vicinity of survey area
Ptilotus helipteroides	261	Numerous records in vicinity of survey area
Ptilotus macrocephalus	158	Numerous records in vicinity of survey area
Ptilotus obovatus	664	Numerous records in vicinity of survey area
Ptilotus polystachyus	133	Numerous records in vicinity of survey area
Ptilotus schwartzii	47	Numerous records in vicinity of survey area, survey area in northern-most section of known distribution
Ptilotus sp.		
Rhagodia eremaea	148	Numerous records in vicinity of survey area
Rhodanthe sterilescens	83	Numerous records in vicinity of survey area, survey area in northern-most section of known distribution
Rhynchosia minima	144	Numerous records in vicinity of survey area
Salsola tragus	130	Numerous records in vicinity of survey area
Scaevola amblyanthera	13	Survey area well within known distribution

SPECIES	NatureMap records	Distribution Comments
Sclerolaena cornishiana	80	Numerous records in vicinity of survey area
Sclerolaena cuneata	103	Numerous records in vicinity of survey area, survey area in northern-most section of known distribution
Senna artemisioides subsp. *helmsii*	181	Numerous records in vicinity of survey area
Senna artemisioides subsp. *oligophylla*	192	Numerous records in vicinity of survey area
Senna ferraria	38	Numerous records in vicinity of survey area
Senna glutinosa	36	Survey area well within known distribution
Senna notabilis	122	Numerous records in vicinity of survey area
Senna symonii	34	Numerous records in vicinity of survey area
Sida fibulifera	83	Numerous records in vicinity of survey area
Sida platycalyx	27	Survey area well within known distribution
Sida rohlenae	20	Survey area well within known distribution
Sida sp. spiciform panicles	0	Florabase shows approximately 30 locations many of which occur within the vicinity of the survey area
Solanum dioicum	189	Survey area within known distribution, occurs at south-western-most section
Solanum lasiophyllum	452	Numerous records in vicinity of survey area
*Sonchus oleraceus**	793	Survey area well within known distribution
Sporobolus australasicus	84	Numerous records in vicinity of survey area
Streptoglossa adscendens	19	Numerous records in vicinity of survey area
Streptoglossa odora	68	Numerous records in vicinity of survey area
Tephrosia virens	64	Survey area within known distribution, occurs at south-western-most section
Trianthema glossostigma	64	Numerous records in vicinity of survey area
Tribulus macrocarpus	58	Numerous records in vicinity of survey area
Trichodesma zeylanicum	247	Numerous records in vicinity of survey area
Triodia basedowii	162	Numerous records in vicinity of survey area
Triodia schinzii	117	Numerous records in vicinity of survey area
*Vachellia farnesiana**	120	Numerous records in vicinity of survey area
Vittadinia dissecta	5	None within vicinity of survey area however Florabase shows 6 locations surrounding survey area

APPENDIX H

RESULTS OF DEC DECLARED RARE AND PRIORITY FLORA DATABASE SEARCH

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
6 October 2008

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Acacia bromilowiana	4	P	Tom Price, Balfour Downs Stn, West Hamersley Ophthalmia	Jul-Aug
Acacia daweana	3	P	Hamersley Range, Karijini N.P.	Jul
Acacia subtiliformis	3	P	Hamersley Ranges, Hancock Range, Down North,	Jul,Aug
Adiantum capillus-veneris	2	P,SW	Hamersley Range, Karijini N.P.,	
Amaranthus cuspidifolius	3	P	Little Sandy Dester, Gibson Desert,	Jul-Sep
Amaranthus sp. Todd River (G. Chippendale 482)	1	P	Newman	
Aristida jerichoensis var. subspinulifera Newman,	1	P,*	East Angelas, Sylvania Stn,	
Atriplex flabelliformis	3	P,K	Roy Hill Stn, Gordon Downs Stn,	
Barbula ehrenbergii	1	P,*	Dale's Gorge, Hamersley Range	
Bothriochloa decipens var.	1	P,*	Hamersley Range, Quennsland	
Brachyscome sp. Wanna Munna Flats (S. van Leeuwen 4662)	1	P	Tom Price, Newman	July, Sep
Brunonia sp. Long hairs (D.E. Symon 2440)	1	GLD, P	Schwerin Mural Crescent, Newman	Jul
Calocephalus beardii ms	1	P	Three Rivers Stn, Gibson Desert, Roy Hill Stn	Aug
Calotis latiuscula	3	P,GLD	Giles, Warburton, Blackstone Range, Rawlinson Range, Hamersley	

Range				
Calotis squamigera	1	P,*	Wittenoom, Hamersley Range	
Crotalaria smithiana	3	P,*	Sturt Creek Stn, Ethel Creek Stn, Roy Hill Stn, Eastern States	Jun
Dampiera anonyma ms	3	P	Mt Bruce, Mt Nameless, Hamersley Ranges, Mt Sheila, Karijini NP	Jun-Aug
Dampiera metallorum ms	3	P	Hamersley Range, Mt Meharry, West Angelas, Karijini NP	Sep
Eragrostis sp.Mt Robinson (S.van Leeuwen 4109)	1	P	Hamersley Range	Sep
Eremophila forrestii subsp. Pingandy	2	P	Karijini NP, Hamersley Range NP, Turee Creek Stn	May-Jul
(M.E. Trudgen 2662)				
Eremophila forrestii subsp. viridis	3	P	Hamersley Range, Onslow, Canning Stock Route	Aug
Eremophila magnifica subsp. magnifica	4	P	Hamersley Ranges, Tom Price, Marandoo, Wittenoom	
Eremophila magnifica subsp. velutina	3	P	Hamersley Ranges, Newman, Marandoo	
Eremophila pilosa	1	P	Roy Hill, Jigalong Community	

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Eremophila sp. West Angelas (S. van Leeuwen 4086)	1	P	West Angela Hill, Opthalmia, Hamersley Range	Sep-Oct
Eremophila sp.Snowy Mountain (S. van. Leeuwen 3737)	1	P	Hamersley Range	
Eremophila spongiocarpa Marillana	1	P	Mt Marsh, Chichester Range, Station, Mulga Downs Station	
Eremophila youngii subsp. lepidota Vernon,	4	P,MW	S Cape Range, Roy Hill, N Mt Mar,Jun Paraburdoo, Muggon Stn	
Eucalyptus lucens	1	P	Hamersley Range	
Fimbristylis sieberiana Fitzroy -	3	P,K	Hamersley Range, Millstream, Crossing, King Leopold Range, Halls Creek, Little Sandy Desert	
Geijera salicifolia Tom Price,	3	P,*	Mt Samson, Mt Howieson, Hamersley Ranges, Qld, NT	
Genus sp. Hamersley Range hilltops (S van Leeuwen 4345)	1	P	Hamersley Range	-
Goodenia hartiana	2	P	Rudall River, Telfer, Jimblebar	Aug
Goodenia lyrata	1	GLD,P	Laverton, Newman	
Goodenia nuda	4	P	Weeli Wolli, Roy Hill, Mt Stuart	Aug
Goodenia sp. East Pilbara (AA Mitchell Nullagine, PRP 727)	1	P	Weeli Wolli, Mulga Downs, Aug,Sep NW of Newman	
Goodenia sp. Pilbara calcrete (A.A. Mitchell PRP 1436)	1	P	Newman, Nullagine	Aug
Indigofera gilesii subsp. gilesii Meekatharra, West	3	P,MW	Hamersley Range, May,Aug Angelas	
Indigofera sp.Bungaroo Creek (S. van Leeuwen 4301)	3	P	Hamersley Range, Tom Price	Jul
Iotasperma sessilifolium Stn,	3	P	Ethel Creek Stn, Coolawanya Jul-Sep Juna Downs Stn, Hamersley Range	
Lepidium catapycnon Range,	R	P	Wittenoom Gorge, Hamersley Oct-Jan? Weeli Wolli, Newman	
Myriocephalus scalpellus	1	P	Roy Hill	Sep
Nicotiana heterantha Roy Hill,	1	K,P	Broome, Dampier Peninsula, May-Jun Mandora, Anna Plains	
Nicotiana umbratica Bar,	3	P	Newman, Karijini N.P., Marble Apr, Jun,	

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Oldenlandia sp. Hamersley Station (A.A. Hamersley Mitchell PRP 1479)	3	P	Millstream-Chichester N.P., Mar-May, Range, Caoolawanyah Stn	Jul
Oxalis sp. Pilbara (M.E. Trudgen 12725)	2	P	Karijini N.P., Hamersley Range	May
Peplidium sp. Fortescue marsh (S. van Leeuwen 4865	1	P	Roy Hill	Aug
Pilbara trudgenii	2	P	Hamersley Range	Sep-Oct
Polymeria sp. Hamersley (ME Trudgen Marandoo, 11353)	3	P	Hamersley Stn, Wittenoom, Hamersley Ranges	
Rhagodia sp.Hamersley (M. Trudgen 17794)	3	P	Hamersley Ranges	
Rhynchosia bungarensis	4	P	Hamersley Ranges, Chichester May-Dec Ranges, Yardie Creek, Robe River, Tom Price, Ashburton, East Lewis Island, Burrup Peninsula, Dampier Archipelago	
Rostellularia adscendens subsp.adscendens var.latifolia	3	P	Hamersley Ranges	
Scaevola sp. Hamersley Range basalts (S. van Leeuwen 3675)	2	P	Hamersley Range	
Sida sp. Barlee Range (S van Leeuwen 1642)	3	P	Barlee Range, Turee Creek, Paraburdoo, Hamersley Range	Aug
Sida sp. Hamersley Range (K. Newbey 10692)	1	P	Hamersley Range, Lawloit Range	
Spartothamnella puberula	2	P	Mt Bruce, Hamersley Range, West Angelas, NT	-
Stemodia sp. Battle Hill (A.L. Payne 1006)	1	P	Roy Hill Stn	Jul
Tecticornia sp. Christmas Creek (K.A. Shepherd and T. Colmer et al. KS	1	P	Fortescue Marsh, Roy Hill Stn	Jul-Aug
Tecticornia sp. Roy Hill (H Pringle 62)	3	P	Roy Hill, Fortescue Marsh	Nov
Tephrosia sp. Cathedral Gorge (FH Fortescue Mollemans 2420)	3	P	Newman, Hamersley Range, Valley	
Tetratheca fordiana ms	1	P	West Angelas, Hamersley Range	Sep
Thryptomene wittweri	R	MW,P,GLD	Hamersley Range, Mt Augustus, Aug-Oct Carnarvon Range, White Cliffs Stn, NT	
Triodia sp. Mt. Ella (ME Trudgen 12739)	3	P	Hamersley Range, Mt Ella	
Vittadinia sp. Coondewanna Flats (s. van Leeuwen 4684)	1	P	Hamersley Range	Jul

HANCOCK PROSPECTING PTY LTD

ROY HILL 1
VEGETATION AND FLORA ASSESSMENT

Providing sustainable environmental strategies, management and monitoring solutions to industry and government.

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ROY HILL 1 PROJECT

FLORA AND VEGETATION ASSESSMENT

HANCOCK PROSPECTING PTY LTD

April 2009

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A	C Macpherson C Winton	G Connell	28.11.08	G Connell	HPPL	28.11.08
B	C Macpherson		27.01.09		Ailan Tran, HPPL Gemma Connelly, SMEC	27.01.08
C	C Macpherson		02.04.09	C Macpherson	Ailan Tran, HPPL	27.04.09

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Executive Summary

Background

Hancock Prospecting Pty Ltd is proposing to mine iron ore within the Roy Hill 1 Project area (Tenements E46/334, 335, 586 and 592 and E47/1326) approximately 120 km north of Newman in the eastern Pilbara, Western Australia.

As part of the requirements for a Public Environmental Review assessment, Hancock Prospecting Pty Ltd commissioned *ecologia* Environment (*ecologia*) to conduct a Level 2 biological assessment of the Roy Hill 1 project area.

Two phases of survey were conducted during October 2005 and May 2006. Due to the severity of seasonal influence upon the flora during the first and most extensive phase, a third phase of survey was undertaken during March 2008 to supplement the floristic inventory and refine the definition of mapping communities.

Vegetation and flora

A total of 477 species from 53 families and 170 genera was recorded during the three phases of survey. The most commonly recorded families were Poaceae (83 taxa), Mimosaceae (41 taxa), Malvaceae (37 taxa), Amaranthaceae (28 taxa), Fabaceae (26 taxa), Chenopodiaceae (23 taxa) and Caesalpiniaceae (18 taxa). The most commonly recorded genera were *Acacia* (39 species), *Ptilotus* (18 species), *Senna* (16 species), *Eremophila* (12 taxa), and *Abutilon, Eragrostis* and *Eriachne* (11 taxa respectively). Thirteen families and 86 genera were represented by a single taxon.

This pattern of representation of families and genera is typical of flora of the Eastern Pilbara. The relatively high number of grasses (Poaceae) reflects the large proportion of the survey area in which an understorey of soft grasses and herbs are present, rather than hummock grasses (*Triodia* spp.) steppes, which encompass a relatively small proportion and in which a smaller number of taxa from this family would be present.

No taxon listed as Critically Endangered, Endangered, Conservation Dependant, Extinct, or Extinct in the Wild under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) were recorded in the survey area.

No taxon listed as Declared Rare Flora under the Western Australian Wildlife Conservation (Rare Flora) Notice 2006(2) of the *Wildlife Conservation Act 1950* was recorded in the survey area. However there are six taxa recorded to date which are categorised Priority species, the details of which are summarised below:

Table S 1 Threatened flora recorded within the Roy Hill 1 survey area

Species	Priority	Number of locations at Roy Hill	Number of locations impacted	% Locations impacted at Roy Hill	Number of other locations regionally
Rhagodia sp. Hamersley	P3	29	22	76	4
Acacia glaucocaesia	P3	1	1	100	>20
Goodenia nuda	P3	12	5	42	15
Polymeria sp. Hamersley	P3	5	0	0.0	4
Rostellularia adscendens var. *latifolia*	P3	1	0	0	12
Eremophila youngii subsp. *lepidota*	P4	7	2	29	21
Total		55	30		

Due to the extent of clearing within the project area there is a moderate to high degree of impact locally to three of the six recorded priority flora; *Rhagodia* sp. Hamersley, *Acacia glaucocaesia* and *Goodenia nuda.* However the regional impact to *Acacia glaucocaesia* and *Goodenia nuda* is relatively minor given the large number of populations recorded elsewhere. The impact to *Rhagodia* sp. Hamersley is more significant, given that more than half of the recorded locations for this taxon at Roy Hill will be cleared and that this location represents 20% of the total number of locations currently known. However, it is noteworthy that this is a relatively new taxon that has yet to be formally described. It has probably been identified as other *Rhagodia* species, particularly when sterile, in many previous surveys. Consequently the number of locations currently known is likely to significantly underestimate the total distribution and abundance of the taxon.

A total of nineteen naturalised alien taxa (weeds) were recorded during the Roy Hill vegetation and flora assessment. One weed of national significance, **Parkinsonia aculeata,* was recorded within the Roy Hill project area. This taxon is also a Declared Weed at a state level in the East Pilbara. Two species with Declared Weed status in some portions of the state but not the East Pilbara were also recorded; **Argemone ochroleuca* subsp. *ochroleuca* (P1, P2, P3, P4) and **Heliotropium europaeum* (P1, P3, P4). By far the most widespread and abundant introduced species recorded was **Cenchrus ciliaris* (grass) which dominates many of the creek banks in the area. The perennial herb **Malvastrum americanum* was also relatively widespread and abundant.

No nationally listed Threatened Ecological Communities have been recorded within the project area. At a state level there are no vegetation complexes present which are identified as Threatened Ecological Communities. The Fortescue Marsh is not a TEC but is listed as a wetland of national significance. It is informally listed as an ecosystem at risk by the DEC. Whilst not within the footprint of clearing, this areas is located to the immediate south of the western portion of Lease E46/ and is dependent upon sheet flow and drainage from, amongst others, Kulkinbah Creek, Kulbee Creek and other minor creek lines which

from, amongst others, Kulkinbah Creek, Kulbee Creek and other minor creek lines which drain through the footprint of disturbance. These creeklines will require temporary diversion for the development to proceed. The proposed mining activities therefore have the potential to disturb the Fortescue Marsh.

The vegetation of the project area has been mapped at a scale of 1:20,000 and has been categorized into four major vegetation associations:

1. *Triodia* sp. Hummock Grasslands
2. Riparian Associations
3. *Acacia aneura* Low Woodlands and Tall Shrublands
4. Miscellaneous Shrublands

These associations were further classified into eighteen sub-associations.

At a regional level, the majority of the leases are comprised of land systems which, by virtue of their relatively broad distribution elsewhere, will be minimally impacted by vegetation clearance within the current project. The most regionally constrained unit, Warri, which has a total representation of only 24,509 hectares, occurs within a portion of the project area that is almost entirely outside the proposed impact footprint. The land system unit most impacted by the proposed vegetation clearance, Turee, will be reduced in regional representation by 2.63%. Due to its suitability for pastoral activities, it is estimated that less than 1% of the total representation of this unit remains in very good condition. The condition of this unit within the Roy Hill project area ranges from good to poor with the largest area of representation of this unit in the south east of Lease 46/592 (largely unaffected by the impact footprint) in poor condition and the area in the northwest of in good condition. Approximately half of this north western area lies within the disturbance footprint.

Much of the vegetation, particularly the riparian communities and, to a lesser but significant degree, the Mulga communities are in relatively poor condition within the Roy Hill project area due to extensive historical and current pastoral activities. The abundance of several introduced species, particularly **Cenchrus ciliaris,* which is often the dominant understory species along creek banks, is indicative of grazing pressure. The abundance of the spiny native taxon *Acacia synchronicia* in the southern portion of the Project area is also indicative of grazing pressure, as this species is unpalatable to cattle. In contrast the areas of hummock grass steppes (*Triodia* spp) that occur in the most northern and in the north eastern portion of the project area are in good to very good condition with a much lower level of weed invasion and greater integrity in the shrub and ground strata.

1.0 INTRODUCTION

1.1 Project Background

The proposed Roy Hill 1 Iron Ore Project (the Project) is situated approximately 120 km north east of Newman (Figure 1-1). The project area is located within existing Hancock Prospecting Pty Ltd (HPPL) exploration tenements E46/334, 335, 586 and 592 and E47/1326 (Figure 1-2). It is situated in the hills and foot slopes of the Chichester Range and the plains of the Fortescue Valley and covers approximately 4,160 hectares of open rangelands.

The current iron ore resource for the project has been estimated at approximately 600 million tonnes with expected extensions currently under exploration. It is proposed to utilise conventional open-cut strip mining methods. The main project components will consist of:

- A number of open pits which would generally be located in three main areas;
- Out-of-pit overburden emplacement areas;
- Infrastructure including ore crushing and screening plant, site administration facilities, rail load-out facilities and stockpiles;
- If required, a beneficiation plant for ore washing and associated residue storages;
- An accommodation camp;
- Haul and access roads;
- Public road diversion;
- Electricity transmission line; and
- A rail spur corridor to a junction near existing rail corridors and railways to ports.

This report details the outcomes of a Level 2 flora and vegetation assessment undertaken by *ecologia* during November 2005, July 2006 and March 2008. The data collected during these three phases has been supplemented by further data collected during several exploration approval clearance surveys over the project area from September 2005 to November 2008.

Figure 1-1: Regional Location of the Roy Hill project area.

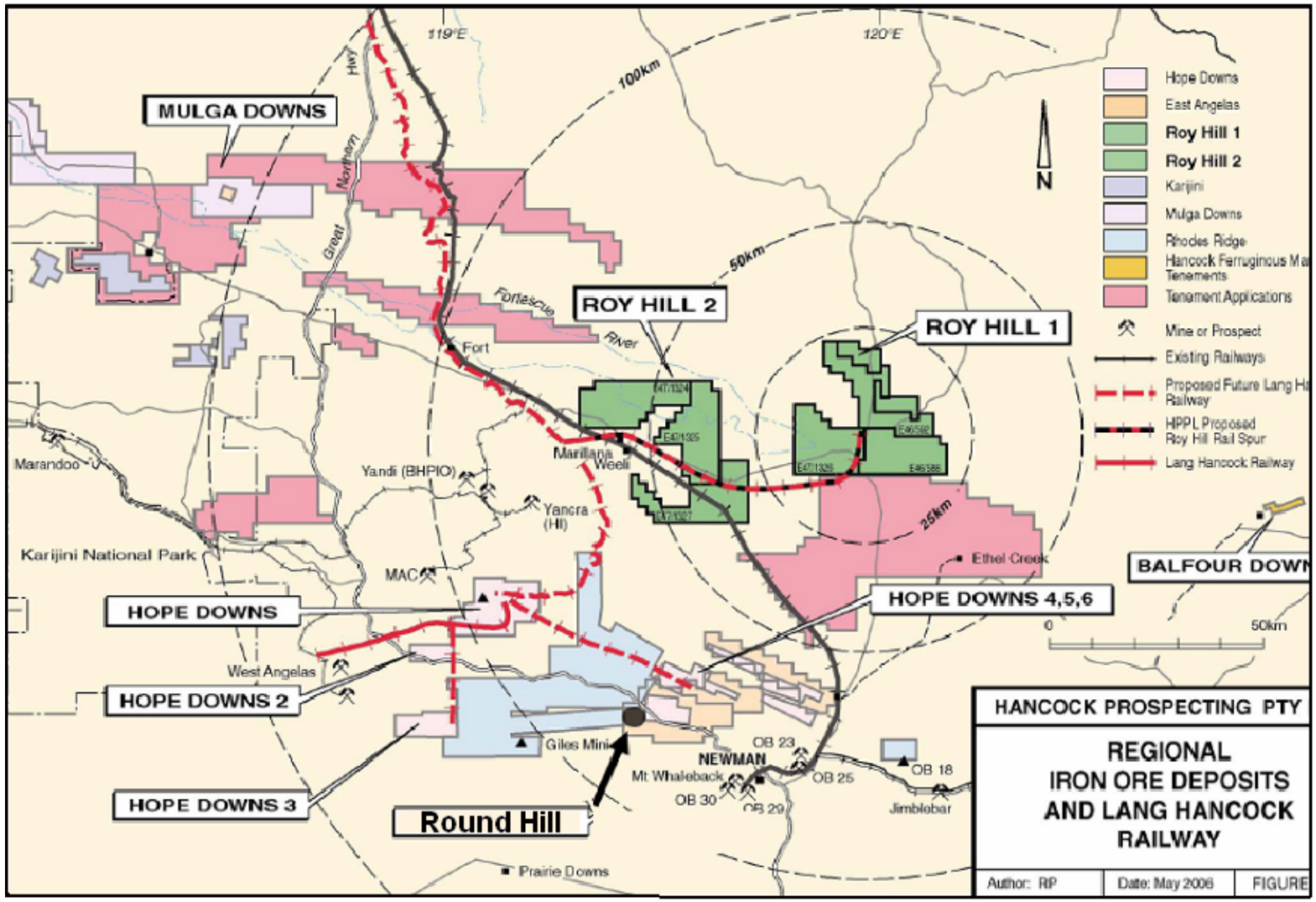


Figure 1-2: Location of Roy Hill 1 project area and other HPPL tenements.

1.2 Legislative Framework

Federal and State legislation applicable to the conservation of native flora include, but are not limited to, the *Environment Protection and Biodiversity Conservation Act 1999*, the *Wildlife Conservation Act 1950*, and the *Environmental Protection Act 1986*.

Section 4a of the *Environmental Protection Act 1986* requires that developments take into account the following principles applicable to native flora:

- The Precautionary Principle

  Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

- The Principle of Intergenerational Equity

  The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

- The Principle of the Conservation of Biological Diversity and Ecological Integrity

  Conservation of biological diversity and ecological integrity should be a fundamental consideration.

Projects undertaken as part of the Environmental Impact Assessment (EIA) process are required to address guidelines produced by the EPA, in this case, Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact in Western Australia (EPA, 2004), and principles outlined in the EPA's Position Statement No. 3 Terrestrial Biological Surveys as an element of Biodiversity Protection (EPA, 2002) (See Table S-1).

Native flora and fauna in Western Australia are protected at a Federal level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and at a State level under the *Wildlife Conservation Act 1950* (WC Act).

The EPBC Act was developed to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance, to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and to promote the conservation of biodiversity. The EPBC Act includes provisions to protect native species (and, in particular, to prevent the extinction and promote the recovery of threatened species) and to ensure the conservation of migratory species. In addition to the principles outlined in Section 4a of the EP Act, Section 3a of the EPBC Act includes a principle of ecologically sustainable development dictating that decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

The WC Act was developed to provide for the conservation and protection of wildlife in Western Australia. Under Section 14 of this Act, all fauna and flora within Western Australia is protected; however, the Minister may, via a notice published in the

Government Gazette, declare a list of flora taxa identified as likely to become extinct, or as rare, or otherwise in need of special protection. The current listing was gazetted on the 5th of August, 2008 (WAGG, 2008).

1.3 Survey Objectives

Hancock Prospecting Pty Ltd commissioned *ecologia* Environment (*ecologia*) to undertake a baseline biological survey of the vegetation and flora of the Roy Hill 1 project area as part of the environmental impact assessment for the project.

The EPA's objectives with regard to management of native flora and vegetation are to:

- Avoid adverse impacts on biological diversity comprising the different plants and animals and the ecosystems they form, at the levels of genetic, species and ecosystem diversity;
- Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities;
- Protect Declared Rare Flora consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- Protect other flora species of conservation significance.

Hence, the primary objective of this study was to provide sufficient information to the EPA to assess the impact of the project on the vegetation and flora of the area, thereby ensuring that these objectives will be upheld.

As per requirements outlined in the EPA's Guidance Statement 51 and Position Statement No. 3, this report provides:

- A review of background information (including literature and database searches);
- An inventory of vegetation types and flora species occurring in the study area, incorporating recent published and unpublished records;
- An inventory of flora taxa of biological and conservation significance recorded or likely to occur within the project area and surrounds;
- A map and detailed description of vegetation types occurring in the study area;
- A description of the characteristics of the vegetation types;
- An appraisal of the current knowledge base for the area, including a review of previous surveys conducted in the area which are relevant to the current study;
- A review of regional and biogeographical significance, including the conservation status of species recorded in the project area; and

- A risk assessment to determine likely impacts of threatening processes on vegetation and flora within the study area.

2.0 REGIONAL SETTING

2.1 General

The Roy Hill 1 project is one of a number of HPPL exploration tenements in the Newman area. The five tenements included in this Roy Hill 1 Flora and Vegetation assessment, cover an area of 648 km² and are shown below (Table 2-1, Figure 1-2).

Table 2-1: HPPL exploration tenements covered by the Roy Hill Project.

Leases	Area (km²)
E46/334	**47.5**
E46/335	**47.6**
E46/592	**177.5**
E46/586	**190**
E47/1326	**221.5**

2.2 Climate

Roy Hill is situated in the Pilbara region of Western Australia and experiences an arid-tropical climate with two distinct seasons; a hot summer from October to April and a mild winter from May to September. Annual evaporation exceeds rainfall by as much as 500 mm per year. Seasonally low but unreliable rainfall, together with high temperatures and high diurnal temperature variations are also characteristic climatic features of the region. This region has in the past experienced no rainfall in any month of the year, which is typical of a desert climate (Beard, 1975). Within the Pilbara, the temperature range is large and maxima are high. Summer temperatures may reach as high as 46 °C at Newman, with a mean maximum of 31.4 °C (Table 2-2). Light frosts occasionally occur during July and August. The climate experienced throughout the year is usually very dry since high temperature and humidity seldom occur simultaneously.

Table 2-2: Summary of Climatic Data for Newman.

NEWMAN	**Elevation: 554 m Location: 23°22'S 119°44'E**											
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Temp (°C)												
Daily max. (mean)	38.8	37.2	35.8	31.6	26.2	22.4	22.2	24.8	29.4	33.6	36.5	38.5
Daily min. (mean)	25.3	24.4	22.5	18.5	13.3	9.6	8.0	10.2	13.7	18.0	21.5	24.1
Rainfall (mm)												
Mean	51.4	80.1	38.6	25.3	23.2	25.0	12.6	10.5	4.1	3.9	9.8	27.0

Source: Bureau of Meteorology, 2008.

Rainfall in the Pilbara is highly unpredictable and recordings are highest at stations around the Hamersley Ranges, which lie at altitudes of up to 900 m (Beard, 1975). From January to March, rain results from moist tropical storms penetrating from the north, producing sporadic and drenching thunderstorms. Tropical cyclones moving south from northern Australian waters also bring sporadic heavy rains. From May to June extensive cold fronts move easterly across the state and occasionally reach the Pilbara. These fronts produce only light winter rains that are ineffective for plant growth other than herbs and grasses. Larger perennial species require the intense and prolonged storms of summer. Surface water can be found in some pools and springs in the Pilbara all year round, although watercourses only flow briefly due to the short wet season. Within the study region, meteorological data has been recorded at the Bureau of Meteorology (BOM) weather station at Newman (23°22'S, 119°44'E). This BOM weather station is located approximately 100 km to the southwest of Roy Hill, providing an indication of climatic conditions experienced within the Project area.

The calculated average annual rainfall is 310 mm, occurring over 34 rain days. It loosely follows the typical Pilbara bimodal distribution pattern, with a peak between December and March and a smaller peak in May and June. Most of the rainfall occurs in the summer period, with over 55 % of total annual precipitation occurring between December and March.

Mean annual maximum and minimum temperatures for Newman are 31.4°C and 17.4°C respectively. Mean monthly maxima range from 38.8°C during January to 22.2°C in July, while mean monthly minima range from 25.3°C in January to 8.0°C in July (Figure 2-1, Table 2-2) (Bureau of Meteorology, 2008).

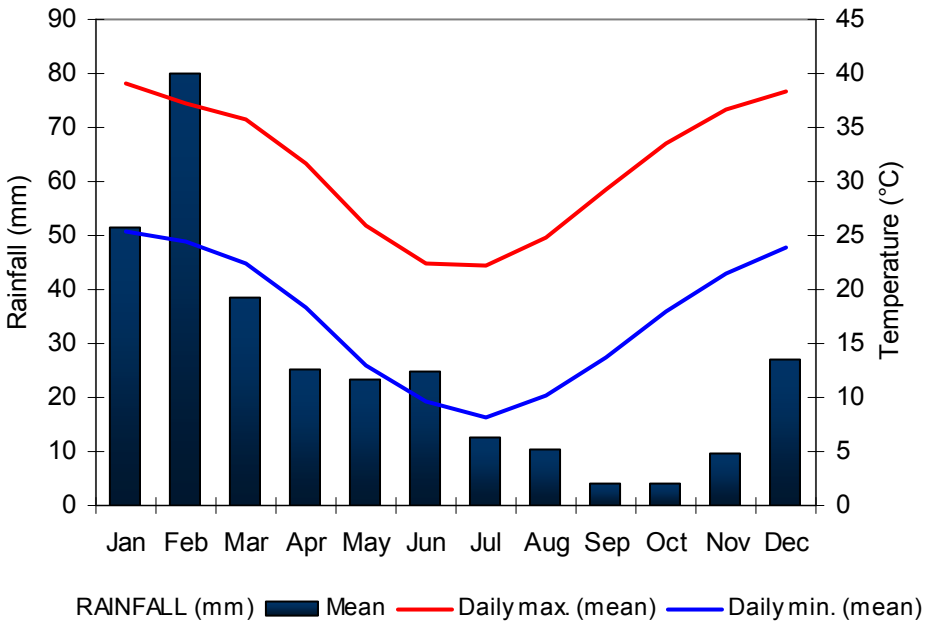


Figure 2-1: Summary of climatic data from Newman (Bureau of Meteorology, 2008).

2.3 Geology

The Pilbara Region comprises a portion of the ancient continental Western Shield, which dominates the geology of Western Australia. The Western Shield is comprised of pre-Cambrian Proterozoic and Archaean rocks. The Pilbara Craton dates back to the Archaean, and includes some of the oldest rocks in the world. It is overlain by Proterozoic rocks deposited in the Hamersley and Bangemall Basins. The Hamersley Basin, which occupies most of the southern part of the Pilbara Craton, can be divided into three stratigraphic groups; the Fortescue, Hamersley and Wyloo Groups (Beard, 1975). Of the three groups, the Hamersley Group is the most relevant to this proposal. Generally 2.5 km thick, it contains both the Brockman Iron Formation and the Marra Mamba Iron Formation, which together provide most of the known major iron ore deposits in the Pilbara region (O'Brien, 1992). The geology of the region around Roy Hill has been mapped and described in detail by Thorne and Tyler (1997). The proposed Roy Hill 1 Project area lies within an extensive area dominated by alluvial and colluvial geology. These fit into four defined classifications:

a) Brecciated siliceous caprock of dolomitic rock (Czz);

b) Calcrete sheet carbonate along major drainage lines (Czk);

c) Alluvium of unconsolidated silt, sand and gravel along drainage and floodplain (Qa); and

d) Alluvium and colluvium of red-brown sandy clay (Qw).

The lower proterozioc rocks of the Pilbara craton are classified into three groups: the Fortescue, Hamersley and Wyloo, of a total thickness of over 9000 m. The Fortescue group is the lowest and consists mainly of basalt with included beds of siltstone, mudstone, shale, dolomite and jaspilite (Beard, 1975). The Fortescue group forms the Chichester Plateau, with a north facing escarpment fronting onto the granite coastal plain, and appears again beneath the Hamersley Plateau and the Ashburton Valley. The Chichester escarpment which terminates the gently rising granitic coastal plain at it's northern boundary, forms a plateau of the Fortescue group of lower Proterozoic rocks which rises another 150-200 m above the coastal plain. The Roy Hill 1 tenements cover part of the Chichester Plateau, and also the Fortescue valley. The rocks of the Chichester Plateau are mainly volcanics, tuff and basalt, with intercalated shales and sandstones in strata, but which are capped by the Marra Mamba Iron formation, which is very hard and resistant and is said to control the escarpment of the Chichester Range (Beard, 1975). The underlying basalts of the Chichester Range continue uninterrupted to dip down beneath the Fortescue Valley and then onwards beneath the Hamersley Escarpment. The Fortescue Valley consists mainly of Quaternary alluvium, colluvium and sand plains overlying the Tertiary Oakover formation (limestone and calcareous gravels) and chert breccia which is exposed locally (Beard, 1975).

2.4 Topography and Soils

The Roy Hill 1 project area lies within both the Fortescue Valley and Chichester plateau sub-regions of the Interim Biogeographic Regionalisation for Australia. These two subregions are typified by distinct landforms and associated soils (Thackway and Cresswell, 1995).

The very long narrow unit of the Chichester Plateau forms a watershed between the numerous rivers flowing north to the coast and the Fortescue River drainage on its southern side. The majority of its northern length and at its western end is bounded by abrupt escarpments rising from the coastal plains, but on the southern side its descent to the Fortescue Valley and the Roy Hill area is much less abrupt and more gradual. The summit of the plateau standing at about 400-500 m above sea level consists mainly of a high level gently undulating plain and it is only dissected into rougher country at the eastern and western extremities (Beard, 1975).

The Fortescue Valley is also a very long narrow region which occupies the trough between the Chichester and Hamersley Plateaux. Drainage in the Roy Hill region of the Valley is into an extensive salt marsh and extensive sand plains in the eastern parts of the valley indicate that the material must have been brought down from the granite country of the nearby Fortescue headwaters (Beard, 1975).

Roy Hill lies within a large region of soils that have been classified by Bettany *et al*. (1967) as dominated by 1) red earths, 2) hard-setting loamy soils, 3) loamy soils with pedalogic organisation, 4) dissected pediments, and 5) outwash plains. The three soil types that are most applicable to the Roy Hill 1 Project area are;

1. The red earth plains of the Fortescue valley, the surface cover of which consists of stony gravels;
2. The dissected pediments forming low stony hills and the outwash plains, both of which support a surface cover of gravel, and;
3. The hard setting loamy soils with red clay subsoils forming dissected stony pediments, hills and mesas.

On the descent to the Fortescue Valley the chief soils of the Chichester Plateau are cracking clays, but non cracking clays and hard alkaline red soils also occur. East of Roy Hill the chief soils are deep earthy loams, together with some areas of clay soils. The more dissected country comprises steep ranges on basaltic lavas and stony pediments on hills. In such dissected country the chief soils are hard alkaline red soils and other red soils with shallow loams associated with rock outcrops (Beard, 1975).

As a consequence of the sparse vegetation cover and the erosive force of heavy summer cyclonic rains, much of the soil on the hill slopes tends to be transported down to the valleys and plains. This results in substantial areas of the Chichester Plateau being without significant soil cover. Thus, species and associations of vegetation on the hills and slopes tend to be correlated to geology rather than soil type (Beard, 1975). Along drainage lines, superficial deposits influence the distribution of the vegetation, but the presence of surface and groundwater is also a major determining factor.

Soils in the sand plains of the Fortescue valley are typically red sands and earthy sands. Adjacent to them are alluvial plains influenced by basaltic parent materials and dominated by deep cracking clays. Most of the extensive valley plains however have as their chief soils earthy clays along with some cracking clays, shallow loams and hard red soils. Flood out zones feature highly calcareous earths with minor areas of shallow calcareous loams, overlying pedologically deposited limestone and kunkar (Beard, 1975).

2.5 Landforms

In their biological survey of the Hamersley Range National Park (Karijini National Park), Dawe and Dunlop, (1983) developed a landform-vegetation classification system of nine main landforms which were further categorised into many sub-units. The Roy Hill 1 Project area covers four of these main landforms:

(a) Low Ridges or Hills: Low ridges and hills rising above the surrounding plains largely covered with skeletal soils, with areas of exposed rock. This landform supports *Eucalyptus leucophloia* open low woodland, *Acacia maitlandii* and *A*. *umbellata* low scrub and mid-dense *Triodia basedowii* hummock grassland.

(b) Outwash Plains: Plains of deep loams or clayey loams supporting *Acacia aneura* low woodland or *Eucalyptus victrix* low woodland over *Triodia pungens* hummock grassland and *Aristida*, *Enneapogon* and *Eragrostis* bunch grasses.

(c) Minor Drainage Lines: Minor drainage lines are generally shallow eroded channels with a sandy or gravelly washline and associated outwash areas. They support open fringing woodlands of *Eucalyptus*, *Grevillea* and *Acacia* species.

(d) Major Creeks: Heavy gravel channels with sandy levee banks and islands. The vegetation is characteristically open *Eucalyptus camaldulensis* woodland over *Acacia* or *Melaleuca glomerata* thicket.

2.6 Land systems

Seven land types and ten land systems, as mapped by Van Vreeswyk *et al*. (2004) occur within the Roy Hill 1 Project area (Figure 2-2,). Of these systems the project area is dominated by Jamindie and Turee and to a lesser extent Newman.

Table 2-3: Land system units present within the Roy Hill 1 survey area

Land System Unit	Area survey area (km^2)	% survey area	Total regional representation (km^2)	% Region representation
Adrian	0.83	0.30	245.1	0.1
Boolgeeda	4.53	1.63	9,996.1	4.3
Brockman	1.44	0.52	741.1	0.4
Coolibah	9.59	3.45	1,010.4	0.6
Jamindie	123.63	44.49	11,882.7	1.1
McKay	7.01	2.52	4,274.7	2.3
Newman	45.48	16.37	19,997.7	8.0
River	0.75	0.27	5,914.3	2.3
Turee	84.30	30.34	927.4	0.3
Warri	0.33	0.12	2,203.0	0.2
Total	555.78	100.00		

The landforms, vegetation, susceptibility to grazing and degree of preservation of these systems can be summarised as follows:

1. Land type 1: Hills and ranges with spinifex grasslands.

    (i) Newman: The Newman land system comprises rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands. Ninety one percent of the regional representation of this land system is classified as having vegetation in very good condition, due to its unsuitability for pastoral activities.

    (ii) McKay: The McKay land system comprises hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands. Like the Newman system, it is generally unsuitable for pastoral practices and is therefore well preserved, with 88% of total area is classified as being in very good condition.

2. Land type 6: Stony plains and hills with spinifex grasslands

    (iii) Adrian: The Adrian land system comprises stony plains with low silcrete hills supporting hard spinifex grasslands. Vegetation on this system is not preferred by livestock and generally not prone to degradation, with a low risk of erosion. Approximately 66% of the total area is classified as in very good condition, with a further 20% classified as good.

3. Land type 8: Stony plains with spinifex grasslands

    (iv) Boolgeeda: The Boolgeeda land system comprises stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands. The hard spinifex grasslands are not preferred by livestock but soft spinifex is moderately preferred for a few years following fire. The vegetation is generally not prone to degradation and the system is not susceptible to erosion, but is subject to fairly frequent burning. Approximately 82% of the total area is classified as in very good condition, with a further 13% classified as good.

4. Land type 12: Wash plains on hardpan with groved mulga shrublands (sometimes with spinifex understorey).

    (v) Jamindie: The Jamindie land system comprises stony hardpan plains and rises with groved mulga shrublands, occasionally with spinifex understorey. Most vegetation is only moderately preferred by grazing animals but can become degraded by overgrazing of cattle. Only 22% of the total area is classified as in very good condition, with a further 26% classified as good.

5. Land type 14: Alluvial plains with tussock grasslands or grassy shrublands.

    (vi) Brockman: The Brockman land system comprises alluvial plains with cracking clay soils supporting tussock grasslands and grassy shrublands. These grasslands are moderately to highly preferred by livestock and are susceptible to overgrazing and degradation. Only 19% of the total area is classified as in very good condition, with a further 26% classified as good.

    (vii) Turee: The Turee land system comprises stony alluvial plains with gilgaied and non-gilgaied surfaces. This system is favoured by cattle and is prone to degradation if overgrazed. Only 1% is classified as being in very good condition with a further 15% classified as good.

6. Land type 17: River plains with grassy woodlands and shrublands and tussock grasslands.

    (viii) Coolibah: The Coolibah land system comprises flood plains with weakly gilgaied clay soils supporting coolibah (*E. victrix*) woodlands with tussock grass understorey. It is favoured by cattle and is prone to depletion if overgrazed. Only 9% is classified as being in very good condition with a further 14% classified as good.

    (ix) River: The River land system comprises active floodplains and major rivers supporting grassy Eucalypt woodlands, tussock grasslands and soft spinifex grasslands. The grass understorey is highly preferred by livestock. The system is largely stabilised by buffel and Spinifex and accelerated erosion is uncommon, but the system is highly susceptible to erosion if vegetative cover is removed. Approximately 56% of the vegetation is classified as in very good condition, with a further 26% classified as good.

7. Land type 18: Calcrete drainage plains with shrublands or spinifex grasslands

    (x) Warri: The Warri land system comprises low calcrete platforms and plains supporting mulga and cassia *(Senna)* shrublands. The system supports shrubs and grasses that are highly preferred by grazing animals and is prone to degradation. Only 7% of the total area of this system is classified as in very good condition with a further 21% classified as good.

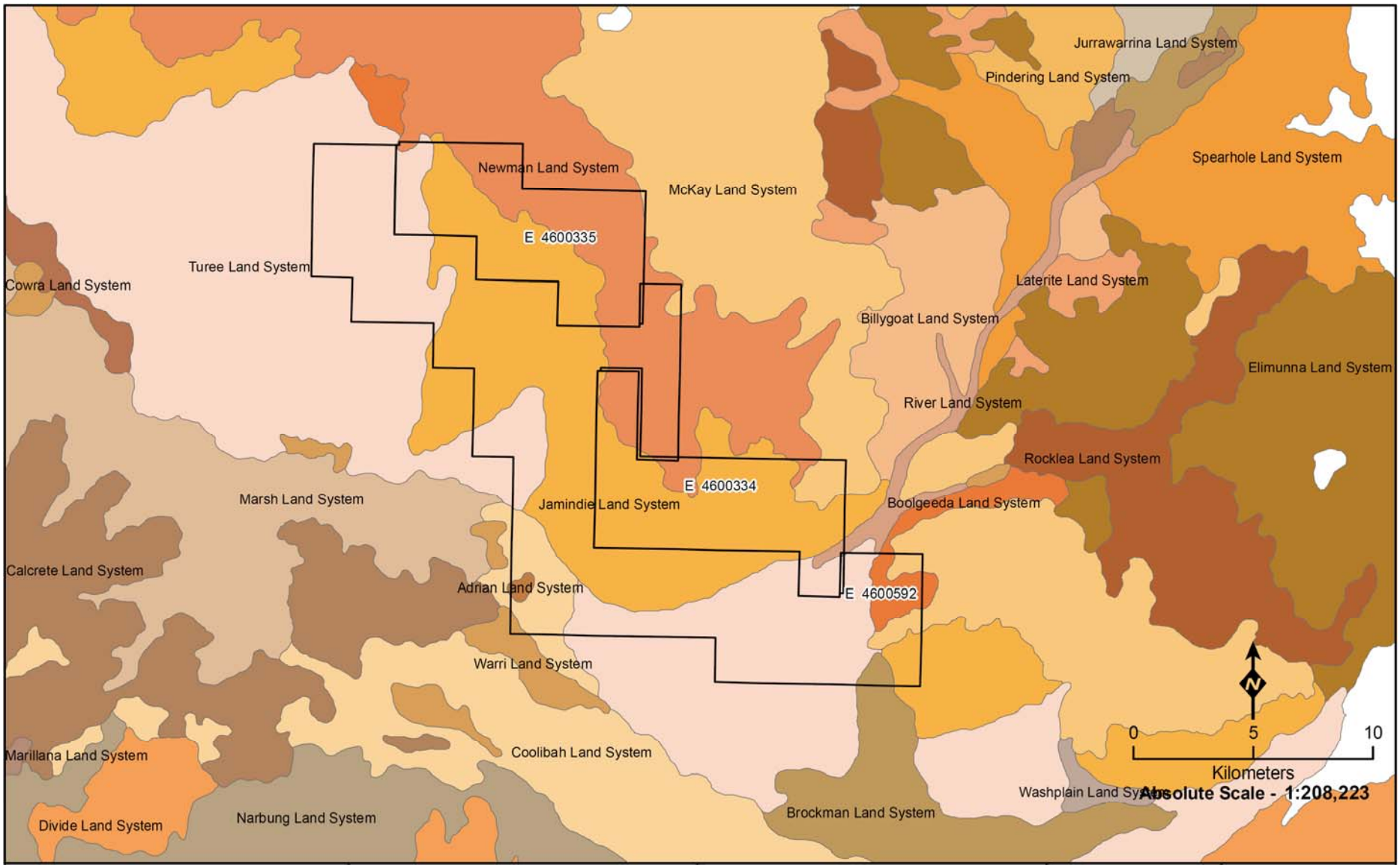


Figure 2-2: Land systems of the Roy Hill region (from Van Vreeswyck *et al*. (2004)

2.7 Biogeography

The Project area lies in the Pilbara biogeographic region of the Interim Biogeographic Regionalisation for Australia (IBRA) (Figure 2-3). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna. The Pilbara biogeographic region is similar to that commonly recognised as the Pilbara region, and includes four major components; the Hamersley, Fortescue Plains, Chichester and Roebourne subregions (Thackway and Cresswell, 1995).

The Roy Hill 1 Project area lies within both the Fortescue and Chichester sub-regions of the Interim Biogeographic Regionalisation for Australia.

The Chichester sub-region is described by Thackway and Cresswell (1995) as:

> "Archaean granite and basalt plains supporting shrub steppe and characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grasses. Snappy gum tree steppes occur on ranges."

The plains of the Chichester subregion are known to support shrub steppes of *Acacia inaequilatera* over *Triodia wiseana* (Kendrick and McKenzie, 2001).

The Fortescue plains sub-region is described by Thackway and Cresswell (1995: 69) as:

> "Alluvial plains and river frontages. Salt marsh, mulga bunch grass, and short grass communities on alluvial plains. River gum woodlands fringe the drainage lines. This is the northern limit of mulga (*Acacia aneura*)."

Some biotopes that are representative of the Fortescue plains subregion occur in the south western part of the Project area. These include the alluvial plains, river frontages and River Gum woodlands that fringe the Fortescue River, which is the main drainage line running across the south western boundary of the Project area.

With an area of 179, 287 km^2, the Pilbara bioregion is within the largest area class. However, the size of the Pilbara bioregion is fairly typical of bioregions situated in remote arid and semi-arid areas. Dominant limiting factors and constraints for the Pilbara bioregion listed by Thackway and Cresswell (1995) include extinction of critical weight range (CWR) mammals, wildfire, feral animals (in particular the cat and fox), weeds, and grazing or pastoral activities. The reservation status of the bioregion is 1-5%, which is relatively low (some bioregions have a greater than 10% reservation status).

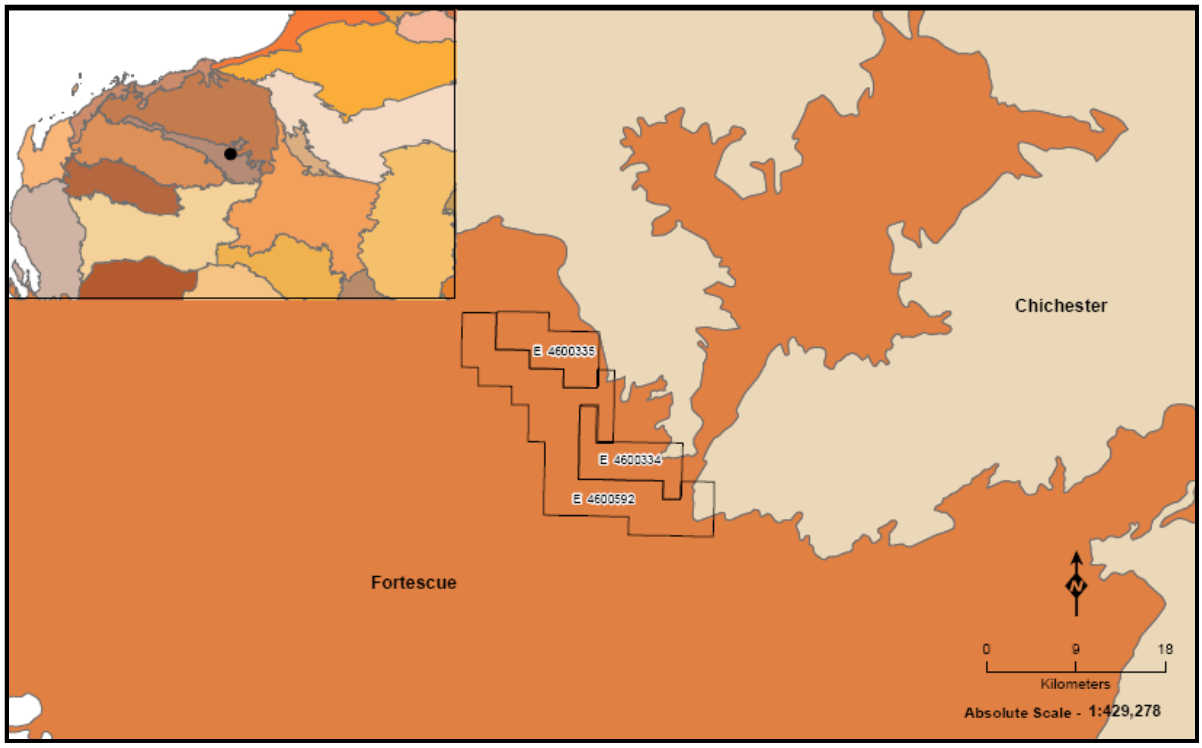


Figure 2-3: IBRA 6.1 sub-regions of the Pilbara (PIL) and surrounding areas (Thackway & Cresswell, 1995).

2.8 Previous Biological Surveys

The Pilbara is a region of considerable environmental significance, lying on the southern limits of the Northern Botanical Province (Burbidge, 1959; Beard, 1979). The region includes species from the northwest, a region of high species endemism, and the arid interior, as well as numerous species which are either endemic to the Pilbara or have restricted geographic distributions (Beard, 1975). Beard (1975) provides a detailed account of previous exploration in the area. Early flora survey work was carried out by Royce (1948) and Burbidge (1959), while broad-scale vegetation mapping was first carried out by Burbidge (1945) and later refined by Beard (1975, 1979). However, it was not until the increased development of mineral resources in the region in the late 1900s that any site-specific detailed flora and fauna surveys have been conducted in the Pilbara region.

A large number of biological assessments and environmental monitoring exercises have been undertaken in the areas adjacent to Roy Hill. Surveys have been conducted in association with development in surrounding areas, such as at Orebody 18 (*ecologia* 1995), the West Angelas Pipeline Corridor (*ecologia*, 1998), Orebody 24 (*ecologia*, 2004a), East Ophthalmia Range (*ecologia*, 2004b), Hope Downs (ecologia 1993, 2006) Mining Area C (*ecologia,* 2004c), and Wheelarra Hill (*ecologia*, 2004d). Other surveys in the region include the Jimblebar Mine Site Survey (Endersby, 1994; *ecologia,* 1999), FMG Stage B Rail Corridor Survey (Biota, 2005) and the Fauna Survey of Cloudbreak Iron Ore Mine (Davis *et al.* 2005).

More extensive biological surveys have been undertaken, and include the Karijini National Park (Muir, 1983), Burrup Peninsula (Butler, 1983; Tingay and Tingay, 1983) and Pilbara wetlands (Masini, 1988; Masini and Walker, 1989). Research projects conducted by the Department of Environment and Conservation (DEC) and opportunistic collecting by amateur naturalists have further supplemented this information. DEC, in association with the Western Australian Museum (WAM), is currently undertaking a five year regional biological survey of the Pilbara to provide comprehensive, long-term baseline data for future management.

2.9 Landuse History

The mineral exploration history of the Pilbara began in 1888 when gold was found in the Pilbara Creek. Although this did not prove productive, more consistent deposits were subsequently discovered at Marble Bar. Tin was discovered in 1899 and manganese and asbestos have also since been mined in the Pilbara. Massive iron-ore deposits were discovered, with exploration expanding immensely in the 1960s when the Commonwealth embargo on exporting iron-ore was relaxed. Subsequently, the construction of several mining towns, including Newman, was undertaken. Newman was developed in the early 1970s to provide accommodation for workers at the Mt Whaleback iron-ore mine. Ports, such as Port Hedland and Dampier, and standard gauge railways from Mt. Tom Price and Paraburdoo to Dampier, Pannawonica to Cape Lambert and Mt Goldsworthy and Mt Newman to Port Hedland, were also constructed. The development of the iron ore industry has resulted in activity within the Pilbara changing from revolving around cattle and sheep stations and small coastal ports to a large mining economic base with a commensurate increase in population.

Tourism is a smaller but rapidly developing industry within the region. The nearest conservation reserve to the Roy Hill area is the Karijini National Park, which is located approximately 140 km to the west (Beard, 1975).

3.0 SURVEY METHODS

3.1 Guiding Principles

The survey methods adopted by *ecologia* were formulated in consideration of the EPA's Guidance Statement No. 51 (EPA, 2004), and Position Statement No. 3 (EPA, 2002).

The survey combined the following two basic methodological approaches:

- Detailed site/association vegetation assessments; and
- Broad-scale vegetation mapping.

3.2 Field Methods

3.2.1 Survey Timing

Three phases of survey were conducted from 26 October to 4 November 2005, 29 May to 5 June 2006 and from 6 to 18 March 2008.

The objectives of the survey were to provide:

- An inventory of vascular plant species;
- A description and mapping of plant communities;
- A review of plant species considered to be rare and endangered, or geographically restricted, which are known to, or may occur, within the project area;
- An inventory of exotic plants, including declared weeds; and
- A review of the significance of the plant communities within a local, regional, and State context.

3.2.2 Detailed Floristic Survey Sites

In total 258 quadrats were sampled with 100 sites established during the Phase I survey, 47 sites during Phase II and 111 sites during Phase III. These survey sites were distributed over the relevant tenements to compile a comprehensive list of flora species, and to record different vegetation types, life-form strata, percentage cover of individual species, surface soil type, litter cover and disturbances to the different areas. Locations of sites for each phase are detailed in Appendix B and Figure 3-1.

Despite the relatively high number of sites surveyed in Phase I, the dry conditions which preceded the survey contributed to the low diversity observed at many sites, and a substantial number of taxa which could not be identified beyond genus. The vegetation

over much of the Roy Hill 1 Project area is dominated by an understorey of annual or semi annual grasses and herbs and thus is particularly subject to seasonal shifts in the composition and condition of the understorey. The fragility of the understorey prior to the summer rainfalls is exacerbated by the impacts of cattle grazing. Substantial wet season rains preceded the Phase II survey, resulting in much higher species richness per site but also constraining the number of sites which could be completed in the time constraints. As a result of the limited number of post-rainfall sites, a third phase of survey work was undertaken in March 2008 to supplement the species inventory and refine the vegetation mapping.

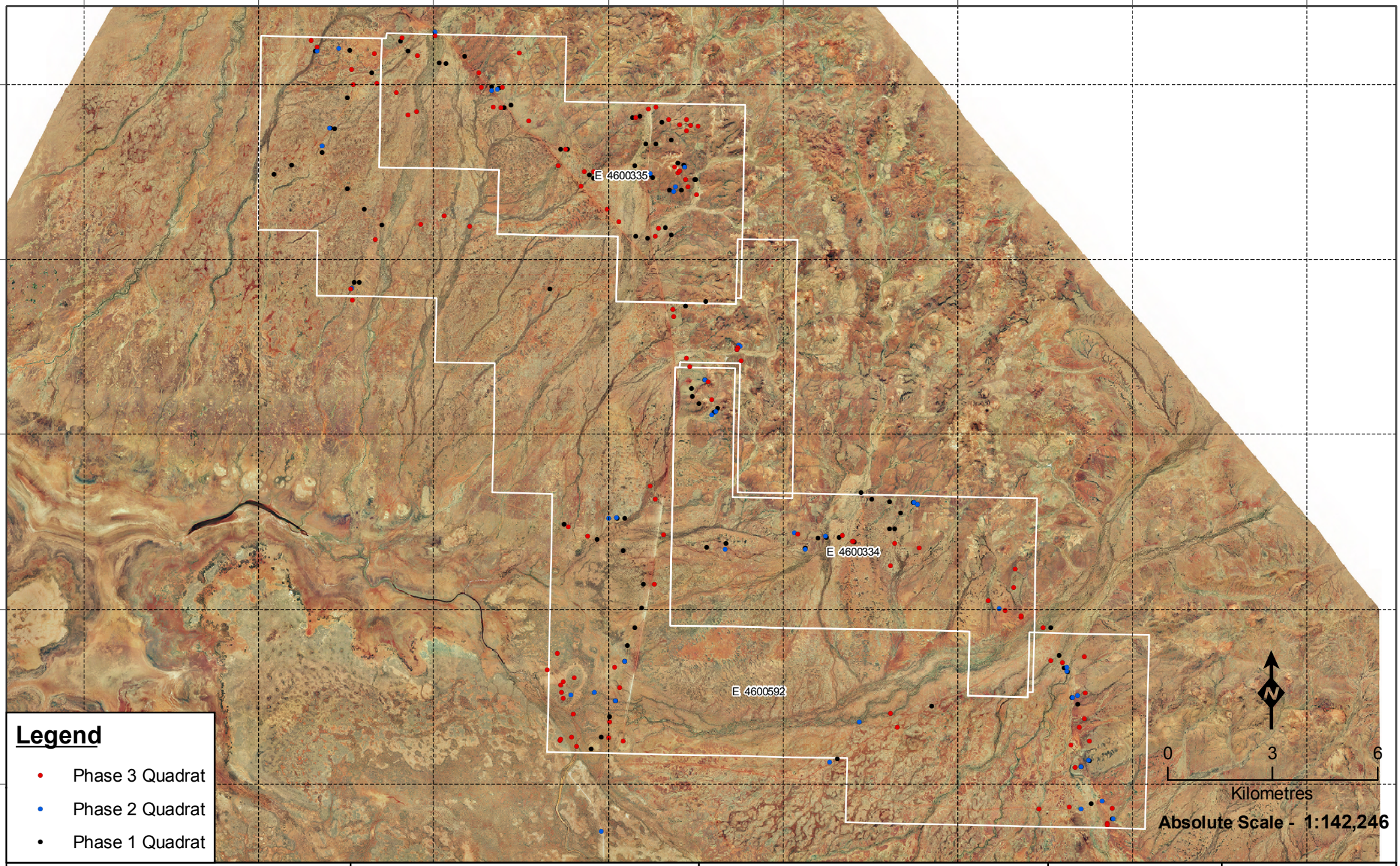
The survey involved a combination of systematic flora sampling using quadrats, and opportunistic collections while traversing between sites to maximise the sampling of the entire area. Opportunistic collections are more time-efficient than bounded quadrats when the aim is to locate flora of potential significance. However, quadrats enable comparative assessment of floristic variation and are essential to multivariate analysis of the data, thus contributing to vegetation mapping. Both methods contribute to the floristic inventory of the survey area.

Sampling sites were chosen by means of aerial photography, topographical features and field observations, to ensure that all vegetation types present within the Project area were represented. The number of sites established was determined by the size and the heterogeneity of the Project area.

The sampling sites were approximately 50 m by 50 m quadrats, or an area of 2500 m^2 in sites which occupied narrow habitats such as creek lines and gullies.

The following parameters were recorded at each quadrat:

- Location details, including GPS co-ordinates (using datum WGS84);
- Site parameters such as topography, soils, and surface lithology;
- Structural information describing the vegetation unit, including the height, cover, form and dominant species within each layer using a vegetation classification system adapted from Executive Steering Committee for Australian Vegetation Information (ESCAVI) (2003) (Appendix A).
- Maximum height and foliage projective cover for each species within the site, including introduced species;
- Vegetation condition based on criteria described by Keighery (1994), Connell (1995) after Trudgen (1991) (Appendix A);
- The estimated time since the last fire at the site.



ecologia ENVIRONMENT

HANCOCK PROSPECTING PTY LTD

Roy Hill Flora Quadrat Locations

Figure: 3.1
Project ID: 943

Drawn: SG
Date: 23/01/09

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

A4

3.3 Vegetation Classification and Mapping

Vegetation mapping is the delineation of plant communities into groups or associations. The distinctive characteristics that these groups or associations share include features such as species dominance and composition, and stratum structure (Heddle *et al*., 1980).

Aerial photographs and topographic maps were used to interpret vegetation patterns of the survey area. These interpretations were then verified using observations of dominant species and vegetation structure. Quadrat sites were selected to be representative of the vegetation types as interpreted from the photographs and field observations.

Multivariate analysis of the Phase 3 site by species (presence and abundance score) matrix was performed using the complete linkage mode in the SYSTAT software package. Cluster analysis packages such as SYSTAT provide a means of objectively verifying the vegetation units observed in the field. The boundaries of the major vegetation units derived from field observations and detailed site data analysis were then mapped onto a 1:20,000 aerial photograph of the area. This provided a visual summary of the extent of dominant floristic and structural elements over the entire project area. A separate analysis combining data from Phases 2 and 3 was also conducted, however data from Phase 1 was too heavily influenced by poor seasonal conditions to warrant inclusion. The dendogram resulting from analysis of Phase 3 data and the site matrix used to derive the dendogram are detailed in Appendices J and H respectively.

3.4 Targeted Rare and Priority Flora and Declared Weed Survey

A search of the WA Herbarium and Department of Environment and Conservation (DEC) Threatened Flora Databases was undertaken to determine the exact locations of flora previously recorded near the proposed mine site. During the field survey, areas not sampled using quadrats were surveyed using linked traverses. Additional grid pattern searches have subsequently been conducted in some locations as part of exploration approvals processes. Such high intensity opportunistic searching increases the probability of record flora of conservation significance. Voucher specimens of all species present were taken, noting the characteristics of the vegetation communities present. In keeping with Guidance Statement 51 (EPA, 2004), nomenclature of all flora species encountered in the survey was aligned with that currently adopted by the Western Australian Herbarium (FloraBase, 2008).

3.5 Survey Limitations and Constraints

The EPA Guidance Statement 51 for Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004), has identified the main factors that can limit and constrain flora and vegetation surveys. In Table 3-1, the current survey has been evaluated against these factors.

Table 3-1: Flora and Vegetation Survey Constraints.

Aspect	Constraint*	Comment
Scope	No	The survey scope was prepared in consultation with the DEC, and the methods used are consistent with the requirements of EPA Guidance Statement No. 51 and EPA Position Statement No. 3.
Proportion of flora identified, recorded and/or collected	No	477 taxa were recoded during the three phases of survey work (Phase 1 = 250; Phase 2 = 308; Phase 3 = 339). Approximately 6,250 collections were made during the three seasons of survey work. Due to a poor season during Phase I, two collections could not be identified beyond family level and 23 collections could not be identified beyond genus level (1.2%). This is compared with 16 collections in Phase 2 (0.9%) and six collections in Phase 3 (0.2%) that were limited to genus level identification The poor season for the Phase 1 survey undoubtedly contributed to the number of partially identified taxa, however with the additional phase undertaken in 2008 this limitation was negated. Estimates from this data based on species accumulation curves indicate that approximately 92% of the flora species potentially present within the Roy Hill survey area were recorded during the survey
Sources of information e.g. previously available information (whether historic or recent) vs. new data	No	The flora of the region, as for all regions, is in subject to review, however taxonomic information for most species is publicly available via FloraBase (2008) and botanical journals. Most of the regional vegetation data of the area were collected in the broad scale vegetation mapping project by Beard (1979). Botanical surveys, some of which include localised mapping at higher scales of resolution have been conducted for the Hope Downs Mining Lease (ecologia, 1993), West Angelas Mining Lease (ecologia 1998, 2004), Packsaddle Ridge (ecologia 2004), FMG Roy Hill Exploration Area (biota 2005), and the Mining Area C Rail Corridor (ecologia, 2004c, biota 2005. The results of the previous Roy Hill Study (biota 2005), which was located within about 15 km of the current Roy Hill study, were a useful source of comparative data.
The proportion of the task achieved and further work which might be needed	No	Sufficient sampling sites were selected to document the flora and vegetation of the project area; however the difference between the number of sites surveyed in Phase 1 (pre summer rainfall) and Phase 2 (post summer rainfall) was potentially a constraint. This was rectified by the third phase of survey in March 2008.

Aspect	Constraint*	Comment
Timing/weather/season/cycle	No	A bi-seasonal survey approach was undertaken for this project. Rainfall during the three months preceding Phase 1 of the Roy Hill survey was low, which is typical of winter rainfall in the region. Rainfall preceding phase ii was much higher, again typical of the summer rainfall in the regions. The seasonal influence on the Phase 1 survey, which assessed a much larger number of sites, was such that definition of vegetation of vegetation communities was impaired, hence the scheduling of a third survey in March 2008 where above average rainfalls occurred in February 2008.
Disturbances which affected results of survey	No	Some portions of the survey area, particularly riparian vegetation, have been heavily grazed, both historically and recently, resulting in diminished biodiversity.
Intensity (in retrospect was the intensity adequate)	No	Adequate
Resources	No	Resources were adequate for the survey with 61 person days invested in the botanical survey work.
Remoteness and/or access problems	No	Access to some areas of the eastern portions of several leases was constrained by the absence of tracks.
Availability of contextual (e.g. Biogeographic) information on the region	Moderate.	The flora of the region is continuing to be documented with many reports produced by ecologia and other consulting companies on the vegetation and flora of the region. The absence of regional mapping other than at a very broad scale limits the interpretation of the regional significance and degree of conservation of vegetation communities.
Competency/experience of the consultant carrying out the survey	No	All personnel are qualified botanists having significant field experience. Senior personnel have 18 and 6 years experience respectively conducting floristic surveys within the Pilbara. The taxonomist utilised has over 20 years experience with the flora of the Pilbara.

*Defined as yes/no; significant, moderate or negligible.

4.0 VEGETATION OF THE ROY HILL 1 PROJECT AREA

4.1 Project Area Vegetation Units

The Roy Hill 1 Project area is located in the Fortescue Botanical District of Beard (1975). Beard (1975) has mapped the vegetation of the Pilbara region at a scale of 1:1,000,000. The area encompassed by the Project area contains four vegetation units (Figure 4-1):

1. Mulga in grooved patterns: comprising *Acacia aneura* occurring in groves or patches;
2. Tree steppe with Mulga in valleys: comprising *Eucalyptus leucophloia* (previously *Eucalyptus brevifolia*), *Triodia wiseana* and *Acacia aneura*;
3. Shrub steppe on basalt/ Kanji, soft and buck spinifex: comprising *Acacia pyrifolia*; *Triodia wiseana* and *T. pungens*; and
4. *Acacia aneura* low woodland (from Beard 1975).

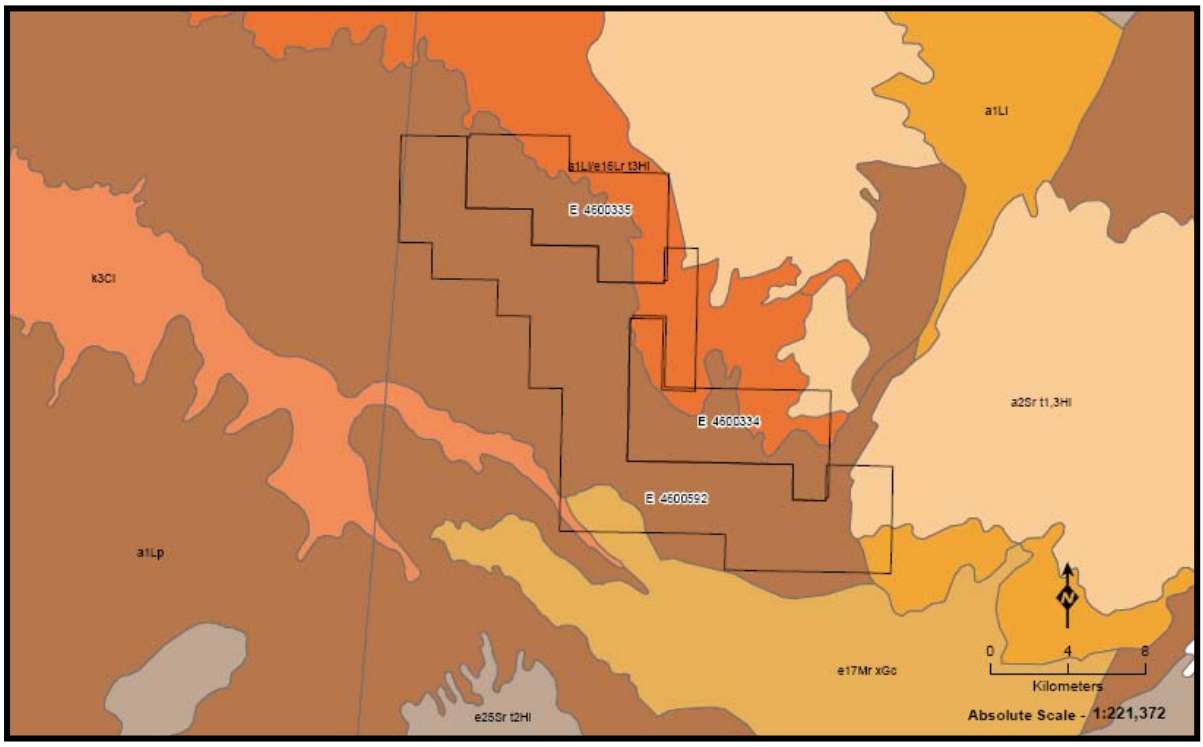


Figure 4-1 Roy Hill 1 Project within Beard Vegetation Mapping units (Beard, 1975).

During the current survey the vegetation was mapped at a scale of 1:20,000. The vegetation has been categorized into four major vegetation associations, which have been sub classified into further eighteen sub associations:

1. *Triodia* sp. Hummock Grassland Steppes

A. Isolated to open low trees and shrubs over *Triodia brizoides* hummock grasslands on slopes and crests.
B. Isolated to open low trees and mixed shrubs over *Triodia* sp. Shovelanna Hill hummock grasslands on slopes and plains.
C. Isolated low trees and isolated to sparse mixed shrubs over *Triodia longiceps* hummock grasslands on colluvial deposits.
D. Isolated low trees over sparse to open mid to low shrubland over *Triodia basedowii* hummock grasslands.
E. Isolated low trees over sparse to open mid to low shrubland over *Triodia epactia* hummock grasslands.

2. Riparian associations

A. Open low forest to woodland of *Eucalyptus camaldulensis* and/or *E. victrix/Corymbia hamersleyana* over open high *Atalaya hemiglauca/Acacia pyrifolia* over open low shrubs over dense **Cenchrus ciliaris*.
B. Scattered *Eucalyptus victrix* over a low woodland of *Acacia aneura/A. coriacea* subsp. *pendens/Atalaya hemiglauca* over open shrubs over dense **Cenchrus ciliaris* grassland.
C. Tall *Acacia* spp. and *Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland.
D. Floodplains adjacent to major creek lines: open forest to woodland of *Eucalyptus victrix* over open mid-height shrubland dominated by *Acacia tetragonophylla, A. sclerosperma, *Vachellia farnesiana* over sparse mixed tussock grasses and herbs.
E. Floodplains: isolated trees to open woodland of *Eucalyptus victrix* over open *Acacia synchronicia* over mixed low shrubs over open to closed mixed tussock grasses.

3. *Acacia aneura* Low woodlands and Tall Shrublands

A. *Acacia aneura*, *A. rhodophloia* open forest and woodland over sparse low shrubs and closed tussock grassland and herbland ± *Triodia longiceps*.
B. Open woodland of *Acacia pruinocarpa, A. aneura* over open mixed shrubland over open grasses.
C. Moderately dense to open tall *Acacia aneura* shrubland over sparse to open *A. tetragonophylla, Senna artemisioides* subsp. *helmsii* shrubs over moderately dense to open grassland dominated by *Aristida contorta*.
D. Groves of *Acacia aneura, A. rhodophloia* woodland over sparse shrubland of *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii, Eremophila latrobei* subsp. *filiformis* over open to sparse grasses.
E. Isolated trees or shrubs of *Acacia aneura* over open shrubland of *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* over sparse grasses.
F. Isolated clumps of tall *Acacia aneura* shrubs over open low shrubs of *Ptilotus schwartzii*.

4. Miscellaneous Shrublands

A. Rocky crests of hills: *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses.
B. Isolated shrubs of *Acacia synchronicia* over open and diverse herbs and grasses.

1. *Triodia* species Hummock Grassland Steppes

Hummock grasslands encompass a significant proportion of the total area, largely occurring to the east of the Nullagine road and at the northern boundary of Lease 46/00335. The dominant species within the low tree and shrub strata are widespread throughout each of the subtypes.

A. Isolated to open low trees and shrubs over *Triodia brizoides* hummock grasslands on slopes and crests (No photo representation available)

This vegetation type is largely restricted to the slopes and crests of steeper hills within the eastern portion of E46/00335, E46/00592 and the northern portion of E46/334. Although widespread in these areas, it constitutes a relatively small proportion of the total survey area. It is distinguished by the dominance of the hummock grass *Triodia brizoides* at ground level, usually at open to closed coverage. An isolated to open overstorey of *Grevillea wickhamii* subsp. *hispidula, Acacia pruinocarpa* with isolated *Eucalyptus leucophloia* subsp. *leucophloia* is present above an open shrubland dominated by *Senna glutinosa* subsp. *glutinosa* above *Corchorus lasiocarpus* subsp. *lasiocarpus.* The tussock grass *Eriachne mucronata* is consistently present at sparse to open density. The diversity and cover of the shrub and herb strata increase on the foot slopes and in areas where pockets of deeper soil occur between boulders.

B. Isolated to open low trees and mixed shrubs over *Triodia* sp. Shovelanna Hill hummock grasslands on slopes and plains

Slopes dominated by the hummock grass *Triodia* sp. Shovelanna Hill were recorded at scattered locations on plains and hill slopes in the northern and north-eastern portions of the survey area. This taxon also occurs in a number of locations in combination with *T. basedowii, T. longiceps* and *T. brizoides.* The boundaries between these steppes are often difficult to distinguish using aerial photography and the mapped distribution of this association may underestimate its extent.

Emergents are typically isolated to open and of variable height. The species composition is typical of most hummock grass steppes, with *Grevillea wickhamii* subsp. *hispidula* the most consistently present shrub. At some locations scattered low trees of *Acacia aneura* and *A. pruinocarpa* trees are present, but elsewhere *Eucalyptus leucophloia* subsp. *leucophloia* or *Hakea lorea* subsp. *lorea* are more common. Other species frequently recorded within the scattered to open shrub stratum include *Senna glutinosa* subsp. *glutinosa, Solanum lasiophyllum, Corchorus lasiocarpus* subsp. *parvus, Acacia acradenia, Dampiera candicans, Eremophila forrestii* subsp. *forrestii* and *Tribulus suberosus.*

C. Isolated low trees and isolated to sparse mixed shrubs over *Triodia longiceps* hummock grasslands on colluvial deposits

This vegetation type is restricted to the eastern and north eastern portions of leases E46/335 and E46/592, in the swales between rocky slopes and in the bases and lower slopes of broad gullies where there is colluvial deposition of soil. Although widespread, each occurrence is confined to these landforms and hence the proportion of the total survey area supporting this vegetation is relatively low.

It is characterised by isolated low trees and sparse shrubs over an open to moderately dense cover of the tall hummock grass *Triodia longiceps.* The species composition of the tree and shrub strata area is typical of all hummock grass steppes in the area rather than specific to the *T. longiceps* community type. The low tree *Eucalyptus leucophloia* subsp.

leucophloia and the tall to mid-height shrubs*, Senna glutinosa* subsp*. glutinosa* and *S. glutinosa* subsp. *pruinosa* are widespread above the low shrubs *Tribulus suberosus, Indigofera monophylla, Corchorus lasiocarpus* subsp. *parvus, Solanum horridum, S. lasiophyllum, S. phlomoides, Sida sp.* Excedentifolia (J.L. Egan 1925*)* and *Sida pilbarensis* ms. The tussock grasses *Eriachne mucronata* and *E. lanata* are widespread at sparse density. Sparse herbs such as *Pterocaulon sphaeranthoides, Trianthema glossostigma, Streptoglossa bubakii, Bonamia media* var. *villosa* and *Pluchea dunlopii* are present, particularly at the bases of gullies.

D. Isolated low trees over a spare to open mid to low shrubland over *Triodia basedowii* hummock grasslands

This vegetation type is widely distributed on low undulating plains and minor hill slopes, particularly within leases E46/335, E46/592 and E46/334. It is characterised by an open to moderately dense cover of the hummock grass *Triodia basedowii,* sometimes in combination with *T. epactia* or *T.* sp. Shovelanna Hill. Isolated low trees of *E. leucophloia* occur above isolated to open *Grevillea wickhamii* subsp*. hispidula,* above a sparse to open mid to low shrubland in which *Solanum lasiophyllum, Senna glutinosa* subsp. *glutinosa, , Tribulus suberosus, Corchorus lasiocarpus* subsp. *parvus, Indigofera monophylla* and *Ptilotus calostachyus* var. *calostachyus* are common. The density of shrubs, particularly *Grevillea wickhamii* subsp. *hispidula,* is greater in areas which have been recently burnt.

E. Isolated low trees over sparse to open mid to low shrubland over *Triodia epactia* hummock grasslands

Triodia epactia is less widespread than in many other locations in the Eastern Pilbara, where it is often the dominant understorey in creek lines and swales. In many such locations the dominant grass is **Cenchrus ciliaris* and *T. epactia,* if present, is a minority species. However it was recorded along sections of Kulbee Creek and also in some minor drainage systems within the hills to the east of the Nullagine Road. In these locations it typically extends up the slopes some distance. The sparse or isolated tall shrub stratum may contain *Acacia marramamba, A. aneura, A. pruinocarpa and Grevillea wickhamii* subsp. *hispidula* above an open lower shrub stratum of *Senna glutinosa* subsp. *glutinosa, Goodenia stobbsiana, Ptilotus calostachyus* subsp. *calostachyus, Solanum phlomoides, Corchorus lasiocarpus* subsp. *parvus* and *Tribulus suberosus.* The tussock grasses *Eriachne mucronata* and *Cymbopogon ambiguous* are typically present at sparse coverage.

2. Riparian associations

There are three moderately large creek lines which traverse the survey area:

- Kulbee Creek, which flows south to south west from the northern boundary through the northern half of the survey area, eventually draining into the Fortescue Marsh system which lies to the south of the survey area;
- "No-Name Creek", which flows almost due south from near the north western boundary through the northern third of the survey area, draining into the Fortescue Marsh system; and
- Kulkinbah Creek, which flows south west to west through the most southern portion of the survey area, draining into the Fortescue Marsh system.

Large portions of these creek lines are dry other than following rainfall, with isolated pools of water remaining in Kulbee Creek and Kulkinbah Creek.

In addition to these more substantial creek lines, much of the remaining area is dissected by narrower drainage channels, some of which have defined banks and scoured beds, and others with only minor definition.

The vegetation in the riparian associations has been severely affected by pastoral activities, with **Cenchrus ciliaris* (buffel grass) largely replacing the native grasslands and herbs in many locations and thorny shrubs such as **Vachellia farnesiana, *Parkinsonia aculeata, Acacia victoriae* and *A. synchronicia* dominating the shrub stratum. The degree of pastoral degradation is one of the major influences in the statistical analysis of riparian vegetation groupings and a major differentiator in the subtypes below:

A. Open low forest to woodland of *Eucalyptus camaldulensis* and/or *E. victrix/Corymbia hamersleyana* over open high *Atalaya hemiglauca/Acacia pyrifolia* over open low shrubs over dense **Cenchrus ciliaris*

This vegetation type is widely distributed along the banks of the creek lines, particularly Kulbee Creek and No Name Creek. Although *Eucalyptus camaldulensis* subsp. *obtusa* is present at some locations, *E. victrix* is more commonly the dominant species in the overstorey, with *Corymbia hamersleyana* also present in shallow portions and tributaries. Below scattered to open tall shrubs of *Atalaya hemiglauca, Gossypium robinsonii, Petalostylis labicheoides, Hakea lorea* subsp. *lorea* and *Acacia pyrifolia,* an open lower shrub stratum of *Tephrosia rosea* var. *glabrior, Corchorus parviflorus, Solanum phlomoides, Hybanthus aurantiacus* and *Sida fibulifera* is present. The ground stratum is dominated by a dense to moderately dense cover of **Cenchrus ciliaris* with the perennial herb **Malvastrum americanum* widespread but less abundant. Small areas near the northern boundary of the survey area appear to have water flowing near ground level even in the drier months, upwelling in small sections of the creek. These areas, although otherwise undistinguished in composition, have small dense stands of the tall rush *Typha domingensis.*

B. Scattered *Eucalyptus victrix* over a low woodland of *Acacia aneura/A. coriacea* subsp. *pendens/Atalaya hemiglauca* over open shrubs over dense **Cenchrus ciliaris* grassland

Also widely distributed, this vegetation tends to be associated with slightly shallower, narrower channels and floodplains immediately adjacent to creek lines. Scattered trees of *Corymbia hamersleyana* or *Eucalyptus victrix* may be present, however the low tree/tall shrub stratum is dominated by *Acacia aneura* (mixed varieties), *Atalaya hemiglauca* and *Acacia coriacea* subsp. *pendens.* The tall to mid-height, unpalatable species *Acacia tetragonophylla* and **Vachellia farnesiana* are also common in some locations. Scattered shrubs of *Sida fibulifera, Hybanthus aurantiacus, Dicladanthera forrestii* are widespread above the dense cover of **Cenchrus ciliaris.* The perennial weed **Malvastrum americanum* and the annuals **Bidens bipinnata, *Cucumis melo* subsp. *agrestis* are widespread but less abundant. The twining species or prostrate species *Glycine canescens, Duperreya commixta, Ipomoea muelleri* and *Rhynchosia minima* var. *australis* are widespread at low densities.

C. Tall *Acacia* spp. and *Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland (No photo representation available)

This association was recorded along the banks of drainage channels in the north eastern portion and eastern portion of the survey area, generally in areas less heavily impacted by cattle. At some locations isolated to open trees of *Corymbia candida* subsp*. candida* or less commonly *C. ferriticola* are present above the open to moderately dense tall shrubland dominated by *A. aneura,* A*. rhodophloia*, *A. tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula and* at some locations *Dodonaea petiolaris.* The open to moderately dense low shrub stratum commonly contains *Corchorus parviflorus, Ptilotus obovatus* var. *obovatus, Indigofera monophylla, Isotropis forrestii, Hybanthus aurantiacus* and *Dicladanthera forrestii.* The tussock grassland is more complex than in other more degraded areas, with the native grasses *Digitaria brownii, Eriachne mucronata, Themeda*

triandra, Enneapogon polyphyllus and *Perotis rara* widespread and common, in addition to the introduced species **Cenchrus ciliaris.* The introduced herbs **Bidens bipinnata* and **Malvastrum americanum* are also abundant and common.

D. Floodplains adjacent to major creek lines: open forest to woodland of *Eucalyptus victrix* over open mid-height shrubland dominated by *Acacia tetragonophylla, A. sclerosperma, *Vachellia farnesiana* over sparse mixed tussock grasses and herbs

This association is relatively restricted within the survey area, occurring adjacent to some sections of Kulkinbah Creek where significant flooding of the plains occurs during water flow.

A moderately dense to open canopy of *Eucalyptus victrix* is present above a sparse low tree/tall shrub stratum of *Atalaya hemiglauca, Grevillea striata* and occasionally *Acacia aneura*. The open mid-height shrub stratum is dominated by *Acacia tetragonophylla, *Vachellia farnesiana*, *Acacia sclerosperma,* but other common species include the *Muehlenbeckia florulenta,* the Declared weed **Parkinsonia aculeata* and the Priority 4 shrub *Eremophila youngiana* subsp. *lepidota.* The sparse ground cover is a relatively diverse mixture of tussock grasses and herbs, including **Cenchrus ciliaris, Setaria dielsii, Dichanthium sericeum* subsp. *humilius, *Malvastrum americanum, Boerhavia burbidgeana, Cleome viscose, Sida fibulifera, Ptilotus gomphrenoides* var. *gomphrenoides, Gomphrena affinis* subsp. *pilbarensis, *Cucumis melo* subsp. *agrestis, *Portulaca oleracea, Sclerolaena bicornis, Trianthema triquetra,* the small sedge *Cyperus bifax* and the Priority 3 taxon *Polymeria* sp. Hamersley (ME Trudgen 11353).

E. Floodplains: isolated trees to open woodland of *Eucalyptus victrix* over open *Acacia synchronicia* over mixed low shrubs over open to closed mixed tussock grasses

This association occurs on the outer floodplains of larger creek lines and the less substantial floodplains of smaller creek lines. The upper stratum of *Eucalypt victrix* is sparser than that of Association 2D and the sparse upper stratum of *Atalaya hemiglauca* is often absent. The open mid-height shrub stratum is dominated by *Acacia synchronicia* and *A. tetragonophylla* but as for Association 2D, **Parkinsonia aculeate, *Vachellia farnesiana, A. sclerosperma* and *Eremophila youngii subsp*. *lepidota* are also common. At ground level the cover by tussock grasses is much more extensive, ranging from open to closed, and is relatively diverse, with *Chloris pumilio, Echinochloa colona* and *Dactyloctenium radulans* the most widespread and abundant, although **Cenchrus ciliaris* is also present and in some areas abundant. A sparse but diverse stratum of herbs similar to those observed in Association 2D is present, including *Malvastrum americanum, Neptunia dimorphantha, Ptilotus gomphrenoides* var. *gomphrenoides, *Portulaca oleracea, *Cucumis melo* subsp. *agrestis, Cleome viscose, Rostellularia adscendens* var. *clementii, Sida fibulifera, Trianthema triquetra, Boerhavia burbidgeana* and the small sedge *Cyperus bifax.* The Priority 3 taxon *Goodenia nuda* was recorded in this association but was not widespread.

3. *Acacia aneura* Low Woodlands and Tall Shrublands

Vegetation associations characterised by the presence of *Acacia aneura* are very widespread within the survey area. Whilst the common features are a canopy of *Acacia aneura* trees at variable density and the ground cover of tussock grasses and herbs, particularly the introduced grass **Cenchrus ciliaris* and herb **Bidens bipinnata*, some further categorisation of the vegetation association is possible:

A. *Acacia aneura, A. rhodophloia* open forest and woodland over sparse low shrubs and closed tussock grassland and herbland ± *Triodia longiceps*

This is a broadly distributed association in minor drainage channels. Isolated trees of *Eucalyptus victrix* or *Corymbia candida* subsp. *candida* may be present, above low woodland or open forest of *Acacia aneura* and *A. rhodophloia* and tall shrubs of the same species and *A. tetragonophylla*. The mid-height and low shrub strata are typically very sparse, with isolated shrubs of *Psydrax latifolia, Senna artemisioides* subsp. *helmsii, Dicladanthera forrestii, Indigofera monophylla, Hybanthus aurantiacus* and the twiner *Glycine canescens.* The open to closed ground cover is generally dominated by a mixture of tussock and other grasses, particularly *Themeda triandra, Digitaria brownii, Chrysopogon fallax, Enneapogon polyphyllus* and **Cenchrus ciliaris.* The hummock grass *Triodia longiceps* is widespread and occasionally dominant. Herbs are frequently co-dominant, with the most widespread and abundant species **Bidens bipinnata.* Other widespread but less prolific species include *Cleome viscose, Evolvulus alsinoides* var. *villosicalyx, Sida fibulifera, Rostellularia adscendens* var. *clementii, Euphorbia biconvexa and Isotropis forrestii.*

B. Open woodland of *Acacia pruinocarpa, A. aneura* over open mixed shrubland over open grasses

This broadly distributed association occurs on slopes and plains and in some instances very minor drainage channels. An open to sparse low tree stratum of *Acacia aneura* with lesser numbers of *A. pruinocarpa* occurs an open shrub stratum of mixed height typically containing *Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis* and *Eremophila forrestii* subsp. *forrestii,* with *Acacia rhodophloia* also common at some locations. The lower shrubs are more variable in composition, but commonly include *Hybanthus aurantiacus, Hibiscus burtonii, Tribulus suberosus, Sida ectogama, Corchorus lasiocarpus* subsp. *parvus, Solanum lasiophyllum* and *Ptilotus obovatus* var. *obovatus.* The ground cover typically contains a open mixture of isolated clumps of hummock grass and other grasses such as *Cymbopogon ambiguous, Eriachne mucronata, Enneapogon polyphyllus Aristida contorta* and **Cenchrus ciliaris.* Hummock grass species are also variable, with *Triodia epactia, T. longiceps* and *T. basedowii* all recorded.

C. Moderately dense to open tall *Acacia aneura* shrubland over sparse to open *A. tetragonophylla, Senna artemisioides* subsp. *helmsii* shrubs over moderately dense to open grassland dominated by *Aristida contorta*

This broadly distributed association occurs on plain throughout the survey area. Although isolated clumps of *Acacia aneura* trees may be present, it is characterised by a tall moderately dense to open shrubland of *Acacia aneura,* which in some areas occurs in a weakly banded formation. The middle to lower shrub stratum is generally open or sparse with *Acacia tetragonophylla, Senna artemisioides* subsp. *helmsii, Solanum lasiophyllum* and *Eremophila latrobei* subsp. *filiformis* common throughout. At some locations, particularly in areas where pastoral activity has been more intense, the dominant species within the shrub stratum is *Acacia synchronicia. Senna artemisioides* subsp. *oligophylla* and *Eremophila lanceolata* are also more common, whilst *Eremophila latrobei* subsp. *filiformis,* a palatable species, is less abundant. However these distinctions in the shrub stratum can not be distinguished in aerial photography and have hence not been mapped. The ground cover typically consists of an open to moderately dense cover of grasses, both perennial and annual. Hummock grasses are absent. The dominant species are a mixture of annual and perennial species, with *Aristida contorta* most common and abundant. Other widespread species are *Chloris pumilio, Enneapogon polyphyllus, Chrysopogon fallax, Perotis rara* and *Iseilema eremaeum. *Cenchrus ciliaris,* although not uncommon, is not dominant as it is elsewhere in the *Acacia aneura* associations. Herbs, although less abundant than grasses, are widespread. *Sida fibulifera, Cleome viscosa, *Bidens bipinnata, Euphorbia biconvexa, Ptilotus gomphrenoides* var. *gomphrenoides, Evolvulus alsinoides* var. *villosicalyx, Gomphrena kanisii, Boerhavia coccinea, *Cucumis melo* subsp. *agrestis and *Portulaca oleracea* are all widespread.

D. Groves of *Acacia aneura, A. rhodophloia* woodland over sparse shrubland of *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii, Eremophila latrobei* subsp. *filiformis* over open to sparse grasses

This association accounts is widespread although less extensive than Association C. It often occurs in combination with areas that are virtually devoid of all vegetation other than very sparse annual herbs. The major species within the open woodland/tall shrubland overstorey is *Acacia aneura,* with *Acacia rhodophloia* often present but usually less abundant. The sparse shrub mid-stratum is low in diversity, *with Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *filiformis, Acacia tetragonophylla, Dodonaea petiolaris, Senna artemisioides* subsp. *helmsii* typically present above a sparse to open grassland in which *Aristida contorta, A. ingrata, Paraneurachne muelleri and Eulalia aurea* are typical and *Perotis rara, Enneapogon polyphyllus* and *Eriachne mucronata* are also widespread. Isolated clumps of *Triodia basedowii* may also be present, particularly near the outer edges of the groves. Isolated clumps of herbs may be present, typically *Sida fibulifera, Maireana villosa, Mollugo forrestii* and the ubiquitous **Bidens bipinnata* and *Cleome viscosa.*

E. Isolated trees or shrubs of *Acacia aneura* over open shrubland of *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* over sparse grasses

This association occurs at a small number of locations on both plains and low rocky crests. It is characterised by a low to mid-height stratum dominated by the shrubs *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia.* Other widespread but less abundant species are *Eremophila latrobei* subsp. *filiformis, Senna artemisioides* subsp. *helmsii, Solanum lasiophyllum* and *Acacia synchronicia.* The sparse cover of grasses is dominated by the annual/semi perennial species *Enneapogon polyphyllus* and *Aristida contorta.* Isolated clumps of the small spinescent herb *Sclerolaena cornishiana* are widespread.

F. Isolated clumps of tall *Acacia aneura* shrubs over open low shrubs of *Ptilotus schwartzii*

This association is present across small areas, predominantly on plains in the southern portion of the survey area. Isolated clumps of tall shrubs of *Acacia aneura* and at some locations *A. catenulata* subsp. *occidentalis* Maslin ms occur, with a sparse lower shrub stratum of *Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis,* and *Eremophila forrestii* subsp. *forrestii* . These clumps of shrubland are surrounded by areas of largely bare ground, with a sparse coverage of the low shrubs *Ptilotus schwartzii* subsp. *schwartzii*, *Eremophila lanceolata* and *Solanum lasiophyllum.* The herb and grass stratum is almost absent in these surrounding areas, with isolated plants of *Sclerolaena cornishiana* and the small annual grass *Enneapogon polyphyllus* occasionally recorded.

4. Miscellaneous Shrublands

A. Rocky crests of hills: *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses

This association is restricted to the rocky crests of small hills. Isolated low trees of *Acacia pruinocarpa* occur above a tall to mid-height shrubland of *Acacia rhodophloia.* A sparse shrub understorey of *Eremophila latrobei* subsp. *filiformis, Senna glutinosa* subsp. *glutinosa, Tribulus suberosus* and *Santalum lanceolatum* occurs above isolated clumps of *Triodia basedowii, Eriachne mucronata, Paspalidium clementii, Perotis rara, *Cenchrus ciliaris* and the small sedge *Bulbostylis barbata.* Isolated herbs such as *Sida fibulifera, Gomphrena kanisii, G. cunninghamii, *Portulaca oleracea* and *Maireana planifolia* are also present.

B. Isolated shrubs of *Acacia synchronicia* over open and diverse herbs and grasses

This association occurs as a large area south of Kulkinbah Creek at the southern boundary of the survey area. It is characterized by isolated to sparse shrub cover dominated by Acacia *synchronicia* over a diverse open cover of soft grasses and herbs. Isolated clumps of low shrubs, typically *Eremophila lanceolata, Solanum lasiophyllum* are scattered across a diverse array of perennial and annual herbs and soft grasses, with *Aristida contorta, Enneapogon polyphyllus, Eragrostis xerophila* and *Panicum decompositum* all common. Herbs present include *Neptunia dimorphantha, Boerhavia paludosa, Gomphrena affinis* subsp. *pilbarensis, Evolvulus alsinoides* var. *villosicalyx, Goodenia muelleriana, *Portulaca oleracea, Sida fibulifera, *Malvastrum americanum, Sclerolaena bicornis, S. densiflora, Ptilotus aervoides, Gomphrena kanisii, Trianthema triquetra* and **Cucumis melo* subsp. *agrestis.*

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7515000 7510000 7505000 7500000 7495000

Legend

- 1A — *Isolated to open low trees and shrubs over Triodia brizoides hummock grasslands on slopes and crests*
- 1B — *Isolated to open low trees and mixed height shrubs over Triodia sp. Shovelanna Hill hummock grasslands on slopes and plains*
- 1C — *Isolated low trees and isolated to sparse mixed height shrubs over Triodia longiceps hummock grasslands on colluvial deposits*
- 1D — *Isolated low trees over a spare to open mid to low shrubland over Triodia basedowii hummock grasslands*
- 1E — *Isolated low trees over sparse to open mid to low shrubland over Triodia epactia hummock grasslands*
- 2A — *Low forest to woodland of Eucalyptus victrix/Corymbia hamersleyana over open high Atalaya hemiglauca/A.pyrifolia over open low shrubs over dense *Cenchrus ciliaris*
- 2B — *Scattered Eucalyptus victrix over a low woodland of Acacia aneura/A. coriacea subsp. pendens/Atalaya hemiglauca over open shrubs over dense *Cenchrus ciliaris grassland*
- 2C — *Tall Acacia spp. and Grevillea wickhamii subsp. hispidula shrubland over low shrubland over mixed tussock grassland*
- 2D — *Floodplains adjacent to major creeklines: Open forest to woodland of Eucalyptus victrix over open mid-height shrubland dominated by Acacia tetragonophylla, A. schlerosperma, *Vachellia farnsiana over sparse mixed tussock*
- 2E — *Floodplains: Isolated trees to open woodland of Eucalyptus victrix over open Acacia synchronicia over mixed low shrubs to low shrubs over open to closed mixed tussock grasses*
- 3A — *Acacia aneura, A. rhodophloia open forest and woodlands over sparse low shrubs and closed tussock grassland and herbland ± Triodia longiceps*
- 3B — *Open woodland of Acacia pruinocarpa, A. aneura over open mixed shrubland over open grasses*
- 3C — *Moderately dense to open tall Acacia aneura shrubland over sparse to open A. tetragonophylla, Senna artemisioides subsp. helmsii shrubs over moderately dense to open grassland dominated by Aristida contorta*
- 3D — *Groves of Acacia aneura, Acacia rhodophloia woodland over sparse shrubland of Eremophila forestii subsp. forestii, Senna artemisioides subsp. helmsii, Eremophila latrobei subsp. filiformis over open to sparse grasses*
- 3E — *Isolated trees or shrubs of Acacia aneura over open shrubland of Senna glutinosa subsp. luerssenii and Eremophila cuneifolia over sparse grasses*
- 3F — *Isolated clumps of tall Acacia aneura shrubs over open low shrubs of Ptilotus schwartzii*
- 4A — *Rocky crests of hills: Acacia rhodophloia shrubland over sparse mixed shrubs and isolated herbs, and grasses*
- 4B — *B. Isolated shrubs of Acacia synchronicia over open and diverse herbs and grasses*

- Phase 1 Sites
- Phase 2 Sites
- Phase 3 Sites

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Absolute Scale - 1:100,000

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HANCOCK PROSPECTING PTY LTD

Distribution of vegetation communities within the Roy Hill 1 project area

Figure: 4-2
Project ID: 943

Drawn: SG
Date: 09/04/09

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M071

A3

4.2 Flora of the Roy Hill Project Area

A total of 477 species from 53 families and 170 genera was recorded during the three phases of survey. Thirty additional specimens, predominantly from Phase 1, could not be identified beyond the level of genus due to a lack of reproductive material and have been excluded from the above figures.

The most commonly recorded families were Poaceae (83 taxa), Mimosaceae (41 taxa), Malvaceae (37 taxa), Amaranthaceae (28 taxa), Fabaceae (26 taxa), Chenopodiaceae (23 taxa) and Caesalpiniaceae (18 taxa).

The most commonly recorded genera were *Acacia* (39 species), *Ptilotus* (18 species), *Senna* (16 species), *Eremophila* (12 taxa), and *Abutilon, Eragrostis* and *Eriachne* (11 taxa respectively). Thirteen families and 86 genera were represented by a single taxon.

This pattern of dominant families and genera is typical of flora of the Eastern Pilbara. The relatively high number of grasses (Poaceae) reflects the large proportion of the survey area in which an understorey of soft grasses and herbs are present, rather than hummock grasses (*Triodia* spp.) steppes, in which a much smaller number of taxa from this family would be present.

A list of species recorded during all phases of the survey is included in Appendix C.

4.3 Sampling Adequacy

Species accumulation curves provide a theoretical basis for understanding the relationship between sampling effort and the accumulation of species, and hence, provide a means of estimating species richness and assessing survey adequacy. As sampling effort increases with a corresponding increase in survey area and time, the rate at which new species are recorded is reduced and the curve becomes asymptotic. At the point where there is a minimal number of additional species recorded with each additional sampling effort, the survey size is deemed sufficient.

Flora sampling adequacy was estimated using species accumulation curve analysis (Colwell, 2005) (Figure 4-3) and extrapolation of the curve to the asymptote using Michaelis-Menten modelling. Using this analysis, the incidence-based coverage estimator of species richness (ICE, Chao) was determined as 520, suggesting that with a total of 477 taxa recorded; approximately 92 % of the flora species potentially present within the study area were recorded during the survey.

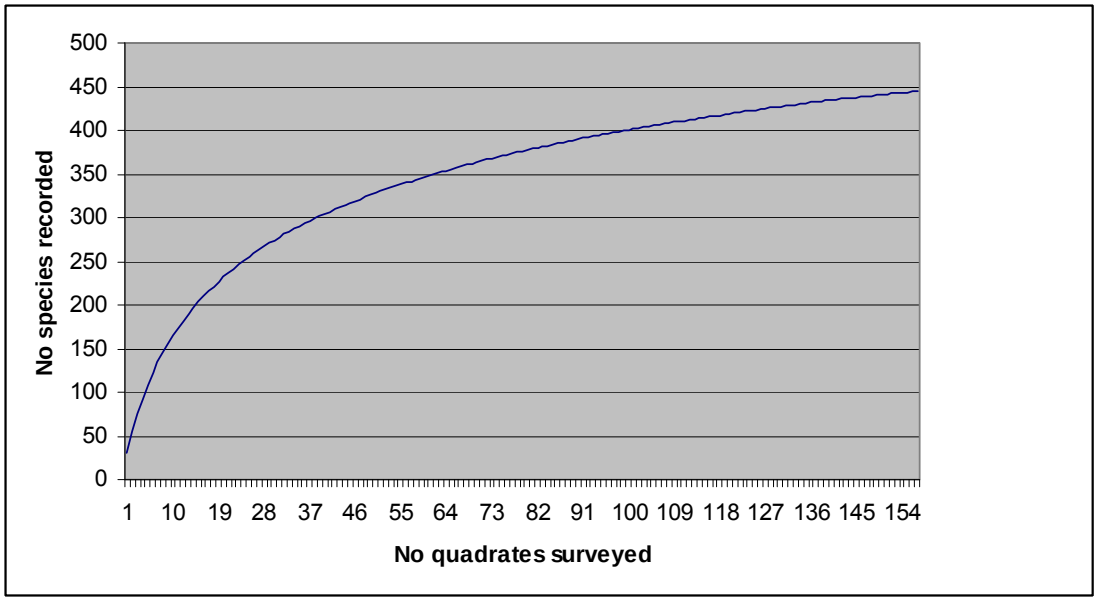

Figure 4-3 Average randomised species accumulation curve for flora surveyed within the Project area (Phases 2 & 3 sites only)

4.4 Flora of Conservation Significance

4.4.1 *Environmental Protection and Biodiversity Conservation Act, 1999* (Commonwealth of Australia)

At a National level, flora is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). This lists species that are considered Critically Endangered, Endangered, Conservation Dependant, Extinct, or Extinct in the Wild (Appendix D).

No nationally listed species have been recorded within the Project area.

4.4.2 *Wildlife Conservation Act, 1950* (Western Australia)

Declared Rare Flora (DRF) are protected under the Western Australian Wildlife Conservation (Rare Flora) Notice 2008(2) of the *Wildlife Conservation Act 1950*. The notice lists flora taxa that are extant and considered likely to become extinct or rare. These taxa are legally protected and removal or impact to their surroundings cannot be conducted without ministerial approval, obtained on each occasion for each population.

The DEC also maintains a list of flora taxa which are considered to be poorly known, uncommon, or under threat, but for which there is insufficient justification on the basis of known distribution and population sizes to be included on the DRF schedule. These are classified as Priority Flora. The Declared Rare Flora and the four ranks of Priority Flora are defined by specific criteria (Appendix G).

A search was undertaken of the Department of Conservation and Environment's (DEC) Threatened (Declared Rare) Flora database, the Western Australian Herbarium Specimen

database for priority species opportunistically collected in the area of interest and the DEC Declared Rare and Priority Flora List. The search area contained the Roy Hill 1 Project area and a radius of 50 km from the Project area.

The database search indicates that nine species listed as DEC Priority taxa and no species listed as Declared Rare Flora have been previously recorded in the vicinity of the Project area. These species, their distribution, preferred habitat and their likelihood of occurrence in the Project area are summarized in Table 4-1.

Table 4-1: DEC Priority Flora taxa previously recorded in the vicinity of the Roy Hill 1 Project area.

Taxon	Cons. Status	Distribution (Nearest named location)	No. of records	Preferred Habitat	Potential to occur in Project area
Acacia aphanoclada (Mimosaceae)	P1	Nullagine	6	Skeletal stony soils on rocky hills, ridges & rises.	Possible on the north eastern perimeter which has not been searched due to access constraints
Eremophila pilosa (Myoporaceae)	P1	Roy Hill, Jigalong Community	2	Shallow depression in sandplain with loamy soil; Hardpan plain over granite	Possible
Eremophila spongiocarpa (Myoporaceae)	P1	Roy Hill	2	Weakly saline alluvial plain on margins of marsh.	Occurs immediately to the south west of Lease 46/592 but unlikely within the Roy Hill 1 leases
Eremophila youngii subsp. *lepidota* ms (Myoporaceae)	P4	Cape Range, Roy Hill, Mt. Vernon, Paraburdoo, Shovelanna Creek	7	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	Recorded during the current survey
Goodenia nuda (Goodeniaceae)	P3	Weeli Wolli, Roy Hill, Mount Stuart	1	Plain. Dry, red sand; Bare river sand in dry scoured river bed	Recorded during the current survey
Goodenia sp. East Pilbara (Goodeniaceae)	P1	Noreena, Mulga Downs	2	Clay soil, calcrete pebbles on low undulating plains.	Possible
Helichrysum oligochaetum (Asteraceae)	P1	Roy Hill,	1	Red clay on alluvial plains.	Possible
Myriocephalus scalpellus (Asteraceae)	P1	Roy Hill	1	Depression on flood plain	Possible
Ptilotus mollis (Amaranthaceae)	P4	Bamboo Springs	1	Stony hills and screes.	Possible

4.4.3 Recorded Flora of Conservation Significance

Six flora species of conservation significance were recorded during the three phase survey (Figure 4-4). During the first phase, one species was recorded: *Rostellularia adscendens* var. *latifolia* (P3). During the second phase, additional populations of *Rostellularia adscendens* var. *latifolia*, were found, and three additional species; *Rhagodia* sp.

Hamersley (M. Trudgen 17794) (P3), *Polymeria* sp. Hamersley (P3) and *Goodenia nuda* (P3) were recorded. During the third phase further populations of the above taxa were recorded, and two additional taxa, Acacia *glaucocaesia* (P3) and *Eremophila youngii subsp. lepidota* (P4) were recorded. Data regarding the locations and abundance of these taxa within the survey area has been supplemented by more intensive grid searches within a subset of polygons within the lease.

These six Priority species are described below, and their locations are detailed in

Table 4-2: DEC Priority Flora taxa recorded in the Roy Hill 1 Project area

Taxon	Priority Rank
Rhagodia sp. Hamersley (M. Trudgen 17794)	P3
Acacia glaucocaesia	P3
Goodenia nuda	P3
Polymeria sp. Hamersley	P3
Rostellularia adscendens var. *latifolia*	P3
Eremophila youngii subsp. lepidota	P4

***Rhagodia* sp. Hamersley (M. Trudgen 17794) (Priority 3)**

Rhagodia sp. Hamersley is a perennial shrub growing up to 60cm high with ovate leaves and a striate stem (Plate 4-1). It superficially resembles in form the widespread species *Rhagodia eremaea* and can be mistaken for this taxon if seasonal conditions are not conducive to the collection of reproductive material.

R. sp. Hamersley has previously been lodged with the Western Australian Herbarium from three locations as follows:

i) Three records at Mining Area C;

ii) One record at East Angelas;

iii) One record at Mount Hilditch.

A fourth location has recently been recorded at West Angelas Mine site.

The current location therefore represents an eastern extension to the known range of this taxon. However given it is a relatively new and as yet undescribed taxon, the current paucity of records may be a consequence of collections from earlier surveys within the region not being assigned to this taxon and hence not being lodged with the Herbarium, rather than a genuinely restricted distribution. The Priority status of this taxon has recently been revised from Priority 1 to Priority 3 given the recent expansion of population records.

Within the Project area, this taxon was recorded at four locations during Phase 2 and a further twenty locations during Phase 3. These point-based records have now been supplemented by grid-pattern traverses of areas of proposed infrastructure and exploration drilling, in which individual plants are counted. The known distribution within the Project area is detailed in Figure 4-4. At some locations within the survey area it is relatively abundant and it is anticipated that additional plants will be located as more intensive searching occurs.

Plate 4-1: Rhagodia sp. Hamersley (M. Trudgen 17794)

***Acacia glaucocaesia* (Mimosaceae) (Priority3)**

Acacia glaucocaesia is a small erect tree to 4 m tall with grey, finely fissured bark on the main trunk and smooth, pruinose (whitish) upper branches and branchlets. The phyllodes are thin, more or less glaucous (blue-green) and pruinose, without a prominent midrib. No stipular spines are present. The inflorescences are predominantly racemose with some simple heads and light golden flowers.

This taxon has been recorded from more than twenty locations within the Pilbara, most of which are closer to the coast near Port Hedland, Roebourne, Whim Creek, Dampier and Karratha and one near Mardie Homestead between Onslow and Damper. A single population has been recorded further north near Anna Plains Homestead within the south Kimberley. However there are also three locations further inland; one approximately 100 km south east of Port Hedland, one between the Ashburton and DeGrey Rivers, and one at Woodie Woodie near the boundary of the Pilbara region with the Great Sandy Desert.

The current record in the Roy Hill 1 tenements therefore represents a minor south eastern extension of the known range of the taxon. To date only one location has been recorded near the eastern boundary of Lease E46/00334 within a sparse, predominantly low shrubland over sparse tussock grasses (Figure 4-4). As no broader searching has been conducted in the vicinity, it is possible the taxon is scattered at low density more widely.

Plate 4-2: Acacia glaucocaesia (photo courtesy of FloraBase 2008)

Goodenia nuda **(**Goodeniaceae) **(Priority 3)**

Goodenia nuda is an annual erect to ascending herb to 0.5 m in height. Flowers are yellow, occurring between April and August (Plate 4-3). *G. nuda* is found in a variety of habitats such as dry scoured river beds, spinifex grassland or Mulga scrub (FloraBase, 2008).

Records of *Goodenia nuda* have been lodged with the Western Australian Herbarium from fifteen other locations as follows:

i) Two records within the Cloudbreak Mining Tenement
ii) Four records along the FMG Stage A Rail Corridor;
iii) One record on the Canning Stock Route;
iv) One record at Yandi Iron Ore Mine
v) One record in Marillana Creek, south of the Yandi Iron Ore Mine
vi) One record at Marillana Creek, 90 km N/W of Newman;
vii) One record at Mardie Station;
viii) One record near Lake Auld
ix) One record 96 miles from Onslow on Mount Stuart Road;
x) One record near Roy Hill, on Wittenoom Road;
xi) One record at Weeli Wolli Creek.

This taxon has also been recently recorded within the West Angelas Mining Lease, approximately 100 km north of Newman.

The current collections at Roy Hill lie within the previously known range. *G. nuda* was recorded at four and six locations during Phases 2 and 3 respectively, with three additional collections subsequently made during ground searches of areas of proposed infrastructure and exploration drilling (Figure 4-4). To date this taxon appears to be present in relatively low numbers at these locations.

Plate 4-3: Goodenia nuda (photo courtesy of FloraBase 2008)

***Polymeria* sp. Hamersley** (Convolvulaceae) **(Priority3)**

Polymeria sp. Hamersley is a rhizomatous perennial with erect annual stems and silvery/hairy leaves, growing to approximately 15 cm in height (Plate 4-4)

Three previous collections of *Polymeria* sp. Hamersley have been lodged at the Western Australian Herbarium, as follows;

i) Two collections near Balbina Bore, Hamersley Station;
ii) One collection from Hamersley (more precise locality details not available).

This taxon has also been collected very recently in the exploration lease immediately south of the current survey area.

Given the limited number of collections to date, the current records at Roy Hill represent an eastern extension to the recorded range of this taxon. However given it is a relatively new and as yet undescribed taxon, the current paucity of records may be a consequence of collections from earlier surveys within the region not being assigned to this taxon and hence not being lodged with the Herbarium, rather than a genuinely restricted distribution.

One small population of *Polymeria* sp. Hamersley was recorded during Phase 2 and a further three locations were recorded during Phase 3 (Figure4-4). This taxon appears to be present at low cover at each of the locations at which it was recorded.

Plate 4-4: Polymeria sp. Hamersley (M.E. Trudgen 11353)

***Rostellularia adscendens* var. *latifolia* (**Acanthaceae**) (P3)**

Rostellularia adscendens var. *latifolia* (Acanthaceae) is a low herb between 0.1 and 0.3 m in height, with blue to purple flowers usually between April and May (Plate 4-5). It most commonly occurs on ironstone soils near creeks and rocky hills (FloraBase, 2008).

Ten previous collections of *R. adscendens* var. *latifolia* have been lodged at the Western Australian Herbarium, as follows;

i. three collections within Karijini National Park, approximately 100 km to the west of Roy Hill;
ii. three collections near Wittenoom, approximately 70 km to the north-north west of Roy Hill;
iii. one collection in the Hamersley Range National Park on a ridge S/W of Juna Downs;
iv. one collection alongside the Tom Price to Paraburdoo rail line;
v. one collection on Warrawagine Station;
vi. one collection on the Flumen Oakover, Oakover River, approximately 200 km to the north east of Roy Hill;

This taxon has also been recently collected from Hope Downs Mine Site and West Angelas Mine site.

The current collection at Roy Hill lies well within the previously distribution range of the taxon.

Only one small population of *R. adscendens* var. *latifolia* was recorded during Phase 1, however a further thirteen and fifteen locations were recorded during Phases 2 and 3 respectively. The significant expansion of collections during the second and third phase is due to the dry conditions which prevailed during Phase 1. At some locations this taxon was observed to be moderately abundant (Figure 4-4).

Plate 4-5: Rostellularia adscendens var. latifolia (lower photograph courtesy of FloraBase 2008)

Eremophila youngii* subsp. *lepidota (Myoporaceae) **(Priority4)**

Eremophila youngii subsp. *lepidota* is a dense, spreading shrub growing from 0.2 to 3 m high that produces purple to red- pink flowers from January to March and June to September (Plate 4-6). It occurs on stony, red sandy loam soils and is found on flats, plains, floodplains and sometimes semi-saline clay flats.

The taxon is relatively broadly distributed and collections have been lodged at the Herbarium from 17 other locations within the Pilbara, Carnarvon, Gascoyne and western boundary of the Little Sandy Desert IBRA regions. It has also been recently collected from locations immediately to the south of the Roy Hill 1 Project area and near Shovelanna Creek. The current project location lies near the eastern boundary of this distribution.

Within the Roy Hill 1 leases, it has been recorded from a number of locations in close proximity to each other in the south eastern boundary of the survey area (Figure 4-4) at cover rankings ranging from less than 2% to 10-30%.

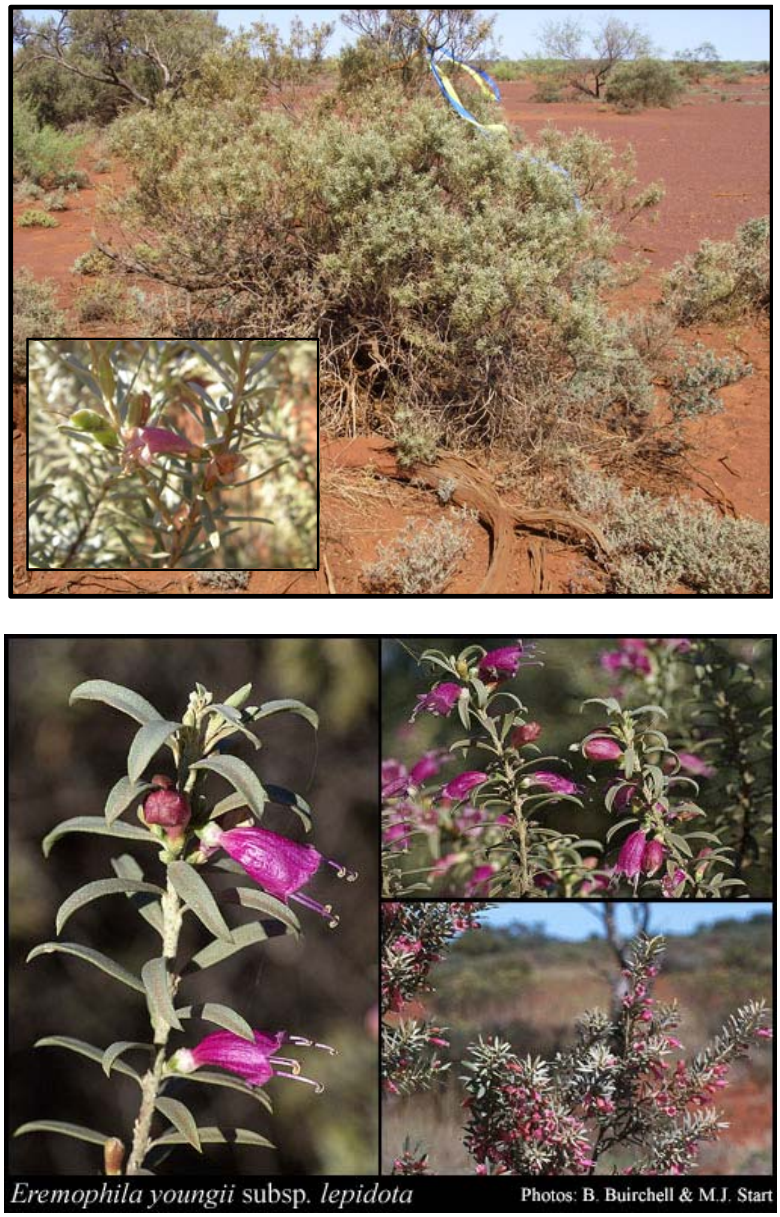

Plate 4-6: Eremophila youngii subsp. lepidota (lower photo courtesy of FloraBase 2008)

790000 795000 800000 805000 810000 815000 820000 825000

7515000 7510000 7505000 7500000 7495000

Waste Dump

Mine Services

Process Plant

E 4600335

Waste Fines Storage Facility

Village

Evaporation Pond

Overland Conveyor

Drainage Shadow

Evaporation Pond

Evaporation Pond

E 4600334

Airstrip

E 4600592

N

0 2.5 5

Kilometers

Absolute Scale - 1:96,801

Legend

- *Rhagodia* sp. Hamersley - P3
- *Acacia glaucocaesia* P3
- *Goodenia nuda* - P3
- *Goodenia pascua* - P3
- *Polymeria* sp. Hamersley - P3
- *Eremophila youngii* subsp. *lepidota* - P4

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HANCOCK PROSPECTING PTY LTD

Roy Hill
Priority 3 and 4 Flora and Mine Infrastructure

Figure: 4.4
Project ID: 943

Drawn: SG
Date: 23/01/09

Coordinate System
Name: GDA 1994 MGA Zone 50/51
Projection: Transverse Mercator
Datum: GDA 1994

A3

4.5 Introduced Flora

A total of nineteen naturalised alien taxa (weeds) were recorded during the Roy Hill 1 Project area vegetation and flora assessment. The locations of these weeds are detailed in Appendix D and Figure 4-5.

4.5.1 Declared Weeds

Weeds that are, or that have the potential to become pests to agriculture may be formally declared under the *Agriculture and Related Resources Protection Act, 1976*. Declared plants under this Act are listed within standard control codes that outline the requirements for control. Five Priority groupings exist (P1, P2, P3, P4 and P5), and more than one of these codes may be placed on a weed species. Depending upon the Priority accorded to the species in the particular district, landholders having declared pests on their property may be obliged to control them at their own expense, and are encouraged to follow the standard control codes. Details of these codes are included in Appendix G.

A search was conducted of the Declared Plants List under the ARRP Act, 1976 by the Department of Agriculture for any declared weed species that could potentially be found in the Roy Hill 1 Project area. One weed with declared weed status in some areas of the state was found during the surveys;

***Parkinsonia aculeata* (CAESALPINIACEAE) P1, P2**

As a P1 species the movement of plants or their seeds is prohibited within the State, including a prohibition of movement of contaminated machinery and produce including livestock and fodder, As a P2 taxon all plants must be treated to destroy and prevent propagation each year until no plants remain.

**Parkinsonia aculeata* (Parkinsonia, Jerusalem Thorn) is a large, spiny shrub or small tree, growing to 8 metres in height with drooping, slender branches. Flowers are yellow, occurring between March and December. It was originally introduced for shade and ornamental purposes, from warm temperate and tropical areas of America. It has become a serious weed, especially along rivers, in pastoral areas of the Pilbara and Kimberley (FloraBase, 2008) (Hussey *et. al.,* 2007) and has declared weed status in the East Pilbara.

**Parkinsonia aculeata* was recorded at two sites during Phase 2 of the Roy Hill 1 survey, one of which was a river bank and the other a floodplain (Figure 4-5). Both populations had more than 10 individuals. During Phase 3 of the Roy Hill 1 survey **P. aculeata* was found at five sites. Two of these sites were creek banks and the other three were floodplains. At all of the sites **P. aculeate* was recorded at a density cover of less than 2%.

This has been categorised as one of the 20 weeds of National significance, by the National Weed Strategy (1999).

4.5.2 Weeds of National Significance

The National Weeds Strategy (1999) defines a weed as “a plant which has, or has the potential to have, a detrimental effect on economic, social, or conservation values”.

Weeds that have proliferated in bushland without direct human intervention are also referred to as naturalised alien species.

One weed of national significance, *Parkinsonia aculeate* was recorded within the Roy Hill project area as described above.

4.5.3 Environmental Weeds

In addition to the 3 declared weed species described above, 18 environmental weeds were recorded within the Roy Hill 1 Project area, two of which have declared status in some part of the state other than the East Pilbara. These weed species are described briefly below.

***Heliotropium europaeum* (BORAGINACEAE)**

Heliotropium europaeum (Common heliotrope) is an annual herb with declared weed status of P1, P3 or P4 in some portions of the south west, growing from 0.1 – 0.3 m in height. The small flowers that occur between January and December are white with a yellow throat. It is native to southern and central Europe, Western Asia and North Africa. It is abundant in paddocks, firebreaks, roadsides and other disturbed areas (FloraBase, 2008) (Hussey *et. al.,* 2007).

Heliotropium europaeum was recorded at three sites during Phase 2 of the Roy Hill 1 survey. All three populations had more than 10 plants. It was found twice in a flat / plain site and once on a river channel site (Figure 4-5). *Heliotropium europaeum* was not found during the other Phases of the survey.

***Argemone ochroleuca* subsp. *ochroleuca* (PAPAVERACEAE)**

**Argemone ochroleuca* subsp. *ochroleuca* (Mexican Poppy) is a declared weed under the *Agriculture and Related Resources Protection Act* in Western Australia. **Argemone ochroleuca* is categorised as Priority One (or higher) for the entire state with the exception of several municipal districts including the East Pilbara. Hence for the purpose of this survey, **A. ochroleuca* is not a declared weed. **Argemone ochroleuca* is widely distributed in the pastoral areas, mainly along river systems, moist flats and sand dunes in Western Australia. It is also present in some agricultural areas, but does not compete well with crops or well managed pastures (FloraBase, 2008) (Hussey *et. al.,* 2007).

**Argemone ochroleuca* subsp. *ochroleuca* was recorded opportunistically during Phase 1; four individual plants were noted adjacent to an access track within the Project area (Figure 4-5). During Phase 2 **A. ochroleuca* was recorded at one river bank site with a population size less than 10 plants.

***Trianthema portulacastrum* (AIZOACEAE)**

**Trianthema portulacastrum* (giant pigweed) is a prostrate, somewhat succulent herb native to tropical Africa and Asia with ovate green leaves and small white flowers hidden

amongst the leaves. (Hussey et. al., 2007). It favours disturbed land and is occurs within the Pilbara and Kimberley, where it can be a serious weed in irrigated crops.

Within the survey area it was recorded in low numbers; two locations in Phase Three (Figure 4-5).

***Aerva javanica* (AMARANTHACEAE)**

**Aerva javanica* (Kapok Bush) is a perennial herb native to northern Africa and south-west Asia, which grows to 1.6 m in height and is covered in dense, branched hairs. **Aerva javanica* was introduced to Australia to assist with the revegetation of degraded rangelands. It is now widespread in many types of vegetation from Carnarvon to the Kimberley (FloraBase, 2008) (Hussey *et. al.,* 2007).

**Aerva javanica* is widely distributed within the survey area, primarily in Mulga woodlands, and was recorded from thirteen quadrates (Figure 4-5). It was also observed opportunistically along the Nullagine road and numerous other tracks within the tenements. Populations are predominantly small (fewer than 10 plants) but the species was prolific at one location surveyed during Phase 3.

****Bidens bipinnata* (ASTERACEAE)**

**Bidens bipinnata* (Beggars Tick) is an erect annual herb with forrestii leaves, four-angled stems, heads in terminal panicles and narrow black fruits with barbed awns at one end. **Bidens bipinnata* is broadly distributed in the Pilbara and favours shaded habitats such as Mulga groves and drainage systems. It is readily spread by means of the awned seed, which attaches to clothes and fur. Cattle are probably a major source of seed dispersion.

**Bidens bipinnata* is broadly distributed throughout the survey area, recorded from 60 quadrates and multiple opportunistic records, with the greatest densities of plants recorded in Mulga woodlands and along drainage channels where it is often prolific (Figure 4-5).

****Sonchus oleraceus* (ASTERACEAE)**

**Sonchus oleraceus* (Sowthistle) is an erect annual herb or short-lived perennial, growing to 1.5 meters in height native to Eurasia and North Africa. It is widespread throughout the state. The leaves are generally flaccid and are weakly prickly or have no prickles at all. Flowers are yellow, occurring from January to December.

**Sonchus oleraceus* was found at one creek bed location during Phase 2 of Roy Hill 1 survey. Fewer than 10 plants were observed.

****Citrullus colocynthis* (CUCURBITACEAE)**

**Citrullus colocynthis* is a trailing perennial herb native to northern Africa and western Asia, with sticky and hairy stems and leaves and fleshy fruits with green with yellow markings. **Citrullus colocynthis* is found in wetlands and creeks in the Pilbara and Kimberley regions (FloraBase, 2008) (Hussey *et. al.,* 2007).

Citrullus colocynthis was recorded at eleven locations during at low abundance (Figure 4-5). Fewer than 10 plants were observed at each location.

***Citrullus lanatus* (CUCURBITACEAE)**

Citrullus lanatus (Afghan Melon, Pie Melon, Wild Melon), a wild relative of the water melon, is a summer growing annual, native to tropical and southern Africa and now widely distributed throughout the state. The prostrate, bristly stems radiate from a fleshy tap root and bear large, deeply lobed leaves up to 20cm long as well as branched tendrils. The separate male and female flowers, produced in summer and autumn (and winter in the Kimberley), are bright yellow and 3-4cm across. The mature spherical fruit is up to 15cm across, hairy, with mottled green stripes at first, but becoming yellow and hairless with age (FloraBase, 2008) (Hussey *et. al.,* 2007).

Citrullus lanatus was recorded in low numbers at only one location during Phase 3 of the Roy Hill 1 survey (Figure 4-5).

***Cucumis melo* subsp. *agrestis* (CUCURBITACEAE)**

Cucumis melo subsp. *agrestis* (Ulcardo Melon) is a trailing annual, herb or climber. Flowers are yellow, occurring from February –June and September–October (FloraBase, 2008).

Cucumis melo subsp. *agrestis* was recorded at 48 locations, usually at low abundance, predominantly within or adjacent to minor channel or river habitats with some records occurring on plains (Figure 4-5).

***Malvastrum americanum* (MALVACEAE)**

Malvastrum americanum (Spiked Malvastrum) is an erect, hairy, perennial herb or shrub between 0.5 and 1.3 m in height. Native to America, **M. americanum* is a weed of river and creek margins, wastelands, and many arid zone habitats from the Nullarbor to the Pilbara and Kimberley. **Malvastrum americanum* is inedible to herbivores (Hussey *et. al.,* 2007) and hence has a competitive advantage and becomes particularly abundant under grazing pressure.

Malvastrum americanum is widespread in the survey and was recorded at a total of 68 locations; seven in Phase 1, 20 in Phase 2 and 41 in Phase 3. The records were predominantly within or adjacent to drainage channels (Figure 4-5). Abundance ranges from sparse to dominant within the ground cover.

***Vachellia farnesiana* (MIMOSACEAE)**

Vachellia farnesiana is a South American species widely introduced in the tropics which was introduced to Australia prior to European settlement. The young seed pods were roasted and eaten by the Aboriginal tribes. It is a dense, sprawling, spiny shrub to 4m with forrestii leaves and paired spines at each node and can be mistaken for the declared weed mesquite (*Prosopis* sp). It is distinguished from mesquite by noting the sweetly-scented yellow flowers are grouped into globular flower heads arising from the leaf axils,

and the pods are black and sausage shaped, tending to be retained on the plant. It is a widespread weed of roadsides, creeks, rivers and disturbed flood plains, from the Kimberley to Carnarvon and occasionally south to Muchea (Hussey et. al., 2007). The spiny branches discourage cattle and it tends to increase relative to other species under grazing pressure.

Within the survey area **V. farnesiana* was recorded at 41 locations; 15 in Phase1 eight in Phase 2 and 18 in Phase 3. This species was generally found in association with drainage channels and their adjacent floodplains, often dominant within the tall shrub stratum.

***Cenchrus ciliaris* (POACEAE)**

**Cenchrus ciliaris* (Buffel Grass) is a tufted, perennial grass growing to 1 m in height and native to Africa and India. **Cenchrus ciliaris* was widely planted in pastoral regions as a pasture grass, and has since become a widespread weed of roadsides, creek lines, river edges and most vegetation types from Shark Bay to the Pilbara. (Hussey *et. al.,* 2007). It continues to spread throughout the state both naturally and through deliberate establishment.

**Cenchrus ciliaris* is a very widespread weed within the Roy Hill study area and was recorded at 35, 22 and 49 locations during Phase 1, 2 and 3 respectively, totalling 106 sites which is 40% of all the sites. It was located in a variety of habitats but is particularly common in minor and major drainage lines and the adjacent flood plains. Estimates of abundance range from less than 2 % to between more than 70% cover; of the 106 sites with **C. ciliaris* present, 19% of these have moderately dense to dense coverage. It is a major environmental weed of the drainage systems, outcompeting native grasses and herbs.

***Chloris virgata* (POACEAE)**

**Chloris virgata* (Windmill Grass) is a tufted perennial grass to 0.5 m in height native to tropical Africa. The inflorescence is shorter, softer and less widely branched than other *Chloris* species. **Chloris virgata* is scattered on roadsides and other disturbed sites throughout southern Western Australia, the Goldfields, Pilbara and Kimberley

**Chloris virgata* is represented by one opportunistic collection during Phase 1 of the Roy Hill 1 survey. This was noted as low abundance (Figure 4-5).

***Echinochloa colona* (POACEAE)**

**Echinochloa colona* (Awnless barnyard grass) is a grass-like annual ranging from 20-90cm in height. Flowers are green or purple occurring from February to July. Native to Africa and Asia, **E. colona* is a widespread weed of creeks, swamps and irrigated crops in the Kimberley and Pilbara (FloraBase, 2008) (Hussey *et. al.,* 2007).

**Echinochloa colona* were recorded at broadly varying abundances in eight locations during the Roy Hill 1 surveys; once during Phase 2 and seven times in Phase 3 (Figure 4-5).

***Eragrostis cilianensis* (POACEAE)**

**Eragrostis cilianensis* (Stinkgrass), native to North Africa and the Mediterranean, is a tufted annual grass growing from 0.1 to 0.9 metres in height and often odorous when wet. The inflorescence is green or purple growing to 30cm long and flowering from November to January and April to May. It is a widespread weed of road verges and disturbed ground from Geraldton to Esperance and around Kununurra (Hussey *et. al.,* 2007).

**Eragrostis cilianensis* was recorded at two small populations, both with cover estimated at less than 2%, and both during Phase 2 of the Roy Hill 1 survey (Figure 4-5).

***Setaria verticillata* (POACEAE)**

**Setaria verticillata* (Whorled pigeon grass) is a loosely-tufted annual ranging from 0.1 – 1.3 metres in height native to temperate and tropical regions of the northern hemisphere. The inflorescence is a dense, spike-like, erect or nodding, cylindrical panicle, 2-30cm long, flowering between December and June. ***Setaria verticillata* is a common and widespread weed of disturbed land, riverine edges and shrublands from the Kimberley and Pilbara south to Three Springs, with one record from Albany (Hussey *et. al.,* 2007).

**Setaria verticillata* was recorded at ten locations in the survey area on plains and riparian habitat, at abundance estimates ranging from less than 2% to 10% cover (Figure 4-5).

***Portulaca oleracea* (PORTULACACEAE)**

**Portulaca oleracea* (Purslane) is a succulent, prostrate to decumbent annual, herb, to 0.2 m high. Under water stress the whole plant becomes reddish. The shiny leaves are spoon-shaped and have yellow sessile flowers in their axils. It is widespread throughout the state (Hussey *et. al.,* 2007).

**Portulaca oleracea* was recorded at 38 locations within the survey area, generally at low levels of abundance (Figure 4-5).

***Cymbalaria muralis* (SCROPHULARIACEAE)**

**Cymbalaria muralis* (Ivy-Leafed Toadflax) originates from the Mediterranean and is commonly a weed of southern Western Australia. Commonly **C. muralis* is found in calcareous and rocky ground, which is true for the ground of **C. muralis* noted during this survey. **Cymbalaria muralis* has a creeping/trailing habit. The leaves of **C. muralis* are soft with five lobes. **Cymbalaria muralis* is an annual and flowers in spring. The flowers are lilac with a yellow patch on the lower lip (Hussey *et. al.,* 2007).

**Cymbalaria muralis* was recorded twice during Phase 1 of the Roy Hill 1 survey at low abundance (Figure 4-5).

790000 795000 800000 805000 810000 815000 820000 825000

7515000 7510000 7505000 7500000 7495000

Waste Dump

Mine Services

Process Plant

E 4600335

Waste Fines Storage Facility

Village

Evaporation Pond

Overland Conveyor

Drainage Shadow

Evaporation Pond

Evaporation Pond

E 4600334

Airstrip

E 4600592

N

0 2.5 5

Kilometers

Absolute Scale - 1:96,801

Legend

- **Parkinsonia Aculeata*
- Weed Locations
- Conceptual Pit

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HANCOCK PROSPECTING PTY LTD

Roy Hill
Weed Locations

Figure: 4.5
Project ID: 943

Drawn: SG
Date: 23/01/09

Coordinate System
Name: GDA 1994 MGA Zone 50/51
Projection: Transverse Mercator
Datum: GDA 1994

A3

5.0 IMPACT ASSESSMENT

Potential impacts arising from the development of the Roy Hill 1 Project are:

5.1.1 Clearing of Vegetation

Clearing of significant areas of vegetation is an unavoidable impact of the development of an open cut mine and associated infrastructure. The localised impact from vegetation clearing within the Project area is presented within Table 5-1 below.

Table 5-1 Percent impact to Roy Hill 1 Project area vegetation sub-associations

Vegetation sub-association code	Area (ha) within project area	% of total project area	Area within proposed impact footprint (ha)	% of total area of unit within project area which will be impacted
Isolated to open low trees and shrubs over *Triodia brizoides* hummock grasslands on slopes and crests	506.0	1.6	16.2	3.2
Isolated to open low trees and mixed shrubs over *Triodia* sp. Shovelanna Hill hummock grasslands on slopes and plains.	1,596.3	5.1	505.3	31.7
Isolated low trees and isolated to sparse mixed shrubs over *Triodia longiceps* hummock grasslands on colluvial deposits	866.7	2.8	41.6	4.8
Isolated low trees over sparse to open mid to low shrubland over *Triodia basedowii* hummock grasslands.	3,830.4	12.3	1,303.3	34.0
Isolated low trees over sparse to open mid to low shrubland over *Triodia epactia* hummock grasslands	435.1	1.4	79.0	18.2
Open low forest to woodland of *Eucalyptus camaldulensis* and/or *E. victrix/Corymbia hamersleyana* over open high *Atalaya hemiglauca/Acacia pyrifolia* over open low shrubs over dense **Cenchrus ciliaris*.	256.0	0.8	38.9	15.2
Scattered *Eucalyptus victrix* over a low woodland of *Acacia aneura/A. coriacea* subsp. *pendens/Atalaya hemiglauca* over open shrubs over dense **Cenchrus ciliaris* grassland.	1,217.4	3.9	305.1	25.1
Tall *Acacia* spp. and *Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland	4.5	0.0	2.5	56.4
Floodplains adjacent to major creek lines: open forest to woodland of *Eucalyptus victrix* over open mid-height shrubland dominated by *Acacia tetragonophylla, A. sclerosperma, *Vachellia farnesiana* over sparse mixed tussock grasses and herbs.	421.0	1.3	0.1	0.0
Floodplains: isolated trees to open woodland of *Eucalyptus victrix* over open *Acacia synchronicia* over mixed low shrubs over open to closed mixed tussock grasses	692.6	2.2	41.3	6.0
Acacia aneura, *A. rhodophloia* open forest and woodland over sparse low shrubs and closed tussock grassland and herbland ± *Triodia longiceps*.	1,243.8	4.0	530.0	42.6
Open woodland of *Acacia pruinocarpa, A. aneura* over open mixed shrubland over open grasses.	231.1	0.7	91.3	39.5
Moderately dense to open tall *Acacia aneura* shrubland over sparse to open *A. tetragonophylla, Senna artemisioides* subsp. *helmsii* shrubs over moderately dense to open grassland dominated by *Aristida contorta*.	12,492.7	40.0	5,561.5	44.5

Vegetation sub-association code	Area (ha) within project area	% of total project area	Area within proposed impact footprint (ha)	% of total area of unit within project area which will be impacted
Groves of *Acacia aneura, A. rhodophloia* woodland over sparse shrubland of *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii, Eremophila latrobei* subsp. *filiformis* over open to sparse grasses.	1,690.2	5.4	600.8	35.5
Isolated trees or shrubs of *Acacia aneura* over open shrubland of *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* over sparse grasses.	147.3	0.5	0.0	0.0
Isolated clumps of tall *Acacia aneura* shrubs over open low shrubs of *Ptilotus schwartzii*	1,873.9	6.0	539.2	28.8
Rocky crests of hills: *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses	12.5	0.0	0.0	0.0
Isolated shrubs of *Acacia synchronicia* over open and diverse herbs and grasses.	3,730.9	11.9	5.5	0.1
Total	**31,248**	**100**	**9,662**	**31.4**

Moderate impact, defined as ≥25% loss of a vegetation unit which represent less than 10% of the total project area

High impact: defined as ≥25% loss of a vegetation unit which represents less than 1% of the total project area

Due to the scale of the proposed development within the project area there is a moderate to high degree impact to some vegetation sub-associations as a result of clearing. It can be seen from the above table that there are five units which are moderately restricted locally (i.e. comprise less than 10% of the total project area) and will have 25% or more of their total area within the Roy Hill 1 leases cleared, whilst two units,

- Open woodland of *Acacia pruinocarpa, A. aneura* over open mixed shrubland over open grasses, and Tall *Acacia* spp. and
- *Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland which is highly restricted (i.e. comprises less than 1% of the total project area)

will have approximately 48% and 56% respectively of their total occurrence within the project area cleared, due to distributions predominantly within the pit footprint.

However all of the sub-associations mapped are expected to be distributed locally beyond the boundaries of the project area, although mapping of their broader distribution is beyond the scope of this survey. In particular, the five units identified above as moderately impacted and the two units identified as highly impacted are known to occur both locally and more broadly within the Eastern Pilbara.

The most restricted sub-association within the project area,

- *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses on rocky crests of hills;

is probably also the most restricted sub-association in the broader locality, due to its specificity to a particular landform which is locally uncommon. However this community type occurs outside the footprint of clearance or drainage shadow and therefore should not be impacted by the proposed development.

Thus, due to the broader local representation of the mapped vegetation units the impact of vegetation clearing, whilst high within the project area, is minor at a local scale

In a regional context mapping of the vegetation is available only at a much broader scale (1,000,000 Beard, 1974). The land systems mapping (Van Vreeswyk *et al*., 2004), with associated vegetation notes provides the most current assessment of vegetation regionally. The project represents a minimal impact to the land systems that it encompasses (Table 5-2), with only one unit, Turee, impacted by greater than 0.5% of its extent.

Table 5-2: Percent impact to land system units within the Roy Hill 1 Project area

Land System Unit	Total regional representation (ha)	Area within proposed impact footprint (ha)	% total area within region impacted
Adrian	24,509	42	0.17
Boolgeeda	999,609	112	0.01
Coolibah	101,035	194	0.19
Jamindie	1,188,272	5,611	0.47
McKay	427,471	54	0.01
Newman	1,999,771	1,641	0.13
River	591,433	68	0.01
Turee	92,741	2,444	2.63
Warri	220,304	29	0.01
Total	**5,645,145**	**10,195**	**3.65**

Note: The total area of impact is slightly larger than Table 5-1 due to a slight difference in area of the mapping units. However the impact footprint is constant in both tables.

The Turee land system comprises stony alluvial plains with gilgaied and non-gilgaied surfaces. This system is favoured by cattle and is prone to degradation if overgrazed. Only 1% of the remaining areas regionally are classified as being in very good condition. The proposed impact to the Turee land system of 2.63% of the total occurrence is relatively minor, particularly given that the area of impact has been subjected to intensive and prolonged grazing. Most of the area classified as this land system unit occurring within the project area would be classified as either poor or moderate condition.

Thus at a regional level the proposed vegetation clearance is considered to be of minor significance in the context of loss of vegetation biodiversity or habitat.

The impact of the proposed vegetation clearing to Priority flora is tabulated in Table 5-3 below.

Table 5-3: Percent impact to Priority Taxa within the Roy Hill 1 Project area based on WA Herbarium records

Species	Priority	Number of locations at Roy Hill	Number of locations impacted	% Locations impacted at Roy Hill	Number of other locations regionally
Rhagodia sp. Hamersley	P3	29	22	76	4
Acacia glaucocaesia	P3	1	1	100	>20
Goodenia nuda	P3	12	5	42	15
Polymeria sp. Hamersley	P3	5	0	0.0	4
Rostellularia adscendens var. *latifolia*	P3	1	0	0	12
Eremophila youngii subsp. *lepidota*	P4	7	2	29	21
Total		55	30		

Again, due to the extent of clearing within the project area there is a moderate to high degree of impact locally to three of the six recorded priority flora; *Rhagodia* sp. Hamersley, *Acacia glaucocaesia* and *Goodenia nuda.* It can be seen that the impacts regionally to *Acacia glaucocaesia* and *Goodenia nuda* are relatively minor given the large number of populations recorded elsewhere. The impact to *Rhagodia* sp. Hamersley is more significant, given that more than half of the recorded locations for this taxon at Roy Hill will be cleared and that this location represents 20% of the total number of locations currently known. However it is noteworthy that this is a relatively new and as yet undescribed taxon which has probably been identified as other *Rhagodia* species, particularly when sterile, in many previous surveys. Consequently the number of locations currently known is likely to significantly underestimate the total distribution and abundance of the taxon.

5.1.2 Damage to Vegetation Due to Dust

Excessive dust can clog the stomata of plants and lead to localised deaths. This is particularly prevalent at track edges. Correct dust suppression techniques can minimise this impact

5.1.3 Leakage of Saline Water Used Industrially

As some of the ground water in the Roy Hill 1 Project area is saline, its use or discharge must be tightly managed to ensure damage to vegetation does not occur. The need for dust suppression must be counterbalanced with the risk of saline scalds if non-saline water is not available in industrial quantities.

5.1.4 Bushfires

Fires are a frequent occurrence in hummock grasslands in the arid zones of Australia. Prior to European occupation, fires occurred as a result of intentional burning by Aboriginals of the area to encourage the growth of fresh growth for game. Due to the early demise of the local Aboriginal groups' traditional life style in the area, this regime of burning is likely to have rapidly diminished from the 1920's. Ground truthing and examination of the aerial photography of the Project area reveals that the area has been affected by extensive fires, some of which are within the last five years. An extensive area at the eastern and north-eastern boundaries of leases E46/00335 and E46/00592 respectively has been very recently burnt, probably between November 2007 and January 2008. The source of these fires is unknown, but is likely to be lightning strikes, unintentional fires caused by human activity, or a combination of these factors.

Although the native flora is adapted and in many instances dependent upon fire for activation of seed germination, too frequent or too hot bushfires can result in detrimental changes to the composition and diversity of the vegetation., causing local extinctions of vulnerable species.

The risk of fire directly as a result of mining activity can be minimised by implementing fire protocols such as appropriate isolation of flammable compounds such as hydrocarbons and explosives, localised clearing around working plant, and enforcement of appropriate smoking practices (e.g. no discarding of cigarette buts). Additional tracks in the area as a result of mining may act as a fire break and so may serve to reduce the extent of fires once started.

5.1.5 Introduction of Weed Species

At present the Roy Hill pastoral lease has high levels of weed invasion, with 19 taxa recorded, some of which are broadly distributed and locally very abundant. Increased vehicular traffic, combined with increased ground disturbance and disposal of water from drilling and domestic operations, provide an opportunity for additional species to become established unless weed hygiene procedures are established.

5.1.6 Introduction of Feral Animals

Feral animals such as rabbits, cats, foxes, dogs, goats, camels, horses and donkeys are already established in the region, and policies prohibiting the introduction of domestic animals to mining leases are mandatory. However the unintentional introduction of additional species, such as alien insects in food or on personnel remains a remote possibility, particularly where personnel are on a fly in/fly out basis and hence arriving from remote locations where these species are already present.

5.2 Risk Assessment of Potential Impacts

A risk assessment was undertaken to determine potential impacts arising from the development on the flora and vegetation and the residual impacts following the implementation of management strategies identified in this document. The risk level is defined as a multiple of the numeric rankings attributed to the likelihood and consequences (criteria for rankings are detailed in The significance of the risks is classified as either “High” (site/issue specific management programmes required, advice/approval from regulators required), “Medium” (specific management and procedures must be specified) or “Low” (managed by routine procedures). The results of this assessment are detailed in Table 5-4.

Table 5-4: Risk assessment of potential impacts of proposed development to the Roy Hill 1 flora and vegetation

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Diversion of water flow from existing creek beds by construction of pits and other infrastructure	Changes to the timing of water flow to the Fortescue Marsh System	Increased or decreased water volume and salinity levels and/or increased turbidity leading to loss of viability of flora and fauna species dependent on the Marsh.	3	5	15	**High**	▪ Detailed modelling of water flows as a result of temporary creek diversions to ensure flows to Marsh are neither inadequate or excessive during mining ▪ Adherence to timeframes in which pits are obstructing flow and necessitating diversion ▪ Ensure that fines from mining construction do not contaminate water supply into Fortescue Marsh	2	5	10	**Medium**
Vegetation Clearing and construction of infrastructure	Distortion of sheet flow of water leading to localised drought or inundations and consequent death of *Acacia aneura* (mulga) vegetation communities	Areas of widespread tree death	3	4	12	**High**	▪ Evaluate the placement of infrastructure in terms of changes to sheet flow. Should significant changes to sheet flow be expected, relocation of infrastructure where feasible or installation or remediating structures (e.g. culverts under rail or roads) to be installed. ▪ Monitor areas of Mulga communities in areas downstream from infrastructure where potential exists for sheet flow disturbance.	2	4	8	**Medium**
Pit construction in areas with saline water table	Discharge of saline dewatering	Saline scalds, leakage of saline water to Fortescue March system	5	5	25	**High**	▪ Disposal of saline dewatering into impermeable evaporative ponds	1	5	5	**Low**

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Vegetation Clearing	Removal of Priority Flora	Reduction or loss of viability of taxa leading to localised extinction	5	3	15	Medium	▪ Specify the proportion of Priority flora likely to be impacted and ensure impact is kept within approved limits for specific taxa given regional distribution ▪ Consult with relevant personnel within DEC with respect to acceptable impacts	5	1	5	Low
Inadequate hygiene to vehicles in the vicinity of *Parkinsonia aculeata* (Declared Weed)	Expansion of existing populations or introduction to new locations	▪ Breach of Dept. of Agriculture legislation ▪ Loss of diversity to native flora	3	3	9	Medium	▪ Eradicate *Parkinsonia aculeata* in areas where movements of personnel or vehicles is necessary ▪ Restrict movement of cattle in areas where *Parkinsonia aculeata* is present ▪ Ensure vehicle hygiene maintained at all times	1	3	3	Low
Clearing combined with poor vehicle hygiene, incorrect disposal of waste water	Introduction or dispersal of environmental weeds	Reduction in floristic diversity and integrity	3	2	6	Medium	Weed hygiene measures should be implemented	2	2	4	Low
Driving	Off-road use of vehicles	Damage to vegetation	3	2	6	Medium	Enforce policy of driving on established tracks only to all site workers by: ▪ emphasis on policy during site induction; ▪ clear signposting of off-limit areas; ▪ appropriate penalties should infringements occur.	1	2	2	Low
Use of saline water during operations	Leakage of saline wager	Localised plant death	3	2	6	Medium	Restrict release of saline water into environment	1	2	2	Low

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Human activities which start fires	Excessively frequent, large scale or too hot bushfire as a result of uncontrolled bushfire	Possible loss of vulnerable species or loss of diversity in some community types Loss of fauna and habitat	1	5	5	Medium	▪ Ensure flammable material is suitably contained ▪ Ensure vehicles and plant do not park on *Triodia species* ▪ Maintain correct procedures for smoking e.g. no discarding of cigarette buts in bush ▪ Prohibition of campfires within lease	1	5	1	Low
Vegetation Clearing	Removal of significant proportion of land system units poorly represented at a regional level	▪ Loss of biodiversity at a regional scale ▪ Loss of habitat to fauna species with dependency on this habitat type	2	4	8	Medium	Clearing of land systems identified as of limited distribution (if present) should be avoided by relocation of infrastructure wherever feasible.	1	4	4	Low
Vegetation Clearing	Removal of Declared Rare Flora	▪ Breach of *EPBC Act*, and *Wildlife Conservation Act 1950* ▪ Reduction or loss of viability of taxon/taxa leading to possible extinction	1	4	4	Low	▪ As no Declared Rare Flora have been recorded to date, no avoidance measures are currently required. ▪ Systematic searching of areas to be cleared to ensure no populations of *Lepidium catapycnon* or *Thryptomene wittweri* (the only two DRF taxa known within the Pilbara) are present. ▪ If either of these taxa are subsequently recorded, the relocation of infrastructure shall occur wherever feasible. If not feasible application to remove rare flora submitted to Minister of Environment prior to any disturbance	1	3	3	Low

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Vegetation Clearing	Removal of significant proportion of identified vegetation sub-associations poorly represented locally	▪ Loss of biodiversity at a local scale▪ Loss of habitat to fauna species with dependency on this habitat type	1	3	3	**Low**	Clearing of the community types identified as of limited distribution locally (Table 5.1) too be avoided by relocation of infrastructure wherever feasible.	1	3	3	**Low**
Dust	Dust emissions from clearing and construction vehicles	Damage to vegetation resulting in loss of diversity or species	2	1	2	**Low**	Dust suppression methods using non-saline water	2	1	2	**Low**
Increased human and plant movement	Introduction of plant or animal pathogens	Loss of vulnerable species	1	2	2	**Low**	Correct vehicle hygiene when using vehicles previously used where pathogens may be present	1	2	2	**Low**
Increased human and plant movement	Introduction of feral animals, particularly insects	Loss of vulnerable species	1	2	2	**Low**	Ensure correct quarantining of material from potentially infected equipment or goods (particularly material from overseas) has occurred prior to use	1	1	1	**Low**

6.0 DISCUSSION

6.1 Conservation Significance of the Roy Hill Vegetation

The vegetation and flora of the Roy Hill project area was assessed within a national, state, regional and local context.

At a national level there are no taxa or floristic community types present which are identified under the EPBC Act and the area is therefore assessed as not significant at this level. However one introduced taxon, **Parkinsonia aculeate* is identified under the National Weeds Strategy (1999) as "a plant which has, or has the potential to have, a detrimental effect on economic, social, or conservation values"

At a state level there are no vegetation complexes present which are identified as Threatened Ecological Communities. The Fortescue Marshes, which lie directly south of the western portion of Lease E46/, whilst not a TEC are a listed as a wetland of national significance (DEWHA Directory of Important Wetlands, 2006) and are currently considered an ecosystem at risk by the DEC (P Modesta, DEC, pers. com. Aug 08). Whilst not within the footprint of clearing, this area is dependent upon inflow from, amongst others, Kulkinbah Creek, Kulbee Creek and other minor creek lines which drain through the footprint of disturbance and thus has the potential to be disturbed by the mining activities by changes to the timing, volume or quality of inflow, or by leakages of saline dewatering into the system unless adequate controls are implemented.

There are six flora taxa recorded to date which are categorised Priority species, the details of which are summarised below.

Table 6.1: Summary of status of Priority Taxa found within the Roy Hill 1 Project Area

Taxon	Priority Status	Number of locations recorded at Roy Hill	Abundance at Roy Hill locations	% Locations impacted at Roy Hill	Number of other locations regionally	Location of Roy Hill relative to other lodged populations
Rhagodia sp. Hamersley (M. Trudgen 17794)	3	77	moderate to high	61.0	4	Within previously known range
Acacia glaucocaesia	3	1	low	100.0	>20	Slight south eastern extension
Goodenia nuda	3	4	low	38.5	15	Within previously known range
Polymeria sp. Hamersley	3	1	low	0.0	4	Range extension
Rostellularia adscendens var. *latifolia*	3	1	low	0.0	12	Within previously known range
Eremophila youngii subsp. lepidota	4	7	low	0.0	21	Within previously known range

It can be seen that the impact regionally to *Acacia glaucocaesia* and *Goodenia nuda* is relatively minor given the large number of populations recorded elsewhere. The impact to *Rhagodia* sp. Hamersley is more significant, given that more than half of the recorded locations for this taxon at Roy Hill will be cleared and that this location represents 20% of the total number of locations currently known. However it is noteworthy that this is a relatively new and as yet undescribed taxon which has probably been identified as other *Rhagodia* species, particularly when sterile, in many previous surveys. Consequently the number of locations currently known is likely to significantly underestimate the total distribution and abundance of the taxon regionally.

At a regional level, the majority of the leases are comprised of land systems which, by virtue of their relatively broad distribution elsewhere, will be minimally impacted by vegetation clearance within the current project. The most regionally constrained unit, Warri, which has a total representation of only 24,509 hectares, occurs within a portion of the project area that is almost entirely outside the proposed impact footprint. The land system unit most impacted by the proposed vegetation clearance, Turee, will be reduced in regional representation by 2.63%. Due to its suitability for pastoral activities, it is estimated that less than 1% of the total representation of this unit remains in very good condition. The condition of this unit within the Roy Hill project area ranges from good to poor with the largest area of representation of this unit in the south east of Lease 46/592 (largely unaffected by the impact footprint) in poor condition and the area in the northwest of in good condition. Approximately half of this north western area lies within the disturbance footprint.

7.0 STUDY TEAM

The Roy Hill Vegetation and Flora Survey described in this document was planned, coordinated and executed by:

ecologia Environment
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Project Staff		
Phase 1		
Carol Macpherson	BSc. (Hons.)	Principal Botanist, Project Manager
Jennifer Langmead	BSc.	Botanist
Allison O'Donnell	BSc.	Botanist
Cate Tauss	BSc. Grad. Dip. Sc. (Botany)	Plant Taxonomist
Phase 2		
Carol Macpherson	BSc. (Hons.)	Principal Botanist, Project Manager
Christina Cox	BSc. (Hons.) PhD	Botanist
Jeremy Naaykens	BSc. (Db. Maj.)	Botanist
Malcolm Trudgen	BSc.	Plant Taxonomist
Phase 3		
Carol Macpherson	BSc. (Hons.)	Principal Botanist, Project Manager
Carmel Winton	BSc.	Botanist
Jeremy Naaykens	BSc. (Db. Maj.)	Botanist
Malcolm Trudgen	BSc.	Plant Taxonomist

8.0 PERMITS

Licences – "Licence to take flora for scientific purposes"		
The Roy Hill Vegetation and Flora Survey was conducted under the authorisation of the following licences issued by the Department of Environment and Conservation:		
Licences	**Permit Number**	**Valid Until**
Carol Macpherson	SL007231 SL007626 SL007957	August 17th 2006 October 17th 2007 December 31st 2008
Jennifer Langmead	SL007228	August 11th 2006
Allison O'Donnell	SL007152	May 9th 2006
Christina Cox	SL007531	May 10th 2007
Jeremy Naaykens	SL007795	December 31st 2008
Carmel Winton	SL007921	April 30th 2009

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The assistance of HPPL staff at Perth and Roy Hill while undertaking these surveys is greatly appreciated.

Plant specimen identifications were undertaken by:

Phase 1 Cate Tauss

Phases 2 & 3 Malcolm Trudgen

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Appendix A: Vegetation Structural and Condition Classifications

Appendix A1: Vegetation Structural Formation Nomenclature

Growth form	Height ranges (m)	Structural Formation Classes					
		70-100	30-70	10-30	<10	0-5	approximately 0
Tree	<10, 10-30, >30	closed forest	open forest	woodland	open woodland	isolated clumps of trees	isolated trees
Tree, mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated clumps of mallee trees	isolated trees
Shrub	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated clumps of shrubs	isolated shrubs
Heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated clumps of heath shrubs	isolated heath shrubs
Chenopod shrub	<1,1-2,>2	closed samphire shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated clumps of chenopod shrubs	isolated chenopod shrubs
Samphire shrub	<1,1-2,>2	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated clumps of samphire shrubs	isolated samphire shrubs
Hummock Grass	<2, >2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated clumps of hummock grasses	isolated hummock grasses
Tussock Grass	<0.5, >0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated clumps of tussock grasses	isolated tussock grasses
Other Grass	<0.5, >0.5	closed grassland	grassland	open grassland	sparse grassland	isolated clumps of grasses	isolated grasses
Sedge	<0.5, >0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated clumps of sedges	isolated sedges
Herbs	<0.5, >0.5	closed herbland	herbland	open herbland	sparse herbland	isolated clumps of herbs	isolated herbs
Vine	<10, 10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated clumps of vines	isolated vines

Citation: Executive Steering Committee for Australian Vegetation Information (ESCAVI) (2003) Australian Vegetation Attribute Manual: National Vegetation Information System, Version 6.0, Dept. of the Environment and Heritage, Canberra

Appendix A2: Vegetation Height Class Nomenclature

Height		Growth Form				
Height class	Height range (m)	tree, vine (M & U)	Shrub, heath shrub, chenopod shrub, ferns, samphire shrub, cycad, tree-fern, grass-tree, palm (multi-stemmed)	tree mallee, mallee shrub	tussock grass, hummock grass, other grass, sedge, rush, herbs, vine (G)	bryophyte, lichen, seagrass, aquatic
8	**>30**	tall	N/A	N/A	N/A	N/A
7	**10-30**	mid	N/A	tall	N/A	N/A
6	**<10**	low	N/A	mid	N/A	N/A
5	**<3**	N/A	N/A	low	N/A	N/A
4	**>2**	N/A	tall	N/A	tall	N/A
3	**1-2**	N/A	mid	N/A	tall	N/A
2	**0.5-1**	N/A	low	N/A	mid	tall
1	**<0.5**	N/A	low	N/A	low	low

Height classes defined by NVIS (2003) Source: (Based on Walker and Hopkins 1990).

Citation: Executive Steering Committee for Australian Vegetation Information (ESCAVI) (2003) Australian Vegetation Attribute Manual: National Vegetation Information System, Version 6.0, Dept. of the Environment and Heritage, Canberra

Appendix A3: V**egetation condition scale** from Keighery BJ (1994) and Connell (1995) after Trudgen (1991)

Excellent (E)	Pristine or nearly so, no obvious signs of damage caused by the activities of European man.
Very Good (VG)	Some relatively slight signs of damage caused by the activities of European man. For example, some signs of damage to tree trunks caused by repeated fires and the presence of some relatively non-aggressive weeds such as *Ursinia anthemoides* or *Briza* species, or occasional vehicle tracks
Good (G)	More obvious signs of damage caused by the activities of European man including some obvious impact on the vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly some more aggressive ones.
Poor (P)	Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of activities of European man such as grazing or partial clearing (chaining) or very frequent fires. Weeds as above, probably plus some more aggressive ones such as *Ehrharta* species
Very Poor (VP)	Severely impacted by grazing, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species, including aggressive species.
Completely Degraded (6)	Areas that are completely or almost completely without native species in the structure of their vegetation i.e. areas that are cleared or "parkland cleared" with their flora comprising weed or crop species with isolated native trees or shrubs.

Government of Western Australia 2000, *Bush Forever Volume 2: Directory of Bush Forever Sites*, Department of Environmental Protection, Perth.

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Appendix B: Locations of Flora Sites

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 1	Site 01	2005	806801	7513419
Phase 1	Site 02	2005	806356	7513316
Phase 1	Site 03	2005	805901	7514114
Phase 1	Site 04	2005	805689	7514048
Phase 1	Site 05	2005	805775	7512655
Phase 1	Site 06	2005	805753	7512676
Phase 1	Site 07	2005	804578	7512316
Phase 1	Site 08	2005	804471	7512409
Phase 1	Site 09	2005	806803	7510692
Phase 1	Site 10	2005	806639	7510923
Phase 1	Site 101	2005	800882	7515817
Phase 1	Site 11	2005	806125	7510613
Phase 1	Site 12	2005	805777	7510679
Phase 1	Site 13	2005	799051	7516264
Phase 1	Site 14	2005	799279	7515959
Phase 1	Site 15	2005	800357	7515613
Phase 1	Site 16	2005	800167	7515616
Phase 1	Site 17	2005	801883	7514898
Phase 1	Site 18	2005	801664	7514942
Phase 1	Site 19	2005	802220	7514415
Phase 1	Site 20	2005	806982	7512760
Phase 1	Site 21	2005	803821	7513166
Phase 1	Site 22	2005	802015	7514356
Phase 1	Site 23	2005	806531	7513946
Phase 1	Site 24	2005	803636	7513162
Phase 1	Site 25	2005	807512	7512294
Phase 1	Site 26	2005	806088	7513317
Phase 1	Site 27	2005	807479	7512289
Phase 1	Site 28	2005	805474	7502581
Phase 1	Site 29	2005	805244	7502603
Phase 1	Site 30	2005	804672	7501986
Phase 1	Site 31	2005	803739	7502417
Phase 1	Site 32	2005	806013	7500718
Phase 1	Site 33	2005	805423	7501663
Phase 1	Site 34	2005	796613	7515960
Phase 1	Site 35	2005	797596	7515995
Phase 1	Site 36	2005	798222	7515330
Phase 1	Site 37	2005	797529	7514627
Phase 1	Site 38	2005	797158	7513734
Phase 1	Site 39	2005	797038	7513763
Phase 1	Site 40	2005	795424	7512449
Phase 1	Site 41	2005	795930	7512709
Phase 1	Site 42	2005	797528	7512019

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 1	Site 43	2005	796802	7513070
Phase 1	Site 44	2005	798517	7510998
Phase 1	Site 45	2005	798004	7511439
Phase 1	Site 60	2005	807806	7501768
Phase 1	Site 61	2005	808371	7501887
Phase 1	Site 73	2005	807082	7511970
Phase 1	Site 74	2005	806747	7511974
Phase 1	Site 75	2005	805956	7500034
Phase 1	Site 76	2005	805751	7499477
Phase 1	Site 77	2005	805536	7498981
Phase 1	Site 78	2005	805479	7498516
Phase 1	Site 79	2005	805209	7497384
Phase 1	Site 80	2005	805050	7496914
Phase 1	Site 81	2005	804795	7496329
Phase 1	Site 82	2005	804509	7496008
Phase 1	Site 83	2005	807770	7506559
Phase 1	Site 85	2005	807413	7506091
Phase 1	Site 86	2005	807382	7506316
Phase 1	Site 87	2005	808040	7505639
Phase 1	Site 88	2005	807608	7505863
Phase 1	Site 89	2005	808134	7505745
Phase 1	Site 90	2005	797737	7509357
Phase 1	Site 91	2005	797873	7509355
Phase 1	Site 92	2005	807219	7508686
Phase 1	Site 93	2005	807794	7508792
Phase 1	Site 94	2005	806172	7512417
Phase 1	Site 95	2005	806281	7512348
Phase 1	Site 96	2005	807192	7512654
Phase 1	Site 97	2005	807164	7512707
Phase 1	Site 98	2005	803328	7509159
Phase 1	Site 46	2005	818820.9	7494443
Phase 1	Site 47	2005	819424.2	7493988
Phase 1	Site 48	2005	818774.5	7495675
Phase 1	Site 49	2005	818532	7495496
Phase 1	Site 50	2005	818277.5	7497476
Phase 1	Site 51	2005	818434.4	7497293
Phase 1	Site 52	2005	818050.2	7498317
Phase 1	Site 53	2005	818146.6	7498202
Phase 1	Site 54	2005	817673	7499489
Phase 1	Site 55	2005	817913.5	7498677
Phase 1	Site 56	2005	811556.2	7495707
Phase 1	Site 57	2005	814252.9	7497229
Phase 1	Site 58	2005	810638.1	7501737
Phase 1	Site 59	2005	810998.6	7502042
Phase 1	Site 63	2005	811234.1	7502072

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 1	Site 64	2005	811595.4	7502072
Phase 1	Site 65	2005	812048.1	7501906
Phase 1	Site 66	2005	812225.5	7503331
Phase 1	Site 67	2005	812552	7503138
Phase 1	Site 68	2005	813051.7	7503068
Phase 1	Site 69	2005	813193.8	7502297
Phase 1	Site 70	2005	813040.8	7502300
Phase 1	Site 71	2005	813376.2	7502751
Phase 1	Site 72	2005	813739.3	7503045
Phase 2	Site 01	2006	807962	7505560
Phase 2	Site 04	2006	803938	7497544
Phase 2	Site 05	2006	804600	7497611
Phase 2	Site 17	2006	797034	7513763
Phase 2	Site 18	2006	796813	7513250
Phase 2	Site 19	2006	797280	7516025
Phase 2	Site 20	2006	796654	7515957
Phase 2	Site 21	2006	800044	7516526
Phase 2	Site 22	2006	801662	7514822
Phase 2	Site 23	2006	801833	7514873
Phase 2	Site 29	2006	808356	7501724
Phase 2	Site 30	2006	805024	7502586
Phase 2	Site 31	2006	805243	7502606
Phase 2	Site 34	2006	807777	7506551
Phase 2	Site 36	2006	808077	7505669
Phase 2	Site 37	2006	805206	7497381
Phase 2	Site 38	2006	804791	7496327
Phase 2	Site 39	2006	805478	7498511
Phase 2	Site 40	2006	806932	7512069
Phase 2	Site 41	2006	806867	7511947
Phase 2	Site 42	2006	807195	7512654
Phase 2	Site 44	2006	806195	7512453
Phase 2	Site 0A	2006	797657	7509185
Phase 2	Site 91	2006	797745	7509365
Phase 2	Site 02	2006	816785.2	7500236
Phase 2	Site 03	2006	816201.7	7500014
Phase 2	Site 06	2006	818524.7	7494296
Phase 2	Site 07	2006	819460.3	7493991
Phase 2	Site 08	2006	819129.9	7494509
Phase 2	Site 09	2006	818523	7495494
Phase 2	Site 10	2006	818756	7495687
Phase 2	Site 11	2006	818434.2	7497514
Phase 2	Site 12	2006	818286.6	7497477
Phase 2	Site 13	2006	818131.5	7498223
Phase 2	Site 14	2006	818120.3	7498343
Phase 2	Site 15	2006	812178.1	7496784

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 2	Site 16	2006	811350.3	7495614
Phase 2	Site 24	2006	813750.5	7503049
Phase 2	Site 25	2006	813858.8	7503004
Phase 2	Site 26	2006	811215.6	7502086
Phase 2	Site 27	2006	810329.2	7502170
Phase 2	Site 28	2006	810629.1	7501712
Phase 2	Site 32	2006	808729.6	7507566
Phase 2	Site 33	2006	808685	7507428
Phase 2	Site 35	2006	808771.5	7507513
Phase 3	Site 121	2008	819280.6	7493875
Phase 3	Site 122	2008	819418.1	7494314
Phase 3	Site 123	2008	818769.3	7496228
Phase 3	Site 124	2008	818200.7	7494344
Phase 3	Site 125	2008	817315.6	7494281
Phase 3	Site 128	2008	818651.7	7497607
Phase 3	Site 129	2008	818634.6	7498627
Phase 3	Site 130	2008	817999.1	7498472
Phase 3	Site 131	2008	818636.1	7496868
Phase 3	Site 132	2008	817650.8	7498538
Phase 3	Site 133	2008	817444	7499472
Phase 3	Site 135	2008	816360.8	7499955
Phase 3	Site 136	2008	816598.3	7500601
Phase 3	Site 137	2008	816648.3	7501138
Phase 3	Site 140	2008	815877.7	7500250
Phase 3	Site 141	2008	813896.4	7501745
Phase 3	Site 142	2008	813066.9	7501233
Phase 3	Site 148	2008	811689.1	7502119
Phase 3	Site 153	2008	810427.7	7502163
Phase 3	Site 154	2008	813081.1	7497008
Phase 3	Site 155	2008	813262.5	7496637
Phase 3	Site 181	2008	808714.2	7507502
Phase 3	Site 182	2008	808691.8	7507425
Phase 3	Site 184	2008	808794.6	7507107
Phase 3	Site 120a	2008	818366.4	7495477
Phase 3	Site 120b	2008	819290.3	7493825
Phase 3	Site 126a	2008	818471.7	7496625
Phase 3	Site 126b	2008	818246.5	7496123
Phase 3	Site 134a	2008	816829.2	7499763
Phase 3	Site 134b	2008	816825.5	7499815
Phase 3	Site 147a	2008	813185.3	7501902
Phase 3	Site 147b	2008	811996.5	7501943
Phase 3	Site 102a	2008	807273.3	7512076
Phase 3	Site 102b	2008	803252.4	7498264
Phase 3	Site 103	2008	807360.6	7513848
Phase 3	Site 104	2008	807229	7513685

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 3	Site 105	2008	807584.4	7513812
Phase 3	Site 106	2008	806722.9	7514019
Phase 3	Site 107	2008	807052.8	7513865
Phase 3	Site 108	2008	807225.3	7513998
Phase 3	Site 109	2008	805786.4	7514064
Phase 3	Site 110	2008	803780.2	7513159
Phase 3	Site 111	2008	804210.3	7512101
Phase 3	Site 112	2008	801025.4	7510955
Phase 3	Site 113	2008	800303.5	7511260
Phase 3	Site 114	2008	799636.3	7511020
Phase 3	Site 116	2008	797625.6	7509169
Phase 3	Site 117a	2008	797671.3	7508833
Phase 3	Site 117b	2008	798318	7510581
Phase 3	Site 118	2008	802465.7	7515918
Phase 3	Site 119	2008	801969.7	7514927
Phase 3	Site 157	2008	805017.2	7496313
Phase 3	Site 157b	2008	805428.2	7496210
Phase 3	Site 159	2008	804105.2	7496079
Phase 3	Site 160	2008	803940.7	7496333
Phase 3	Site 161a	2008	803624	7496249
Phase 3	Site 161b	2008	803636	7496282
Phase 3	Site 162	2008	805039.4	7496775
Phase 3	Site 163	2008	804026	7498029
Phase 3	Site 165	2008	803707	7497440
Phase 3	Site 166a	2008	803645.2	7497837
Phase 3	Site 166b	2008	803712.9	7497936
Phase 3	Site 167	2008	803544.6	7498727
Phase 3	Site 169a	2008	805318	7497774
Phase 3	Site 170	2008	805172.9	7498354
Phase 3	Site 171	2008	806315.3	7500716
Phase 3	Site 173	2008	806578.8	7502139
Phase 3	Site 174	2008	804411.9	7502081
Phase 3	Site 175	2008	803854.1	7502354
Phase 3	Site 176	2008	806335.3	7503152
Phase 3	Site 177	2008	806198.8	7503523
Phase 3	Site 178a	2008	807231.6	7507185
Phase 3	Site 178b	2008	807324.8	7506931
Phase 3	Site 179	2008	807864	7506510
Phase 3	Site 180	2008	807948.5	7505997
Phase 3	Site 183	2008	803662.2	7497613
Phase 3	Site 185	2008	806881.8	7508356
Phase 3	Site 186	2008	806852.9	7508589
Phase 3	Site 187	2008	806339.9	7510687
Phase 3	Site 188	2008	806445	7510889
Phase 3	Site 189	2008	805302.8	7511084

Appendix B: Location of Flora Quadrats

Phase	Site	Year	Easting	Northing
Phase 3	Site 190	2008	804976.3	7511451
Phase 3	Site 191	2008	804303.9	7512508
Phase 3	Site 192	2008	804577.6	7512513
Phase 3	Site 193	2008	803576.7	7512670
Phase 3	Site 194	2008	802731.8	7513960
Phase 3	Site 195	2008	801303.3	7515345
Phase 3	Site 196	2008	801379.5	7514917
Phase 3	Site 196b	2008	803989.3	7497004
Phase 3	Site 197	2008	801919.1	7514337
Phase 3	Site 198	2008	801704.1	7514369
Phase 3	Site 200	2008	800047.5	7516402
Phase 3	Site 201	2008	796672.9	7516095
Phase 3	Site 202	2008	796505.1	7516277
Phase 3	Site 203	2008	806373.4	7514378
Phase 3	Site 204	2008	806145.4	7514295
Phase 3	Site 206	2008	806903.9	7512659
Phase 3	Site 207	2008	807005	7512486
Phase 3	Site 208	2008	807199.6	7512292
Phase 3	Site 209	2008	807053.1	7512535
Phase 3	Site 210	2008	807514.6	7511853
Phase 3	Site 213	2008	799098.9	7516347
Phase 3	Site 214	2008	798306.1	7515889
Phase 3	Site 215	2008	799530.2	7515851
Phase 3	Site 216	2008	798924.6	7514779
Phase 3	Site 217	2008	798368.3	7515045
Phase 3	Site 218	2008	797704.4	7514991
Phase 3	Site 219	2008	797650.9	7515434
Phase 3	Site 220	2008	799520	7514216
Phase 3	Site 221	2008	799264.1	7514118

Appendix C: Flora Species Recorded during Phases 1, 2 and 3 of the Roy Hill 1 Project Vegetation and Flora Assessment

Appendix C Roy Hill 1 Project Area Flora Species List

Family	Species
Acanthaceae	*Dicladanthera forrestii*
	Dicladanthera forrestii
	Rostellularia adscendens var. *latifolia*
Adiantaceae	*Cheilanthes austrotenuifolia*
	Cheilanthes brownii
	Cheilanthes sieberi subsp. *sieberi*
Aizoaceae	*Trianthema glossostigma*
	Trianthema oxycalyptra var. *oxycalyptra*
	Trianthema portulacastrum
	Trianthema triquetra
Amaranthaceae	*Achyranthes aspera*
	Aerva javanica
	Alternanthera angustifolia
	Alternanthera nodiflora
	Amaranthus interruptus
	Amaranthus undulatus
	Gomphrena affinis subsp. *pilbarensis*
	Gomphrena canescens subsp. *canescens*
	Gomphrena cunninghamii
	Gomphrena kanisii
	Ptilotus aervoides
	Ptilotus astrolasius var. *astrolasius*
	Ptilotus auriculifolius
	Ptilotus calostachyus var. *calostachyus*
	Ptilotus carinatus
	Ptilotus clementii
	Ptilotus drummondii
	Ptilotus exaltatus var. *exaltatus*
	Ptilotus fusiformis var. *fusiformis*
	Ptilotus gaudichaudii var. *gaudichaudii*
	Ptilotus gomphrenoides var. *gomphrenoides*
	Ptilotus helipteroides var. *helipteroides*
	Ptilotus incanus var. *incanus*
	Ptilotus macrocephalus
	Ptilotus obovatus var. *obovatus*
	Ptilotus polystachyus var. *polystachyus*
	Ptilotus roei
	Ptilotus schwartzii var. *schwartzii*

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Apiaceae	*Trachymene oleracea* subsp. *oleracea*
Asclepiadaceae	*Cynanchum floribundum*
	Rhyncharrhena linearis
Asteraceae	*Bidens bipinnata*
	Blumea tenella
	Calocephalus francisii
	Calocephalus knappii
	Calotis plumulifera
	Calotis porphyroglossa
	Centipeda minima subsp. *macrocephala*
	Centipeda thespidioides
	Chrysocephalum apiculatum
	Chrysocephalum eremaeum
	Chrysocephalum gilesii
	Flaveria australasica
	Minuria integerrima
	Pluchea dunlopii
	Pluchea ferdinandi-muelleri
	Pluchea rubelliflora
	Pluchea tetranthera
	Pterocaulon serrulatum
	Pterocaulon sphacelatum
	Pterocaulon sphaeranthoides
	Rhodanthe floribunda
	Rhodanthe margarethae
	Rutidosis helichrysoides subsp. *helichrysoides*
	Sonchus oleraceus
	Streptoglossa bubakii
	Streptoglossa cylindriceps
	Streptoglossa decurrens
	Streptoglossa liatroides
Boraginaceae	*Ehretia saligna* var. *saligna*
	Heliotropium chrysocarpum
	Heliotropium cunninghamii
	Heliotropium europaeum
	Heliotropium heteranthum
	Heliotropium inexplicitum
	Heliotropium pachyphyllum
	Heliotropium tanythrix

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Boraginaceae	*Trichodesma zeylanicum* var. *zeylanicum*
Brassicaceae	*Arabidella nasturtium*
	Lepidium echinatum
	Lepidium pedicellosum
	Lepidium phlebopetalum
	Lepidium pholidogynum
	Stenopetalum decipiens
	Stenopetalum nutans
Caesalpiniaceae	*Parkinsonia aculeata*
	Petalostylis labicheoides
	Senna artemisioides subsp. *filifolia*
	Senna artemisioides subsp. *helmsii*
	Senna artemisioides subsp. *oligophylla*
	Senna artemisioides subsp. *x sturtii*
	Senna ferraria
	Senna glaucifolia
	Senna glutinosa subsp. *chatelainiana*
	Senna glutinosa subsp. *glutinosa*
	Senna glutinosa subsp. *pruinosa*
	Senna glutinosa subsp. *x luerssenii*
	Senna hamersleyensis
	Senna notabilis
	Senna sericea
	Senna stricta
	Senna symonii
	Senna venusta
Campanulaceae	*Wahlenbergia tumidifructa*
Capparaceae	*Capparis lasiantha*
	Capparis spinosa var. *nummularia*
	Capparis umbonata
	Cleome oxalidea
	Cleome viscose
Caryophyllaceae	*Polycarpaea corymbosa* var. *corymbosa*
	Polycarpaea holtzei
	Polycarpaea longiflora
Chenopodiaceae	*Atriplex bunburyana*
	Dissocarpus paradoxus
	Dysphania kalpari

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*
	Enchylaena tomentosa
	Maireana carnosa
	Maireana luehmannii
	Maireana planifolia
	Maireana pyramidata
	Maireana tomentosa subsp. *tomentosa*
	Maireana villosa
	Rhagodia eremaea
	Rhagodia sp. Hamersley (M. Trudgen 17794)
	Salsola tragus subsp. *tragus*
	Sclerolaena bicornis
	Sclerolaena convexula
	Sclerolaena cornishiana
	Sclerolaena costata
	Sclerolaena cuneata
	Sclerolaena densiflora
	Sclerolaena deserticola
	Sclerolaena eriacantha
	Sclerolaena tetragona
Commelinaceae	*Commelina ciliata*
	Commelina ensifolia
Convolvulaceae	*Bonamia media* var. *villosa*
	Bonamia pannosa
	Convolvulus angustissimus subsp. *angustissimus*
	Duperreya commixta
	Evolvulus alsinoides var. *villosicalyx*
	Ipomoea coptica
	Ipomoea diamantinensis
	Ipomoea lonchophylla
	Ipomoea muelleri
	Ipomoea plebeia
	Ipomoea polymorpha
	Operculina aequisepala
	Polymeria aff. *ambigua (CGC-25)*
	Polymeria sp. Hamersley (M.E. Trudgen 11353)
Cucurbitaceae	*Austrobryonia pilbarensis*
	Citrullus colocynthis
	Citrullus lanatus
	Cucumis maderaspatanus

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Cucurbitaceae	*Cucumis melo* subsp. *agrestis*
Cyperaceae	*Bulbostylis barbata*
	Cyperus bifax
	Cyperus iria
	Fimbristylis dichotoma
	Fimbristylis microcarya
	Fimbristylis simulans
Euphorbiaceae	*Adriana urticoides* var. *urticoides*
	Euphorbia australis
	Euphorbia biconvexa
	Euphorbia boophthona
	Euphorbia coghlanii
	Euphorbia drummondii
	Euphorbia schultzii
	Euphorbia tannensis subsp. *eremophila*
	Leptopus decaisnei
	Phyllanthus erwinii
	Phyllanthus maderaspatensis
Goodeniaceae	*Dampiera candicans*
	Goodenia forrestii
	Goodenia lamprosperma
	Goodenia microptera
	Goodenia muelleriana
	Goodenia nuda
	Goodenia pascua
	Goodenia prostrata
	Goodenia stobbsiana
	Goodenia triodiophila
	Goodenia vilmoriniae
	Scaevola acacioides
Gyrostemonaceae	*Codonocarpus cotinifolius*
Lamiaceae	*Basilicum polystachyon*
	Teucrium racemosum
Lauraceae	*Cassytha capillaries*
Loranthaceae	*Amyema* aff. *bifurcata*
	Amyema fitzgeraldii

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Loranthaceae	*Amyema gibberula* var. *gibberula*
	Amyema miquelii
	Lysiana casuarinae
Lythraceae	*Ammannia auriculata*
	Ammannia baccifera
Malvaceae	*Abutilon ?dioicum* R.M.Barker ms.
	Abutilon amplum
	Abutilon cryptopetalum
	Abutilon cunninghamii
	Abutilon fraseri
	Abutilon lepidum
	Abutilon leucopetalum
	Abutilon macrum
	Abutilon malvifolium
	Abutilon otocarpum
	Abutilon oxycarpum subsp. *prostratum* R.M.Barker ms
	Gossypium australe
	Gossypium robinsonii
	Hibiscus burtonii
	Hibiscus coatesii
	Hibiscus gardneri
	Hibiscus haynaldii
	Hibiscus leptocladus
	Hibiscus sturtii var. aff. *grandiflorus*
	Hibiscus sturtii var. *campylochlamys*
	Hibiscus sturtii var. *platychlamys*
	Hibiscus sturtii var. *truncatus*
	Hibiscus trionum var. *vesicarius*
	Malvastrum americanum
	Sida arenicola
	Sida calyxhymenia
	Sida echinocarpa
	Sida ectogama
	Sida fibulifera
	Sida pilbarensis R.M. Barker ms
	Sida platycalyx
	Sida rohlenae subsp. *rohlenae*
	Sida sp. dark green fruits (S. van Leeuwen 2260)
	Sida sp. Excedentifolia (J.L. Egan 1925)
	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)
	Sida sp. Supplejack Station (T.S. Henshall 2345)

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Malvaceae	*Sida spinosa*
Marsileaceae	*Marsilea exarata*
	Marsilea hirsute
Mimosaceae	*Acacia acradenia*
	Acacia adsurgens
	Acacia ampliceps
	Acacia ancistrocarpa
	Acacia aneura var. *aneura*
	Acacia aneura var. *conifera*
	Acacia aneura var. *intermedia*
	Acacia aneura var. *macrocarpa*
	Acacia aneura var. *major*
	Acacia aneura var. *pilbarana*
	Acacia aneura var. *tenuis*
	Acacia arida
	Acacia atkinsiana
	Acacia ayersiana
	Acacia bivenosa
	Acacia catenulata subsp. *occidentalis Maslin ms*
	Acacia coriacea subsp. *pendens*
	Acacia distans
	Acacia glaucocaesia
	Acacia hamersleyensis
	Acacia inaequilatera
	Acacia kempeana
	Acacia maitlandii
	Acacia marramamba
	Acacia monticola
	Acacia oswaldii
	Acacia paraneura
	Acacia pruinocarpa
	Acacia pyrifolia
	Acacia rhodophloia
	Acacia robeorum
	Acacia sclerosperma subsp. *sclerosperma*
	Acacia sibirica
	Acacia synchronicia
	Acacia tetragonophylla
	Acacia trachycarpa
	Acacia tumida var. *pilbarensis*
	Acacia victoriae

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Mimosaceae	*Acacia xiphophylla*
	Neptunia dimorphantha
	Vachellia farnesiana
Molluginaceae	*Glinus lotoides*
	Mollugo molluginea
Myoporaceae	*Eremophila cuneifolia*
	Eremophila enata
	Eremophila exilifolia
	Eremophila forrestii subsp. *forrestii*
	Eremophila lanceolata
	Eremophila latrobei subsp. *filiformis*
	Eremophila latrobei subsp. *glabra*
	Eremophila latrobei subsp. *latrobei*
	Eremophila longifolia
	Eremophila margarethae
	Eremophila platycalyx
	Eremophila youngii subsp. *lepidota*
Myrtaceae	*Calytrix carinata*
	Corymbia candida subsp. *candida*
	Corymbia deserticola
	Corymbia ferriticola
	Corymbia hamersleyana
	Eucalyptus camaldulensis var. *obtusa*
	Eucalyptus leucophloia subsp. *leucophloia*
	Eucalyptus lucasii
	Eucalyptus pilbarensis
	Eucalyptus socialis
	Eucalyptus victrix
	Melaleuca glomerata
	Melaleuca linophylla
Nyctaginaceae	*Boerhavia burbidgeana*
	Boerhavia coccinea
	Boerhavia gardneri
	Boerhavia paludosa
	Boerhavia repleta
	Boerhavia schomburgkiana
Oleaceae	*Jasminum didymum* subsp. *lineare*

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Papaveraceae	*Argemone ochroleuca* subsp. *ochroleuca*
Papilionaceae	*Aeschynomene indica*
	Alysicarpus muelleri
	Crotalaria dissitiflora subsp. *benthamiana*
	Crotalaria medicaginea var. *neglecta*
	Cullen aff. *lachnostachys* (MET 15,154)
	Cullen cinereum
	Cullen graveolens
	Cullen pogonocarpum
	Desmodium campylocaulon
	Desmodium filiforme
	Erythrina vespertilio
	Glycine canescens
	Gompholobium karijini
	Indigofera colutea
	Indigofera linifolia
	Indigofera linnaei
	Indigofera monophylla
	Isotropis forrestii
	Lotus cruentus
	Rhynchosia minima
	Swainsona canescens
	Swainsona kingii
	Tephrosia aff. *supina*
	Tephrosia clementii
	Tephrosia rosea var. *glabrior* Pedley ms
	Vigna lanceolata var. *lanceolata*
Pedaliaceae	*Josephinia eugeniae*
Poaceae	*Aristida contorta*
	Aristida holathera var. *latifolia*
	Aristida inaequiglumis
	Aristida ingrata
	Aristida jerichoensis var. *subspinulifera*
	Aristida latifolia
	Bothriochloa bladhii
	Bothriochloa ewartiana
	Brachyachne prostrata
	Cenchrus ciliaris
	Chloris pectinata
	Chloris pumilio

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Poaceae	*Chloris virgata*
	Chrysopogon fallax
	Cymbopogon ambiguus
	Cymbopogon bombycinus
	Cymbopogon obtectus
	Cymbopogon procerus
	Dactyloctenium radulans
	Dichanthium fecundum
	Dichanthium sericeum subsp. *humilius*
	Digitaria brownii
	Digitaria ctenantha
	Echinochloa colona
	Enneapogon avenaceus
	Enneapogon caerulescens
	Enneapogon cylindricus
	Enneapogon intermedius
	Enneapogon lindleyanus
	Enneapogon polyphyllus
	Enteropogon ramosus
	Eragrostis cilianensis
	Eragrostis cumingii
	Eragrostis desertorum
	Eragrostis dielsii
	Eragrostis eriopoda
	Eragrostis falcata
	Eragrostis leptocarpa
	Eragrostis pergracilis
	Eragrostis setifolia
	Eragrostis tenellula
	Eragrostis xerophila
	Eriachne aristidea
	Eriachne benthamii
	Eriachne ciliata
	Eriachne flaccida
	Eriachne helmsii
	Eriachne lanata
	Eriachne mucronata
	Eriachne pulchella subsp. *dominii*
	Eriachne pulchella subsp. *pulchella*
	Eriachne semiciliata
	Eriachne tenuiculmis
	Eriochloa pseudoacrotricha
	Eulalia aurea

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
	Heteropogon contortus
	Iseilema dolichotrichum
	Iseilema eremaeum
	Iseilema macratherum
	Iseilema vaginiflorum
	Panicum decompositum
	Panicum laevinode
	Paraneurachne muelleri
	Paspalidium clementii
	Paspalidium constrictum
	Paspalidium rarum
	Perotis rara
	Setaria dielsii
	Setaria verticillata
	Sporobolus australasicus
	Sporobolus mitchellii
	Themeda triandra
	Triodia angusta
	Triodia basedowii
	Triodia brizoides
	Triodia epactia
	Triodia longiceps
	Triodia pungens
	Triodia sp. Shovelanna Hill (S. van Leeuwen 3835)
	Triodia wiseana
	Urochloa occidentalis var. *occidentalis* ms (C.A.Gardner & C.E.Hubb.) B.K.Simon
	Urochloa occidentalis var. *ciliata* (C.A.Gardner & C.E.Hubb.) B.K.Simon ms
	Whiteochloa ?airoides
Polygalaceae	*Polygala isingii*
Polygonaceae	*Muehlenbeckia florulenta*
Portulacaceae	*Calandrinia polyandra*
	Calandrinia ptychosperma
	Portulaca conspicua
	Portulaca intraterranea
	Portulaca oleracea
	Portulaca pilosa
Proteaceae	*Grevillea berryana*
	Grevillea striata

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Proteaceae	*Grevillea wickhamii* subsp. *hispidula*
	Hakea chordophylla
	Hakea lorea subsp. *lorea*
Rhamnaceae	*Ventilago viminalis*
Rubiaceae	*Psydrax latifolia*
	Psydrax suaveolens
	Spermacoce brachystema
	Synaptantha tillaeacea var. *tillaeacea*
Santalaceae	*Anthobolus leptomerioides*
	Santalum lanceolatum
Sapindaceae	*Atalaya hemiglauca*
	Dodonaea coriacea
	Dodonaea petiolaris
Scrophulariaceae	*Cymbalaria muralis*
	Stemodia grossa
	Striga curviflora
Solanaceae	*Nicotiana benthamiana*
	Nicotiana occidentalis
	Solanum centrale
	Solanum dioicum
	Solanum ellipticum
	Solanum ferocissimum
	Solanum horridum
	Solanum lasiophyllum
	Solanum phlomoides
	Solanum sturtianum
Sterculiaceae	*Keraudrenia nephrosperma*
	Keraudrenia velutina subsp. *elliptica*
	Melhania oblongifolia
	Rulingia luteiflora
	Waltheria indica
Tiliaceae	*Corchorus laniflorus*
	Corchorus lasiocarpus subsp. *lasiocarpus*
	Corchorus lasiocarpus subsp. *parvus*
	Corchorus parviflorus

Appendix C Cont. Roy Hill 1 Project Area Flora Species List – All Phases of work.

Family	Species
Tiliaceae	*Corchorus tridens*
	Triumfetta aff. *chaetocarpa*
	Triumfetta maconochieana
Typhaceae	*Typha domingensis*
Verbenaceae	*Clerodendrum floribundum* var. *angustifolium*
Violaceae	*Hybanthus aurantiacus*
Zygophyllaceae	*Tribulus astrocarpus*
	Tribulus hirsutus
	Tribulus occidentalis
	Tribulus suberosus
	Zygophyllum iodocarpum

Classification and nomenclature according to the Western Australian Herbarium and R.J. Hnatiuk (1990), Census of Australian Vascular Plants. Australian Government Publishing Service.

Appendix D: Flora Site Descriptions, Phase 3

943.00 HPPL Roy Hill **Site** 102

Described CW **Date** 8/03/2008

MGA Zone 50 807274 **mE** 7512076 **mN**

Habitat Midslope, moderate to gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Grevillea wickhamii* subsp. *hispidula* scattered shrubs over *Ptilotus calostachyus* var. *calostachyus* and *Corchorus lasiocarpus* subsp. *lasiocarpus* shrubland over *Eriachne lanata* very open tussock grassland and *Triodia basedowii* and *Triodia* aff. *basedowii* very open hummock grassland.

Veg Condition Pristine

Fire Mod (1-5 yrs)

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Hakea lorea* subsp. *lorea*
shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula*
shrubs 0.5-1 m	*Ptilotus calostachyus* var. *calostachyus, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *pruinosa*
shrubs < 0.5 m	*Acacia acradenia, Calytrix carinata, Corchorus lasiocarpus* subsp. *lasiocarpus, Dampiera candicans, Goodenia stobbsiana, Hybanthus aurantiacus, Indigofera monophylla* (brown calyx form)*, Pterocaulon sphaeranthoides, Ptilotus clementii, Ptilotus exaltatus* var. *exaltatus, Senna notabilis, Solanum lasiophyllum*
hummock grass	*Triodia* aff. *basedowii, Triodia basedowii*
other grasses	*Eriachne lanata*
herbs	*Gomphrena affinis* subsp. *pilbarensis*

943.00 HPPL Roy Hill **Site** 102b

Described CJM **Date** 9/03/2008

MGA Zone 50 803254 **mE** 7498265 **mN**

Habitat Flat/plain

Soil Red-orange clay

Rock Type Cracked clay, surface crust

Vegetation *Acacia synchronicia* and *Vachellia farnesiana* shrubland over *Vachellia farnesiana* low shrubland over *Chloris pumilio* and *Echinochloa colona* open tussock grassland.

Veg Condition Poor (cattle, weeds, ground disturbance, horses)

Fire None evident

Notes Sparse leaf litter, neg wood litter, mainly under shrubs

trees < 5m	*Eucalyptus victrix*
shrubs > 2 m	*Acacia synchronicia, Vachellia farnesiana*
shrubs 1-2 m	*Acacia synchronicia, Vachellia farnesiana, Acacia sclerosperma* subsp. *sclerosperma*
shrubs < 0.5 m	*Neptunia dimorphantha, Sida* aff. *fibulifera (HD2000-6), Trianthema triquetra* var. *triquetra*
other grasses	*Chloris pumilio, Dactyloctenium radulans, Echinochloa colona, Eragrostis* aff. *falcata, Panicum laevinode*
herbs	*Boerhavia burbidgeana, Cleome viscosa, Cullen* sp., *Malvastrum americanum, Minuria integerrima, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Trianthema portulacastrum*

943.00 HPPL Roy Hill **Site** 103

Described JN **Date** 8/03/2008

MGA Zone 50807361 **mE** 7513850 **mN**

Habitat Footslope, midslope, small gorge (gorge sides and gorge base)

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders, surface level plates

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) open woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Eucalyptus leucophloia* subsp. *leucophloia* low woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high shrubland over *Dodonaea petiolaris* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) open shrubland to low open shrubland over *Gomphrena cunninghamii* very open herbs over *Eriachne mucronata* (typical form) very open tussock grassland over *Triodia epactia* scattered hummock grasses.

Veg Condition Excellent

Fire Old (>5 yrs)

Notes Sparse leaf litter, moderate to sparse wood litter, mainly under shrubs

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Eucalyptus leucophloia* subsp. *leucophloia*
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Eucalyptus leucophloia* subsp. *leucophloia, Clerodendrum floribundum* var. *angustifolium*
Shrubs > 2 m	*Acacia tumida* var. *pilbarensis, Ehretia saligna* var. *saligna*
shrubs 1-2 m	*Acacia pruinocarpa, Acacia tumida* var. *pilbarensis, Ehretia saligna* var. *saligna, Clerodendrum floribundum* var. *angustifolium, Dodonaea petiolaris, Senna glutinosa* subsp. *glutinosa, Eremophila latrobei* subsp. *filiformis*
shrubs 0.5-1 m	*Acacia tumida* var. *pilbarensis, Clerodendrum floribundum* var. *angustifolium, Dodonaea petiolaris, Senna glutinosa* subsp. *glutinosa, Ehretia saligna* var. *saligna, Grevillea wickhamii* subsp. *hispidula, Hibiscus gardneri, Indigofera monophylla* (brown calyx form)*, Ptilotus calostachyus* var. *calostachyus*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Gomphrena cunninghamii, Hibiscus gardneri, Hybanthus aurantiacus, Pterocaulon serrulatum, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Sida atrovirens, Sida* sp. Excedentifolia (J.L. Egan 1925)*, Solanum horridum, Solanum phlomoides, Tribulus suberosus*
hummock grass	*Triodia epactia*
other grasses	*Cymbopogon ambiguus, Eriachne mucronata (typical form)*
herbs	*Amaranthus* aff. *interruptus* (WAS 988), *Gomphrena cunninghamii, Goodenia stobbsiana*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 104

Described CW **Date** 8/03/2008

MGA Zone 50807228 **mE** 7513685 **mN**

Habitat Midslope, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low mallee trees over *Hakea chordophylla* high open shrubland over *Senna glutinosa* subsp. *luerssenii* and *Senna symonii* low open shrubland over *Eriachne lanata* very open tussock grassland and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia longiceps* very open hummock grassland.

Veg Condition Excellent (not far from tracks)

Fire Mod (1-5 yrs)

Notes Neg leaf and wood litter

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Hakea chordophylla, Hakea lorea* subsp. *lorea*
shrubs 0.5-1 m	*Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa*
shrubs < 0.5 m	*Acacia acradenia, Calytrix carinata, Corchorus lasiocarpus* subsp. *parvus, Goodenia stobbsiana, Goodenia triodiophila, Indigofera monophylla* (brown calyx form)*, Melhania* sp. (CH15-39)*, Pterocaulon sphaeranthoides, Ptilotus calostachyus* var. *calostachyus, Salsola tragus* subsp. *tragus, Senna glutinosa* subsp. *luerssenii, Senna notabilis, Senna symonii, Sida pilbarensis* (ferruginous form) ms*, Solanum lasiophyllum, Solanum sturtianum, Tribulus suberosus*
hummock grass	*Triodia longiceps, Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Eriachne* aff. *mucronata, Eriachne lanata*
herbs	*Trianthema glossostigma*

943.00 HPPL Roy Hill **Site** 105

Described CJM **Date** 8/03/2008

MGA Zone 50 807584 **mE** 7513810 **mN**

Habitat Flat/plain, hill crest

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Grevillea wickhamii* subsp. *hispidula* open shrubland over *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Indigofera monophylla* (brown calyx form) low shrubland over *Ptilotus calostachyus* var. *calostachyus* very open herbs over *Triodia basedowii* very open hummock grassland.

Veg Condition Excellent

Fire Very recent (<1 yr)

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
Shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Acacia pruinocarpa, Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa, Eremophila latrobei* subsp. *glabra*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Indigofera monophylla* (brown calyx form)*, Ptilotus astrolasius* var. *astrolasius, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii, Senna notabilis, Tephrosia* aff. *rosea* (CH3-47)*, Tribulus hirsutus, Tribulus suberosus*
hummock grass	*Triodia basedowii*
other grasses	*Eriachne mucronata* (typical form)*, Eriachne pulchella* subsp. *pulchella*
herbs	*Bonamia media* var. *villosa, Goodenia triodiophila, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus*

943.00 HPPL Roy Hill **Site** 106

Described JN **Date** 8/03/2008

MGA Zone 50 806723 **mE** 7514019 **mN**

Habitat Midslope, moderate slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Corymbia* aff. *hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees and *Eucalyptus leucophloia* subsp. *leucophloia* (regrowth) scattered low mallee trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs to open shrubland over *Ptilotus calostachyus* var. *calostachyus* and *Corchorus lasiocarpus* subsp. *parvus* low shrubland over *Trianthema glossostigma* scattered herbs over *Eriachne lanata* open tussock grassland over *Triodia* aff. *basedowii* scattered hummock grasses.

Veg Condition Good (fire)

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, moderate to sparse wood litter, mainly under shrubs

trees 5-15 m	*Corymbia* aff. *hamersleyana, Eucalyptus leucophloia* subsp. *leucophloia*
trees < 5m	*Corymbia* aff. *hamersleyana, Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula, Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii, Senna venusta*
shrubs 0.5-1 m	*Acacia ancistrocarpa, Acacia monticola, Acacia pruinocarpa, Corchorus lasiocarpus* subsp. *parvus, Solanum phlomoides, Eremophila latrobei* subsp. *filiformis, Grevillea wickhamii* subsp. *hispidula, Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii, Senna notabilis, Tribulus suberosus*
shrubs < 0.5 m	*Acacia ancistrocarpa, Calytrix carinata, Corchorus lasiocarpus* subsp. *parvus, Solanum phlomoides, Dampiera candicans, Goodenia stobbsiana, Goodenia triodiophila, Hibiscus sturtii* var. *campylochlamys, Hybanthus aurantiacus, Indigofera monophylla* (brown calyx form)*, Pterocaulon sphaeranthoides, Ptilotus calostachyus* var. *calostachyus, Sida sp. Excedentifolia (J.L. Egan 1925) , Sida pilbarensis* (ferruginous form) ms*, Streptoglossa bubakii, Trianthema glossostigma*
hummock grass	*Triodia* aff. *basedowii*
other grasses	*Eriachne lanata, Eriachne mucronata* (typical form)
herbs	*Bonamia media* var. *villosa, Mollugo molluginea*

943.00 HPPL Roy Hill **Site** 107

Described CJM **Date** 8/03/2008

MGA Zone 50 807053 **mE** 7513864 **mN**

Habitat Gully sides, gully base, minor gully, lower slopes and base = one veg type, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders, surface level plates

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Senna glutinosa* subsp. *glutinosa* scattered shrubs over *Indigofera monophylla* (brown calyx form) low scattered shrubs over *Triodia longiceps* and *Triodia epactia* very open hummock grassland.

Veg Condition Pristine

Fire Mod (1-5 yrs)

Notes Neg leaf litter

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Dodonaea petiolaris, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Dodonaea petiolaris, Hibiscus* aff. *coatesii* (MET 15 012)*, Ptilotus calostachyus* var. *calostachyus, Solanum phlomoides, Trichodesma zeylanicum* var. *zeylanicum*
shrubs < 0.5 m	*Indigofera monophylla* (brown calyx form)*, Pluchea dunlopii, Ptilotus incanus* var. *incanus, Senna glutinosa* subsp. *pruinosa, Sida sp. Excedentifolia (J.L. Egan 1925) , Sida pilbarensis* (ferruginous form) ms*, Solanum horridum, Solanum phlomoides, Streptoglossa bubakii*
hummock grass	*Triodia epactia, Triodia longiceps*
other grasses	*Aristida contorta, Enneapogon caerulescens* var. *occidentalis, Enneapogon polyphyllus, Eriachne lanata, Eriachne mucronata* (typical form)
herbs	*Amaranthus* aff. *interruptus* (WAS 988), *Bonamia media* var. *villosa, Cleome viscosa, Dysphania rhadinostachya* subsp. *rhadinostachya, Gomphrena cunninghamii, Goodenia muelleriana, Pterocaulon sphaeranthoides, Ptilotus clementii, Ptilotus exaltatus* var. *exaltatus, Streptoglossa bubakii, Trianthema glossostigma*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 108

Described CW **Date** 8/03/2008

MGA Zone 50 807225 **mE** 7513998 **mN**

Habitat Ridgetop, crest, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low mallee trees over *Senna glutinosa* subsp. *glutinosa*, *Ptilotus calostachyus* var. *calostachyus*, *Indigofera monophylla* (brown calyx form) and *Corchorus lasiocarpus* subsp. *parvus* low open shrubland over *Eriachne lanata* open tussock grassland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia* aff. *basedowii* very open hummock grassland.

Veg Condition Pristine

Fire None evident

Notes Neg leaf and wood litter

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Acacia marramamba, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Acacia acradenia, Senna glutinosa* subsp. *luerssenii*
shrubs < 0.5 m	*Calytrix carinata, Corchorus lasiocarpus* subsp. *parvus, Goodenia stobbsiana, Goodenia triodiophila, Indigofera monophylla* (brown calyx form)*, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus, Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Triodia* aff. *basedowii , Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Aristida holathera* var. *latifolia, Eriachne lanata, Eriachne mucronata* (typical form)
herbs	*Bonamia media* var. *villosa, Pterocaulon sphaeranthoides, Trianthema glossostigma*

943.00 HPPL Roy Hill **Site** 109

Described CJM **Date** 8/03/2008

MGA Zone 50 805784 **mE** 7514027 **mN**

Habitat Hill crest, gentle slope

Soil Red-orange sandy clay

Rock Type Fine gravel, stones/boulders, surface level plates

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered trees over *Grevillea wickhamii* subsp. *hispidula* (patchy) open shrubland over *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Indigofera monophylla* (brown calyx form) low open shrubland over *Ptilotus calostachyus* var. calostachyus very open herbs over *Paraneurachne muelleri*, *Eriachne lanata* and *Eriachne mucronata* very open tussock grassland and *Triodia basedowii* and *Triodia epactia* very open hummock grassland.

Veg Condition Excellent (drill lines nearby)

Fire Mod (1-5 yrs)

Notes Neg leaf litter, sparse wood litter

Species List:

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa*
Shrubs 0.5-1 m	*Corchorus lasiocarpus* subsp. *lasiocarpus*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Corchorus lasiocarpus* subsp. *lasiocarpus, Dampiera candicans, Goodenia stobbsiana, Hibiscus* aff. *coatesii (site 664), Indigofera monophylla* (brown calyx form)*, Senna glutinosa* subsp. *glutinosa, Senna notabilis, Senna stricta, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Solanum phlomoides, Streptoglossa bubakii, Tribulus suberosus*
hummock grass	*Triodia basedowii , Triodia epactia, Triodia longiceps*
other grasses	*Enneapogon caerulescens* var. *occidentalis, Eriachne lanata, Eriachne mucronata, Eriachne pulchella* subsp. *pulchella, Paraneurachne muelleri*
herbs	*Bonamia media* var. *villosa, Dysphania rhadinostachya* subsp. *rhadinostachya, Goodenia stobbsiana, Goodenia triodiophila, Hybanthus aurantiacus, Pterocaulon sphaeranthoides, Ptilotus calostachyus* var. *calostachyus, Ptilotus clementii, Ptilotus exaltatus* var. *exaltatus, Ptilotus fusiformis* var. *fusiformis*

943.00 HPPL Roy Hill **Site** 110

Described CJM **Date** 7/03/2008

MGA Zone 50 803770 **mE** 7513170 **mN**

Habitat Broad floodplain/bank on side of minor scoured creek line

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Corymbia candida* subsp. *candida* open woodland over *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* high shrubland over *Tephrosia* aff. *rosea* (HD292-37), *Corchorus parviflorus*, mixed low open heath over *Digitaria brownii, Eriachne tenuiculmis*, mixed tussock grassland over *Triodia longiceps* very open hummock grassland.

Veg Condition Good

Fire Mod (1-5 yrs)

Notes Sparse leaf and wood litter, widespread

trees 5-15 m	*Corymbia candida* subsp. *candida*
shrubs > 2m	*Acacia tumida* var. *pilbarensis, Atalaya hemiglauca, Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Acacia pyrifolia, Indigofera monophylla, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Rulingia luteiflora*
shrubs 0.5-1 m	*Abutilon aff. lepidum, Corchorus parviflorus, Indigofera monophylla, Paraneurachne muelleri, Senna artemisioides* subsp. *helmsii, Tephrosia* aff. *rosea* (HD292-37)
shrubs < 0.5 m	*Hibiscus gardneri, Hybanthus aurantiacus, Isotropis forrestii, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus, Ptilotus obovatus* var. *obovatus, Sida* sp. spiciform panicles (E. Leyland s.n. 14/8/90)*, Solanum phlomoides, Tephrosia* aff. *rosea* (HD292-37)
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Cymbopogon ambiguus, Digitaria brownii, Eriachne mucronata* (typical form)*, Eriachne tenuiculmis, Themeda triandra*
herbs	*Abutilon fraseri, Bidens bipinnata, Cleome viscosa, Gomphrena kanisii, Mollugo molluginea, Phyllanthus maderaspatensis, Polycarpaea longiflora, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Trichodesma zeylanicum* var. *zeylanicum, Waltheria indica*
climbers	*Cucumis maderaspatanus, Duperreya commixta, Jasminum didymum* subsp. *lineare*

943.00 HPPL Roy Hill **Site** 111

Described CJM **Date** 7/03/2008

MGA Zone 50 804211 **mE** 7512102 **mN**

Habitat Creek bank, minor creek line, gentle slope

Soil Red orange sandy clay (more clay than sand)

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia pruinocarpa* woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) low woodland over *Acacia tetragonophylla* and *Psydrax latifolia* high open shrubland over *Sida ectogama, Senna* spp. and *Indigofera monophylla* shrubland to low shrubland and *Dicladanthera forrestii* low open shrubland over mixed herbs over *Eriachne mucronata* (typical form), mixed very open tussock grassland.

Veg Condition Good

Fire None evident

Notes Spare leaf litter, plentiful wood litter, mainly under shrubs

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa, Corymbia* aff. *hamersleyana*
Trees < 5 m	*Acacia pruinocarpa*
shrubs > 2m	*Acacia pyrifolia, Acacia rhodophloia, Acacia tetragonophylla, Dodonaea petiolaris, Psydrax latifolia, Senna ferraria*
shrubs 1-2 m	*Acacia rhodophloia, Acacia tetragonophylla, Dodonaea petiolaris, Indigofera monophylla, Sida ectogama, Psydrax latifolia, Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *oligophylla x helmsii, Senna glutinosa* subsp. *glutinosa, Waltheria indica*
shrubs 0.5-1 m	*Anthobolus leptomerioides, Corchorus parviflorus, Hibiscus sturtii* var. *platychlamys, Indigofera monophylla, Sida ectogama, Ptilotus obovatus* var. *obovatus, Tephrosia* aff. *rosea* (CH3-47)
shrubs < 0.5 m	*Dicladanthera forrestii, Hybanthus aurantiacus, Sida* aff. *fibulifera* (FMG 125-20)
other grasses	*Cenchrus ciliaris, Chrysopogon fallax, Cymbopogon ambiguus, Eriachne mucronata* (typical form)*, Paspalidium clementii, Themeda triandra*
herbs	*Abutilon fraseri, Bidens bipinnata, Euphorbia biconvexa, Glycine canescens*
climbers	*Cucumis maderaspatanus, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 112

Described CJM **Date** 7/03/2008

MGA Zone 50 801032 **mE** 7510960 **mN**

Habitat Creek bank, creek bed

Soil Red-orange clay (base = stones/pebbles)

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Eucalyptus victrix* open woodland over *Acacia aneura* var. *pilbarana* and *Acacia rhodophloia* low open forest over *Acacia tetragonophylla* high open shrubland to scattered shrubs over *Cucumis maderaspatanus* and *Ipomoea muelleri* climbers over *Bidens bipinnata* open herbs over *Themeda triandra* closed tussock grassland.

Veg Condition Poor (weeds, cattle)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana, Corymbia candida* subsp. *candida, Eucalyptus victrix*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia rhodophloia*
shrubs 1-2 m	*Acacia pyrifolia, Acacia synchronicia, Acacia tetragonophylla, Sida ectogama*
shrubs < 0.5 m	*Boerhavia* sp., *Corchorus parviflorus, Dodonaea petiolaris, Hybanthus aurantiacus, Indigofera monophylla, Isotropis forrestii, Psydrax latifolia, Sclerolaena cornishiana*
hummock grass	*Triodia longiceps*
other grasses	*Chrysopogon fallax, Cyperus iria, Echinochloa colona, Eragrostis cumingii, Eragrostis leptocarpa, Eriachne tenuiculmis, Fimbristylis microcarya, Paspalidium rarum, Perotis rara, Setaria dielsii, Themeda triandra*
herbs	*Bidens bipinnata, Cheilanthes sieberi* subsp. *sieberi, Cleome viscosa, Dicladanthera forrestii, Gomphrena affinis* subsp. *pilbarensis, Leptopus decaisnei* var. *orbicularis, Malvastrum americanum, Marsilea hirsuta, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis maderaspatanus, Ipomoea muelleri, Ipomoea plebeia, Operculina aequisepala*

943.00 HPPL Roy Hill **Site** 113

Described JN **Date** 7/03/2008

MGA Zone 50 800302 **mE** 7511261 **mN**

Habitat Flat/plain, gentle to neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* scattered trees to scattered low trees over *Acacia aneura* var. *pilbarana* open scrub over *Dodonaea petiolaris* and *Acacia aneura* var. *pilbarana* shrubland over *Indigofera monophylla, Dodonaea petiolaris*, mixed low open shrubland over *Cucumis maderaspatanus* climbers over very open mixed herbs over *Chloris pumilio* and *Enneapogon polyphyllus* open tussock grassland.

Veg Condition Good (grazing and weeds)

Fire None evident

Notes Sparse leaf litter, moderate to sparse wood litter, mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana, Psydrax latifolia*
trees < 5m	*Acacia aneura* var. *pilbarana, Psydrax latifolia*
shrubs 1-2 m	*Acacia tetragonophylla, Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla, Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Dodonaea petiolaris, Rhagodia* sp. Hamersley (M. Trudgen 17794), *Eremophila latrobei* subsp. *filiformis, Indigofera monophylla, Senna artemisioides* subsp. *helmsii Sida ectogama, Solanum lasiophyllum*
shrubs < 0.5 m	*Abutilon aff. lepidum, Eremophila lanceolata, Gomphrena affinis* subsp. *pilbarensis, Gomphrena cunninghamii, Hibiscus burtonii, Hibiscus sturtii* var. aff. *grandiflorus, Indigofera monophylla, Malvastrum americanum, Ptilotus gomphrenoides* var. *gomphrenoides, Sida* aff. *fibulifera* (FMG 125-20), *Solanum lasiophyllum, Tribulus astrocarpus*
other grasses	*Aristida contorta, Chloris pumilio, Chrysopogon fallax, Dichanthium sericeum* subsp. *humilius, Digitaria ctenantha, Enneapogon polyphyllus, Eriachne helmsii, Iseilema eremaeum, Perotis rara, Setaria dielsii*
herbs	*Alysicarpus muelleri, Bidens bipinnata, Boerhavia* aff. *coccinea, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Portulaca oleracea*
climbers	*Austrobryonia pilbarensis, Citrullus colocynthis, Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 114

Described CW **Date** 7/03/2008

MGA Zone 50 799636 **mE** 7511020 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Fine gravel, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* woodland over *Senna artemisioides* subsp. *oligophylla* high shrubland over *Cleome viscosa* open herbs over *Aristida contorta* and *Enneapogon polyphyllus* open tussock grassland.

Veg Condition Excellent (tracks)

Fire None evident

Notes Neg leaf litter, sparse wood litter, mainly under shrubs and trees

trees 5-15 m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Senna artemisioides* subsp. *oligophylla*
shrubs 1-2 m	*Acacia tetragonophylla*
shrubs 0.5-1 m	*Eremophila latrobei* subsp. *filiformis, Evolvulus alsinoides* var. *villosicalyx*
shrubs < 0.5 m	*Eremophila lanceolata, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Goodenia muelleriana, Heliotropium tanythrix, Hibiscus sturtii* var. aff. *grandiflorus, Neptunia dimorphantha, Polygala* aff. *isingii, Ptilotus gomphrenoides* var. *gomphrenoides, Solanum lasiophyllum, Tephrosia* aff. *clementii* (9) (HD284-6)
other grasses	*Aristida contorta, Aristida latifolia, Chloris pumilio, Dactyloctenium radulans, Dichanthium sericeum* subsp. *humilius, Enneapogon caerulescens* var. *caerulescens, Enneapogon polyphyllus, Eragrostis xerophila*
herbs	*Boerhavia coccinea, Cleome viscosa, Goodenia muelleriana, Rhynchosia minima* var. *australis*
climbers	*Sida rhytidocarpa*

943.00 HPPL Roy Hill **Site** 116

Described CW **Date** 7/03/2008

MGA Zone 50 797626 **mE** 7509169 **mN**

Habitat Undulating plain, minor channel

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia aneura* var. *pilbarana* open forest to low woodland over *Chrysopogon fallax* tussock grassland.

Veg Condition Good (tracks, stock disturbance, old drill site)

Fire Mod (1-5 yrs)

Notes Neg leaf litter, sparse wood litter

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia aneura* var. *pilbarana*
shrubs 1-2 m	*Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs 0.5-1 m	*Acacia tetragonophylla*
shrubs < 0.5 m	*Eremophila latrobei* subsp. *filiformis, Evolvulus alsinoides* var. *villosicalyx, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Indigofera monophylla* (brown calyx form)*, Maireana planifolia, Neptunia dimorphantha, Ptilotus exaltatus, Ptilotus gomphrenoides* var. *gomphrenoides, Tephrosia* aff. *clementii, Tephrosia* aff. *clementii* (9) (HD284-6)
other grasses	*Chrysopogon fallax, Dactyloctenium radulans, Dichanthium sericeum* subsp. *humilius, Urochloa occidentalis* var. *occidentalis*
herbs	*Alysicarpus muelleri, Bidens bipinnata, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Portulaca oleracea*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 117

Described JN **Date** 7/03/2008

MGA Zone 50 797703 **mE** 7508831 **mN**

Habitat Flat/plain, slightly undulating (gentle to neg slope)

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees to high open shrubland over *Senna artemisioides* aff. subsp. *oligophylla* (thinly sericeous) open shrubland over *Eremophila lanceolata* low shrubland and *Senna artemisioides* subsp. *helmsii* low scattered shrubs over *Gomphrena kanisii* scattered herbs over *Chloris pumilio* scattered tussock grasses.

Veg Condition Good (grazing)

Fire Old (>5 yrs)

Notes Sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana*
trees < 5m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Acacia aneura* var. *pilbarana*
shrubs 1-2 m	*Acacia tetragonophylla, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Acacia tetragonophylla, Eremophila lanceolata, Psydrax latifolia, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii*
shrubs < 0.5 m	*Boerhavia gardneri, Eremophila lanceolata, Gomphrena kanisii, Hibiscus sturtii* var. aff. *grandiflorus, Maireana planifolia, Malvastrum americanum, Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum lasiophyllum*
other grasses	*Aristida contorta, Chloris pumilio, Dactyloctenium radulans, Enneapogon polyphyllus, Eragrostis xerophila, Iseilema macratherum*
climbers	*Cucumis melo* subsp. *agrestis, Operculina aequisepala*

943.00 HPPL Roy Hill **Site** 117b

Described CJM **Date** 7/03/2008

MGA Zone 50 798318 **mE** 7510581 **mN**

Habitat Flat/plain

Soil Clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) low woodland over *Acacia tetragonophylla* high open shrubland over *Senna artemisioides* subsp. *oligophylla* shrubland over *Senna artemisioides* subsp. *oligophylla* and *Acacia tetragonophylla* low open shrubland over *Operculina aequisepala* climbers over *Cleome viscosa* and *Ptilotus gomphrenoides* var. *gomphrenoides* open herbs over *Chloris pumilio, Iseilema dolichotrichum*, mixed open tussock grassland.

Veg Condition Poor (cattle, weeds, holes, grazing evident)

Fire

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*Acacia tetragonophylla, Senna artemisioides* subsp. *oligophylla*
shrubs 0.5-1 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs < 0.5 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
other grasses	*Aristida contorta, Aristida latifolia, Chloris pumilio, Dichanthium sericeum* subsp. *humilius, Eragrostis xerophila, Iseilema dolichotrichum, Iseilema macratherum, Panicum laevinode*
herbs	*Abutilon malvifolium, Cleome viscosa, Corchorus tridens, Euphorbia biconvexa, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Goodenia muelleriana, Indigofera linifolia, Neptunia dimorphantha, Ptilotus gomphrenoides* var. *gomphrenoides, Rhynchosia minima* var. *australis, Sida* aff. *fibulifera* (HD200-6), *Tephrosia* aff. *clementii* (9) (HD284-6)
climbers	*Ipomoea muelleri, Operculina aequisepala*

943.00 HPPL Roy Hill **Site** 118

Described CJM **Date** 6/03/2008

MGA Zone 50 802323 **mE** 7515765 **mN**

Habitat Upper slope, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Grevillea wickhamii* subsp*. hispidula* high shrubland to open heath over *Grevillea wickhamii* subsp*. hispidula* and *Corchorus lasiocarpus* subsp*. parvus* low open shrubland over *Triodia basedowii* and *Triodia epactia* hummock grassland.

Veg Condition Excellent (tracks)

Fire Old (>5 yrs)

Notes Sparse leaf and wood litter, mainly under shrubs

shrubs > 2m	*Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula, Hakea chordophylla*
shrubs 1-2 m	*Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula, Rulingia luteiflora, Senna glutinosa* subsp. *glutinosa, Tribulus suberosus*
shrubs 0.5-1 m	*Calytrix carinata, Keraudrenia nephrosperma, Psydrax latifolia*
shrubs < 0.5 m	*Acacia maitlandii, Corchorus lasiocarpus* subsp. *parvus, Dodonaea coriacea, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla* (brown calyx form)
hummock grass	*Triodia basedowii , Triodia epactia*
other grasses	*Eriachne lanata*
herbs	*Cassytha capillaris, Euphorbia* sp. (site 1089)*, Goodenia stobbsiana, Mollugo molluginea*

943.00 HPPL Roy Hill **Site** 119

Described JN **Date** 6/03/2008

MGA Zone 50801825 **mE** 7514773 **mN**

Habitat Top of small minor hill and midslopes, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees/mallee trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Grevillea wickhamii* subsp. *hispidula* and *Senna glutinosa* subsp. *glutinosa* open shrubland over *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Acacia acradenia* low open shrubland over *Triodia basedowii* hummock grassland.

Veg Condition Good

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, sparse to neg wood litter, mainly under shrubs

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Acacia acradenia, Acacia maitlandii, Acacia tumida* var. *pilbarensis, Corchorus lasiocarpus* subsp. *lasiocarpus, Senna artemisioides* subsp. *helmsii Grevillea wickhamii* subsp. *hispidula, Keraudrenia nephrosperma, Senna symonii, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii, Tribulus suberosus*
shrubs < 0.5 m	*Acacia acradenia, Dodonaea coriacea, Corchorus lasiocarpus* subsp. *lasiocarpus, Senna artemisioides* subsp. *helmsii, Indigofera monophylla* (brown calyx form), *Ptilotus calostachyus* var. *calostachyus, Sida pilbarensis* (ferruginous form) ms, *Tribulus suberosus*
hummock grass	*Triodia basedowii , Triodia brizoides, Triodia epactia, Triodia longiceps*
other grasses	*Aristida contorta, Cymbopogon ambiguus, Eriachne mucronata* (typical form), *Paraneurachne muelleri*

943.00 HPPL Roy Hill **Site** 120a

Described CW **Date** 12/03/2008

MGA Zone 51 201560 **mE** 7495878 **mN**

Habitat Flat/plain, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia pruinocarpa* low open woodland to high shrubland over *Acacia tetragonophylla* open shrubland over *Solanum lasiophyllum* low shrubland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland.

Veg Condition Excellent

Fire None evident

Notes Sparse leaf and wood litter, widespread

trees < 5m	*Acacia pruinocarpa, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia synchronicia*
shrubs 1-2 m	*Acacia tetragonophylla, Rhagodia* sp. Hamersley (M. Trudgen 17794), *Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Eremophila cuneifolia*
shrubs < 0.5 m	*Dodonaea petiolaris, Sclerolaena cornishiana, Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Aristida contorta, Cenchrus ciliaris, Enneapogon caerulescens* var. *occidentalis, Enneapogon polyphyllus, Eulalia aurea, Paraneurachne muelleri*
herbs	*Abutilon* aff. *lepidum (4), Euphorbia boophthona , Gomphrena kanisii, Ptilotus exaltatus* var. *exaltatus*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 120b

Described CW **Date** 12/03/2008

MGA Zone 51 202548 **mE** 7494266 **mN**

Habitat Undulating plain, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered low trees over *Acacia synchronicia* scattered tall shrubs over *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* open shrubland over *Eremophila cuneifolia* low open heath to low open shrubland over *Enneapogon polyphyllus* and *Aristida contorta* very open tussock grassland and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) scattered hummock grasses.

Veg Condition Excellent (track)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia synchronicia, Senna glutinosa* subsp. *luerssenii*
shrubs 1-2 m	*Eremophila cuneifolia, Eremophila latrobei* subsp. *filiformis, Senna glutinosa* subsp. *luerssenii*
shrubs < 0.5 m	*Evolvulus alsinoides* var. *villosicalyx, Sclerolaena cornishiana, Solanum horridum, Solanum lasiophyllum*
hummock grass	*Triodia brizoides, Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Aristida contorta, Cenchrus ciliaris, Enneapogon polyphyllus, Enteropogon ramosus, Eulalia aurea*
herbs	*Gomphrena kanisii*

943.00 HPPL Roy Hill **Site** 121

Described CW **Date** 12/03/2008

MGA Zone 51 202538 **mE** 7494315 **mN**

Habitat Flat/plain, minor channel

Soil Red-orange sandy clay

Rock Type Surface crust, fine gravel, loose soil

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia ancistrocarpa* shrubland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) low scattered shrubs over *Cleome viscosa* herbs over *Dactyloctenium radulans* very open tussock grassland.

Veg Condition Good (cattle, tracks)

Fire None evident

Notes Sparse leaf litter, neg wood litter, mainly under shrubs

shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia ancistrocarpa, Acacia rhodophloia, Acacia tetragonophylla, Acacia trachycarpa, Vachellia farnesiana*
shrubs < 0.5 m	*Ipomoea muelleri*
other grasses	*Aristida contorta, Dactyloctenium radulans, Enneapogon polyphyllus, Eriachne aristidea*
herbs	*Boerhavia* aff. *coccinea, Cleome viscosa, Gomphrena kanisii, Ipomoea muelleri, Ptilotus exaltatus* var. *exaltatus, Salsola tragus* subsp. *tragus*

943.00 HPPL Roy Hill **Site** 122

Described JN **Date** 12/03/2008

MGA Zone 51202657 **mE** 7494758 **mN**

Habitat Flat/plain, small band of mulga (low) on bare plain

Soil Red-orange clay/sandy clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered low trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high open shrubland to open shrubland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Maireana villosa* low open shrubland over *Paraneurachne muelleri* very open hummock grassland.

Veg Condition Good

Fire None evident

Notes Neg leaf litter, sparse wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia tetragonophylla*
shrubs 1-2 m	*Acacia rhodophloia, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs < 0.5 m	*Boerhavia coccinea, Ipomoea muelleri, Maireana villosa, Mollugo molluginea, Sida* aff. *fibulifera* (FMG 125-20)
other grasses	*Aristida contorta, Aristida ingrata, Digitaria brownii, Eriachne* aff. *mucronata, Eulalia aurea, Paraneurachne muelleri*
climbers	*Glycine canescens*

943.00 HPPL Roy Hill **Site** 123

Described JN **Date** 12/03/2008

MGA Zone 51 201931 **mE** 7496647 **mN**

Habitat Footslope of small hill, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Hakea lorea* subsp. *lorea* scattered low trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered tall shrubs over *Acacia ancistrocarpa* and *Senna glutinosa* subsp. *luerssenii* shrubland over *Senna glutinosa* subsp. *luerssenii*, *Solanum sturtianum*, mixed low open shrubland over *Ptilotus exaltatus* var. *exaltatus* scattered herbs over *Paraneurachne muelleri* and *Aristida contorta* open tussock grassland and *Triodia basedowii* hummock grassland.

Veg Condition Good/Excellent

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, mod wood litter, mainly under shrubs

trees < 5m	*Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia ancistrocarpa, Acacia pruinocarpa, Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *luerssenii, Solanum sturtianum*
shrubs 1-2 m	*Acacia synchronicia, Acacia tetragonophylla, Dodonaea petiolaris, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *glabra, Psydrax latifolia, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Senna glutinosa* subsp. *glutinosa, Sida pilbarensis* (ferruginous form) ms
shrubs 0.5-1 m	*Abutilon otocarpum, Corchorus lasiocarpus* subsp. *lasiocarpus, Eremophila exilifolia, Eremophila latrobei* subsp. *filiformis, Hibiscus burtonii, Hibiscus sturtii* var. *platychlamys, Hybanthus aurantiacus, Sida* aff. *echinocarpa (MET 15,350), Solanum lasiophyllum, Tribulus suberosus*
shrubs < 0.5 m	*Gomphrena kanisii, Mollugo molluginea, Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum horridum, Tephrosia* aff. *clementii*
hummock grass	*Triodia basedowii , Triodia brizoides*
other grasses	*Aristida contorta, Aristida ingrata, Cymbopogon obtectus, Enneapogon polyphyllus, Eulalia aurea, Paraneurachne muelleri*
herbs	*Evolvulus alsinoides* var. *villosicalyx, Ptilotus exaltatus* var. *exaltatus*

943.00 HPPL Roy Hill **Site** 124

Described JN **Date** 12/03/2008

MGA Zone 51 201440 **mE** 7494741 **mN**

Habitat Flat/plain

Soil Red-orange clay

Rock Type Cracked clay and gilgai, coarse gravel/pebbles

Vegetation *Vachellia farnesiana* scattered tall shrubs to scattered shrubs over *Boerhavia burbidgeana* low shrubland and *Senna glaucifolia* x aff. *oligophylla* (thinly sericeous) low scattered shrubs over *Ptilotus gomphrenoides* var. *gomphrenoides* open herbs over *Cenchrus ciliaris* scattered tussock grasses.

Veg Condition Good (grazing)

Fire None evident

Notes Sparse leaf litter, neg wood litter

shrubs > 2m	*Vachellia farnesiana*
shrubs 0.5-1 m	*Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Operculina aequisepala*
shrubs < 0.5 m	*Boerhavia burbidgeana, Cullen cinereum, Indigofera linifolia, Indigofera linnaei, Ipomoea lonchophylla, Ipomoea muelleri, Ipomoea polymorpha, Malvastrum americanum, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Sida fibulifera s.lat. , Solanum lasiophyllum, Streptoglossa liatroides, Tephrosia* aff. *clementii* (9) (HD284-6)*, Operculina aequisepala*
other grasses	*Cenchrus ciliaris, Eragrostis xerophila, Iseilema macratherum, Panicum laevinode*
herbs	*Evolvulus alsinoides* var. *villosicalyx, Indigofera colutea, Ptilotus gomphrenoides* var. *gomphrenoides*
climbers	*Cucumis melo* subsp. *agrestis, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 125

Described CW **Date** 12/03/2008

MGA Zone 51 200558 **mE** 7494641 **mN**

Habitat Flat/plain, minor channel

Soil Red-orange sandy clay

Rock Type Fine gravel, loose soil

Vegetation *Eucalyptus victrix* open woodland over *Atalaya hemiglauca* low open woodland over *Neptunia dimorphantha* shrubland and *Acacia tetragonophylla* open shrubland over *Ipomoea muelleri* climbers over *Malvastrum americanum* herbs over *Cenchrus ciliaris* and *Chloris pumilio* tussock grassland.

Veg Condition Poor (track, cattle, Malvastrum)

Fire None evident

Notes Mod leaf litter, sparse wood litter, widespread

trees 5-15 m	*Eucalyptus victrix*
trees < 5m	*Atalaya hemiglauca*
shrubs 1-2 m	*Acacia tetragonophylla, Neptunia dimorphantha*
shrubs < 0.5 m	*Gomphrena kanisii, Ptilotus gomphrenoides* var. *gomphrenoides, Tribulus occidentalis*
other grasses	*Cenchrus ciliaris, Chloris pumilio, Dactyloctenium radulans, Eragrostis tenellula, Panicum laevinode, Urochloa occidentalis* var. *occidentalis*
herbs	*Alysicarpus muelleri, Boerhavia burbidgeana, Cleome viscosa, Corchorus tridens, Crotalaria medicaginea, Cullen cinereum, Goodenia nuda, Indigofera linifolia, Malvastrum americanum, Phyllanthus maderaspatensis, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii, Sida fibulifera s.lat. , Tephrosia* aff. *clementii* (9) (HD284-6)*, Trianthema* aff. *triquetra* (M3.35)
climbers	*Cucumis melo* subsp. *agrestis, Ipomoea muelleri, Vigna lanceolata* var. *lanceolata*

943.00 HPPL Roy Hill **Site** 126

Described JN **Date** 12/03/2008

MGA Zone 51 201617 **mE** 7497031 **mN**

Habitat Flat/plain

Soil Red orange clay/sandy clay

Rock Type Surface crust, coarse gravel/pebbles, some stones/boulders

Vegetation *Acacia tetragonophylla* and *Acacia synchronicia* scattered shrubs over *Acacia tetragonophylla*, *Acacia synchronicia*, *Sclerolaena cornishiana* and *Senna artemisioides* subsp. *oligophylla x helmsii* low scattered shrubs over *Ptilotus exaltatus* var. *exaltatus* scattered herbs over *Aristida contorta*, *Aristida ingrata* and *Enneapogon polyphyllus* scattered tussock grasses.

Veg Condition Good

Fire None evident

Notes Neg leaf and wood litter

shrubs 1-2 m	*Acacia synchronicia, Acacia tetragonophylla*
shrubs 0.5-1 m	*Senna artemisioides* subsp. *oligophylla x helmsii, Solanum lasiophyllum*
shrubs < 0.5 m	*Ipomoea muelleri, Maireana tomentosa, Mollugo molluginea, Ptilotus roei, Ptilotus schwartzii* var. *schwartzii, Salsola tragus* subsp. *tragus, Sclerolaena cornishiana, Sida platycalyx, Solanum lasiophyllum*
other grasses	*Aristida contorta, Aristida ingrata, Enneapogon polyphyllus*
herbs	*Ptilotus exaltatus* var. *exaltatus*

943.00 HPPL Roy Hill **Site** 126b

Described JN **Date** 12/03/2008

MGA Zone 51 201414 **mE** 7496521 **mN**

Habitat Flat/plain

Soil Clay/sandy clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia synchronicia* scattered shrubs to low scattered shrubs over mixed low open shrubland over *Ptilotus gomphrenoides* var. *gomphrenoides* open herbs over *Enneapogon polyphyllus* tussock grassland.

Veg Condition Good (weeds, grazing)

Fire None evident

Notes Mod to sparse leaf litter, neg wood litter

shrubs 1-2 m	*Acacia synchronicia*
shrubs 0.5-1 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia synchronicia, Acacia tetragonophylla, Malvastrum americanum, Solanum lasiophyllum, Vachellia farnesiana*
shrubs < 0.5 m	*Boerhavia coccinea, Cleome viscosa, Corchorus lasiocarpus* subsp. *parvus, Indigofera colutea, Indigofera linifolia, Indigofera linnaei, Ipomoea muelleri, Portulaca oleracea, Ptilotus exaltatus* var. *exaltatus, Ptilotus gomphrenoides* var. *gomphrenoides, Salsola tragus* subsp. *tragus, Senna artemisioides aff subsp oligophylla (thinly sericeous), Sida* aff. *fibulifera* (HD200-6), *Tephrosia* aff. *clementii* (9) (HD284-6)
other grasses	*Aristida contorta, Aristida ingrata, Cenchrus ciliaris, Chloris pumilio, Enneapogon caerulescens* var. *occidentalis, Enneapogon polyphyllus, Eragrostis xerophila, Iseilema vaginiflorum, Panicum laevinode*
herbs	*Euphorbia coghlanii, Evolvulus alsinoides* var. *villosicalyx, Rhynchosia minima* var. *australis, Salsola tragus* subsp. *tragus, Trianthema* aff. *triquetra* (M3.35)
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 128

Described JN **Date** 11/03/2008

MGA Zone 51 201757 **mE** 7498019 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia pruinocarpa* scattered trees to scattered low trees over *Acacia rhodophloia* high shrubland over *Senna artemisioides* subsp. *oligophylla x helmsii* open shrubland over *Senna artemisioides* subsp*. oligophylla x helmsii* and *Corchorus lasiocarpus* subsp. *parvus* low open shrubland over *Cucumis maderaspatanus* climbers over *Cleome viscosa* scattered herbs over *Cymbopogon ambiguus* open tussock grassland and *Triodia longiceps* very open hummock grassland.

Veg Condition Good (grazing)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia aneura* var. *intermedia, Acacia pruinocarpa, Acacia rhodophloia, Acacia tetragonophylla*
shrubs 1-2 m	*Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Senna artemisioides* subsp. *oligophylla x helmsii, Senna glaucifolia*
shrubs 0.5-1 m	*Abutilon macrum, Corchorus lasiocarpus* subsp. *lasiocarpus, Corchorus lasiocarpus* subsp. *parvus, Eremophila forrestii* subsp. *forrestii , Hibiscus burtonii, Rhagodia eremaea*
shrubs < 0.5 m	*Bidens bipinnata, Corchorus lasiocarpus* subsp. *parvus, Eremophila forrestii* subsp. *forrestii , Gomphrena kanisii, Maireana planifolia x villosa, Mollugo molluginea, Ptilotus exaltatus* var. *exaltatus, Ptilotus schwartzii* var. *schwartzii, Salsola tragus* subsp. *tragus, Sida* aff. *fibulifera* (FMG 125-20)*, Sida ectogama, Solanum lasiophyllum, Rhagodia eremaea*
hummock grass	*Triodia basedowii , Triodia longiceps*
other grasses	*Aristida contorta, Aristida ingrata, Cenchrus ciliaris, Cymbopogon ambiguus, Enneapogon polyphyllus, Eriachne* aff. *mucronata, Eulalia aurea, Paraneurachne muelleri*
herbs	*Cleome viscosa*
climbers	*Citrullus colocynthis, Cucumis maderaspatanus, Cucumis melo* subsp. *agrestis, Duperreya commixta*

943.00 HPPL Roy Hill **Site** 129

Described JN **Date** 11/03/2008

MGA Zone 51 201703 **mE** 7499039 **mN**

Habitat Crest of small rise, gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Hakea lorea* subsp. *lorea* scattered low trees over *Acacia adsurgens* scattered tall shrubs over *Senna glutinosa* subsp. *luerssenii* open shrubland over *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Solanum lasiophyllum* low open shrubland over *Cymbopogon ambiguus* very open tussock grassland and *Triodia* aff. *basedowii* hummock grassland.

Veg Condition Excellent

Fire Mod (1-5 yrs)

Notes Neg leaf litter, sparse to neg wood litter, mainly under shrubs

trees < 5m	*Hakea lorea* subsp. *lorea*
shrubs > 2 m	*Acacia adsurgens*
shrubs 1-2 m	*Acacia adsurgens, Acacia pruinocarpa, Corchorus lasiocarpus* subsp. *lasiocarpus, Senna glutinosa* subsp. *pruinosa, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Acacia tetragonophylla, Corchorus lasiocarpus* subsp. *lasiocarpus, Dodonaea petiolaris, Solanum lasiophyllum, Tribulus suberosus, Eremophila forrestii x latrobei, Senna artemisioides* subsp. *oligophylla x symonii?, Senna glutinosa* subsp. *luerssenii, Senna notabilis*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Dodonaea petiolaris, Solanum lasiophyllum, Tribulus suberosus, Gomphrena kanisii, Mollugo molluginea, Ptilotus schwartzii* var. *schwartzii, Sclerolaena cornishiana, Solanum horridum*
hummock grass	*Triodia* aff. *basedowii*
other grasses	*Cymbopogon ambiguus, Eriachne* aff. *mucronata, Eulalia aurea*
herbs	*Evolvulus alsinoides* var. *villosicalyx, Ptilotus exaltatus* var. *exaltatus*

943.00 HPPL Roy Hill **Site** 130

Described CW **Date** 11/03/2008

MGA Zone 51 201071 **mE** 7498855 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Surface crust, loose soil, coarse gravel/pebbles

Vegetation *Eucalyptus victrix* open woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) low woodland over *Acacia tetragonophylla*, *Acacia synchronicia* and *Neptunia dimorphantha* open shrubland over *Acacia synchronicia* and *Corchorus lasiocarpus* subsp. *lasiocarpus* low open shrubland over *Cenchrus ciliaris* tussock grassland.

Veg Condition Poor (tracks, cattle, weeds)

Fire None evident

Notes Neg leaf and wood litter

trees 5-15 m	*Eucalyptus victrix*
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Hakea lorea* subsp. *lorea*
shrubs 1-2 m	*Acacia sclerosperma* subsp. *sclerosperma, Acacia synchronicia, Acacia tetragonophylla, Capparis lasiantha, Grevillea wickhamii* subsp. *hispidula, Neptunia dimorphantha*
shrubs 0.5-1 m	*Acacia synchronicia*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Sclerolaena costata, Sida* aff. *fibulifera* (oblong; MET 15 220)
other grasses	*Aristida contorta, Cenchrus ciliaris, Dactyloctenium radulans, Eragrostis xerophila*
herbs	*Cleome viscosa, Crotalaria medicaginea, Portulaca intraterranea*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 131

Described CW **Date** 12/03/2008

MGA Zone 51 201773 **mE** 7497279 **mN**

Habitat Flat/plain, minor drainage band

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia aneura* var. *intermedia* and *Acacia rhodophloia* open scrub to shrubland over *Senna artemisioides* subsp. *helmsii* open shrubland over *Senna artemisioides* subsp. *helmsii*, *Eremophila forrestii* subsp. *forrestii* and *Sida* aff. *fibulifera* (FMG 125-20) low shrubland over *Cleome viscosa* very open herbs over *Aristida ingrata* and *Perotis rara* tussock grassland.

Veg Condition Excellent

Fire Old (>5 yrs)

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Acacia aneura* var. *intermedia, Acacia catenulata* subsp. *occidentalis, Acacia rhodophloia, Senna artemisioides* subsp. *helmsii*
shrubs 1-2 m	*Maireana villosa*
shrubs 0.5-1 m	*Eremophila forrestii* subsp. *forrestii*
shrubs < 0.5 m	*Dodonaea petiolaris, Gomphrena kanisii, Sida* aff. *fibulifera* (FMG 125-20), *Sida ectogama, Tephrosia* aff. *supina* (HD133-20), *Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia basedowii*
other grasses	*Aristida contorta, Aristida ingrata, Enneapogon polyphyllus, Eulalia aurea, Paraneurachne muelleri, Perotis rara*
herbs	*Bidens bipinnata, Boerhavia coccinea, Cleome viscosa, Evolvulus alsinoides* var. *villosicalyx, Mollugo molluginea, Ptilotus exaltatus* var. *exaltatus, Ptilotus gaudichaudii* var. *gaudichaudii*
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 132

Described JN **Date** 11/03/2008

MGA Zone 51 200720 **mE** 7498909 **mN**

Habitat Creek bed, creek bank, minor drainage area (several channels), gentle slope

Soil Red-orange sand/sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Corymbia* aff. *hamersleyana* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) open woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) low woodland over *Acacia tetragonophylla* high shrubland over *Vachellia farnesiana* shrubland over *Vachellia farnesiana*, mixed low open shrubland over *Cucumis maderaspatanus* climbers over *Ptilotus gomphrenoides* var. *gomphrenoides* and *Malvastrum americanum* open herbs over *Cenchrus ciliaris* closed tussock grassland.

Veg Condition Poor (weeds, grazing)

Fire Old (>5 yrs)

Notes Mod leaf and wood litter, mainly under shrubs

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Atalaya hemiglauca, Corymbia* aff. *hamersleyana*
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia coriacea* subsp. *pendens, Acacia pruinocarpa, Atalaya hemiglauca, Corymbia* aff. *hamersleyana, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pyrifolia, Acacia tetragonophylla , Acacia sclerosperma* subsp. *sclerosperma, Acacia synchronicia, Eremophila latrobei* subsp. *glabra, Eremophila longifolia, Vachellia farnesiana*
shrubs 1-2 m	*Acacia tetragonophylla, Indigofera monophylla, Vachellia farnesiana*
shrubs 0.5-1 m	*Corchorus lasiocarpus* subsp. *parvus, Malvastrum americanum, Vachellia farnesiana*
shrubs < 0.5 m	*Aeschynomene indica, Bidens bipinnata, Boerhavia coccinea, Crotalaria medicaginea, Gomphrena affinis* subsp. *pilbarensis, Neptunia dimorphantha, Operculina aequisepala, Phyllanthus maderaspatensis, Polymeria* aff. *ambigua* (CGC-25)*, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii, Sclerolaena costata*
other grasses	*Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Echinochloa colona, Eragrostis tenellula, Urochloa occidentalis* var. *occidentalis*
herbs	*Alysicarpus muelleri, Cleome viscosa, Marsilea hirsuta, Portulaca oleracea, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis maderaspatanus, Cucumis melo* subsp. *agrestis, Duperreya commixta, Ipomoea muelleri, Rhynchosia minima* var. *australis*
Epiphytes	*Amyema fitzgeraldii*
Sedges	*Cyperus iria*

943.00 HPPL Roy Hill **Site** 133

Described CW **Date** 11/03/2008

MGA Zone 51 200477 **mE** 7499832 **mN**

Habitat Undulating plain, floodplain

Soil Red-orange sandy clay

Rock Type Loose soil

Vegetation *Acacia coriacea* subsp. *pendens* open forest over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Atalaya hemiglauca* low woodland over *Acacia tetragonophylla* high open shrubland over *Acacia tetragonophylla* and *Acacia pyrifolia* shrubland over *Ipomoea muelleri* and *Rhynchosia minima* var. *australis* climbers over *Bidens bipinnata* herbs over *Cenchrus ciliaris* closed tussock grassland.

Veg Condition Poor (cattle, weeds)

Fire None evident

Notes Sparse leaf litter, neg wood litter, widespread

trees 5-15 m	*Acacia coriacea* subsp. *pendens, Corymbia* aff. *hamersleyana, Eucalyptus camaldulensis* var. *obtusa*
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Atalaya hemiglauca*
shrubs > 2m	*Acacia tetragonophylla, Vachellia farnesiana*
shrubs 1-2 m	*Acacia pyrifolia*
shrubs 0.5-1 m	*Senna artemisioides* subsp. *filifolia*
shrubs < 0.5 m	*Boerhavia repleta, Capparis umbonata, Senna artemisioides* subsp. *helmsii, Sida* aff. *fibulifera* (oblong; MET 15 220)
other grasses	*Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Urochloa occidentalis* var. *occidentalis*
herbs	*Amaranthus* aff. *pallidiflorus (WAS1127), Bidens bipinnata, Cleome viscosa, Corchorus tridens, Dicladanthera forrestii, Euphorbia biconvexa, Malvastrum americanum, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta, Glycine canescens, Ipomoea muelleri, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 134

Described CJM **Date** 10/03/2008

MGA Zone 51 199852 **mE** 7500098 **mN**

Habitat Flat/plain

Soil Red-orange clay

Rock Type Surface crust

Vegetation *Acacia aneura* var. *intermedia* and *Acacia rhodophloia* low open forest over *Dodonaea petiolaris* and *Senna artemisioides* subsp. *helmsii* scattered tall shrubs over *Sida* aff. *fibulifera* (FMG 125-20) low shrubland and mixed low scattered shrubs over *Bidens bipinnata* herbs over *Triodia longiceps* open hummock grassland.

Veg Condition Poor (lots of *Bidens bipinnata*)

Fire Old (>5 yrs)

Notes Mod leaf litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *intermedia, Acacia rhodophloia*
shrubs 1-2 m	*Dodonaea petiolaris, Psydrax latifolia, Senna artemisioides* subsp. *helmsii*
shrubs < 0.5 m	*Eremophila lanceolata, Hibiscus burtonii, Isotropis forrestii, Sida* aff. *fibulifera* (FMG 125-20)*, Tephrosia* aff. *supina* (HD133-20)
hummock grass	*Triodia longiceps*
other grasses	*Chloris pumilio, Chrysopogon fallax, Commelina ciliata, Digitaria brownii, Enneapogon polyphyllus, Paspalidium clementii*
herbs	*Abutilon otocarpum, Alysicarpus muelleri, Bidens bipinnata, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena cunninghamii, Gomphrena kanisii, Goodenia nuda, Ipomoea muelleri, Rostellularia adscendens* var. *clementii, Spermacoce brachystema*
climbers	*Cucumis maderaspatanus*
sedges	*Fimbristylis dichotoma*

943.00 HPPL Roy Hill **Site** 134b

Described CW **Date** 11/03/2008

MGA Zone 51 199845 **mE** 7500150 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) high shrubland over *Acacia tetragonophylla* open shrubland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) low shrubland over *Paraneurachne muelleri* open tussock grassland.

Veg Condition Good (track, cattle)

Fire None evident

Notes Neg leaf and wood litter

shrubs > 2m	*Acacia rhodophloia, Acacia tetragonophylla*
shrubs 1-2 m	*Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Dodonaea petiolaris*
shrubs < 0.5 m	*Abutilon otocarpum, Alysicarpus muelleri, Corchorus tridens, Eremophila exilifolia, Eremophila lanceolata, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Hibiscus sturtii* var. *platychlamys, Hibiscus sturtii* var. *truncatus, Maireana planifolia x villosa, Maireana villosa, Ptilotus schwartzii* var. *schwartzii, Sclerolaena cornishiana, Senna hamersleyensis, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum lasiophyllum*
hummock grass	*Triodia basedowii*
other grasses	*Aristida contorta, Aristida ingrata, Chrysopogon fallax, Cymbopogon ambiguus, Enneapogon polyphyllus, Eragrostis xerophila, Eriachne* aff. *mucronata, Eulalia aurea, Paraneurachne muelleri, Perotis rara*
herbs	*Bidens bipinnata, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Mollugo molluginea*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis, Ipomoea muelleri*

943.00 HPPL Roy Hill **Site** 135

Described CW **Date** 11/03/2008

MGA Zone 51 199375 **mE** 7500272 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia catenulata* subsp. *occidentalis* and *Acacia aneura* var. *intermedia* high shrubland over *Dodonaea petiolaris* open shrubland over *Acacia aneura* and *Ptilotus schwartzii* var. *schwartzii* low shrubland.

Veg Condition Good (track, drill site, cattle)

Fire None evident

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia aneura* var. *intermedia, Acacia catenulata* subsp. *occidentalis*
shrubs 1-2 m	*Dodonaea petiolaris*
shrubs 0.5-1 m	*Acacia aneura* var. *?, Acacia catenulata* subsp. *occidentalis, Acacia tetragonophylla*
shrubs < 0.5 m	*Eremophila forrestii* subsp. *forrestii, Eremophila lanceolata, Maireana villosa, Pluchea tetranthera, Ptilotus schwartzii* var. *schwartzii, Salsola tragus* subsp. *tragus, Sclerolaena cuneata, Solanum lasiophyllum*
other grasses	*Eriachne helmsii*

943.00 HPPL Roy Hill **Site** 136

Described JN **Date** 10/03/2008

MGA Zone 51 199587 **mE** 7500926 **mN**

Habitat Crest and upper slopes of very small hill, gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia pruinocarpa* low open woodland to high open shrubland over *Eremophila exilifolia* open shrubland to low open shrubland over *Triodia basedowii* hummock grassland.

Veg Condition Excellent

Fire Mod (1-5 yrs)

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia rhodophloia, Acacia tetragonophylla, Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs 1-2 m	*Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs 0.5-1 m	*Dodonaea petiolaris*
shrubs < 0.5 m	*Abutilon otocarpum, Alysicarpus muelleri, Corchorus tridens, Eremophila exilifolia, Eremophila lanceolata, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Hibiscus sturtii* var. *platychlamys, Hibiscus sturtii* var. *truncatus, Maireana planifolia x villosa, Maireana villosa, Ptilotus schwartzii* var. *schwartzii, Sclerolaena cornishiana, Senna hamersleyensis, Sida* aff. *fibulifera* (FMG 125-20), *Solanum lasiophyllum*
hummock grass	*Triodia basedowii*
other grasses	*Aristida contorta, Aristida ingrata, Chrysopogon fallax, Cymbopogon ambiguus, Enneapogon polyphyllus, Eragrostis xerophila, Eriachne* aff. *mucronata, Eulalia aurea, Paraneurachne muelleri, Perotis rara*
herbs	*Bidens bipinnata, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Mollugo molluginea*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis, Ipomoea muelleri*

943.00 HPPL Roy Hill **Site** 137

Described JN **Date** 11/03/2008

MGA Zone 51 199616 **mE** 7501465 **mN**

Habitat Minor gully between two small gently sloping hills/rises, gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered trees to low woodland and *Eucalyptus leucophloia* subsp. *leucophloia* (regrowth) scattered low mallee trees over *Acacia monticola* scattered tall shrubs to open shrubland over *Acacia monticola, Corchorus lasiocarpus* subsp. *parvus* and *Indigofera monophylla* low shrubland over *Cucumis maderaspatanus* climbers over *Paraneurachne muelleri* open tussock grassland and *Triodia basedowii* scattered hummock grasses.

Veg Condition Excellent (weeds, fire)

Fire Very recent/Mod

Notes Sparse leaf litter, mod wood litter, mainly under shrubs

trees < 5m	*Codonocarpus cotinifolius, Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Abutilon cunninghamii, Acacia maitlandii, Acacia monticola, Dodonaea petiolaris, Grevillea wickhamii* subsp. *hispidula, Keraudrenia nephrosperma, Solanum sturtianum, Psydrax latifolia, Ptilotus calostachyus* var. *calostachyus, Santalum lanceolatum, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii, Senna notabilis, Sida arenicola, Solanum phlomoides*
shrubs 0.5-1 m	*Acacia tetragonophylla, Acacia monticola, Hibiscus* aff. *coatesii* (MET 15 012), *Hibiscus sturtii* var. *campylochlamys, Indigofera monophylla, Keraudrenia nephrosperma, Solanum sturtianum, Ptilotus exaltatus* var. *exaltatus, Senna artemisioides* subsp. *helmsii, Tephrosia* aff. *rosea* (HD292-37), *Trichodesma zeylanicum* var. *zeylanicum*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Eremophila latrobei* subsp. *glabra, Hybanthus aurantiacus, Keraudrenia nephrosperma, Solanum sturtianum, Pterocaulon sphaeranthoides, Ptilotus clementii*
hummock grass	*Triodia basedowii*
other grasses	*Aristida contorta, Enneapogon polyphyllus, Eriachne mucronata* (typical form), *Paraneurachne muelleri*
herbs	*Goodenia microptera*
climbers	*Cucumis maderaspatanus, Duperreya commixta*

943.00 HPPL Roy Hill **Site** 140

Described CW **Date** 10/03/2008

MGA Zone 51 198882 **mE** 7500547 **mN**

Habitat Minor creek bank

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia aneura* var. *intermedia* low open forest over *Acacia rhodophloia* high shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Bidens bipinnata* herbs over *Triodia longiceps* open hummock grassland.

Veg Condition Poor (tracks, weeds)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees 5-15 m	*Corymbia candida* subsp. *candida*
trees < 5m	*Acacia aneura* var. *intermedia, Acacia catenulata* subsp. *occidentalis, Acacia pruinocarpa*
shrubs > 2m	*Acacia coriacea* subsp. *pendens, Acacia rhodophloia, Acacia tetragonophylla, Psydrax latifolia, Senna glutinosa* subsp. *glutinosa, Vachellia farnesiana*
shrubs 1-2 m	*Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Indigofera monophylla*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Dicladanthera forrestii, Gomphrena kanisii, Indigofera monophylla, Melhania* sp. (CH15-39)*, Ptilotus calostachyus* var. *calostachyus, Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Chrysopogon fallax, Enneapogon polyphyllus, Paspalidium clementii, Themeda triandra*
herbs	*Bidens bipinnata, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Hybanthus aurantiacus, Waltheria indica*
climbers	*Cucumis melo* subsp. *agrestis, Glycine canescens, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 141

Described JN **Date** 10/03/2008

MGA Zone 51 196841 **mE** 7501961 **mN**

Habitat Foot slopes of small rounded hill, gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs to scattered shrubs over *Acacia stowardii* (linear form), *Acacia pruinocarpa*, mixed low scattered shrubs over *Triodia basedowii* hummock grassland.

Veg Condition Excellent

Fire Mod (1-5 yrs)

Notes Neg leaf and wood litter, mainly under shrubs

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 1-2 m	*Acacia pruinocarpa, Grevillea wickhamii* subsp. *hispidula, Psydrax latifolia*
shrubs 0.5-1 m	*Acacia pruinocarpa, Acacia stowardii (linear form), Corchorus lasiocarpus* subsp. *parvus, Dodonaea petiolaris, Grevillea wickhamii* subsp. *hispidula, Ptilotus calostachyus* var. *calostachyus, Senna glutinosa* subsp. *glutinosa, Solanum sturtianum*
shrubs < 0.5 m	*Solanum lasiophyllum, Solanum sturtianum*
hummock grass	*Triodia basedowii , Triodia basedowii ?*
other grasses	*Eulalia aurea, Paraneurachne muelleri*

943.00 HPPL Roy Hill **Site** 142

Described CJM **Date** 10/03/2008

MGA Zone 51 196031 **mE** 7501411 **mN**

Habitat Flat/plain

Soil Red-orange clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered trees to low woodland over *Psydrax latifolia* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered tall shrubs over *Dodonaea petiolaris* and *Senna* spp. open shrubland over *Senna* spp., *Solanum lasiophyllum*, mixed low open shrubland over *Aristida contorta* tussock grassland.

Fire Old (>5 yrs)

Notes Neg leaf litter, sparse wood litter

shrubs >2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Psydrax latifolia, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *glutinosa, Sida ectogama*
shrubs 0.5-1 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Indigofera monophylla, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
shrubs < 0.5 m	*Acacia tetragonophylla, Corchorus lasiocarpus* subsp. *parvus, Eremophila forrestii* subsp. *forrestii, Gomphrena kanisii, Hibiscus burtonii, Hybanthus aurantiacus, Pterocaulon sphaeranthoides, Ptilotus obovatus* var. *obovatus , Sclerolaena cornishiana, Sida atrovirens, Solanum lasiophyllum*
other grasses	*Enneapogon polyphyllus, Eriachne* aff. *mucronata, Eulalia aurea*
herbs	*Goodenia microptera, Pterocaulon sphaeranthoides*
grasses	*Aristida contorta*

943.00 HPPL Roy Hill **Site** 143

Described CJM **Date** 10/03/2008

MGA Zone 51 194948 **mE** 7502079 **mN**

Habitat Flat/plain

Soil Clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees to high open shrubland over *Eremophila cuneifolia*, *Sclerolaena cornishiana* and *Ptilotus schwartzii* var. *schwartzii* low open shrubland and *Senna* spp. low scattered shrubs over *Aristida contorta* and *Eriachne* aff. *mucronata* scattered tussock grasses.

Veg Condition Excellent (cattle)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia aneura* var. *pilbarana , Acacia glaucocaesia*
shrubs > 2 m	*Acacia aneura* var. *pilbarana*
shrubs 1-2 m	*Eremophila latrobei* subsp. *filiformis, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Senna artemisioides* subsp. *helmsii, Senna stricta, Solanum lasiophyllum*
shrubs < 0.5 m	*Anthobolus leptomerioides, Eremophila cuneifolia, Hibiscus burtonii, Psydrax latifolia, Ptilotus schwartzii* var. *schwartzii, Sclerolaena cornishiana, Senna glutinosa* subsp. *glutinosa, Solanum lasiophyllum*
other grasses	*Aristida contorta, Enneapogon polyphyllus, Eriachne* aff. *mucronata*

943.00 HPPL Roy Hill **Site** 147

Described CW **Date** 10/03/2008

MGA Zone 51 196124 **mE** 7502089 **mN**

Habitat Minor creek bank, minor channel

Soil Red-orange sandy clay

Rock Type Fine gravel, coarse gravel/pebbles

Vegetation *Acacia rhodophloia* and *Acacia* aff. aneura (narrow fine veined; site 1259) high shrubland over *Dodonaea petiolaris*, *Indigofera monophylla* and *Hybanthus aurantiacus* low open shrubland over *Eriachne mucronata* (typical form) open tussock grassland and *Triodia epactia* open hummock grassland.

Veg Condition Excellent (track)

Fire None evident

Notes Sparse leaf litter, mod wood litter, mainly under shrubs

trees < 5m	*Corymbia candida* subsp. *candida*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia catenulata* subsp. *occidentalis, Acacia rhodophloia, Acacia tumida* var. *pilbarensis*
shrubs 1-2 m	*Acacia pruinocarpa, Grevillea wickhamii* subsp. *hispidula, Psydrax latifolia, Ptilotus obovatus* var. *obovatus*
shrubs 0.5-1 m	*Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla, Senna glutinosa* subsp. *luerssenii*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Eremophila forrestii* subsp. *forrestii, Hibiscus* aff. *coatesii* (MET 15 012)*, Isotropis forrestii, Ptilotus exaltatus* var. *exaltatus, Tephrosia* aff. *rosea* (HD292-37)*, Waltheria indica*
hummock grass	*Triodia epactia*
other grasses	*Aristida contorta, Cymbopogon ambiguus, Digitaria brownii, Eriachne mucronata* (typical form)*, Paraneurachne muelleri*
herbs	*Evolvulus alsinoides* var. *villosicalyx, Hybanthus aurantiacus*
climbers	*Glycine canescens*

943.00 HPPL Roy Hill **Site** 148

Described JN **Date** 10/03/2008

MGA Zone 51 194618 **mE** 7502244 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay/clay loam

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) open woodland to low open woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high shrubland to scattered shrubs over *Senna artemisioides* subsp. *helmsii*, *Corchorus parviflorus* and *Malvastrum americanum* low shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Cleome viscosa* very open herbs over *Aristida contorta* and *Perotis rara* tussock grassland.

Veg Condition Good (grazing, weeds)

Fire Old (>5 yrs)

Notes Mod to sparse leaf litter, mod wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura (narrow fine veined; site 1259,)Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia* aff. *aneura (narrow fine veined; site 1259,)Acacia tetragonophylla, Hakea lorea* subsp. *lorea*
shrubs 0.5-1 m	*Abutilon macrum, Abutilon otocarpum, Aerva javanica, Corchorus parviflorus, Malvastrum americanum, Senna artemisioides* subsp. *helmsii, Senna notabilis, Tephrosia* aff. *rosea* (HD292-37)*, Trichodesma zeylanicum* var. *zeylanicum*
shrubs < 0.5 m	*Abutilon otocarpum, Boerhavia coccinea, Crotalaria medicaginea, Gomphrena affinis* subsp. *pilbarensis, Hibiscus sturtii* var. *campylochlamys, Indigofera colutea, Indigofera linnaei, Maireana planifolia, Rutidosis helichrysoides, Salsola tragus* subsp. *tragus, Sida* aff. *fibulifera* (FMG 125-20)*, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Solanum dioicum, Solanum lasiophyllum*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Enneapogon polyphyllus, Eriachne helmsii, Perotis rara*
herbs	*Alysicarpus muelleri, Amaranthus* aff. *pallidiflorus (WAS1127), Bidens bipinnata, Cleome viscosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Hybanthus aurantiacus, Pterocaulon sphaeranthoides*
climbers	*Cucumis melo* subsp. *agrestis, Ipomoea muelleri, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 153

Described CW **Date** 10/03/2008

MGA Zone 51 193358 **mE** 7502239 **mN**

Habitat Midslope, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Corchorus lasiocarpus* subsp. *lasiocarpus* low scattered shrubs over *Ptilotus calostachyus* var. *calostachyus* herbs over *Triodia* aff. *basedowii* open hummock grassland.

Veg Condition Excellent (track)

Fire Mod (1-5 yrs)

Notes Neg leaf and wood litter

shrubs 1-2 m	*Acacia ancistrocarpa, Grevillea wickhamii* subsp. *hispidula*
shrubs 0.5-1 m	*Keraudrenia nephrosperma, Sida arenicola, Solanum phlomoides*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Dampiera candicans, Indigofera monophylla* (brown calyx form), *Ptilotus clementii, Sida arenicola, Sida pilbarensis* (ferruginous form) ms
hummock grass	*Triodia* aff. *basedowii*
herbs	*Goodenia microptera, Goodenia stobbsiana, Goodenia triodiophila, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus*

943.00 HPPL Roy Hill **Site** 154

Described JN **Date** 13/03/2008

MGA Zone 51 196216 **mE** 7497195 **mN**

Habitat Creek bed, creek bank, gentle slope

Soil Red-orange sand/sandy clay

Rock Type Loose soil, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* woodland over *Acacia coriacea* subsp. *pendens* low woodland to open shrubland over *Malvastrum americanum*, mixed low open shrubland over *Rhynchosia minima* var. *australis* climbers over *Rostellularia adscendens* var. *clementii* scattered herbs over *Cenchrus ciliaris* open tussock grassland.

Veg Condition Good (weeds, grazing)

Fire Old (>5 yrs)

Notes Sparse leaf litter, mod wood litter, mainly under shrubs

trees 5-15 m	*Eucalyptus victrix*
trees < 5m	*Acacia aneura* var. *pilbarana, Acacia coriacea* subsp. *pendens, Atalaya hemiglauca, Erythrina vespertilio*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia coriacea* subsp. *pendens, Acacia synchronicia, Acacia trachycarpa*
shrubs 1-2 m	*Acacia coriacea* subsp. *pendens, Indigofera monophylla, Vachellia farnesiana*
shrubs 0.5-1 m	*Achyranthes aspera, Malvastrum americanum*
shrubs < 0.5 m	*Achyranthes aspera, Boerhavia paludosa, Cleome viscosa, Crotalaria medicaginea, Hybanthus aurantiacus, Ipomoea muelleri, Operculina aequisepala, Sida fibulifera s.lat.*
other grasses	*Bothriochloa ewartiana, Cenchrus ciliaris, Dichanthium sericeum* subsp. *humilius, Urochloa occidentalis* var. *occidentalis*
herbs	*Rostellularia adscendens* var. *clementii*
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 155

Described CW **Date** 13/03/2008

MGA Zone 51 196413 **mE** 7496832 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia aneura* var. *conifera* low open woodland over *Acacia synchronicia* and *Acacia aneura* var. *conifera* open shrubland over *Acacia synchronicia, Eremophila lanceolata* and *Senna hamersleyensis* low open shrubland over *Ipomoea muelleri* climbers over *Ptilotus gomphrenoides* var. *gomphrenoides* open herbs over *Enneapogon polyphyllus* and *Aristida contorta* open tussock grassland.

Veg Condition Good (cattle, weeds, tracks)

Fire None evident

Notes Neg leaf and wood litter

trees < 5m	*Acacia aneura* var. *conifera*
shrubs 1-2 m	*Acacia synchronicia, Acacia tetragonophylla, Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs 0.5-1 m	*Acacia synchronicia, Eremophila lanceolata*
shrubs < 0.5 m	*Boerhavia paludosa, Crotalaria dissitiflora* subsp. *benthamiana, Hibiscus sturtii* var. *campylochlamys, Indigofera colutea, Neptunia dimorphantha, Sclerolaena bicornis, Sclerolaena densiflora, Senna hamersleyensis, Sida* aff. *fibulifera* (HD200-6)*, Solanum lasiophyllum, Tephrosia* aff. *clementii* (9) (HD284-6)
other grasses	*Aristida contorta, Cenchrus ciliaris, Dactyloctenium radulans, Enneapogon polyphyllus, Eragrostis xerophila, Panicum decompositum*
herbs	*Cleome viscosa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena affinis* subsp. *pilbarensis, Goodenia muelleriana, Malvastrum americanum, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides*
climbers	*Cucumis melo* subsp. *agrestis, Ipomoea muelleri*

943.00 HPPL Roy Hill **Site** 157

Described CW **Date** 13/03/2008

MGA Zone 50 805017 **mE** 7496313 **mN**

Habitat Flat/plain, floodplain

Soil Red-orange sandy clay

Rock Type Surface crust, stones/boulders

Vegetation *Eucalyptus victrix* and *Eucalyptus camaldulensis* var. *obtusa* woodland over *Hakea lorea* subsp. *lorea* low open woodland over *Acacia tetragonophylla* high open shrubland over *Vachellia farnesiana* and *Acacia tetragonophylla* shrubland over *Vachellia farnesiana* low open shrubland over *Boerhavia burbidgeana* herbs over *Dichanthium sericeum* subsp. *humilius* very open tussock grassland.

Veg Condition Poor (litter, tracks, cattle, weeds)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Eucalyptus camaldulensis* var. *obtusa, Eucalyptus victrix*
trees < 5m	*Atalaya hemiglauca, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia sclerosperma* subsp. *sclerosperma, Acacia tetragonophylla*
shrubs 1-2 m	*Acacia synchronicia, Grevillea striata, Vachellia farnesiana*
shrubs 0.5-1 m	*Acacia synchronicia*
shrubs < 0.5 m	*Malvastrum americanum, Polymeria* sp. Hamersley (M.E. Trudgen 11353), *Sclerolaena bicornis, Sida fibulifera s.lat. , Tribulus occidentalis*
other grasses	*Cenchrus ciliaris, Dichanthium sericeum* subsp. *humilius*
herbs	*Boerhavia burbidgeana, Cleome viscosa, Cullen cinereum, Euphorbia biconvexa, Euphorbia schultzii, Ipomoea lonchophylla, Malvastrum americanum, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Trianthema* aff. *triquetra* (M3.35)

943.00 HPPL Roy Hill **Site** 157b

Described JN **Date** 13/03/2008

MGA Zone 50 805430 **mE** 7496207 **mN**

Habitat Crest and slopes of small rocky hill, moderate to gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* low open woodland to high shrubland over *Senna glutinosa* subsp. *luerssenii* open heath over *Eremophila latrobei* subsp. *filiformis*, *Acacia aneura* var. *pilbarana*, mixed low open shrubland over *Gomphrena cunninghamii* scattered herbs over *Cenchrus ciliaris* scattered tussock grasses.

Veg Condition Excellent/good

Fire None evident

Notes Neg leaf litter, sparse wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia synchronicia, Acacia tetragonophylla, Grevillea striata, Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *luerssenii*
shrubs 1-2 m	*Capparis spinosa* var. *nummularia, Dodonaea petiolaris, Eremophila cuneifolia, Eremophila latrobei* subsp. *filiformis, Tribulus suberosus*
shrubs 0.5-1 m	*Capparis spinosa* var. *nummularia, Senna artemisioides* subsp. *oligophylla x helmsii, Solanum lasiophyllum*
shrubs < 0.5 m	*Capparis spinosa* var. *nummularia, Boerhavia coccinea, Gomphrena cunninghamii, Heliotropium cunninghamii, Maireana planifolia, Sclerolaena bicornis, Sclerolaena cornishiana*
other grasses	*Cenchrus ciliaris, Enneapogon polyphyllus, Eriachne mucronata* (typical form)

943.00 HPPL Roy Hill **Site** 159

Described CW **Date** 9/03/2008

MGA Zone 50 804106 **mE** 7496079 **mN**

Habitat River bank

Soil Red-orange clay

Rock Type Cracked clay

Vegetation *Eucalyptus victrix* and *Eucalyptus camaldulensis* var. *obtusa* open forest over *Cyperus bifax* sedges over *Echinochloa colona* tussock grassland.

Veg Condition Excellent (cattle)

Fire None evident

Notes Mod leaf litter, sparse wood litter, widespread

trees 5-15 m	*Eucalyptus camaldulensis* var. *obtusa, Eucalyptus victrix*
trees < 5m	*Atalaya hemiglauca*
shrubs 1-2 m	*Neptunia dimorphantha*
shrubs < 0.5 m	*Alternanthera* sp.*, Malvastrum americanum, Neptunia dimorphantha, Parkinsonia aculeata*
other grasses	*Chloris pumilio, Echinochloa colona, Eragrostis tenellula*
herbs	*Basilicum polystachyon, Cullen cinereum, Euphorbia schultzii, Malvastrum americanum, Marsilea exarata, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii*
sedges	*Cyperus bifax*

943.00 HPPL Roy Hill **Site** 160

Described JN **Date** 9/03/2008

MGA Zone 50 803941 **mE** 7496333 **mN**

Habitat Floodplain/extended channel of river, gentle to neg slope

Soil Red-orange clay/sandy clay

Rock Type Cracked clay, surface crust, coarse gravel/pebbles

Vegetation *Eucalyptus victrix* woodland to low woodland over *Acacia sclerosperma* subsp. *sclerosperma* high open shrubland to shrubland over *Acacia sclerosperma* subsp. *sclerosperma*, *Vachellia farnesiana* and *Malvastrum americanum* low open shrubland over *Cyperus bifax* scattered sedges over *Cenchrus ciliaris* and *Eragrostis* aff. *falcata* scattered tussock grasses.

Veg Condition Poor (weeds and grazing)

Fire None evident

Notes Moderate leaf litter, moderate to sparse wood litter, mainly under shrubs and trees

trees < 5m	*Eucalyptus victrix, Grevillea striata*
shrubs > 2 m	*Acacia sclerosperma* subsp. *sclerosperma, Atalaya hemiglauca, Eremophila youngii* subsp. *lepidota, Rhagodia eremaea*
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia tetragonophylla, Acacia sclerosperma* subsp. *sclerosperma, Atalaya hemiglauca, Capparis lasiantha, Senna glutinosa* subsp. *chatelainiana, Parkinsonia aculeate, Vachellia farnesiana*
shrubs 0.5-1 m	*Acacia victoriae (hairy variant), Acacia sclerosperma* subsp. *sclerosperma, Atalaya hemiglauca, Capparis lasiantha, Eremophila youngii* subsp. *lepidota, Rhagodia eremaea , Muehlenbeckia florulenta, Parkinsonia aculeate, Vachellia farnesiana*
shrubs < 0.5 m	*Acacia victoriae (hairy variant), Boerhavia burbidgeana, Capparis lasiantha, Gomphrena affinis* subsp. *pilbarensis, Malvastrum americanum, Neptunia dimorphantha, Ptilotus exaltatus* var. *exaltatus, Sclerolaena cornishiana, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Vachellia farnesiana*
other grasses	*Cenchrus ciliaris, Eragrostis* aff. *falcata, Paspalidium constrictum*
herbs	*Goodenia pascua, Polymeria* sp. Hamersley (M.E. Trudgen 11353), *Teucrium racemosum*
sedges	*Cyperus bifax*

943.00 HPPL Roy Hill **Site** 161

Described CJM **Date** 9/03/2008

MGA Zone 50 803624 **mE** 7496249 **mN**

Habitat Flat/plain

Soil Orange-yellow sandy clay

Rock Type Surface crust, loose soil

Vegetation *Vachellia farnesiana* scattered shrubs over *Pterocaulon sphaeranthoides, Goodenia forrestii*, *Stemodia grossa* and *Goodenia forrestii* scattered herbs over *Cenchrus ciliaris* scattered tussock grasses and *Triodia longiceps* hummock grassland.

Veg Condition Good (cattle have grazed edible plants such as Cenchrus)

Fire

Notes Neg leaf litter

trees < 5m	*Eremophila longifolia*
shrubs 1-2 m	*Acacia sclerosperma* subsp. *sclerosperma, Acacia synchronicia, Vachellia farnesiana, Muehlenbeckia florulenta*
shrubs < 0.5 m	*Aerva javanica, Corchorus parviflorus, Eremophila youngii* subsp. *lepidota, Heliotropium chrysocarpum, Hibiscus sturtii* var. *campylochlamys, Muehlenbeckia florulenta, Solanum lasiophyllum*
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Enneapogon cylindricus*
herbs	*Goodenia forrestii, Pterocaulon sphaeranthoides, Stemodia grossa*

943.00 HPPL Roy Hill **Site** 161b

Described CJM **Date** 9/03/2008

MGA Zone 50 803636 **mE** 7496282 **mN**

Habitat Flat/plain, neg slope

Soil Orange sandy clay

Rock Type Surface crust

Vegetation *Acacia aneura* var. *pilbarana* low open woodland over *Eremophila forrestii* subsp. *forrestii* and *Acacia sclerosperma* subsp. *sclerosperma* open shrubland over *Eremophila forrestii* subsp. *forrestii* and *Sida* aff. *fibulifera* (oblong; MET 15 220) low open shrubland over *Sclerolaena cornishiana* scattered herbs over *Cenchrus ciliaris* scattered tussock grasses and *Triodia longiceps* very open hummock grassland.

Veg Condition Good

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *pilbarana*
shrubs 1-2 m	*Vachellia farnesiana, Acacia sclerosperma* subsp. *sclerosperma, Rhagodia eremaea*
shrubs 0.5-1 m	*Eremophila forrestii* subsp. *forrestii, Senna glutinosa* subsp. *chatelainiana*
shrubs < 0.5 m	*Aerva javanica, Sclerolaena cornishiana, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. *oligophylla, Sida* aff. *fibulifera* (oblong; MET 15 220), *Solanum lasiophyllum*
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Eragrostis desertorum*
herbs	*Malvastrum americanum*
climbers	*Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 162

Described CW **Date** 13/03/2008

MGA Zone 50 805039 **mE** 7496775 **mN**

Habitat Flat/plain, floodplain, neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel / pebbles

Vegetation *Eucalyptus victrix* woodland/mallee woodland over *Atalaya hemiglauca* scattered low trees over *Acacia synchronicia* high open shrubland over *Acacia synchronicia* and *Senna glutinosa* subsp. *chatelainiana* shrubland over *Eremophila youngii* subsp. *lepidota* low shrubland over *Cucumis melo* subsp. *agrestis* scattered climbers over *Dactyloctenium radulans* open tussock grassland.

Veg Condition Good (cattle, track)

Fire

Notes Sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Eucalyptus victrix*
trees < 5m	*Atalaya hemiglauca*
shrubs > 2m	*Acacia synchronicia, Parkinsonia aculeata*
shrubs 1-2 m	*Acacia coriacea* subsp. *pendens, Acacia tetragonophylla, Atriplex bunburyana, Senna glutinosa* subsp. *chatelainiana*
shrubs 0.5-1 m	*Eremophila youngii* subsp. *lepidota*
shrubs < 0.5 m	*Neptunia dimorphantha, Sclerolaena bicornis, Sclerolaena densiflora, Sida* aff. *fibulifera* (HD200-6)*, Sida fibulifera s.lat.*
other grasses	*Cenchrus ciliaris, Dactyloctenium radulans, Echinochloa colona*
herbs	*Malvastrum americanum, Portulaca oleracea, Salsola tragus* subsp. *grandiflora*
climbers	*Austrobryonia pilbarensis, Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 163

Described CJM **Date** 9/03/2008

MGA Zone 50 804026 **mE** 7498029 **mN**

Habitat Hill crest, gentle slope

Soil Red-orange fine sandy clay

Rock Type Skeletal soils, belts rocks, stones/boulders

Vegetation *Acacia pruinocarpa* scattered low trees over *Acacia rhodophloia* high open shrubland to open heath over *Eremophila latrobei* subsp. aff. *filiformis* low open shrubland over mixed scattered herbs over *Bulbostylis barbata* scattered sedges over *Eriachne mucronata* (arid form) very open tussock grassland and *Triodia basedowii* very open hummock grassland.

Veg Condition Good (grazed by cattle)

Fire

Notes

shrubs 1-2 m	*Acacia rhodophloia, Santalum lanceolatum, Senna glutinosa* subsp. *glutinosa*
shrubs < 0.5 m	*Maireana planifolia, Sida* aff. *fibulifera* (FMG 125-20)*, Tribulus suberosus*
hummock grass	*Triodia basedowii*
other grasses	*Cenchrus ciliaris, Eriachne mucronata , Paspalidium clementii, Perotis rara*
herbs	*Gomphrena cunninghamii, Gomphrena kanisii, Portulaca oleracea*
s3s2	*Eremophila latrobei* subsp. aff. *filiformis*
sedges	*Bulbostylis barbata*
t3s1s2	*Acacia pruinocarpa*

943.00 HPPL Roy Hill **Site** 165

Described JN **Date** 9/03/2008

MGA Zone 50 803707 **mE** 7497442 **mN**

Habitat Midslope, upper slopes of small hill, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders, surface level plates

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) low woodland to high shrubland over *Eremophila latrobei* subsp. *glabra* and *Dodonaea petiolaris* shrubland to low scattered shrubs over *Enneapogon polyphyllus* scattered tussock grasses and *Triodia basedowii* scattered hummock grasses.

Veg Condition Good (grazing)

Fire None evident

Notes Mod to sparse leaf litter, mod wood litter, mainly under shrubs

shrubs 1-2 m	*Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *pruinosa*
shrubs < 0.5 m	*Hibiscus burtonii*
hummock grass	*Triodia basedowii*
other grasses	*Cenchrus ciliaris, Cymbopogon ambiguus, Enneapogon polyphyllus, Paspalidium clementii*
s1s2	*Acacia rhodophloia*
s2s3s4	*Dodonaea petiolaris*
s3s4	*Tribulus suberosus*
s4s3s2	*Eremophila latrobei* subsp. aff. *filiformis, Eremophila latrobei* subsp. *glabra*
t3t2	*Acacia* aff. *aneura* (narrow fine veined; site 1259)

943.00 HPPL Roy Hill **Site** 166a

Described CW **Date** 9/03/2008

MGA Zone 50 803646 **mE** 7497837 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Eremophila cuneifolia* low shrubland over *Sclerolaena cuneata* and *Sclerolaena densiflora* open herbs over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) very open hummock grassland.

Veg Condition Excellent (track)

Fire None evident

Notes Neg leaf and wood litter

shrubs < 0.5 m	*Acacia victoriae, Eremophila cuneifolia, Solanum lasiophyllum*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Cenchrus ciliaris, Dactyloctenium radulans, Enteropogon ramosus*
herbs	*Sclerolaena cuneata, Sclerolaena densiflora*

943.00 HPPL Roy Hill **Site** 166b

Described CW **Date** 9/03/2008

MGA Zone 50 803712 **mE** 7497936 **mN**

Habitat Stony plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Sclerolaena cuneata* very open herbs over *Dactyloctenium radulans* scattered tussock grasses.

Veg Condition Excellent (track)

Fire None evident

Notes Neg leaf and wood litter

other grasses	*Dactyloctenium radulans*
herbs	*Sclerolaena cuneata*

943.00 HPPL Roy Hill **Site** 167

Described JN **Date** 9/03/2008

MGA Zone 50 803544 **mE** 7498727 **mN**

Habitat Floodplain, gentle to neg slope

Soil Red orange clay/sandy clay

Rock Type Cracked clay, stones/boulders

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) open woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Eucalyptus victrix* low open forest over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high open shrubland over *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) shrubland to low shrubland over mixed low scattered shrubs over *Cucumis melo* subsp. *agrestis* scattered climbers over *Cleome viscosa* very open herbs over *Setaria dielsii* very open tussock grassland.

Veg Condition Good/Poor (grazing and weeds)

Fire None evident

Notes Mod leaf litter, mod to sparse wood litter, mainly under trees

trees 5-15 m	*Eucalyptus victrix, Acacia* aff. *aneura* (narrow fine veined; site 1259)
trees < 5m	*Atalaya hemiglauca, Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia sclerosperma* subsp. *sclerosperma, Acacia tetragonophylla, Parkinsonia aculeata*
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*,Acacia synchronicia, Acacia tetragonophylla, Capparis spinosa* var. *nummularia, Eremophila youngii* subsp. *lepidota, Rhagodia eremaea, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna glutinosa* subsp. *chatelainiana, Vachellia farnesiana*
shrubs 0.5-1 m	*Capparis spinosa* var. *nummularia, Eremophila cuneifolia, Malvastrum americanum, Vachellia farnesiana*
shrubs < 0.5 m	*Gomphrena affinis* subsp. *pilbarensis, Operculina aequisepala, Ptilotus gomphrenoides* var. *gomphrenoides, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Solanum lasiophyllum, Vachellia farnesiana*
other grasses	*Cenchrus ciliaris, Setaria dielsii, Urochloa occidentalis* var. *occidentalis*
herbs	*Cleome viscosa, Euphorbia schultzii, Portulaca oleracea*
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 169

Described CW **Date** 13/03/2008

MGA Zone 50 805318 **mE** 7497774 **mN**

Habitat Creek bank

Soil Red-orange sandy clay

Rock Type Loose soil, stones/boulders

Vegetation *Eucalyptus victrix* woodland over *Neptunia dimorphantha* high shrubland to low open shrubland over *Acacia synchronicia* low scattered shrubs over *Malvastrum americanum* herbs over *Cyperus bifax* sedges over *Chloris pumilio, Eragrostis leptocarpa* and *Echinochloa colona* tussock grassland.

Veg Condition Poor (cattle, tracks, weeds)

Fire None evident

Notes Sparse leaf litter, neg wood litter, widespread

trees 5-15 m	*Acacia coriacea* subsp. *pendens, Eucalyptus victrix*
trees < 5m	*Erythrina vespertilio*
shrubs > 2m	*Acacia sclerosperma* subsp. *sclerosperma, Neptunia dimorphantha*
shrubs < 0.5 m	*Acacia synchronicia*
other grasses	*Cenchrus ciliaris, Chloris pumilio, Dactyloctenium radulans, Dichanthium sericeum* subsp. *humilius, Echinochloa colona, Eragrostis leptocarpa, Eragrostis tenellula*
herbs	*Basilicum polystachyon, Boerhavia paludosa, Centipeda minima* subsp. *macrocephala, Corchorus tridens, Gomphrena affinis* subsp. *pilbarensis, Malvastrum americanum, Marsilea hirsuta, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis melo* subsp. *agrestis, Rhynchosia minima* var. *australis*
sedges	*Cyperus bifax*

943.00 HPPL Roy Hill **Site** 169b

Described JN **Date** 13/03/2008

MGA Zone 50 803991 **mE** 7497003 **mN**

Habitat Creek bank, bank between two channels of one creek, gentle slope

Soil Red-orange sandy clay/clay loam

Rock Type Cracked clay, surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus victrix* scattered trees to low open forest over *Vachellia farnesiana* scattered tall shrubs over *Vachellia farnesiana* and *Muehlenbeckia florulenta* shrubland to low open shrubland over *Rhynchosia minima* var. *australis* climbers over *Polymeria* sp. Hamersley (M.E. Trudgen 11353) scattered herbs over *Cyperus bifax* scattered sedges over *Dichanthium fecundum* and *Sporobolus mitchellii* scattered tussock grasses.

Veg Condition Poor (weeds and grazing)

Fire None evident

Notes Plentiful/mod leaf litter, mod/sparse wood litter, mainly under shrubs and trees

trees 5-15 m	*Eucalyptus victrix*
trees < 5 m	*Acacia coriacea* subsp. *pendens, Atalaya hemiglauca, Erythrina vespertilio, Eucalyptus camaldulensis* var. *obtusa*
shrubs > 2 m	*Acacia coriacea* subsp. *pendens, Acacia tetragonophylla, Grevillea striata, Parkinsonia aculeata, Vachellia farnesiana*
shrubs 1-2 m	*Eremophila youngii* subsp. *lepidota, Muehlenbeckia florulenta*
shrubs 0.5-1 m	*Acacia victoriae (hairy variant)*
shrubs < 0.5 m	*Boerhavia coccinea, Cleome viscosa, Malvastrum americanum, Sclerolaena bicornis*
other grasses	*Dichanthium fecundum, Sporobolus mitchellii*
herbs	*Polymeria* sp. *Hamersley (M.E. Trudgen 11353)*
climbers	*Cucumis melo* subsp. *agrestis, Rhynchosia minima* var. *australis*
sedges	*Cyperus bifax*

943.00 HPPL Roy Hill **Site** 170

Described JN **Date** 13/03/2008

MGA Zone 50 805173 **mE** 7498355 **mN**

Habitat Flat/plain, floodplain

Soil Red-orange clay/sandy clay

Rock Type Cracked clay, surface crust, coarse gravel/pebbles

Vegetation *Eucalyptus victrix* scattered low trees over *Acacia synchronicia* scattered tall shrubs over *Vachellia farnesiana* scattered shrubs to low scattered shrubs over *Sclerolaena bicornis* low open shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Trianthema* aff. *triquetra* (M3.35) very open herbs over *Chloris pumilio* and *Dactyloctenium radulans* tussock grassland.

Veg Condition Degraded (tracks, grazing and weeds)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Eucalyptus victrix*
shrubs > 2m	*Vachellia farnesiana*
shrubs 0.5-1 m	*Sclerolaena bicornis*
shrubs < 0.5 m	*Acacia synchronicia, Boerhavia burbidgeana, Cleome viscosa, Cullen cinereum, Malvastrum americanum, Minuria integerrima, Ptilotus gomphrenoides* var. *gomphrenoides, Sclerolaena cuneata, Trianthema* aff. *triquetra* (M3.35)*, Trianthema portulacastrum, Trianthema triquetra*
other grasses	*Chloris pumilio, Dactyloctenium radulans, Echinochloa colona, Eragrostis leptocarpa, Eragrostis setifolia, Eriachne* aff. *festucacea, Setaria dielsii*
herbs	*Portulaca oleracea*
climbers	*Cucumis melo* subsp. *agrestis*
Epiphytes	*Amyema* aff. *bifurcata*

943.00 HPPL Roy Hill **Site** 171

Described JN **Date** 14/03/2008

MGA Zone 50 806314 **mE** 7500715 **mN**

Habitat Flat/plain, gentle to neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees to high shrubland over mixed open shrubland over *Eremophila cuneifolia* and *Sclerolaena cornishiana* low shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Gomphrena cunninghamii* very open herbs over *Aristida contorta* open tussock grassland.

Veg Condition Good (grazing and weeds)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

Trees < 5 m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia synchronicia, Acacia tetragonophylla, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Senna artemisioides aff subsp oligophylla (thinly sericeous)*
shrubs 1-2 m	*Eremophila latrobei* subsp. *filiformis, Hakea lorea* subsp. *lorea, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii, Senna artemisioides aff subsp oligophylla (thinly sericeous)*
shrubs 0.5-1 m	*Cleome viscosa, Enchylaena tomentosa, Eremophila cuneifolia, Hibiscus burtonii, Maireana planifolia, Sclerolaena cornishiana, Solanum lasiophyllum*
shrubs < 0.5 m	*Hibiscus sturtii* var. aff. *grandiflorus, Ipomoea muelleri, Malvastrum americanum, Neptunia dimorphantha, Portulaca pilosa, Ptilotus roei, Sida* aff. *fibulifera* (HD200-6)*, Solanum lasiophyllum*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Chloris* sp.*, Chrysopogon fallax, Dactyloctenium radulans, Enneapogon polyphyllus, Eragrostis xerophila, Iseilema macratherum, Urochloa occidentalis* var. *occidentalis*
herbs	*Bidens bipinnata, Boerhavia coccinea, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena cunninghamii, Goodenia muelleriana, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Rhynchosia minima* var. *australis*
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 173

Described CW **Date** 14/03/2008

MGA Zone 50 806579 **mE** 7502139 **mN**

Habitat Flat/plain, drainage line

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia rhodophloia* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) open scrub over *Acacia tetragonophylla* open shrubland over *Eremophila latrobei* subsp. *filiformis* and *Sida ectogama* low open shrubland over *Bidens bipinnata* herbs over *Digitaria ctenantha* and *Enneapogon polyphyllus* open tussock grassland.

Veg Condition Good (cattle, tracks, weeds)

Fire

Notes Neg leaf and wood litter

shrubs > 2m	*Acacia rhodophloia, Acacia tetragonophylla*
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Psydrax latifolia, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Dodonaea petiolaris, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla, Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs < 0.5 m	*Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Sida* aff. *fibulifera* (FMG 125-20)*, Sida ectogama*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Commelina ensifolia, Dactyloctenium radulans, Digitaria brownii, Digitaria ctenantha, Enneapogon polyphyllus, Eragrostis leptocarpa, Eriachne* aff. *mucronata, Paspalidium clementii, Perotis rara, Themeda triandra, Urochloa occidentalis* var. *ciliata*
herbs	*Alysicarpus muelleri, Bidens bipinnata, Boerhavia coccinea, Cheilanthes sieberi* subsp. *sieberi, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Hybanthus aurantiacus, Isotropis forrestii, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis melo* subsp. *agrestis, Ipomoea plebeia*
sedges	*Fimbristylis dichotoma*

943.00 HPPL Roy Hill **Site** 174

Described CW **Date** 10/03/2008

MGA Zone 50 804412 **mE** 7502081 **mN**

Habitat Flat/plain, sump land in middle/side of plot

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* low woodland over *Sclerolaena cuneata* low shrubland over *Eriachne flaccida* tussock grassland.

Veg Condition Good (weeds and track)

Fire

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Vachellia farnesiana*
shrubs 1-2 m	*Acacia tetragonophylla, Eremophila latrobei* subsp. *glabra, Rhagodia eremaea*
shrubs 0.5-1 m	*Acacia synchronicia, Eremophila cuneifolia, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *glabra, Solanum phlomoides*
shrubs < 0.5 m	*Acacia victoriae, Aeschynomene indica, Rhagodia eremaea, Sclerolaena costata, Sclerolaena cuneata*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Cyperus iria, Dactyloctenium radulans, Eragrostis leptocarpa, Eragrostis setifolia, Eriachne flaccida, Urochloa occidentalis* var. *occidentalis*
herbs	*Bidens bipinnata, Cleome viscosa, Gomphrena affinis* subsp. *pilbarensis, Malvastrum americanum, Marsilea hirsuta, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis maderaspatanus, Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 175

Described JN **Date** 10/03/2008

MGA Zone 50 803853 **mE** 7502356 **mN**

Habitat Flat/plain, minor gully on flat plain, bed and bank

Soil Red-orange clay/sandy clay

Rock Type Cracked clay, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered low trees over *Acacia synchronicia* high shrubland to open shrubland over *Maireana pyramidata, Acacia synchronicia* and *Sclerolaena cuneata* low open shrubland over *Gomphrena affinis* subsp. *pilbarensis* scattered herbs over *Dactyloctenium radulans* very open tussock grassland.

Veg Condition Poor (grazing and weeds)

Fire None evident

Notes Neg leaf litter, sparse wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2 m	*Acacia synchronicia*
shrubs 1-2 m	*Acacia synchronicia, Eremophila cuneifolia, Eremophila forrestii x latrobei, Maireana pyramidata, Rhagodia eremaea, Senna artemisioides aff subsp oligophylla (thinly sericeous)*
shrubs 0.5-1 m	*Acacia synchronicia*
shrubs < 0.5 m	*Boerhavia burbidgeana, Boerhavia coccinea, Maireana tomentosa, Ptilotus exaltatus* var. *exaltatus, Salsola tragus* subsp. *tragus, Sclerolaena cuneata, Sida* aff. *fibulifera* (HD200-6)*, Trianthema oxycalyptra* var. *oxycalyptra*
other grasses	*Cenchrus ciliaris, Dactyloctenium radulans, Enneapogon polyphyllus, Enteropogon ramosus*
herbs	*Gomphrena affinis* subsp. *pilbarensis, Portulaca pilosa*

943.00 HPPL Roy Hill **Site** 176

Described CW **Date** 14/03/2008

MGA Zone 50 806336 **mE** 7503152 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) open scrub over *Dodonaea petiolaris* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) open shrubland over *Senna artemisioides* subsp. *oligophylla x helmsii* and *Senna artemisioides* subsp *oligophylla* (thinly sericeous) low shrubland over *Bidens bipinnata* herbs over *Aristida contorta* and *Enneapogon polyphyllus* tussock grassland.

Veg Condition Good (weeds, tracks, cattle)

Fire None evident

Notes Neg leaf and wood litter

shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia tetragonophylla, Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Psydrax latifolia*
shrubs 0.5-1 m	*Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs < 0.5 m	*Evolvulus alsinoides* var. *villosicalyx, Ptilotus gomphrenoides* var. *gomphrenoides, Sida ectogama*
other grasses	*Aristida contorta, Chloris pumilio, Chrysopogon fallax, Dactyloctenium radulans, Digitaria ctenantha, Enneapogon polyphyllus, Iseilema eremaeum, Paspalidium clementii*
herbs	*Bidens bipinnata, Boerhavia coccinea, Cleome viscosa, Euphorbia biconvexa, Gomphrena affinis* subsp. *pilbarensis, Portulaca oleracea, Portulaca pilosa, Ptilotus exaltatus* var. *exaltatus*
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 177

Described JN **Date** 14/03/2008

MGA Zone 50 806199 **mE** 7503522 **mN**

Habitat Drainage complex, small channels, gentle slope

Soil Red-orange sandy clay/clay loam

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) open forest to scattered low trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high open shrubland to scattered shrubs over *Ptilotus obovatus* var. *obovatus*, mixed low open shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Bidens bipinnata* and *Cleome viscosa* open herbs over *Cyperus iria* scattered sedges over *Paspalidium rarum* and *Digitaria ctenantha* tussock grassland.

Veg Condition Poor (grazing and weeds)

Fire None evident

Notes Mod leaf litter, plentiful/mod wood litter, mainly under shrubs

trees < 5m	*Psydrax latifolia*
shrubs > 2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Abutilon cryptopetalum, Acacia* aff. *aneura* (narrow fine veined; site 1259), *Dodonaea petiolaris, Isotropis forrestii, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Sida ectogama*
shrubs 0.5-1 m	*Abutilon cryptopetalum, Acacia* aff. *aneura* (narrow fine veined; site 1259), *Bidens bipinnata, Hakea lorea* subsp. *lorea, Isotropis forrestii, Josephinia eugeniae, Ptilotus macrocephalus, Sida* aff. *fibulifera* (FMG 125-20)
shrubs < 0.5 m	*Mollugo molluginea, Isotropis forrestii*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Cyperus iria, Digitaria brownii, Digitaria ctenantha, Enneapogon polyphyllus, Eragrostis leptocarpa, Eulalia aurea, Paspalidium constrictum, Paspalidium rarum, Perotis rara, Urochloa occidentalis* var. *occidentalis*
herbs	*Alysicarpus muelleri, Boerhavia coccinea, Cleome viscosa, Dicladanthera forrestii, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena cunninghamii, Goodenia nuda, Marsilea hirsuta, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides, Rostellularia adscendens* var. *clementii, Spermacoce brachystema*
climbers	*Cucumis melo* subsp. *agrestis, Glycine canescens, Ipomoea lonchophylla, Ipomoea muelleri*

943.00 HPPL Roy Hill **Site** 178

Described CW **Date** 15/03/2008

MGA Zone 50 807231 **mE** 7507185 **mN**

Habitat Flat/plain, gentle slope

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) high shrubland over *Dodonaea petiolaris* shrubland over *Corchorus parviflorus* low open heath over *Cucumis melo* subsp. *agrestis* climbers over *Aristida contorta* tussock grassland and *Triodia basedowii* hummock grassland.

Veg Condition Good (tracks)

Fire

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa*
shrubs 1-2 m	*Acacia acradenia, Acacia tetragonophylla, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Corchorus parviflorus, Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis*
shrubs < 0.5 m	*Amaranthus* aff. *interruptus* (WAS 988), *Gomphrena affinis* subsp. *pilbarensis, Gomphrena cunninghamii, Hybanthus aurantiacus, Mollugo molluginea, Ptilotus exaltatus* var. *exaltatus, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum horridum, Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia basedowii*
other grasses	*Aristida contorta, Cymbopogon ambiguus, Enneapogon polyphyllus, Iseilema eremaeum, Paspalidium clementii*
herbs	*Bidens bipinnata, Boerhavia* aff. *coccinea, Cleome viscosa, Euphorbia biconvexa, Euphorbia* sp. (site 1089)*, Salsola tragus* subsp. *tragus*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis, Duperreya commixta*

943.00 HPPL Roy Hill **Site** 178b

Described JN **Date** 15/03/2008

MGA Zone 50 807324 **mE** 7506931 **mN**

Habitat Footslope/midslope, gentle slope

Soil Red-orange clay/sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia pruinocarpa* scattered tall shrubs over *Acacia pruinocarpa* and *Acacia marramamba* open shrubland over *Corchorus lasiocarpus* subsp. *parvus* and *Senna glutinosa* subsp. *glutinosa* low open shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Paraneurachne muelleri* scattered tussock grasses and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland.

Veg Condition Excellent

Fire Mod (1-5 yrs)

Notes Neg leaf litter, sparse wood litter, mainly under shrubs

trees < 5m	*Psydrax latifolia*
shrubs > 2m	*Acacia marramamba, Acacia pruinocarpa, Acacia tetragonophylla, Grevillea wickhamii* subsp. *hispidula, Psydrax latifolia*
shrubs 1-2 m	*Acacia acradenia, Dodonaea petiolaris, Ptilotus obovatus* var. *obovatus, Keraudrenia nephrosperma, Psydrax suaveolens, Solanum lasiophyllum, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. *oligophylla x helmsii, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Acacia acradenia, Corchorus lasiocarpus* subsp. *parvus, Eremophila forrestii* subsp. *forrestii, Eremophila forrestii x latrobei, Hybanthus aurantiacus, Indigofera monophylla* (brown calyx form), *Keraudrenia nephrosperma, Psydrax suaveolens, Solanum lasiophyllum*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Enneapogon polyphyllus, Paraneurachne muelleri*
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta*

943.00 HPPL Roy Hill **Site** 179

Described JN **Date** 17/03/2008

MGA Zone 50 807863 **mE** 7506511 **mN**

Habitat Crest of mesa hill, moderate/gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders, surface level plates

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Grevillea wickhamii* subsp. *hispidula* high shrubland over *Acacia pruinocarpa* shrubland over *Acacia pruinocarpa* and *Corchorus lasiocarpus* subsp. *lasiocarpus* low shrubland over *Eriachne mucronata* (typical form) very open tussock grassland and *Triodia brizoides* hummock grassland.

Veg Condition Excellent (fire)

Fire Mod (1-5 yrs)

Notes Mod to sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia marramamba, Acacia pruinocarpa, Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa*
shrubs 1-2 m	*Dodonaea petiolaris, Ptilotus calostachyus* var. *calostachyus, Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs 0.5-1 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Ptilotus clementii, Tribulus suberosus*
shrubs < 0.5 m	*Mollugo molluginea, Ptilotus fusiformis* var. *fusiformis*
hummock grass	*Triodia brizoides*
other grasses	*Cymbopogon ambiguus, Eriachne mucronata* (typical form)
s3s4	*Dampiera candicans, Triumfetta maconochieana*

943.00 HPPL Roy Hill **Site** 180

Described CW **Date** 17/03/2008

MGA Zone 50 807949 **mE** 7505997 **mN**

Habitat Flat/plain, foot slopes of hills all round, gentle slope

Soil Red-orange sandy clay

Rock Type Loose soil, stones/boulders

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia pruinocarpa* low open woodland over *Eucalyptus leucophloia* subsp. *leucophloia* scattered low mallee trees over *Acacia monticola* high open shrubland over *Acacia monticola* and *Acacia marramamba* open shrubland over *Senna glutinosa* subsp. *glutinosa*, *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Solanum lasiophyllum* low shrubland over *Duperreya commixta* climbers over *Hybanthus aurantiacus* very open herbs over *Triodia longiceps* and *Triodia brizoides* hummock grassland.

Veg Condition Poor (cattle, grazing, tracks, drill site)

Fire Very recent/Mod

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa, Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *pilbarana, Acacia ayersiana, Acacia pruinocarpa, Acacia marramamba, Acacia monticola, Acacia pruinocarpa*
shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula, Keraudrenia nephrosperma, Senna glutinosa* subsp. *glutinosa, Tribulus suberosus, Trichodesma zeylanicum* var. *zeylanicum*
shrubs 0.5-1 m	*Abutilon cunninghamii, Corchorus lasiocarpus* subsp. *lasiocarpus, Dampiera candicans, Hibiscus* aff. *coatesii* (MET 15 012), *Keraudrenia nephrosperma, Hybanthus aurantiacus, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus*
shrubs < 0.5 m	*Abutilon cunninghamii, Dampiera candicans, Indigofera monophylla, Keraudrenia nephrosperma, Hybanthus aurantiacus, Pterocaulon sphaeranthoides, Ptilotus fusiformis* var. *fusiformis, Salsola tragus* subsp. *tragus, Senna notabilis, Solanum lasiophyllum, Solanum phlomoides, Streptoglossa bubakii*
hummock grass	*Triodia brizoides, Triodia longiceps*
other grasses	*Aristida contorta, Aristida inaequiglumis, Cymbopogon ambiguus, Eriachne mucronata* (typical form), *Paspalidium clementii*
herbs	*Euphorbia* sp. (site 1089), *Goodenia stobbsiana*
climbers	*Duperreya commixta*

943.00 HPPL Roy Hill **Site** 181

Described CW **Date** 9/03/2008

MGA Zone 51 191432 **mE** 7507505 **mN**

Habitat Midslope, steep slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Senna glutinosa* subsp. *glutinosa* and *Sida pilbarensis* (ferruginous form) R.M. Barker ms low shrubland over *Goodenia stobbsiana* open herbs over *Eriachne mucronata* (typical form) very open tussock grassland and *Triodia epactia* hummock grassland.

Veg Condition Pristine

Fire Mod (1-5 yrs)

Notes Neg leaf and wood litter

shrubs 0.5-1 m	*Acacia marramamba, Ptilotus calostachyus* var. *calostachyus, Salsola tragus* subsp. *tragus, Senna glutinosa* subsp. *glutinosa*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Grevillea wickhamii* subsp. *hispidula, Ptilotus calostachyus* var. *calostachyus, Ptilotus clementii, Ptilotus exaltatus* var. *exaltatus, Rutidosis helichrysoides, Senna notabilis, Sida pilbarensis* (ferruginous form) ms*, Solanum phlomoides, Solanum sturtianum, Tribulus suberosus*
hummock grass	*Triodia epactia*
other grasses	*Eriachne mucronata* (typical form)
herbs	*Goodenia stobbsiana, Lepidium pholidogynum, Pterocaulon sphaeranthoides*

943.00 HPPL Roy Hill **Site** 182

Described JN **Date** 9/03/2008

MGA Zone 51 191412 **mE** 7507426 **mN**

Habitat Creek bed, creek bank, minor permanent creek, gentle slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus victrix* woodland to low open woodland and *Eucalyptus victrix* (regrowth) scattered low mallee trees over *Acacia tumida* scattered tall shrubs over *Acacia bivenosa* scattered shrubs over *Senna notabilis*, *Acacia bivenosa*, mixed low shrubland over *Ipomoea muelleri* climbers over *Pluchea rubelliflora* very open herbs over *Typha domingensis* very open sedges over *Cenchrus ciliaris* open tussock grassland and *Triodia longiceps* very open hummock grassland.

Veg Condition Good (grazing and fire)

Fire Very recent (<1 yr)

Notes Mod to sparse leaf litter, mod wood litter, mainly under shrubs

trees 5-15 m	*Corymbia* aff. *hamersleyana, Eucalyptus victrix*
trees < 5m	*Atalaya hemiglauca*
shrubs > 2m	*Acacia tumida, Ehretia saligna* var. *saligna*
shrubs 1-2 m	*Acacia bivenosa, Hakea lorea* subsp. *lorea, Petalostylis labicheoides, Santalum lanceolatum, Vachellia farnesiana*
shrubs 0.5-1 m	*Abutilon amplum, Acacia bivenosa, Acacia pyrifolia, Acacia tetragonophylla, Capparis lasiantha, Solanum sturtianum, Senna ferraria, Senna glutinosa* subsp. *glutinosa, Senna notabilis, Solanum phlomoides, Stemodia grossa, Tephrosia* aff. *rosea* (CH3-47)
shrubs < 0.5 m	*Abutilon aff. lepidum, Abutilon amplum, Amaranthus* aff. *pallidiflorus (WAS1127), Acacia bivenosa, Cleome viscosa, Corchorus parviflorus, Capparis lasiantha, Solanum sturtianum, Euphorbia biconvexa, Euphorbia* sp. (site 1089), *Flaveria australasica, Hibiscus sturtii* var. aff. *grandiflorus, Hybanthus aurantiacus, Indigofera monophylla, Isotropis forrestii, Leptopus decaisnei* var. *orbicularis, Malvastrum americanum, Phyllanthus maderaspatensis, Polymeria* aff. *ambigua* (CGC-25), *Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Sida* aff. *fibulifera, Senna notabilis, Solanum phlomoides, Solanum lasiophyllum, Streptoglossa decurrens*
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Cymbopogon obtectus, Themeda triandra*
herbs	*Pluchea rubelliflora, Rhynchosia minima* var. *australis*
climbers	*Cucumis maderaspatanus, Ipomoea muelleri*
sedges	*Typha domingensis*

943.00 HPPL Roy Hill **Site** 183

Described CW **Date** 9/03/2008

MGA Zone 50 803662 **mE** 7497613 **mN**

Habitat Midslope, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia pruinocarpa* and *Acacia aneura* var. *pilbarana* high shrubland over *Eremophila latrobei* subsp. *filiformis* and *Senna glutinosa* subsp. *glutinosa* open shrubland to low open shrubland over *Corchorus lasiocarpus* subsp. *parvus* low open shrubland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland.

Veg Condition Pristine

Fire Old (>5 yrs)

Notes Mod leaf litter, sparse wood litter, mainly under *Acacia aneura*

trees < 5m	*Grevillea wickhamii* subsp. *hispidula, Hakea chordophylla*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa*
shrubs 1-2 m	*Acacia tetragonophylla, Eremophila latrobei* subsp. aff. *filiformis, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Senna glutinosa* subsp. *pruinosa*
shrubs < 0.5 m	*Abutilon macrum, Bonamia pannosa, Corchorus lasiocarpus* subsp. *parvus, Enchylaena tomentosa, Euphorbia boophthona, Hibiscus sturtii* var. *campylochlamys, Hybanthus aurantiacus, Indigofera monophylla* (brown calyx form)*, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum horridum, Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Cenchrus ciliaris*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 184

Described CJM **Date** 9/03/2008

MGA Zone 51 191528 **mE** 7507113 **mN**

Habitat Flat/plain, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia paraneura* scattered low trees over *Solanum lasiophyllum, Acacia paraneura* and *Ptilotus schwartzii* var. *schwartzii* low scattered shrubs over *Eriachne helmsii* and *Enneapogon polyphyllus* scattered tussock grasses and *Triodia longiceps* and *Triodia brizoides* hummock grassland.

Veg Condition Good (cattle, low impact relatively speaking)

Fire Very recent (<1 yr)

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia paraneura*
shrubs 1-2 m	*Acacia ayersiana, Acacia marramamba, Keraudrenia nephrosperma, Psydrax suaveolens, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Acacia paraneura, Eremophila latrobei* subsp. *filiformis, Ptilotus calostachyus* var. *calostachyus, Senna artemisioides* subsp. *helmsii*
shrubs < 0.5 m	*Dampiera candicans, Hibiscus burtonii, Keraudrenia nephrosperma, Ptilotus exaltatus* var. *exaltatus, Ptilotus schwartzii* var. *schwartzii, Senna notabilis, Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Triodia brizoides, Triodia longiceps*
other grasses	*Aristida contorta, Enneapogon polyphyllus, Eragrostis eriopoda, Eriachne helmsii*
herbs	*Citrullus colocynthis, Euphorbia biconvexa*

943.00 HPPL Roy Hill **Site** 185

Described CW **Date** 15/03/2008

MGA Zone 50 806881 **mE** 7508356 **mN**

Habitat Flat/plain, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/pebbles

Vegetation *Grevillea berryana* high open shrubland over *Senna glutinosa* subsp*. luerssenii* shrubland over *Tribulus suberosus* and *Corchorus lasiocarpus* subsp*. lasiocarpus* low shrubland over *Cucumis melo* subsp*. agrestis* climbers over *Goodenia stobbsiana* scattered herbs over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland.

Veg Condition Excellent (track)

Fire Old (>5 yrs)

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Grevillea berryana, Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Keraudrenia nephrosperma*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *lasiocarpus, Ptilotus calostachyus* var. *calostachyus, Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Paraneurachne muelleri, Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Aristida ingrata, Eulalia aurea*
herbs	*Goodenia stobbsiana, Pterocaulon sphaeranthoides*
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta*

943.00 HPPL Roy Hill **Site** 186

Described JN **Date** 15/03/2008

MGA Zone 50 806852 **mE** 7508589 **mN**

Habitat Creek bank, creek bed, small drainage line, gentle slope

Soil Red-orange sand/sandy clay

Rock Type Surface crust, loose soil, coarse gravel, pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* and *Acacia* aff. *ayersiana* (narrow form; MET 15,786) scattered trees to low open woodland over *Acacia aneura* var. *pilbarana* and *Acacia* aff. *ayersiana* (narrow form; MET 15,786) open scrub over *Dodonaea petiolaris* and *Sida ectogama* open heath to low shrubland over mixed low open shrubland over *Duperreya commixta* climbers over *Bidens bipinnata* very open herbs over *Eriachne helmsii* very open tussock grassland and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) scattered hummock grasses.

Veg Condition Good

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, plentiful/mod wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *intermedia, Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Grevillea berryana*
shrubs > 2m	*Acacia aneura* var. *intermedia, Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Acacia tetragonophylla, Anthobolus leptomerioides, Eremophila latrobei* subsp. *filiformis*
shrubs 1-2 m	*Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *pilbarana, Dodonaea petiolaris, Eremophila forrestii* subsp. *forrestii, Psydrax latifolia, Ptilotus obovatus* var. *obovatus, Senna glutinosa* subsp. *luerssenii, Sida ectogama, Tribulus suberosus*
shrubs 0.5-1 m	*Corchorus lasiocarpus* subsp. *parvus, Hybanthus aurantiacus, Solanum lasiophyllum*
shrubs < 0.5 m	*Bidens bipinnata, Evolvulus alsinoides* var. *villosicalyx, Hibiscus burtonii, Maireana luehmannii, Maireana villosa, Ptilotus schwartzii* var. *schwartzii, Sida* aff. *fibulifera* (FMG 125-20)*, Sida atrovirens*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Aristida contorta, Aristida ingrata, Digitaria brownii, Enneapogon polyphyllus, Eragrostis eriopoda, Eriachne helmsii, Iseilema eremaeum, Paspalidium rarum, Perotis rara*
climbers	*Duperreya commixta*

943.00 HPPL Roy Hill **Site** 187

Described CW **Date** 15/03/2008

MGA Zone 50 806340 **mE** 7510687 **mN**

Habitat Flat/plain, creek bed, creek bank, gentle slope

Soil Red-orange sand/sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Atalaya hemiglauca* woodland over *Corymbia hamersleyana* low open woodland over *Grevillea wickhamii* subsp*. hispidula* scattered tall shrubs to shrubland over *Cucumis maderaspatanus* climbers over *Trichodesma zeylanicum* var. *zeylanicum* very open herbs over *Cenchrus ciliaris* tussock grassland.

Veg Condition Poor (cattle, weeds)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees 5-15 m	*Atalaya hemiglauca*
trees < 5m	*Acacia aneura* var. *conifera, Corymbia hamersleyana*
shrubs > 2m	*Acacia aneura* var. *conifera, Acacia coriacea* subsp. *pendens, Grevillea wickhamii* subsp. *hispidula, Hakea lorea* subsp. *lorea*
shrubs 1-2 m	*Acacia coriacea* subsp. *pendens, Abutilon amplum, Petalostylis labicheoides, Senna ferraria*
shrubs 0.5-1 m	*Gossypium robinsonii*
shrubs < 0.5 m	*Boerhavia coccinea, Cleome viscosa, Corchorus parviflorus, Dicladanthera forrestii, Hybanthus aurantiacus, Leptopus decaisnei* var. *orbicularis, Melhania* sp. (CH15-39)*, Pluchea rubelliflora, Ptilotus obovatus* var. *obovatus, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Solanum phlomoides, Tephrosia* aff. *rosea (CH 3-12), Trichodesma zeylanicum* var. *zeylanicum, Waltheria indica*
other grasses	*Cenchrus ciliaris, Cymbopogon procerus, Eulalia aurea*
herbs	*Amaranthus* aff. *pallidiflorus (WAS1127), Euphorbia biconvexa, Euphorbia tannensis s*sp. *eremophila (Panorama form), Hybanthus aurantiacus, Malvastrum americanum, Pterocaulon sphaeranthoides*
climbers	*Citrullus* aff. *lanatus, Cucumis maderaspatanus, Glycine canescens, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 188

Described JN **Date** 15/03/2008

MGA Zone 50 806447 **mE** 7510889 **mN**

Habitat Creek bank, floodplain beside medium creek, gentle slope

Soil Red-orange clay loam

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Corymbia* aff. *hamersleyana* open woodland to low open woodland over *Atalaya hemiglauca* (regrowth) high open shrubland over *Acacia pyrifolia* open shrubland over *Corchorus lasiocarpus* subsp. *parvus*, mixed low shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Cleome viscosa* scattered herbs over *Cenchrus ciliaris* tussock grassland.

Veg Condition Good (grazing and weeds)

Fire Mod (1-5 yrs)

Notes Mod leaf litter, mod to sparse wood litter, mainly under shrubs

trees 5-15 m	*Atalaya hemiglauca, Corymbia* aff. *hamersleyana*
shrubs > 2m	*Atalaya hemiglauca, Acacia coriacea* subsp. *pendens, Acacia pyrifolia, Ehretia saligna* var. *saligna, Jasminum didymum* subsp. *lineare*
shrubs 1-2 m	*Aerva javanica, Hakea lorea* subsp. *lorea, Indigofera monophylla, Ptilotus obovatus* var. *obovatus, Tephrosia* aff. *rosea* (CH3-47), *Solanum lasiophyllum*
shrubs 0.5-1 m	*Abutilon amplum, Corchorus lasiocarpus* subsp. *parvus, Gossypium robinsonii, Solanum phlomoides, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna notabilis, Solanum lasiophyllum*
shrubs < 0.5 m	*Amaranthus* aff. *pallidiflorus (WAS1127), Boerhavia gardneri, Euphorbia biconvexa, Gomphrena affinis* subsp. *pilbarensis, Gossypium robinsonii, Solanum phlomoides, Hybanthus aurantiacus, Leptopus decaisnei* var. *orbicularis, Melhania* sp. (CH15-39), *Operculina aequisepala, Pterocaulon sphaeranthoides, Ptilotus auriculifolius, Ptilotus exaltatus* var. *exaltatus, Salsola tragus* subsp. *tragus, Sida* aff. *fibulifera* (FMG 125-20), *Solanum dioicum, Solanum lasiophyllum , Tribulus occidentalis, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Cenchrus ciliaris, Enneapogon caerulescens* var. *occidentalis, Setaria verticillata*
herbs	*Cleome viscosa, Euphorbia* sp. (site 1089), *Flaveria australasica, Malvastrum americanum*
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 189

Described JN **Date** 7/03/2008

MGA Zone 50 805305 **mE** 7511082 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered trees to scattered low trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) high open shrubland over *Acacia* aff. *aneura* (narrow line veined; site 1259) and *Eremophila latrobei* subsp. *filiformis* scattered shrubs over *Corchorus lasiocarpus* subsp. *lasiocarpus* and *Solanum lasiophyllum* low open shrubland over *Cucumis maderaspatanus* climbers over mixed scattered herbs over *Aristida contorta* tussock grassland.

Veg Condition Good (grazing and weeds)

Fire None evident

Notes Sparse leaf litter, mod to sparse wood litter, mainly under shrubs

trees > 5 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Abutilon macrum, Eremophila latrobei* subsp. *filiformis, Trichodesma zeylanicum* var. *zeylanicum*
shrubs 0.5-1 m	*Abutilon macrum, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii, Senna notabilis, Cleome viscosa, Corchorus lasiocarpus* subsp. *lasiocarpus, Hibiscus burtonii, Malvastrum americanum, Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
shrubs < 0.5 m	*Boerhavia* aff. *coccinea, Cleome viscosa, Corchorus lasiocarpus* subsp. *lasiocarpus, Hibiscus burtonii, Malvastrum americanum, Solanum lasiophyllum, Euphorbia biconvexa, Gomphrena affinis* subsp. *pilbarensis, Gomphrena cunninghamii, Goodenia muelleriana, Gossypium australe (Burrup form), Josephinia eugeniae, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Sida* aff. *fibulifera* (FMG 125-20), *Solanum horridum, Streptoglossa bubakii, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Aristida contorta, Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Cymbopogon ambiguus, Digitaria brownii, Enneapogon polyphyllus, Iseilema eremaeum, Paspalidium rarum, Perotis rara*
herbs	*Bidens bipinnata, Corchorus tridens, Evolvulus alsinoides* var. *villosicalyx, Portulaca oleracea, Ptilotus gomphrenoides* var. *gomphrenoides*
climbers	*Cucumis maderaspatanus*
sedges	*Fimbristylis dichotoma*

943.00 HPPL Roy Hill **Site** 190

Described CW **Date** 7/03/2008

MGA Zone 50 804976 **mE** 7511451 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Corymbia hamersleyana* and *Psydrax latifolia* scattered low trees over *Acacia aneura* var. pilbarana, Grevillea wickhamii subsp. *hispidula, Senna glutinosa* subsp. *luerssenii* and *Acacia tetragonophylla* scattered shrubs over mixed low scattered shrubs over *Aristida contorta* open tussock grassland.

Veg Condition Pristine

Fire

Notes Neg leaf and wood litter

trees < 5m	*Corymbia* aff. *hamersleyana, Corymbia hamersleyana, Psydrax latifolia*
shrubs 1-2 m	*Acacia aneura* var. *pilbarana, Acacia tetragonophylla, Eremophila latrobei* subsp. *filiformis, Grevillea wickhamii* subsp. *hispidula, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii*
shrubs < 0.5 m	*Abutilon otocarpum, Cleome viscosa, Corchorus lasiocarpus* subsp. *lasiocarpus, Evolvulus alsinoides* var. *villosicalyx, Gomphrena kanisii, Hybanthus aurantiacus, Mollugo molluginea, Ptilotus exaltatus* var. *exaltatus, Ptilotus schwartzii* var. *schwartzii, Senna notabilis, Solanum lasiophyllum, Tribulus hirsutus, Tribulus suberosus, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Aristida contorta*
herbs	*Goodenia muelleriana*
climbers	*Boerhavia coccinea, Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 191

Described JN **Date** 14/03/2008

MGA Zone 50 804303 **mE** 7512507 **mN**

Habitat Flat/plain

Soil Red-orange clay loam

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia pruinocarpa* low open woodland to high open shrubland over *Acacia pruinocarpa* and *Dodonaea petiolaris* shrubland over *Corchorus parviflorus*, mixed low shrubland over *Cucumis maderaspatanus* climbers over *Cleome viscosa* scattered herbs over *Aristida contorta* very open tussock grassland.

Veg Condition Good

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, mod wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa, Psydrax latifolia*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa, Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *intermedia, Acacia pyrifolia, Acacia rhodophloia, Acacia tetragonophylla, Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa, Acacia tumida* var. *pilbarensis, Dodonaea petiolaris, Eremophila forrestii* subsp. *forrestii, Hakea lorea* subsp. *lorea, Hibiscus burtonii, Ptilotus obovatus* var. *obovatus, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Senna artemisioides* subsp. *helmsii, Sida arenicola, Solanum phlomoides, Trichodesma zeylanicum* var. *zeylanicum*
shrubs 0.5-1 m	*Abutilon lepidum, Abutilon macrum, Cleome viscosa, Corchorus parviflorus, Cullen aff. lachnostachys (MET 15,154), Malvastrum americanum, Ptilotus calostachyus* var. *calostachyus, Senna glutinosa* subsp. *luerssenii, Senna glutinosa* subsp. *x luerssenii, Senna notabilis, Solanum lasiophyllum, Solanum phlomoides, Tephrosia rosea* var. *glabrior, Tribulus suberosus*
shrubs < 0.5 m	*Bidens bipinnata, Boerhavia coccinea, Evolvulus alsinoides* var. *villosicalyx, Gomphrena kanisii, Hybanthus aurantiacus, Mollugo molluginea, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Salsola tragus* subsp. *tragus, Sida* aff. *fibulifera* (FMG 125-20)*, Solanum horridum, Solanum phlomoides, Stemodia grossa*
other grasses	*Aristida contorta, Aristida ingrata, Cenchrus ciliaris, Cymbopogon ambiguus, Digitaria ctenantha, Enneapogon polyphyllus, Eriachne mucronata* (typical form)*, Perotis rara*
climbers	*Cucumis maderaspatanus, Duperreya commixta, Glycine canescens*

943.00 HPPL Roy Hill **Site** 192

Described CW **Date** 14/03/2008

MGA Zone 50 804578 **mE** 7512513 **mN**

Habitat Flat/plain, drainage channel

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Corymbia candida* subsp. *candida* low mallee woodland over *Acacia aneura* var. *intermedia* and *Acacia* aff. *aneura* (narrow fine veined; site 1259) high open shrubland over *Grevillea wickhamii* subsp. *hispidula* and *Acacia tumida* var. *pilbarensis* shrubland over *Isotropis forrestii* and *Corchorus parviflorus* low open heath over *Rhynchosia minima* var. *australis* and *Glycine canescens* climbers over *Hybanthus aurantiacus* very open herbs over *Enneapogon intermedius*, *Eriachne* aff. *mucronata* and *Digitaria brownii* open tussock grassland.

Veg Condition Good (tracks)

Fire Old (>5 yrs)

Notes Neg leaf and wood litter

trees < 5m	*Corymbia candida* subsp. *candida*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia aneura* var. *intermedia, Acacia catenulata* subsp. *occidentalis, Acacia rhodophloia*
shrubs 1-2 m	*Acacia pruinocarpa, Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Dodonaea petiolaris, Indigofera monophylla, Isotropis forrestii, Psydrax latifolia, Ptilotus obovatus* var. *obovatus, Trichodesma zeylanicum* var. *zeylanicum, Solanum phlomoides*
shrubs < 0.5 m	*Abutilon fraseri, Abutilon* sp., *Corchorus parviflorus, Sida* aff. *fibulifera* (FMG 125-20), *Solanum lasiophyllum, Solanum phlomoides*
other grasses	*Cymbopogon ambiguus, Digitaria brownii, Enneapogon intermedius, Enneapogon polyphyllus, Eriachne* aff. *mucronata, Perotis rara*
herbs	*Bidens bipinnata, Boerhavia gardneri, Cleome viscosa, Dicladanthera forrestii, Euphorbia* sp. (site 1089), *Evolvulus alsinoides* var. *villosicalyx, Goodenia microptera, Hybanthus aurantiacus, Malvastrum americanum, Melhania* sp. (CH15-39), *Phyllanthus maderaspatensis, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Rhagodia* sp. Hamersley (M. Trudgen 17794)
climbers	*Cucumis maderaspatanus, Duperreya commixta, Glycine canescens, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 193

Described JN **Date** 14/03/2008

MGA Zone 50 803577 **mE** 7512670 **mN**

Habitat Drainage complex and flood plain area, gentle slope

Soil Red-orange clay loam

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* scattered trees to low open woodland over *Acacia rhodophloia* high shrubland over mixed shrubland over *Indigofera monophylla* low open shrubland over *Cucumis maderaspatanus* climbers over *Bidens bipinnata* very open herbs over *Triodia longiceps* hummock grassland.

Veg Condition Good

Fire Mod (1-5 yrs)

Notes Sparse leaf litter, mod/sparse wood litter, mainly under shrubs

shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia pyrifolia, Acacia rhodophloia, Acacia tetragonophylla, Psydrax latifolia*
shrubs 1-2 m	*Acacia tumida* var. *pilbarensis, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla, Senna glutinosa* subsp. *glutinosa, Sida* sp. spiciform panicles (E. Leyland s.n. 14/8/90)
shrubs 0.5-1 m	*Corchorus parviflorus, Dicladanthera forrestii, Isotropis forrestii, Hibiscus sturtii* var. *platychlamys, Pterocaulon sphaeranthoides, Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii, Tephrosia rosea* var. *glabrior, Trichodesma zeylanicum* var. *zeylanicum*
shrubs < 0.5 m	*Abutilon aff. lepidum, Abutilon macrum, Boerhavia coccinea, Dicladanthera forrestii, Isotropis forrestii, Enchylaena tomentosa, Evolvulus alsinoides* var. *villosicalyx, Hybanthus aurantiacus, Maireana villosa, Melhania* sp. (CH15-39), *Sida* aff. *fibulifera* (FMG 125-20)
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Dactyloctenium radulans, Digitaria brownii, Digitaria ctenantha, Enneapogon caerulescens* var. *occidentalis, Enneapogon polyphyllus, Iseilema eremaeum, Paspalidium clementii, Paspalidium rarum, Perotis rara, Setaria verticillata, Themeda triandra*
herbs	*Bidens bipinnata, Cheilanthes sieberi* subsp. *sieberi, Cleome viscosa, Euphorbia biconvexa, Euphorbia tannensis* subsp. *eremophila (Hamersley form)*
climbers	*Cucumis maderaspatanus, Duperreya commixta, Glycine canescens*

943.00 HPPL Roy Hill **Site** 194

Described CW **Date** 7/03/2008

MGA Zone 50 802732 **mE** 7513960 **mN**

Habitat Flat/plain, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Grevillea wickhamii* subsp. *hispidula* high open shrubland over *Acacia acradenia* low shrubland over Triodia sp. Shovelanna Hill (S. van Leeuwen 3835) hummock grassland.

Veg Condition Pristine

Fire None evident

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Acacia acradenia, Acacia marramamba, Eremophila forrestii* subsp. *forrestii, Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia marramamba, Calytrix carinata, Corchorus lasiocarpus* subsp. *parvus, Indigofera monophylla (brown calyx form)Dodonaea petiolaris, Keraudrenia nephrosperma, Psydrax latifolia, Senna artemisioides* subsp. *oligophylla x helmsii, Senna glutinosa* subsp. *glutinosa, Tribulus suberosus*
shrubs < 0.5 m	*Corchorus lasiocarpus* subsp. *parvus, Indigofera monophylla (brown calyx form,)Goodenia nuda, Heliotropium chrysocarpum*
hummock grass	*Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)
other grasses	*Paraneurachne muelleri*
climbers	*Rhyncharrhena linearis*

943.00 HPPL Roy Hill **Site** 195

Described JN **Date** 16/03/2008

MGA Zone 50 801303 **mE** 7515347 **mN**

Habitat Minor creek bed and bank, gentle slope

Soil Red-orange sand/sandy clay

Rock Type Surface crust, loose soil, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* open woodland to low open woodland over *Acacia aneura* var. *pilbarana* and *Grevillea wickhamii* subsp. *hispidula* high shrubland over *Grevillea wickhamii* subsp. *hispidula, Senna artemisioides* subsp. *helmsii* and *Dodonaea petiolaris* shrubland to low open shrubland over *Dicladanthera forrestii* low shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Bidens bipinnata* very open herbs over *Themeda triandra* tussock grassland.

Veg Condition Excellent/Good (grazing and weeds)

Fire Mod (1-5 yrs)

Notes Mod leaf and wood litter mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana*
trees < 5m	*Acacia pruinocarpa, Eucalyptus leucophloia* subsp. *leucophloia*
shrubs > 2m	*Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *intermedia, Acacia pyrifolia, Acacia pruinocarpa, Acacia tumida* var. *pilbarensis, Grevillea wickhamii* subsp. *hispidula, Rulingia luteiflora*
shrubs 1-2 m	*Abutilon macrum, Acacia rhodophloia, Dodonaea petiolaris, Eremophila latrobei* subsp. *filiformis, Eremophila latrobei* subsp. *glabra, Indigofera monophylla, Isotropis forrestii, Keraudrenia nephrosperma, Ptilotus obovatus* var. *obovatus, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna stricta, Sida ectogama, Sida* sp. spiciform panicles (E. Leyland s.n. 14/8/90)*, Rulingia luteiflora*
shrubs 0.5-1 m	*Abutilon fraseri, Amaranthus* aff. *pallidiflorus (WAS1127), Hybanthus aurantiacus, Isotropis forrestii, Keraudrenia nephrosperma, Malvastrum americanum, Melhania* sp. (CH15-39)*, Tephrosia* aff. *rosea* (CH3-47)*, Waltheria indica, Rulingia luteiflora*
shrubs < 0.5 m	*Abutilon cunninghamii, Boerhavia coccinea, Corchorus lasiocarpus* subsp. *parvus, Dicladanthera forrestii, Gomphrena kanisii, Isotropis forrestii, Keraudrenia nephrosperma, Leptopus decaisnei* var. *orbicularis, Maireana villosa, Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Senna notabilis, Sida* aff. *fibulifera* (FMG 125-20)*, Trichodesma zeylanicum* var. *zeylanicum, Rulingia luteiflora*
other grasses	*Cenchrus ciliaris, Chrysopogon fallax, Digitaria brownii, Enneapogon intermedius, Enneapogon polyphyllus, Eragrostis tenellula, Eriachne mucronata* (typical form)*, Perotis rara, Setaria dielsii, Themeda triandra*
herbs	*Amaranthus* aff. *interruptus* (WAS 988), *Bidens bipinnata, Cleome viscosa, Euphorbia* sp. (site 1089)
climbers	*Cucumis melo* subsp. *agrestis, Duperreya commixta, Glycine canescens*

943.00 HPPL Roy Hill **Site** 196

Described CW **Date** 16/03/2008

MGA Zone 50 801379 **mE** 7514917 **mN**

Habitat Flat/plain, adjacent to drill site

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia aneura* var. *intermedia* and *Acacia* aff. *ayersiana* (narrow form; MET 15,786) low open woodland to high open shrubland over *Eremophila forrestii* subsp. *forrestii* scattered shrubs over *Eremophila forrestii* subsp. *forrestii* and *Solanum lasiophyllum* low open shrubland over *Ptilotus schwartzii* var. *schwartzii* very open herbs over *Aristida contorta* very open tussock grassland and *Triodia longiceps* very open hummock grassland.

Veg Condition Good (tracks)

Fire Old (>5 yrs)

Notes Sparse leaf litter, neg wood litter, widespread

trees < 5m	*Acacia aneura* var. *intermedia*
shrubs > 2m	*Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia aneura* var. *intermedia Acacia pruinocarpa*
shrubs 1-2 m	*Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Hibiscus burtonii, Senna stricta*
shrubs 0.5-1 m	*Dodonaea petiolaris, Maireana planifolia x villosa, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Sida ectogama*
shrubs < 0.5 m	*Maireana luehmannii, Sclerolaena cornishiana, Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Triodia longiceps*
other grasses	*Aristida contorta, Cymbopogon ambiguus, Eragrostis eriopoda, Eriachne* aff. *mucronata*
herbs	*Ptilotus schwartzii* var. *schwartzii*

943.00 HPPL Roy Hill **Site** 197

Described CW **Date** 16/03/2008

MGA Zone 50 801918 **mE** 7514337 **mN**

Habitat Creek bed, creek bank, minor drainage channel between drill pads

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Clerodendrum floribundum* var. *angustifolium* and *Acacia* aff. *aneura* (narrow fine veined; site 1259)low woodland and *Corymbia ferriticola* subsp. *ferriticola* low mallee woodland over *Acacia tumida* var. *pilbarensis*, *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia aneura* var. *intermedia* and *Acacia rhodophloia* open scrub over *Dodonaea petiolaris* and *Grevillea wickhamii* subsp. *hispidula* open heath over *Dodonaea petiolaris*, *Indigofera monophylla* and *Corchorus parviflorus* low shrubland over *Cucumis maderaspatanus* climbers over *Bidens bipinnata* herbs over *Perotis rara, Themeda triandra* and *Enneapogon polyphyllus* tussock grassland.

Veg Condition Poor (weeds, cattle, tracks)

Fire

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Clerodendrum floribundum* var. *angustifolium, Corymbia candida* subsp. *candida, Corymbia ferriticola* subsp. *ferriticola*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia aneura* var. *intermedia, Acacia rhodophloia, Acacia tumida* var. *pilbarensis*
shrubs 1-2 m	*Dodonaea petiolaris, Grevillea wickhamii* subsp. *hispidula Indigofera monophylla, Psydrax latifolia, Ptilotus obovatus* var. *obovatus*
shrubs 0.5-1 m	*Grevillea wickhamii* subsp. *hispidula, Eremophila latrobei* subsp. *filiformis, Indigofera monophylla*
shrubs < 0.5 m	*Boerhavia coccinea, Corchorus parviflorus, Dicladanthera forrestii, Grevillea wickhamii* subsp. *hispidula, Isotropis forrestii, Maireana planifolia x villosa, Ptilotus schwartzii* var. *schwartzii, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Cenchrus ciliaris, Digitaria brownii, Enneapogon polyphyllus, Eriachne mucronata* (typical form)*, Paspalidium clementii, Perotis rara, Sporobolus australasicus, Themeda triandra, Urochloa occidentalis* var. *occidentalis*
herbs	*Abutilon* sp.*, Bidens bipinnata, Cleome viscosa, Corchorus parviflorus, Euphorbia biconvexa, Euphorbia boophthona, Evolvulus alsinoides* var. *villosicalyx, Hybanthus aurantiacus, Malvastrum americanum, Tephrosia* aff. *rosea* (HD292-37)*, Trachymene oleracea* subsp. *oleracea, Waltheria indica*
climbers	*Cucumis maderaspatanus, Glycine canescens*

943.00 HPPL Roy Hill **Site** 198

Described JN **Date** 16/03/2008

MGA Zone 50 801705 **mE** 7514368 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees over *Acacia aneura* var. *pilbarana* and *Acacia* aff. *ayersiana* (narrow form; MET 15,786) high shrubland over *Eremophila forrestii* subsp. *forrestii* open shrubland over *Eremophila forrestii* subsp. *forrestii* and *Solanum lasiophyllum* low open shrubland over *Aristida contorta* scattered tussock grasses.

Veg Condition Good (grazing)

Fire None evident

Notes Neg leaf litter, sparse wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *pilbarana, Psydrax latifolia*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Psydrax latifolia, Acacia* aff. *ayersiana (narrow form; MET 15,786), Acacia tetragonophylla*
shrubs 1-2 m	*Acacia rhodophloia, Dodonaea petiolaris, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *filiformis, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Anthobolus leptomerioides, Senna stricta, Solanum lasiophyllum*
shrubs < 0.5 m	*Hibiscus burtonii, Ptilotus schwartzii* var. *schwartzii, Sclerolaena cornishiana*
other grasses	*Aristida contorta, Enneapogon polyphyllus, Eriachne* aff. *mucronata*
herbs	*Evolvulus alsinoides* var. *villosicalyx*
s1t3	*Acacia aneura* var. *pilbarana, Psydrax latifolia*

943.00 HPPL Roy Hill **Site** 200

Described CW **Date** 16/03/2008

MGA Zone 50 800047 **mE** 7516402 **mN**

Habitat Flat/plain, adjacent to banks of major river (no water)

Soil Red-orange sandy clay

Rock Type Loose soil

Vegetation *Ehretia saligna* var. *saligna* low woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia aneura* var. *pilbarana* high shrubland over *Grevillea wickhamii* subsp. *hispidula* open shrubland over *Senna artemisioides* subsp. *oligophylla* x *helmsii* low scattered shrubs over *Cucumis maderaspatanus* climbers over Cenchrus ciliaris closed tussock grassland and *Triodia longiceps* scattered hummock grasses.

Veg Condition Poor (weeds, cattle, drill site close by)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia coriacea* subsp. *pendens, Atalaya hemiglauca, Ehretia saligna* var. *saligna*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia aneura* var. *pilbarana, Acacia tetragonophylla*
shrubs 1-2 m	*Grevillea wickhamii* subsp. *hispidula, Rhagodia eremaea, Senna stricta, Trichodesma zeylanicum* var. *zeylanicum, Waltheria indica*
shrubs 0.5-1 m	*Corchorus parviflorus, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs < 0.5 m	*Dicladanthera forrestii, Hybanthus aurantiacus, Melhania* sp. (CH15-39)*, Ptilotus exaltatus* var. *exaltatus, Sida* aff. *fibulifera* (FMG 125-20)
hummock grass	*Triodia longiceps*
other grasses	*Cenchrus ciliaris, Enneapogon polyphyllus, Themeda triandra*
herbs	*Abutilon amplum, Bidens bipinnata, Malvastrum americanum, Rostellularia adscendens* var. *clementii*
climbers	*Cucumis maderaspatanus, Duperreya commixta, Glycine canescens, Jasminum didymum* subsp. *lineare*

943.00 HPPL Roy Hill **Site** 201

Described JN **Date** 15/03/2008

MGA Zone 50 796673 **mE** 7516094 **mN**

Habitat Creek bed, creek bank, gentle slope

Soil Red-orange sand/sandy clay

Rock Type Surface crust, loose soil, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia pruinocarpa* woodland to low open woodland over *Acacia rhodophloia* open scrub to open shrubland over *Malvastrum americanum*, mixed low open shrubland over *Rhynchosia minima* var. *australis* climbers over *Bidens bipinnata* open herbs over *Digitaria ctenantha* open tussock grassland.

Veg Condition Poor (weeds and grazing)

Fire None evident

Notes Mod/sparse leaf litter, plentiful/mod wood litter, mainly under shrubs

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia pruinocarpa*
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)*, Acacia rhodophloia, Atalaya hemiglauca, Psydrax latifolia*
shrubs > 2m	*Acacia rhodophloia, Acacia tetragonophylla*
shrubs 1-2 m	*Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Abutilon cryptopetalum, Corchorus lasiocarpus* subsp. *parvus, Vachellia farnesiana*
shrubs < 0.5 m	*Abutilon fraseri, Amaranthus* aff. *interruptus* (WAS 988), *Boerhavia gardneri, Crotalaria medicaginea, Dicladanthera forrestii, Josephinia eugeniae, Melhania* sp. (CH15-39)*, Sida* aff. *fibulifera* (FMG 125-20)
other grasses	*Aristida ingrata, Cenchrus ciliaris, Chloris pumilio, Chrysopogon fallax, Commelina ensifolia, Digitaria brownii, Digitaria ctenantha, Enneapogon polyphyllus, Eriochloa pseudoacrotricha, Iseilema eremaeum, Themeda triandra, Urochloa occidentalis* var. *ciliata, Urochloa occidentalis* var. *occidentalis*
herbs	*Alysicarpus muelleri, Bidens bipinnata, Cleome viscosa, Evolvulus alsinoides* var. *villosicalyx, Malvastrum americanum, Rostellularia adscendens* var. *clementii*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis, Duperreya commixta, Glycine canescens, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 202

Described CW **Date** 15/03/2008

MGA Zone 50 796505 **mE** 7516277 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) high shrubland over *Acacia synchronicia* open heath over *Acacia synchronicia* and *Sida* aff. *fibulifera* (B235-7) low open shrubland over *Marsilea hirsuta* scattered herbs over *Cenchrus ciliaris, Aristida holathera, Aristida contorta* and *Eragrostis xerophila* open tussock grassland.

Veg Condition Good (track)

Fire Old (>5 yrs)

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia coriacea* subsp. *pendens, Acacia synchronicia*
shrubs 0.5-1 m	*Acacia coriacea* subsp. *pendens, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii x ?symonii, Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs < 0.5 m	*Acacia coriacea* subsp. *pendens, Corchorus tridens, Crotalaria dissitiflora* subsp. *benthamiana, Gomphrena kanisii, Neptunia dimorphantha, Ptilotus gomphrenoides* var. *gomphrenoides, Sclerolaena cornishiana, Sida* aff. *fibulifera (B235-7), Solanum phlomoides*
other grasses	*Aristida contorta, Aristida holathera, Cenchrus ciliaris, Chloris pumilio, Enneapogon caerulescens* var. *caerulescens, Enneapogon caerulescens* var. *occidentalis, Eragrostis leptocarpa, Eragrostis tenellula, Eragrostis xerophila, Iseilema macratherum*
herbs	*Cleome viscosa, Crotalaria medicaginea, Malvastrum americanum, Marsilea hirsuta, Phyllanthus maderaspatensis, Tephrosia* aff. *clementii* (9) (HD284-6)
climbers	*Austrobryonia pilbarensis*

943.00 HPPL Roy Hill **Site** 203

Described JN **Date** 8/03/2008

MGA Zone 50 806375 **mE** 7514378 **mN**

Habitat Midslope, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders, surface level plates

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia pruinocarpa* scattered low trees to scattered tall shrubs over *Senna glutinosa* subsp. *glutinosa* scattered shrubs over *Senna glutinosa* subsp. *glutinosa*, *Solanum phlomoides* and *Corchorus lasiocarpus* subsp. *parvus* low open shrubland over *Gomphrena cunninghamii* scattered herbs over *Cymbopogon ambiguus* very open tussock grassland and *Triodia epactia* very open hummock grassland.

Veg Condition Good (grazing, fire)

Fire Very recent/Mod

Notes Sparse/neg leaf litter, sparse wood litter, mainly under shrubs

trees 5-15 m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Hakea lorea* subsp. *lorea, Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Aerva javanica, Corchorus lasiocarpus* subsp. *parvus, Eulalia aurea, Hakea lorea* subsp. *lorea, Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Senna glutinosa* subsp. *glutinosa, Solanum phlomoides*
shrubs < 0.5 m	*Boerhavia gardneri, Gomphrena cunninghamii, Hibiscus* aff. *coatesii* (MET 15 012), *Leptopus decaisnei* var. *orbicularis, Mollugo molluginea, Ptilotus incanus* var. *incanus, Salsola tragus* subsp. *tragus, Senna glutinosa* subsp. *glutinosa, Solanum horridum, Solanum phlomoides, Streptoglossa bubakii, Ptilotus exaltatus* var. *exaltatus, Tribulus suberosus*
hummock grass	*Triodia epactia*
other grasses	*Aristida contorta, Cenchrus ciliaris, Cymbopogon ambiguus, Enneapogon lindleyanus, Eriachne mucronata* (typical form)
herbs	*Cleome viscosa, Euphorbia* sp. (site 1089), *Gomphrena affinis* subsp. *pilbarensis, Polycarpaea longiflora (red form), Pterocaulon sphaeranthoides*
climbers	*Cucumis maderaspatanus, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 204

Described CW **Date** 8/03/2008

MGA Zone 50 806145 **mE** 7514295 **mN**

Habitat Undulating plain, creek bed, creek bank, gentle slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus victrix* open woodland over *Tephrosia* aff. *rosea* (CH3-47) and *Corchorus parviflorus* low open shrubland over *Cenchrus ciliaris* tussock grassland.

Veg Condition Poor

Fire None evident

Notes Neg leaf and wood litter

trees 5-15 m	*Corymbia hamersleyana, Eucalyptus victrix*
shrubs > 2m	*Melaleuca glomerata*
shrubs 1-2 m	*Gossypium robinsonii, Senna artemisioides aff subsp oligophylla (thinly sericeous)*
shrubs 0.5-1 m	*Acacia pyrifolia, Adriana urticoides* var. *urticoides, Atalaya hemiglauca, Hakea lorea* subsp. *lorea, Neptunia dimorphantha, Sida rohlenae* subsp. *rohlenae, Tephrosia* aff. *rosea* (CH3-47)
shrubs < 0.5 m	*Abutilon amplum, Cleome viscosa, Corchorus parviflorus, Gomphrena kanisii, Malvastrum americanum, Melhania* sp. (CH15-39), *Pterocaulon sphaeranthoides, Ptilotus exaltatus* var. *exaltatus, Rhagodia eremaea, Salsola tragus* subsp. *tragus, Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Cenchrus ciliaris*
herbs	*Euphorbia biconvexa, Streptoglossa bubakii*
climbers	*Cucumis maderaspatanus, Cynanchum* sp. *(MET 15,151)*

943.00 HPPL Roy Hill **Site** 206

Described JN **Date** 8/03/2008

MGA Zone 50 806904 **mE** 7512659 **mN**

Habitat Small valley between small hills, gentle slope

Soil Brown clay loam

Rock Type Surface crust, coarse gravel/pebbles, surface level plates (small flat plates)

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees/mallee (regrowth) trees over *Solanum phlomoides* and *Senna notabilis* low open shrubland over *Triodia longiceps* very open hummock grassland.

Veg Condition Good (fire)

Fire Very recent (<1 yr)

Notes Neg leaf litter, sparse/neg wood litter, mainly under shrubs

trees < 5m	*Atalaya hemiglauca, Eucalyptus leucophloia* subsp. *leucophloia*
shrubs 0.5-1 m	*Gossypium robinsonii, Ptilotus calostachyus* var. *calostachyus, Senna glutinosa* subsp. *glutinosa, Senna glutinosa* subsp. *pruinosa, Solanum phlomoides*
shrubs < 0.5 m	*Abutilon otocarpum, Bonamia media* var. *villosa, Corchorus lasiocarpus* subsp. *parvus, Gossypium robinsonii, Goodenia microptera, Goodenia stobbsiana, Indigofera monophylla* (brown calyx form)*, Pluchea dunlopii, Pterocaulon sphaeranthoides, Salsola tragus* subsp. *tragus, Senna notabilis, Sida sp. Excedentifolia (J.L. Egan 1925) , Sida pilbarensis* (ferruginous form) ms*, Solanum horridum, Solanum lasiophyllum, Streptoglossa bubakii, Streptoglossa decurrens, Tephrosia* aff. *supina (WW23-22), Tribulus suberosus*
hummock grass	*Triodia longiceps*
other grasses	*Enneapogon polyphyllus, Eriachne mucronata* (typical form)

943.00 HPPL Roy Hill **Site** 207

Described CJM **Date** 8/03/2008

MGA Zone 50 807005 **mE** 7512486 **mN**

Habitat Basin surrounded by low hills, gentle slope

Soil Red-orange sandy clay

Rock Type Loose soil

Vegetation *Triodia longiceps* closed hummock grassland.

Veg Condition Excellent (low impact track)

Fire None evident

Notes Neg leaf and wood litter

shrubs 1-2 m	*Ptilotus obovatus* var. *obovatus*
shrubs < 0.5 m	*Heliotropium inexplicitum, Hibiscus* aff. *coatesii* (MET 15 012)*, Indigofera monophylla*
hummock grass	*Triodia longiceps*
other grasses	*Cymbopogon ambiguus*
herbs	*Gomphrena cunninghamii, Salsola kali, Trianthema glossostigma*

943.00 HPPL Roy Hill **Site** 208

Described CW **Date** 8/03/2008

MGA Zone 50 807199 **mE** 7512292 **mN**

Habitat Gully sides, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles, stones/boulders

Vegetation *Eucalyptus leucophloia* subsp. *leucophloia* scattered low mallee trees over *Ptilotus clementii* and *Indigofera monophylla* (brown calyx form) low open shrubland over *Triodia basedowii* , *Triodia* aff. *basedowii* and *Triodia epactia* very open hummock grassland.

Veg Condition Pristine

Fire Mod (1-5 yrs)

Notes Neg leaf litter, sparse wood litter, mainly under shrubs and trees

trees < 5m	*Eucalyptus leucophloia* subsp. *leucophloia, Hakea chordophylla*
shrubs > 2m	*Grevillea wickhamii* subsp. *hispidula*
shrubs 1-2 m	*Senna glutinosa* subsp. *glutinosa*
shrubs 0.5-1 m	*Senna glutinosa* subsp. *pruinosa*
shrubs < 0.5 m	*Bonamia media* var. *villosa, Corchorus lasiocarpus* subsp. *parvus, Dampiera candicans, Heliotropium inexplicitum, Indigofera monophylla* (brown calyx form), *Pterocaulon sphaeranthoides, Ptilotus calostachyus* var. *calostachyus, Ptilotus clementii, Ptilotus exaltatus* var. *exaltatus, Senna notabilis, Sida pilbarensis* (ferruginous form) ms, *Solanum lasiophyllum, Tribulus suberosus*
hummock grass	*Triodia* aff. *basedowii , Triodia basedowii , Triodia epactia*
other grasses	*Eriachne lanata, Eriachne mucronata* (typical form)
herbs	*Euphorbia* aff. *australis*

943.00 HPPL Roy Hill **Site** 209

Described CJM **Date** 8/03/2008

MGA Zone 50 807053 **mE** 7512535 **mN**

Habitat Creek bank, moderate slope

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Eucalyptus victrix* scattered trees to scattered low trees over *Gossypium robinsonii* and *Acacia pyrifolia* open shrubland over *Gossypium robinsonii* low open shrubland and *Tephrosia* aff. *rosea* (HD292-37), *Indigofera monophylla* and *Solanum phlomoides* low scattered shrubs over *Cucumis maderaspatanus* climbers over *Themeda triandra* (locally) and *Cenchrus ciliaris* closed tussock grassland.

Veg Condition Poor (Cenchrus, cattle)

Fire Mod (1-5 yrs)

Notes

trees 5-15 m	*Eucalyptus victrix*
shrubs 1-2 m	*Abutilon amplum, Acacia pyrifolia, Atalaya hemiglauca, Gossypium robinsonii, Hakea lorea* subsp. *lorea, Solanum phlomoides*
shrubs 0.5-1 m	*Petalostylis labicheoides, Sida pilbarensis* (ferruginous form) ms, *Solanum phlomoides*
shrubs < 0.5 m	*Flaveria australasica, Hybanthus aurantiacus, Indigofera monophylla, Ptilotus exaltatus* var. *exaltatus, Senna artemisioides* subsp. *helmsii, Senna notabilis, Sida* aff. *fibulifera* (FMG 125-20), *Tephrosia* aff. *rosea* (HD292-37), *Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Cenchrus ciliaris, Eriachne tenuiculmis, Themeda triandra*
herbs	*Amaranthus* aff. *pallidiflorus (WAS1127), Cleome viscosa, Euphorbia biconvexa, Leptopus decaisnei* var. *orbicularis, Malvastrum americanum, Phyllanthus maderaspatensis, Pterocaulon sphaeranthoides, Rhynchosia minima* var. *australis, Salsola tragus* subsp. *tragus*
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 210

Described JN **Date** 8/03/2008

MGA Zone 50 807515 **mE** 7511852 **mN**

Habitat Floodplain of medium sized creek

Soil Brown clay loam

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Corymbia* aff. *hamersleyana* scattered trees to scattered low trees over *Acacia pyrifolia* scattered tall shrubs to open shrubland over *Acacia pyrifolia, Corchorus parviflorus*, mixed low open shrubland over *Cucumis maderaspatanus* climbers over *Cenchrus ciliaris* tussock grassland.

Veg Condition Good (Cenchrus ciliaris plain)

Fire Mod (1-5 yrs)

Notes Mod/sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Corymbia* aff. *hamersleyana, Eucalyptus victrix*
trees < 5m	*Corymbia* aff. *hamersleyana, Eucalyptus victrix, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia pyrifolia*
shrubs 1-2 m	*Acacia pruinocarpa, Acacia pyrifolia, Atalaya hemiglauca, Gossypium robinsonii, Trichodesma zeylanicum* var. *zeylanicum*
shrubs 0.5-1 m	*Acacia pyrifolia, Aerva javanica, Gossypium robinsonii, Trichodesma zeylanicum* var. *zeylanicum, Malvastrum americanum, Petalostylis labicheoides, Ptilotus obovatus* var. *obovatus, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii, Swainsona canescens*
shrubs < 0.5 m	*Amaranthus* aff. *pallidiflorus (WAS1127), Cleome viscosa, Corchorus parviflorus, Indigofera monophylla, Melhania* sp. (CH15-39), *Ptilotus exaltatus* var. *exaltatus, Senna notabilis, Solanum phlomoides, Tephrosia* aff. *rosea* (CH3-47), *Boerhavia gardneri, Hybanthus aurantiacus, Leptopus decaisnei* var. *orbicularis, Mollugo molluginea, Petalostylis labicheoides, Pterocaulon sphaeranthoides, Sida* aff. *fibulifera* (oblong; MET 15 220)
other grasses	*Aristida contorta, Cenchrus ciliaris, Eriachne mucronata* (typical form)
herbs	*Euphorbia biconvexa, Euphorbia* sp. (site 1089)
climbers	*Cucumis maderaspatanus*

943.00 HPPL Roy Hill **Site** 213

Described CW **Date** 15/03/2008

MGA Zone 50 799099 **mE** 7516347 **mN**

Habitat Crest of small hill, moderate slope

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Hakea lorea* subsp. *lorea* scattered low trees over *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered tall shrubs over *Acacia bivenosa* open shrubland over *Dodonaea petiolaris* and *Corchorus lasiocarpus* subsp. *parvus* low open shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Eriachne mucronata* (typical form) very open tussock grassland and *Triodia* aff. *basedowii* hummock grassland.

Veg Condition Good

Fire None evident

Notes Neg leaf and wood litter

trees < 5m	*Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs 1-2 m	*Acacia bivenosa, Grevillea wickhamii* subsp. *hispidula*
shrubs 0.5-1 m	*Indigofera monophylla* (brown calyx form), *Senna glutinosa* subsp. *glutinosa*
shrubs < 0.5 m	*Acacia* aff. *stowardii (linear form), Corchorus lasiocarpus* subsp. *parvus, Dodonaea petiolaris, Gomphrena kanisii, Goodenia stobbsiana, Maireana planifolia x villosa, Senna notabilis, Sida pilbarensis* (ferruginous form) ms, *Solanum horridum, Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia* aff. *basedowii*
other grasses	*Cymbopogon obtectus, Eriachne mucronata* (typical form)
herbs	*Bonamia media* var. *villosa, Pterocaulon sphaeranthoides, Ptilotus calostachyus* var. *calostachyus*
climbers	*Cucumis melo* subsp. *agrestis*

943.00 HPPL Roy Hill **Site** 214

Described JN **Date** 15/03/2008

MGA Zone 50 798306 **mE** 7515889 **mN**

Habitat Flat/plain

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* and Acacia pruinocarpa scattered low trees over *Acacia aneura* var. *pilbarana* scattered tall shrubs over *Acacia pruinocarpa* and *Acacia synchronicia* scattered shrubs over *Ptilotus schwartzii* var. *schwartzii* and *Eremophila lanceolata* low open heath and mixed low scattered shrubs.

Veg Condition Good (grazing, tracks)

Fire None evident

Notes Neg leaf litter, sparse/neg wood litter, mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa*
trees < 5m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Acacia synchronicia*
shrubs 1-2 m	*Acacia tetragonophylla, Rhagodia* sp. Hamersley (M. Trudgen 17794)
shrubs 0.5-1 m	*Eremophila latrobei* subsp. *filiformis, Pluchea ferdinandi-muelleri, Pluchea tetranthera, Solanum lasiophyllum, Ptilotus schwartzii* var. *schwartzii, Senna artemisioides aff subsp oligophylla (thinly sericeous)*
shrubs < 0.5 m	*Pluchea ferdinandi-muelleri, Pluchea tetranthera, Solanum lasiophyllum, Eremophila lanceolata, Gomphrena kanisii, Maireana luehmannii, Sclerolaena cornishiana, Solanum horridum*
other grasses	*Enneapogon polyphyllus*

943.00 HPPL Roy Hill **Site** 215

Described JN **Date** 16/03/2008

MGA Zone 50 799530 **mE** 7515851 **mN**

Habitat Flat/plain, gentle/neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees to open scrub over *Eremophila latrobei* subsp. *filiformis* open shrubland over *Senna artemisioides* subsp. *helmsii* and *Eremophila lanceolata* low open shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Bidens bipinnata* very open herbs over *Fimbristylis dichotoma* scattered sedges over *Aristida contorta* tussock grassland.

Veg Condition Good (grazing, weeds)

Fire Old (>5 yrs)

Notes Mod/sparse leaf and wood litter, mainly under shrubs

trees 5-15 m	*Acacia aneura* var. *pilbarana*
trees < 5m	*Acacia aneura* var. *pilbarana*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia synchronicia, Acacia tetragonophylla, Psydrax latifolia, Rhagodia* sp. Hamersley (M. Trudgen 17794)
shrubs 1-2 m	*Eremophila latrobei* subsp. *filiformis, Senna artemisioides* subsp. *helmsii, Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Senna glutinosa* subsp. *luerssenii*
shrubs 0.5-1 m	*Abutilon macrum, Cleome viscosa, Eremophila lanceolata, Hibiscus burtonii, Hibiscus sturtii* var. aff. *grandiflorus*
shrubs < 0.5 m	*Abutilon oxycarpum* subsp. *prostratum, Boerhavia gardneri, Enchylaena tomentosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena cunninghamii, Gomphrena kanisii, Ptilotus gomphrenoides* var. *gomphrenoides, Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20), *Solanum lasiophyllum, Trichodesma zeylanicum* var. *zeylanicum*
other grasses	*Aristida contorta, Chloris pumilio, Chrysopogon fallax, Enneapogon polyphyllus, Eragrostis xerophila, Iseilema eremaeum, Setaria dielsii*
herbs	*Bidens bipinnata, Corchorus tridens, Portulaca oleracea, Ptilotus exaltatus* var. *exaltatus*
climbers	*Cucumis melo* subsp. *agrestis*
sedges	*Fimbristylis dichotoma*

943.00 HPPL Roy Hill **Site** 216

Described CW **Date** 16/03/2008

MGA Zone 50 798925 **mE** 7514779 **mN**

Habitat Flat/plain, band of tall shrub vegetation adjacent to drill site

Soil Red-orange sandy clay

Rock Type Coarse gravel/pebbles

Vegetation *Acacia synchronicia* scattered tall shrubs over *Senna glutinosa* subsp. *luerssenii* and *Senna stricta* shrubland over *Eremophila cuneifolia* low shrubland and *Senna artemisioides* subsp. *oligophylla* x *helmsii* low scattered shrubs over *Aristida contorta* very open tussock grassland.

Veg Condition Good (tracks and cattle)

Fire Old (>5 yrs)

Notes Neg leaf litter, sparse wood litter

shrubs > 2m	*Acacia synchronicia*
shrubs 1-2 m	*Acacia tetragonophylla, Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii, Senna glutinosa* subsp. *luerssenii, Senna stricta*
shrubs 0.5-1 m	*Eremophila latrobei* subsp. *filiformis, Senna artemisioides* subsp. *oligophylla x helmsii*
shrubs < 0.5 m	*Acacia aneura* var. *conifera, Eremophila cuneifolia, Gomphrena affinis* subsp. *pilbarensis, Gomphrena kanisii, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Sclerolaena cornishiana, Solanum lasiophyllum*
other grasses	*Aristida contorta, Cymbopogon ambiguus, Enneapogon polyphyllus*
herbs	*Portulaca oleracea*

943.00 HPPL Roy Hill **Site** 217

Described JN **Date** 16/03/2008

MGA Zone 50 798367 **mE** 7515044 **mN**

Habitat Flat/plain, gentle slope

Soil Clay

Rock Type Cracked clay, surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia pruinocarpa* scattered low trees over *Acacia synchronicia* high shrubland to open shrubland over *Acacia synchronicia* and *Eremophila lanceolata* low shrubland over *Cucumis melo* subsp. *agrestis* climbers over *Aristida contorta* and *Enneapogon polyphyllus* tussock grassland.

Veg Condition Good (grazing)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa*
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa, Acacia synchronicia, Acacia tetragonophylla*
shrubs 1-2 m	*Rhagodia* sp. Hamersley (M. Trudgen 17794), *Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Abutilon macrum, Abutilon otocarpum, Cleome viscosa, Eremophila lanceolata, Malvastrum americanum, Solanum lasiophyllum*
shrubs < 0.5 m	*Boerhavia gardneri, Corchorus lasiocarpus* subsp. *parvus, Enchylaena tomentosa, Euphorbia biconvexa, Evolvulus alsinoides* var. *villosicalyx, Gomphrena kanisii, Hibiscus sturtii* var. aff. *grandiflorus, Hibiscus sturtii* var. *campylochlamys, Salsola tragus* subsp. *tragus, Sclerolaena cornishiana, Sida* aff. *fibulifera* (HD200-6), *Tephrosia* aff. *clementii*
other grasses	*Aristida contorta, Aristida ingrata, Cenchrus ciliaris, Chloris pumilio, Enneapogon polyphyllus, Iseilema eremaeum, Perotis rara, Setaria dielsii, Themeda triandra*
herbs	*Alysicarpus muelleri, Amaranthus* aff. *pallidiflorus (WAS1127), Bidens bipinnata, Flaveria australasica, Rostellularia adscendens* var. *clementii*
climbers	*Citrullus colocynthis, Cucumis melo* subsp. *agrestis, Duperreya commixta, Rhynchosia minima* var. *australis*

943.00 HPPL Roy Hill **Site** 218

Described CW **Date** 17/03/2008

MGA Zone 50 797705 **mE** 7514991 **mN**

Habitat Flat/plain, mulga band adjacent to drill sites and open field

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *conifera* open scrub over *Acacia synchronicia* open shrubland to low shrubland over Enneapogon polyphyllus, Urochloa occidentalis var. *ciliata* and *Chloris pumilio* tussock grassland.

Veg Condition Poor (cattle - heavily grazed, weeds)

Fire None evident

Notes Neg leaf litter, sparse wood litter

trees < 5m	*Hakea lorea* subsp. *lorea*
shrubs 1-2 m	*Acacia aneura* var. *conifera, Acacia aneura* var. *intermedia, Acacia synchronicia, Acacia tetragonophylla, Eremophila latrobei* subsp. *filiformis, Psydrax latifolia, Senna artemisioides* subsp. *helmsii, Senna glaucifolia x* aff. *oligophylla (thinly sericeous)*
shrubs < 0.5 m	*Eremophila lanceolata, Evolvulus alsinoides* var. *villosicalyx, Maireana planifolia x villosa, Maireana villosa, Rhagodia* sp. Hamersley (M. Trudgen 17794), *Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20), *Sida pilbarensis* (ferruginous form) ms
other grasses	*Aristida contorta, Chloris pumilio, Chrysopogon fallax, Digitaria ctenantha, Enneapogon polyphyllus, Iseilema eremaeum, Perotis rara, Themeda triandra, Urochloa occidentalis* var. *ciliata*
herbs	*Abutilon macrum, Bidens bipinnata, Boerhavia* aff. *coccinea, Euphorbia biconvexa, Gomphrena kanisii, Malvastrum americanum, Portulaca oleracea, Rostellularia adscendens* var. *clementii*
climbers	*Duperreya commixta*

943.00 HPPL Roy Hill **Site** 219

Described JN **Date** 17/03/2008

MGA Zone 50 797651 **mE** 7515435 **mN**

Habitat Flat/plain, gentle/neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles

Vegetation *Acacia* aff. *aneura* (narrow fine veined; site 1259) scattered low trees to high open shrubland over *Acacia synchronicia* open shrubland over *Sclerolaena cornishiana, Senna* spp., mixed low open shrubland over *Aristida contorta* open tussock grassland.

Veg Condition Good (grazing)

Fire None evident

Notes Sparse leaf and wood litter, mainly under shrubs

trees < 5m	*Acacia* aff. *aneura* (narrow fine veined; site 1259)
shrubs > 2m	*Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia synchronicia*
shrubs 1-2 m	*Acacia tetragonophylla, Eremophila latrobei* subsp. *filiformis, Rhagodia* sp. Hamersley (M. Trudgen 17794), *Senna artemisioides* subsp. *helmsii, Senna glaucifolia x* aff. *oligophylla (thinly sericeous), Senna glutinosa* subsp. *luerssenii, Senna stricta*
shrubs 0.5-1 m	*Cleome viscosa, Hibiscus sturtii* var. aff. *grandiflorus, Pluchea ferdinandi-muelleri, Solanum lasiophyllum, Solanum lasiophyllum*
shrubs < 0.5 m	*Boerhavia gardneri, Calandrinia polyandra, Eremophila lanceolata, Evolvulus alsinoides* var. *villosicalyx, Gomphrena kanisii, Pterocaulon sphaeranthoides, Pluchea ferdinandi-muelleri, Solanum lasiophyllum, Ptilotus gomphrenoides* var. *gomphrenoides, Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20)
other grasses	*Aristida contorta, Aristida ingrata, Chloris pumilio, Chrysopogon fallax, Enneapogon polyphyllus, Eragrostis xerophila, Eriachne* aff. *mucronata, Iseilema eremaeum, Perotis rara*
herbs	*Bidens bipinnata, Portulaca oleracea*
sedges	*Fimbristylis dichotoma*

943.00 HPPL Roy Hill **Site** 220

Described CW **Date** 17/03/2008

MGA Zone 50 799519 **mE** 7514216 **mN**

Habitat Flat/plain, minor creek bank

Soil Red-orange sandy clay

Rock Type Loose soil, coarse gravel/pebbles

Vegetation *Acacia pruinocarpa* low open forest over *Acacia synchronicia* high open shrubland over *Acacia tetragonophylla* open shrubland over *Aerva javanica* low open heath over *Cenchrus ciliaris* open tussock grassland.

Veg Condition Poor (heavily grazed and cattle route through site)

Fire None evident

Notes

trees < 5m	*Acacia aneura* var. *pilbarana, Acacia pruinocarpa, Atalaya hemiglauca, Hakea lorea* subsp. *lorea*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia synchronicia, Vachellia farnesiana*
shrubs 1-2 m	*Acacia tetragonophylla, Psydrax latifolia, Senna glutinosa* subsp. *luerssenii, Vachellia farnesiana*
shrubs 0.5-1 m	*Acacia coriacea* subsp. *pendens, Eremophila cuneifolia*
shrubs < 0.5 m	*Aerva javanica, Corchorus parviflorus, Dicladanthera forrestii, Enchylaena tomentosa, Rhagodia* sp. Hamersley (M. Trudgen 17794)*, Sclerolaena cornishiana, Senna artemisioides* subsp. *helmsii, Sida* aff. *fibulifera* (oblong; MET 15 220)*, Solanum lasiophyllum, Tephrosia* aff. *rosea* (CH3-47)
other grasses	*Cenchrus ciliaris, Chloris pumilio, Enneapogon polyphyllus, Setaria verticillata, Urochloa occidentalis* var. *ciliata*
herbs	*Abutilon macrum, Bidens bipinnata, Boerhavia gardneri, Cleome viscosa, Euphorbia biconvexa, Malvastrum americanum, Portulaca pilosa, Salsola tragus* subsp. *tragus*

943.00 HPPL Roy Hill **Site** 221

Described JN **Date** 17/03/2008

MGA Zone 50 799264 **mE** 7514118 **mN**

Habitat Undulating flat plain, gentle/neg slope

Soil Red-orange sandy clay

Rock Type Surface crust, coarse gravel/pebbles, stones/boulders

Vegetation *Acacia aneura* var. *pilbarana* scattered low trees over *Acacia synchronicia* high shrubland over *Senna artemisioides* subsp. *helmsii* and *Acacia synchronicia* shrubland to low shrubland over *Eremophila lanceolata* low open shrubland over *Rhynchosia minima* var. *australis* climbers over *Bidens bipinnata* scattered herbs over *Aristida contorta* and *Enneapogon polyphyllus* tussock grassland.

Veg Condition Good (grazing and weeds)

Fire Old (>5 yrs)

Notes Spare leaf litter, mod/sparse wood litter, mainly under shrubs

trees < 5m	*Acacia aneura* var. *pilbarana, Atalaya hemiglauca*
shrubs > 2m	*Acacia aneura* var. *pilbarana, Acacia synchronicia, Acacia tetragonophylla*
shrubs 1-2 m	*Ptilotus obovatus* var. *obovatus, Rhagodia* sp. Hamersley (M. Trudgen 17794), *Senna artemisioides aff subsp oligophylla (thinly sericeous), Senna artemisioides* subsp. *helmsii*
shrubs 0.5-1 m	*Cleome viscosa, Enchylaena tomentosa, Solanum lasiophyllum*
shrubs < 0.5 m	*Boerhavia gardneri, Crotalaria medicaginea, Eremophila lanceolata, Euphorbia biconvexa, Gomphrena kanisii, Heliotropium tanythrix, Hibiscus sturtii* var. aff. *grandiflorus, Indigofera colutea, Ipomoea muelleri, Maireana planifolia, Malvastrum americanum, Portulaca oleracea, Ptilotus exaltatus* var. *exaltatus, Ptilotus gomphrenoides* var. *gomphrenoides, Salsola tragus* subsp. *tragus, Sclerolaena cornishiana, Sida* aff. *fibulifera* (FMG 125-20), *Solanum horridum, Tribulus hirsutus, Trichodesma zeylanicum* var. *zeylanicum*
hummock grass	*Triodia wiseana*
other grasses	*Aristida contorta, Aristida ingrata, Chloris pumilio, Chrysopogon fallax, Dactyloctenium radulans, Enneapogon polyphyllus, Eragrostis xerophila, Eriachne* aff. *mucronata, Iseilema eremaeum, Perotis rara, Setaria dielsii, Themeda triandra*
herbs	*Bidens bipinnata, Flaveria australasica, Portulaca pilosa*
climbers	*Cucumis melo* subsp. *agrestis, Rhynchosia minima* var. *australis*

Appendix E: Locations of Priority Flora

Refer to enclosed compact disc
NB: The contents of this appendix must not be disclosed to any member of the general public nor released in any public document

Appendix F: Locations of Naturalised Alien Flora (Weeds)

Table F1: **Locations of naturalised alien Flora located during the Roy Hill Survey**

FAMILY	Species	Weed Class.	Phase	Site	Cover	Zone
AIZOACEAE	**Trianthema portulacastrum*	GEW	Ph 3	102b	x	50
AIZOACEAE	**Trianthema portulacastrum*	GEW	Ph 3	170	1	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 1	10	1	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 1	27	n	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 1	64	n	51
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 2	15	n	51
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 2	41	n	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	148	n	51
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	188	1	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	203	n	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	210	n	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	220	4	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	161a	n	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	161b	1	50
AMARANTHACEAE	**Aerva javanica*	GEW	Ph 3	Opp Coll	n	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	12	n	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	14	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	25	1	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	26	n	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	26	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	26	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	34	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	38	1	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	42	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	63	1	51
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	71	1	51
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	90	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	94	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 1	Opp Coll	1	
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	2	1	51
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	4	t	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	18	n	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	19	1	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	20	1	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	22	1	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	32	1	51
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	35	1	51
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	41	n	50
ASTERACEAE	**Bidens bipinnata*	GEW	Ph 2	44	1	50

Table F1: **Locations of naturalised alien Flora located during the Roy Hill Survey**

FAMILY	Species	Weed Class.	Phase	Site	Cover	Zone
ASTERACEAE	*Bidens bipinnata	GEW	Ph 2	91	1	
ASTERACEAE	*Bidens bipinnata	GEW	Ph 2	21b	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	110	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	111	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	112	3	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	113	2	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	116	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	128	1	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	131	2	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	132	1	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	133	4	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	134a	4	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	140	n	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	148	1	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	171	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	173	4	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	174	x	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	176	4	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	177	3	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	186	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	189	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	191	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	192	4	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	193	2	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	195	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	197	4	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	200	2	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	201	3	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	215	2	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	217	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	218	3	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	219	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	220	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	221	1	50
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	134b	2	51
ASTERACEAE	*Bidens bipinnata	GEW	Ph 3	178a	3	50
ASTERACEAE	*Sonchus oleraceus	GEW	Ph 2	33	n	51
BORAGINACEAE	***Heliotropium europaeum**	**P1, P3, P4**	Ph 2	15	n	51
BORAGINACEAE	***Heliotropium europaeum**	**P1, P3, P5**	Ph 2	29	n	50
BORAGINACEAE	***Heliotropium europaeum**	**P1, P3, P6**	Ph 2	37	n	50

Table F1: **Locations of naturalised alien Flora located during the Roy Hill Survey**

FAMILY	Species	Weed Class.	Phase	Site	Cover	Zone
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P4**	Ph 2	5	n	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P5**	Ph 2	39	n	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P6**	Ph 3	159	1	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P7**	Ph 3	160	1	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P8**	Ph 3	162	n	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P9**	Ph 3	167	1	50
CAESALPINIACEAE	***Parkinsonia aculeata**	**P1, P2, P10**	Ph 3	169b	1	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 1	60	n	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 2	2	n	
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 2	14	n	51
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	113	n	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	116	1	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	128	n	51
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	134b	n	51
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	178a	1	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	184	1	51
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	201	n	50
CUCURBITACEAE	**Citrullus colocynthis*	GEW	Ph 3	217	n	50
CUCURBITACEAE	**Citrullus lanatus*	GEW	Ph 3	187	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	5	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	6	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	7	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	9	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	11	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	18	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	19	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	25	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	26	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	35	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	37	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	38	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	39	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 2	21b	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	116	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	117	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	124	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	125	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	126	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	128	n	51

Table F1: **Locations of naturalised alien Flora located during the Roy Hill Survey**

FAMILY	Species	Weed Class.	Phase	Site	Cover	Zone
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	131	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	132	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	133	2	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	140	2	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	148	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	154	1	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	155	n	51
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	162	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	167	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	170	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	171	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	173	n	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	174	x	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	176	1	50
CUCURBITACEAE	**Cucumis melo* subsp. *agrestis*	GEW	Ph 3	177	1	50

Appendix G: Priority and Rare Flora Desktop Study

Table G1: Records of Priority Flora at Roy Hill from Atkins, 2006

Species	Priority Code	District Found
Eremophila pilosa ms	1	Roy Hill, Jigalong Community
Eremophila youngii subsp. lepidota ms	4	S Cape Range, Roy Hill, N Mt Vernon, Paraburdoo, Muggon Stn
Goodenia nuda	3	Weeli Wolli, Roy Hill, Mt Stuart
Myriocephalus scalpellus	1	Roy Hill
Nicotiana heterantha	1	Broome, Dampier Peninsula, Roy Hill, Mandora, Anna Plains
Sida sp. Wittenoom (WR Barker 1962)	3	Wittenoom, Nickol Bay, Roy Hill, Fortescue Roadhouse, Nanutarra, Lawloit Range

Table G2: **Priority Flora recorded from the Pilbara IBRA region in the vicinity of Roy Hill (FloraBase, 2008)**

Species	Priority code	District Found (Atkins, 2006)
Lepidium catapycnon	R	Wittenoom Gorge, Hamersley Range, Weeli Wolli, Newman
Thryptomene wittweri	R	Hamersley Range, Mt Augustus, Carnarvon Range, White Cliffs Stn, NT
Abutilon uncinatum	1	Onslow, Yaraloola Stn
Acacia aphanoclada	1	Nullagine
Acacia cyperophylla var. *omearana*	1	Nullagine
Acacia leeuweniana	1	
Acacia levata	1	Marble Bar, Woodstock H/S, Hillside
Aluta quadrata	1	Mt Channar, Paraburdoo
Atriplex spinulosa	1	Nullagine
Calotis squamigera	1	Wittenoom, Hamersley Range
Eragrostis sp. Mt Robinson (S. van Leeuwen 4109)	1	Hamersley Range
Eremophila coacta	1	Mt Vernon, Ashburton Downs
Eremophila pilosa	1	Roy Hill, Jigalong Community
Eremophila sp. Ophthalmia Range (D. Brearley s.n. 20/3/2004)	1	Ophthalmia Range
Eremophila spongiocarpa	1	Mt Marsh, Chichester Range, Marillana Station
Fimbristylis sp. Shay Gap (K.R. Newbey 10293)	1	Shay Gap
Genus sp. Hamersley Range	1	Hamersley Range

Table G2: **Priority Flora recorded from the Pilbara IBRA region in the vicinity of Roy Hill (FloraBase, 2008)**

Species	Priority code	District Found (Atkins, 2006)
hilltops (S. van Leeuwen 4345)		
Goodenia lyrata	1	Laverton, Newman
Goodenia pallida	1	Fortescue
Goodenia pedicellata	1	Telfer
Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)	1	Weeli Wolli, Mulga Downs, Nullagine, NW of Newman
Gunniopsis sp. Fortescue (M.E. Trudgen 11019)	1	South Fortescue Pipeline
Helichrysum oligochaetum	1	Port Walcott, Ashburton Downs
Josephinia sp. Marandoo (M.E. Trudgen 1554)	1	Marandoo, West Angelas
Lepidium amelum	1	Tanguin Hill
Myriocephalus nudus	1	Hamersley Range, Paynes Find, Yannarie River, Juna Downs, Swan River (Drummond)
Myriocephalus scalpellus	1	Roy Hill
Nicotiana heterantha	1	Broome, Dampier Peninsula, Roy Hill, Mandora, Anna Plains
Ptilotus appendiculatus var. *minor*	1	Port Hedland, Boodardee
Ptilotus sp. Brockman (E. Thoma & A. Joder ET & AJ 145)	1	Brockman
Ptilotus trichocephalus	1	Mt James Stn, Paraburdoo
Rhodanthe ascendens	1	Gascoyne Junction, Middalya Station
Sida sp. Pilbara (S. van Leeuwen 4377)	1	Hamersley Range
Stackhousia clementii	1	Bernier Is., Dorre Is., Gibson Desert, Beverly Springs, NT, SA, Gnaraloo Stn
Swainsona sp. Millstream (A.A. Mitchell PRP 798)	1	Millstream, Hamersley Stn, West Angelas
Tetratheca fordiana	1	West Angelas, Hamersley Range
Acacia daweana	2	Hamersley Range, Karijini N.P.
Acacia effusa	2	Mt Bruce, Hamersley Ra., Karijini N.P., Juna Downs
Dampiera atriplicina	2	Gregory Range, Jupiter Well, Gibson Desert
Dicladanthera glabra	2	Wittenoom, Robe River, Hamersley Gorge, Marandoo, Mt Mossenson
Euphorbia clementii	2	Port Hedland area, Yarrie

Table G2: **Priority Flora recorded from the Pilbara IBRA region in the vicinity of Roy Hill (FloraBase, 2008)**

Species	Priority code	District Found (Atkins, 2006)
Gomphrena cucullata	2	Derby, King Sound, Pt Hedland
Gomphrena pusilla	2	Dampier Peninsula, Pt Hedland
Gonocarpus ephemerus	2	East of Wiluna, Mt Augustus, Rudall River, Jiggalong
Indigofera ixocarpa	2	Marandoo, Tom Price, Nullagine, Karijini NP
Ischaemum albovillosum	2	Fortescue, Millstream, Hooley Stn, Mulga Downs Stn
Olearia fluvialis	2	Hamersley Range, Karijini N.P., West Angelas, Newman
Olearia mucronata	2	Hamersley and Chichester Range area, West Angelas, Paraburdoo, Mt Margaret, Mt Keith
Paspalidium retiglume	2	Halls Creek, Chichester Range
Pilbara trudgenii	2	Hamersley Range
Scaevola sp. Hamersley Range basalts (S. van Leeuwen 3675)	2	Hamersley Range
Spartothamnella puberula	2	Mt Bruce, Hamersley Range, West Angelas, NT
Stylidium weeliwolli	2	Mt Augustus, Barlee Range
Abutilon trudgenii	3	Marillana, Warralong, Woodstock, Hamersley Range, Karratha, Pt Sampson, Newman, Pannawonica
Acacia fecunda	3	
Acacia glaucocaesia	3	Karratha, Port Hedland, Mardie, Roebourne, De Grey
Acacia subtiliformis	3	
Astrebla lappacea	3	Hamersley Stn, NT, Eastern States
Bulbine pendula	3	Rudall River, Mt Augustus Stn, Minilya River, Juna Downs, Hamersley Stn
Bulbostylis burbidgeae	3	Mount Edgar, Gorge Creek, Abydos-Woodstock
Calotis latiuscula	3	Giles, Warburton, Blackstone Range, Rawlinson Range, Hamersley Range
Cynanchum sp. Hamersley (M. Trudgen 2302)	3	Hamersley Range, Marandoo, Turner Syncline, West Angelas
Dampiera anonyma	3	Mt Bruce, Mt Nameless, Hamersley Ranges, Mt Sheila, Karijini NP
Dampiera metallorum	3	Hamersley Range, Mt Meharry, West Angelas, Karijini NP
Eragrostis crateriformis	3	Balgo Hill, Warralong Stn, Yanrey Stn, Chichester Range, NT
Eremophila caespitosa	3	Mt Vernon, Waldburg, Wanna Munna Flats, Woodlands, West Angelas, Marymia Station
Eremophila magnifica subsp. *velutina*	3	Hamersley Ranges, Newman, Marandoo

Table G2: **Priority Flora recorded from the Pilbara IBRA region in the vicinity of Roy Hill (FloraBase, 2008)**

Species	Priority code	District Found (Atkins, 2006)
Fimbristylis sieberiana	3	Hamersley Range, Millstream, Fitzroy Crossing, King Leopold Range, Halls Creek, Little Sandy Desert
Fuirena incrassata	3	Oakover River (Wandanya), Edgar Ranges, Deep Creek, NT, Qld, NSW
Glycine falcata	3	Chichester, Hamersley Station, Mulga Downs Station, Bungle Bungle NP
Goodenia nuda	3	Weeli Wolli, Roy Hill, Mt Stuart
Goodenia pascua	3	Hamersley Stn, Sandy Creek, Port Hedland, Onslow, Mardie, Roebourne, Little Sandy Desert
Gymnanthera cunninghamii	3	Minilya, Dampier Archipelago, Boodarie, 80 Mile Beach, NT, Qld
Hibiscus brachysiphonius	3	Balgo Mission, Christmas Creek, Wandagee, Karratha, Tom Price, Millstream, Warrawagine, Hamersley Range
Indigofera ammobia	3	
Indigofera gilesii subsp. *gilesii*	3	Hamersley Range, Meekatharra, West Angelas
Owenia acidula	3	Mardie Stn, Millstream, Collier Range, Winning Stn., Minilya Stn, Boolathana Stn, Qld, NSW
Phyllanthus aridus	3	West Kimberley, Chichester Range, West Angelas, Pardoo, Shay Gap, Doongan Homestead, Durack River
Plantago sp. Hamersley (M.E. Trudgen 11207)	3	Hamersley Stn, Wittenoom
Polymeria sp. Hamersley (M.E. Trudgen 11353)	3	Hamersley Stn, Wittenoom, Marandoo, Hamersley Ranges
Rhynchosia bungarensis	3	Hamersley Ranges, Chichester Ranges, Yardie Creek, Robe River, Tom Price
Rostellularia adscendens var. *latifolia*	3	Hamersley Ranges
Sida sp. Barlee Range (S. van Leeuwen 1642)	3	Barlee Range, Turee Creek
Sida sp. Marandoo (M.E. Trudgen 10976)	3	Marandoo, Mindi Springs, Channar
Sida sp. Wittenoom (W.R. Barker 1962)	3	Wittenoom, Nickol Bay, Roy Hill, Fortescue Roadhouse, Nanutarra, Lawloit Range
Tephrosia sp. Cathedral Gorge (F.H. Mollemans 2420)	3	Newman, Hamersley Range, Fortescue Valley
Terminalia supranitifolia	3	Robe River, Burrup Peninsula, Dolphin Is., Bungaroo Creek, Yannery River, Harding Dam
Themeda sp. Hamersley Station	3	Karratha, Millstream, Hamersley Stn, West Angelas,

Table G2: **Priority Flora recorded from the Pilbara IBRA region in the vicinity of Roy Hill (FloraBase, 2008)**

Species	Priority code	District Found (Atkins, 2006)
(M.E. Trudgen 11431)		Coondewanna Flats
Triodia sp. Mt Ella (M.E. Trudgen 12739)	3	Hamersley Range, Mt Ella
Triumfetta leptacantha	3	Hamersley Range, Marandoo
Acacia balsamea	4	Mount William Lambert, Paterson Range, Gibson Desert, Clutterbuck Hills, Leinster Downs, Little Sandy Desert
Eremophila magnifica subsp. *magnifica*	4	Hamersley Ranges, Tom Price, Marandoo, Wittenoom
Eremophila youngii subsp. *lepidota*	4	S Cape Range, Roy Hill, N Mt Vernon, Paraburdoo, Muggon Stn
Livistona alfredii	4	Millstream, Cave Creek, Cape Range
Ptilotus mollis	4	Warralong Station, Mt Channar, Bamboo, Rudall River, Ripon Hills, Mt Bruce

Appendix H: Definitions of Conservation Codes

Definition of Conservation Codes

Table H2: Definition of categories described under the EPBC Act

Conservation Category	Definition
Extinct	A species is extinct if there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	A species is categorised as extinct in the wild if it is only known to survive in cultivation, in captivity or as a naturalised population well outside its past range; or if it has not been recorded in its known/expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	The species is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Conservation Dependent	The species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of five years.

Table H3: Definition of Declared Rare and Priority categories

Code	Definition
DRF	Declared Rare Flora-Extant Taxa. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
P1: Priority One	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3: Priority Three	Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4: Priority Four	Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

(From Atkins, K.J., Declared Rare and Priority Flora List Dec. 2008, DEC)

Table H4: Explanation of codes for Declared Weeds in Western Australia

Priority	Requirements
P1 Prohibits movement	The movement of plants or their seeds is prohibited within the State. This prohibits the movement of contaminated machinery and produce, including livestock and fodder.
P2 Aim is to eradicate infestation	Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.

Table H4: Explanation of codes for Declared Weeds in Western Australia

Priority	Requirements
P3 Aims to control infestation by reducing area and/or density of infestation	The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property, on or in livestock, fodder, grain, vehicles and/or machinery. Treat to destroy and prevent seed set for all plants: • within 100 metres inside of the boundaries of the infestation. • within 50 metres of roads and high-water marks on waterways. • within 50 metres of sheds, stock yards and houses. Treatment must be done prior to seed set each year. Of the remaining infested area: • Where plant density is 1-10 per hectare, treat 100% of infestation. • Where plant density is 11-100 per hectare, treat 50% of infestation. • Where plant density is 101-1000 per hectare, treat 10% of infestation. Properties with less than two hectares of infestation must treat the entire infestation. Additional areas may be ordered to be treated.

Table H4: Explanation of codes for Declared Weeds in Western Australia

Priority	Requirements
P4 Aims to prevent infestation spreading beyond existing boundaries of infestation	The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property, on or in livestock, fodder, grain, vehicles and/or machinery. Treat to destroy and prevent seed set for all plants: • within 100 metres inside of the boundaries of the infested property. • within 50 metres of roads and high-water marks on waterways. • within 50 metres of sheds, stock yards and houses. • Treatment must be done prior to seed set each year. Properties with less than two hectares of infestation must treat the entire infestation. Additional areas may be ordered to be treated. Special considerations: In the case of P4 infestations where they continue across property boundaries, there is no requirement to treat the relevant part of the property boundaries as long as the boundaries of the infestation as a whole are treated. There must be agreement between neighbours in relation to the treatment of these areas.
P5	Infestations on public lands must be controlled.

Appendix I: Criteria applied to risk assessment

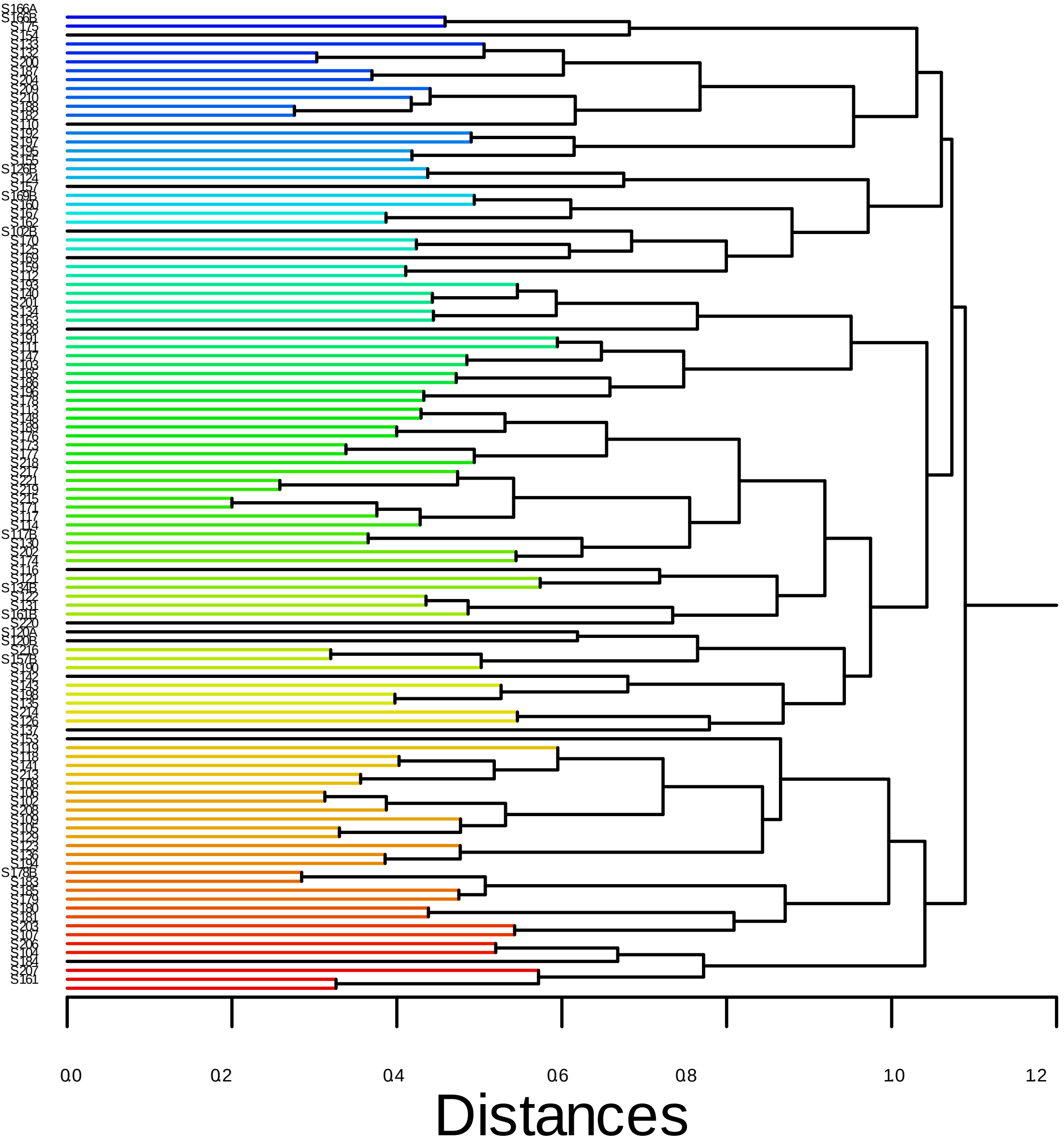
Risk Assessment Rating		LIKELIHOOD				
		5: Almost Certain Is expected to occur in most circumstance	**4: Likely** Will probably occur in most circumstance	**3: Possible** Could occur	**2: Unlikely** Could occur but not expected	**1: Rare** Occurs in exceptional circumstances
CONSEQUENCES	**5: Catastrophic** Significant impact to flora species of conservation significance or regional biodiversity	25	20	15	10	5
	4: Major Impact to flora species of conservation significance in project area.	20	16	12	8	4
	3: Moderate Loss of flora biodiversity in project area.	15	12	9	6	3
	2: Minor Short term or localised impact to flora biodiversity.	10	8	6	4	2
	1: Insignificant No impact to flora of conservation significance or biodiversity.	5	4	3	2	1

11-25	High risk, site/issue specific management programmes required, advice/approval from regulators required.
6 – 10	Medium risk, specific management and procedures must be specified.
1 – 5	Low risk, managed by routine procedures.

Appendix J: Dendogram, Phase 3 quadrats, coverage ranked data

(SYSTAT 12 TM, Spearman rank order correlation matrix,
Pearson complete linkage cluster analysis)

Dendogram, Phase 3 Data, Cover Ranked Complete Linkage



Appendix K: Phase 3 Site by species matrix, coverage ranked data

Refer to attach compact disk

Appendix L: Addendum - Stage 1 Impact Assessment

STAGE 1 IMPACT ASSESSMENT

Subsequent to the completion of the flora and vegetation assessment, the development of the Roy Hill 1 Mining Proposal was restructured into two stages, Stage 1 of which is detailed in the Roy Hill Phase 1 Public Environmental Review (SMEC, 2009). The infrastructure requirements for Stage 1 result in a revised impact footprint.

In addition to the polygons of known clearing, the revised impact footprint includes an additional 5% for clearing for minor infrastructures such as access tracks and lay down areas. The precise locations for these minor infrastructures have yet to be determined, but are assumed to be in the vicinity of the defined polygons and to be evenly distributed, such that an increase of 5% has been applied to the estimated impact area of each vegetation category. In practice of course the impact may be more localised and thus have a greater or lesser effect on some vegetation types.

The potential impacts arising from the development of all Stage 1 infrastructure and mining pits within the Roy Hill 1 Project are discussed below.

1.1.1 Clearing of vegetation

Clearing of significant areas of vegetation is an unavoidable impact of the development of an open cut mine and associated infrastructure. The localised impact from vegetation clearing within the Project area given the Stage 1 infrastructure is presented within Table L-1 below.

Table L-1 Percent impact to Roy Hill 1 Project area vegetation sub-associations

Vegetation sub-association code	Area (ha) within project area	% of total project area	Area estimated to be within proposed impact footprint (ha)	% of total area of unit estimated to be within project area which will be impacted
Isolated to open low trees and shrubs over *Triodia brizoides* hummock grasslands on slopes and crests	506.00	1.6	109.3365	21.61
Isolated to open low trees and mixed shrubs over *Triodia* sp. Shovelanna Hill hummock grasslands on slopes and plains.	1596.32	5.1	776.916	48.67
Isolated low trees and isolated to sparse mixed shrubs over *Triodia longiceps* hummock grasslands on colluvial deposits	866.68	2.8	199.584	23.03
Isolated low trees over sparse to open mid to low shrubland over *Triodia basedowii* hummock grasslands.	3830.40	12.3	1319.399	34.45
Isolated low trees over sparse to open mid to low shrubland over *Triodia epactia* hummock grasslands	435.12	1.4	200.4345	46.06
Open low forest to woodland of *Eucalyptus camaldulensis* and/or *E. victrix/Corymbia hamersleyana* over open high *Atalaya hemiglauca/Acacia pyrifolia* over open low shrubs over dense **Cenchrus ciliaris*.	255.96	0.8	44.793	17.50

Vegetation sub-association code	Area (ha) within project area	% of total project area	Area estimated to be within proposed impact footprint (ha)	% of total area of unit estimated to be within project area which will be impacted
Scattered *Eucalyptus victrix* over a low woodland of *Acacia aneura/A. coriacea* subsp. *pendens/Atalaya hemiglauca* over open shrubs over dense **Cenchrus ciliaris* grassland.	1217.38	3.9	244.1145	20.05
Tall *Acacia* spp. and *Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland	4.50	0.01	2.7195	60.43
Floodplains adjacent to major creek lines: open forest to woodland of *Eucalyptus victrix* over open mid-height shrubland dominated by *Acacia tetragonophylla, A. sclerosperma, *Vachellia farnesiana* over sparse mixed tussock grasses and herbs.	420.98	1.3	0	0.00
Floodplains: isolated trees to open woodland of *Eucalyptus victrix* over open *Acacia synchronicia* over mixed low shrubs over open to closed mixed tussock grasses	692.64	2.2	10.962	1.58
Acacia aneura, *A. rhodophloia* open forest and woodland over sparse low shrubs and closed tussock grassland and herbland ± *Triodia longiceps*.	1243.81	4.0	246.2565	19.80
Open woodland of *Acacia pruinocarpa, A. aneura* over open mixed shrubland over open grasses.	231.06	0.7	29.3895	12.72
Moderately dense to open tall *Acacia aneura* shrubland over sparse to open *A. tetragonophylla, Senna artemisioides* subsp. *helmsii* shrubs over moderately dense to open grassland dominated by *Aristida contorta*.	12492.67	40.0	3518.246	28.16
Groves of *Acacia aneura, A. rhodophloia* woodland over sparse shrubland of *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii, Eremophila latrobei* subsp. *filiformis* over open to sparse grasses.	1690.20	5.4	250.446	14.82
Isolated trees or shrubs of *Acacia aneura* over open shrubland of *Senna glutinosa* subsp. *luerssenii* and *Eremophila cuneifolia* over sparse grasses.	147.34	0.5	0	0.00
Isolated clumps of tall *Acacia aneura* shrubs over open low shrubs of *Ptilotus schwartzii*	1873.86	6.0	102.0285	5.44
Rocky crests of hills: *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses	12.54	0.04	0	0.00
Isolated shrubs of *Acacia synchronicia* over open and diverse herbs and grasses.	3730.91	11.9	0	0.00
Total	**31,248**	**100**	**7,055**	22.58

Moderate impact, defined as ≥25% loss of a vegetation unit which represent less than 10% of the total project area

High impact: defined as≥25% loss of a vegetation unit which represents less than 1% of the total project area

Due to the scale of the proposed development within the project area there is a moderate to high degree of impact to some vegetation sub-associations as a result of clearing. It can be seen from the above table that there are two units which are moderately restricted locally (i.e. comprise less than 10% of the total project area) that will have 25% or more of their total area within the Roy Hill 1 leases cleared.

One unit:

- Tall *Acacia* species/*Grevillea wickhamii* subsp. *hispidula* shrubland over low shrubland over mixed tussock grassland;

Is highly restricted (i.e. comprises less than 1% of the total project area) and will have approximately 60.4 % of the total occurrence within the project area cleared, due a distribution predominantly within the proposed pit footprint. This unit is relatively common with the project area, but occupies a small proportion of the total area due to its occurrence along minor drainage lines as narrow bands, often only 1-2 metres in width. It is widely distributed in the Eastern Pilbara.

All of the sub-associations mapped are expected to be distributed locally beyond the boundaries of the project area, although mapping of their broader distribution is beyond the scope of this survey. In particular, the two units identified above as moderately impacted and the unit identified as highly impacted are all known to occur both locally and more broadly within the Eastern Pilbara.

The other sub-association within the project area that is highly restricted locally,

- *Acacia rhodophloia* shrubland over sparse mixed shrubs and isolated herbs, and grasses on rocky crests of hills;

is estimated to encompass only 0.04% of the total project area. This community type is probably also the most restricted sub-association in the broader locality, due to its specificity to a particular landform which is locally uncommon. However as it occurs outside the footprint of clearance or drainage shadow it should not be impacted by the proposed development.

Thus, due to the broader representation of the mapped vegetation units the impact of vegetation clearing, whilst high within the project area, is minor at a local scale

In a regional context, the vegetation mapping is only available at a much broader scale (1,000,000 Beard, 1974). The land systems mapping (Van Vreeswyk *et al*., 2004), with associated vegetation notes provides the most current assessment of vegetation regionally and includes an estimate of the current condition of the vegetation types present. The distribution of each land system unit within the project areas is detailed in Table L-2.

Table L-2: Percent impact to land system units within the Roy Hill 1 Project area

Land System Unit	Total regional representation (ha)	Area within proposed impact footprint (ha)	% total area within region impacted
Adrian	24,509	0	0
Boolgeeda	999,609	0	0
Coolibah	101,035	14.5	0.01
Jamindie	1,188,272	1,879	0.16
McKay	427,471	109	0.03
Newman	1,999,771	2,707	0.14
River	591,433	0	0
Turee	92,741	2192	2.36
Warri	220,304	0	0
Total	**5,645,145**	**6,900**	**0.18**

Note: The total area of impact is slightly larger than Table 5-1 due to a slight difference in area of the mapping units. However the impact footprint is constant in both tables.

The project represents a minimal impact to the land systems that it encompasses with only one unit, Turee, impacted by greater than 0.5% of its total extent.

The Turee land system comprises stony alluvial plains with gilgaied and non-gilgaied surfaces. This system is favoured by cattle and is prone to degradation if overgrazed. Only 1% of the total extent is classified as remaining in very good condition. The proposed impact to the Turee land system of 2. 36% of the total occurrence is relatively minor, particularly given that the area of impact has been subjected to intensive and prolonged grazing. Most of the area classified as this land system unit occurring within the project area would be classified as either poor or moderate condition.

Thus at a regional level the proposed vegetation clearance is considered to be of minor significance in the context of loss of vegetation biodiversity or habitat.
The impact of the proposed vegetation clearing to Priority flora is tabulated in Table L-3 below.

Table L-3: Percent impact to Priority Taxa within the Roy Hill 1 Project area based on WA Herbarium records

Species	Priority	Number of locations* at Roy Hill	Number of locations impacted	% Locations impacted at Roy Hill	Number of other locations regionally
Rhagodia sp. Hamersley	P3	29	23	79.3	4
Acacia glaucocaesia	P3	1	0	0	>20
Goodenia nuda	P3	12	3	25.0	15
Polymeria sp. Hamersley	P3	1	0	0	4
Rostellularia adscendens var. *latifolia*	P3	1	0	0	12
Eremophila youngii subsp. *lepidota*	P4	7	0	0	21
Total		51			

* A location is defined as one or more plants located by at least 50 metres distant from any other collection of the taxon

Again, due to the extent of clearing within the project area there will be high and moderate degrees of impact to the known local distributions of *Rhagodia* sp. Hamersley and *Goodenia nuda* respectively. It can be seen that the impact regionally to *Goodenia nuda* is minor given the large number of populations recorded elsewhere. The impact to *Rhagodia* sp. Hamersley is more significant, given that more than half of the locations recorded for this taxon at Roy Hill will be cleared and that this location represents 20% of the total number of locations currently known. However it is noteworthy that this is a relatively new and as yet undescribed taxon that has probably been identified as other *Rhagodia* species, particularly when sterile, in many previous surveys. Consequently the

number of locations currently known is likely to significantly underestimate the total distribution and abundance of the taxon.

1.1.2 Damage to vegetation due to dust

Excessive dust can clog the stomata of plants and lead to localised deaths. This is particularly prevalent at track edges. Correct dust suppression techniques can minimise this impact.

1.1.3 Leakage of saline water used industrially

As some of the ground water in the Roy Hill 1 Project area is saline, its use or discharge must be tightly managed to ensure damage to vegetation does not occur. The need for dust suppression must be counterbalanced with the risk of saline scalds if non-saline water is not available in industrial quantities.

1.1.4 Bushfires

Fires are a frequent occurrence in hummock grasslands in the arid zones of Australia. Prior to European occupation, fires occurred as a result of intentional burning by Aboriginals of the area to encourage the growth of fresh growth for game. Due to the early demise of the local Aboriginal groups' traditional life style in the area, this regime of burning is likely to have rapidly diminished from the 1920's. Ground truthing and examination of the aerial photography of the Project area reveals that the area has been affected by extensive fires, some of which are within the last five years. An extensive area at the eastern and north-eastern boundaries of leases E46/00335 and E46/00592 respectively has been very recently burnt, probably between November 2007 and January 2008. The source of these fires is unknown, but is likely to be lightning strikes, unintentional fires caused by human activity, or a combination of these factors.

Although the native flora is adapted and in many instances dependent upon fire for activation of seed germination, too frequent or too hot bushfires can result in detrimental changes to the composition and diversity of the vegetation., causing local extinctions of vulnerable species.

The risk of fire directly as a result of mining activity can be minimised by implementing fire protocols such as appropriate isolation of flammable compounds such as hydrocarbons and explosives, localised clearing around working plant, and enforcement of appropriate smoking practices (e.g. no discarding of cigarette buts). Additional tracks in the area as a result of mining may act as a fire break and so may serve to reduce the extent of fires once started.

1.1.5 Introduction of weed species

At present the Roy Hill pastoral lease has high levels of weed invasion, with 19 taxa recorded, some of which are broadly distributed and locally very abundant. Increased vehicular traffic, combined with increased ground disturbance and disposal of water from

drilling and domestic operations, provide an opportunity for additional species to become established unless weed hygiene procedures are established.

1.1.6 Introduction of feral animals

Feral animals such as rabbits, cats, foxes, dogs, goats, camels, horses and donkeys are already established in the region, and policies prohibiting the introduction of domestic animals to mining leases are mandatory. However the unintentional introduction of additional species, such as alien insects in food or on personnel remains a remote possibility, particularly where personnel are on a fly in/fly out basis and hence arriving from remote locations where these species are already present.

1.2 Risk Assessment of Potential Impacts

A risk assessment was undertaken to determine potential impacts arising from the development on the flora and vegetation and the residual impacts following the implementation of management strategies identified in this document. The risk level is defined as a multiple of the numeric rankings attributed to the likelihood and consequences (criteria for rankings are detailed in The significance of the risks is classified as either “High” (site/issue specific management programmes required, advice/approval from regulators required), “Medium” (specific management and procedures must be specified) or “Low” (managed by routine procedures). The results of this assessment are detailed in Table L-4.

Table L-4: Risk assessment of potential impacts to flora and vegetation of the Stage 1 development

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Diversion of water flow from existing creek beds by construction of pits and other infrastructure	Changes to the timing of water flow to the Fortescue Marsh System	Increased or decreased water volume and salinity levels and/or increased turbidity leading to loss of viability of flora and fauna species dependent on the Marsh.	3	5	15	**High**	▪ Detailed modelling of water flows as a result of temporary creek diversions to ensure flows to Marsh are neither inadequate or excessive during mining ▪ Adherence to timeframes in which pits are obstructing flow and necessitating diversion ▪ Ensure that fines from mining construction do not contaminate water supply into Fortescue Marsh	2	5	10	**Medium**
Vegetation Clearing and construction of infrastructure	Distortion of sheet flow of water leading to localised drought or inundations and consequent death of *Acacia aneura* (mulga) vegetation communities	Areas of widespread tree death	3	4	12	**High**	▪ Evaluate the placement of infrastructure in terms of changes to sheet flow. Should significant changes to sheet flow be expected, relocation of infrastructure where feasible or installation or remediating structures (e.g. culverts under rail or roads) to be installed. ▪ Monitor areas of Mulga communities in areas downstream from infrastructure where potential exists for sheet flow disturbance.	2	4	8	**Medium**
Pit construction in areas with saline water table	Discharge of saline dewatering	Saline scalds, leakage of saline water to Fortescue March system	5	5	25	**High**	▪ Disposal of saline dewatering into impermeable evaporative ponds	1	5	5	**Low**

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Vegetation Clearing	Removal of Priority Flora	Reduction or loss of viability of taxa leading to localised extinction	5	3	15	Medium	▪ Specify the proportion of Priority flora likely to be impacted and ensure impact is kept within approved limits for specific taxa given regional distribution ▪ Consult with relevant personnel within DEC with respect to acceptable impacts	1	3	3	Low
Inadequate hygiene to vehicles in the vicinity of *Parkinsonia aculeata* (Declared Weed)	Expansion of existing populations or introduction to new locations	▪ Breach of Dept. of Agriculture legislation ▪ Loss of diversity to native flora	3	3	9	Medium	▪ Eradicate *Parkinsonia aculeata* in areas where movements of personnel or vehicles is necessary ▪ Restrict movement of cattle in areas where *Parkinsonia aculeata* is present ▪ Ensure vehicle hygiene maintained at all times	1	3	3	Low
Clearing combined with poor vehicle hygiene, incorrect disposal of waste water	Introduction or dispersal of environmental weeds	Reduction in floristic diversity and integrity	3	2	6	Medium	Weed hygiene measures should be implemented	2	2	4	Low
Driving	Off-road use of vehicles	Damage to vegetation	3	2	6	Medium	Enforce policy of driving on established tracks only to all site workers by: ▪ emphasis on policy during site induction; ▪ clear signposting of off-limit areas; ▪ appropriate penalties should infringements occur.	1	2	2	Low
Use of saline water during operations	Leakage of saline wager	Localised plant death	3	2	6	Medium	Restrict release of saline water into environment	1	2	2	Low

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Human activities which start fires	Excessively frequent, large scale or too hot bushfire as a result of uncontrolled bushfire	Possible loss of vulnerable species or loss of diversity in some community types Loss of fauna and habitat	2	4	8	Medium	▪ Ensure flammable material is suitably contained ▪ Ensure vehicles and plant do not park on *Triodia species* ▪ Maintain correct procedures for smoking e.g. no discarding of cigarette buts in bush ▪ Prohibition of campfires within lease	1	4	5	Low
Vegetation Clearing	Removal of significant proportion of identified vegetation sub-associations poorly represented locally	▪ Loss of biodiversity at a local scale▪ Loss of habitat to fauna species with dependency on this habitat type	2	3	6	Medium	Clearing of the community types identified as of limited distribution locally (Table 5.1) too be avoided by relocation of infrastructure wherever feasible.	1	3	3	Low
Vegetation Clearing	Removal of significant proportion of land system units poorly represented at a regional level	▪ Loss of biodiversity at a regional scale ▪ Loss of habitat to fauna species with dependency on this habitat type	1	4	4	Low	Clearing of land systems identified as of limited distribution (if present) should be avoided by relocation of infrastructure wherever feasible.	1	3	3	Low

Process/Activity	Event	Impacts	Inherent Risk				Controls	Residual Risk			
			Likelihood	Consequence	Risk Level	Significance		Likelihood	Consequence	Risk Level	Significance
Vegetation Clearing	Removal of Declared Rare Flora	▪ Breach of *EPBC Act*, and *Wildlife Conservation Act 1950* ▪ Reduction or loss of viability of taxon/taxa leading to possible extinction	1	4	4	**Low**	▪ As no Declared Rare Flora have been recorded to date, no avoidance measures are currently required. ▪ Systematic searching of areas to be cleared to ensure no populations of *Lepidium catapycnon* or *Thryptomene wittweri* (the only two DRF taxa known within the Pilbara) are present. ▪ If either of these taxa are subsequently recorded, the relocation of infrastructure shall occur wherever feasible. If not feasible application to remove rare flora submitted to Minister of Environment prior to any disturbance	1	4	4	**Low**
Dust	Dust emissions from clearing and construction vehicles	Damage to vegetation resulting in loss of diversity or species	2	2	4	**Low**	Dust suppression methods using non-saline water	1	2	2	**Low**
Increased human and plant movement	Introduction of plant or animal pathogens	Loss of vulnerable species	2	2	4	**Low**	Correct vehicle hygiene when using vehicles previously used where pathogens may be present	1	2	2	**Low**
Increased human and plant movement	Introduction of feral animals, particularly insects	Loss of vulnerable species	1	2	2	**Low**	Ensure correct quarantining of material from potentially infected equipment or goods (particularly material from overseas) has occurred prior to use	1	1	1	**Low**

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