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ATTACHMENT 1

SUPPORTING INFORMATION

BEEBYN-W11 IRON ORE PROJECT
CLEARING PERMIT APPLICATION SUPPORTING INFORMATION

Tenements: M51/869, L20/92

Revision: 2
Date: 18 November 2024

Prepared by
Ecotec (WA) Pty Ltd for:

Fenix Beebyn Pty Ltd
Level 33, 1 Spring Street
Perth, WA 6000

Contact: Goran Seat

Email: goran@fenixresources.com.au

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Appendix 1: Flora and Fauna Reports

1a: Weld Range Flora and Vegetation Assessment - ecologia Environment 2010

1b: Beebyn Flora, Vegetation and Fauna Assessment – APM 2024

1c: Iron Ridge Biological Survey 2019 – ecologia Environment 2020

1d: Status review of Idiosoma clypeatum – Biologic Environmental Survey 2019

1e: Weld Range Idiosoma nigrum Survey – Biologic Environmental Survey 2012

1f: W11 Targeted Biological Survey – Ecotec 2024

1g: Review of Cethegus species limits and SRE status – Invertebrate Solutions 2024

Appendix 2: Iron Ridge Stygofauna Assessment - *ecologia* Environment 2020

Appendix 3: Hydrogeology and Hydrology Assessment - Pentium Water 2024

1 OVERVIEW

Fenix Resources Ltd is proposing to develop the Beebyn-W11 Iron Ore Project (the Project), approximately 600 km north-east of Perth and 85 km south-west of Meekatharra in the Mid-West Region of Western Australia (Figure 1.1). Fenix Beebyn Pty Ltd (Fenix Beebyn) is a wholly owned subsidiary of Fenix Resources Pty Ltd.

Fenix Beebyn has signed a binding agreement with Sinosteel Midwest Corporation (SMC) securing the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range (refer ASX announcement dated 3 October 2023).

Fenix already owns and operates the Iron Ridge Project, approximately 20 km to the west of the Beebyn-W11 deposit. The project is located on an existing mining lease – M51/869 – held by Sinosteel Midwest Corporation Ltd (SMC). Development of the Project will be undertaken by Fenix under an agreement with SMC. Miscellaneous Licence L20/92, to be held by Fenix Beebyn Pty Ltd, will connect the Beebyn-W11 project to the Iron Ridge Project.

The project is expected to produce approximately 3.9 million tonnes (Mt) of high-grade iron ore over a four year mine life, with ore being crushed on site using a semi-mobile crushing plant, then trucked to Geraldton for export to overseas customers.

An expected 13.7 Mt of waste rock will be produced over the life of the operation, with some being used for construction of pads and road surfaces, and the remainder deposited into a waste dump adjacent to the pit on M51/869.

The workforce will operate on a fly-in, fly-out (FIFO) roster and will be accommodated at Fenix's existing Iron Ridge facility, approximately 20 km to the west of the proposed Beebyn-W11 mine site.

Fenix Beebyn lodged a Mining Proposal and Mine Closure Plan in May 2024 detailing the proposed project. The Mining Proposal and Mine Closure is currently under assessment by DEMIRS.

A Works Approval application was lodged in May 2024 for the prescribed activities Category 5 (crushing and screening) and Category 6 (mine dewatering) and is currently under assessment by DWER.

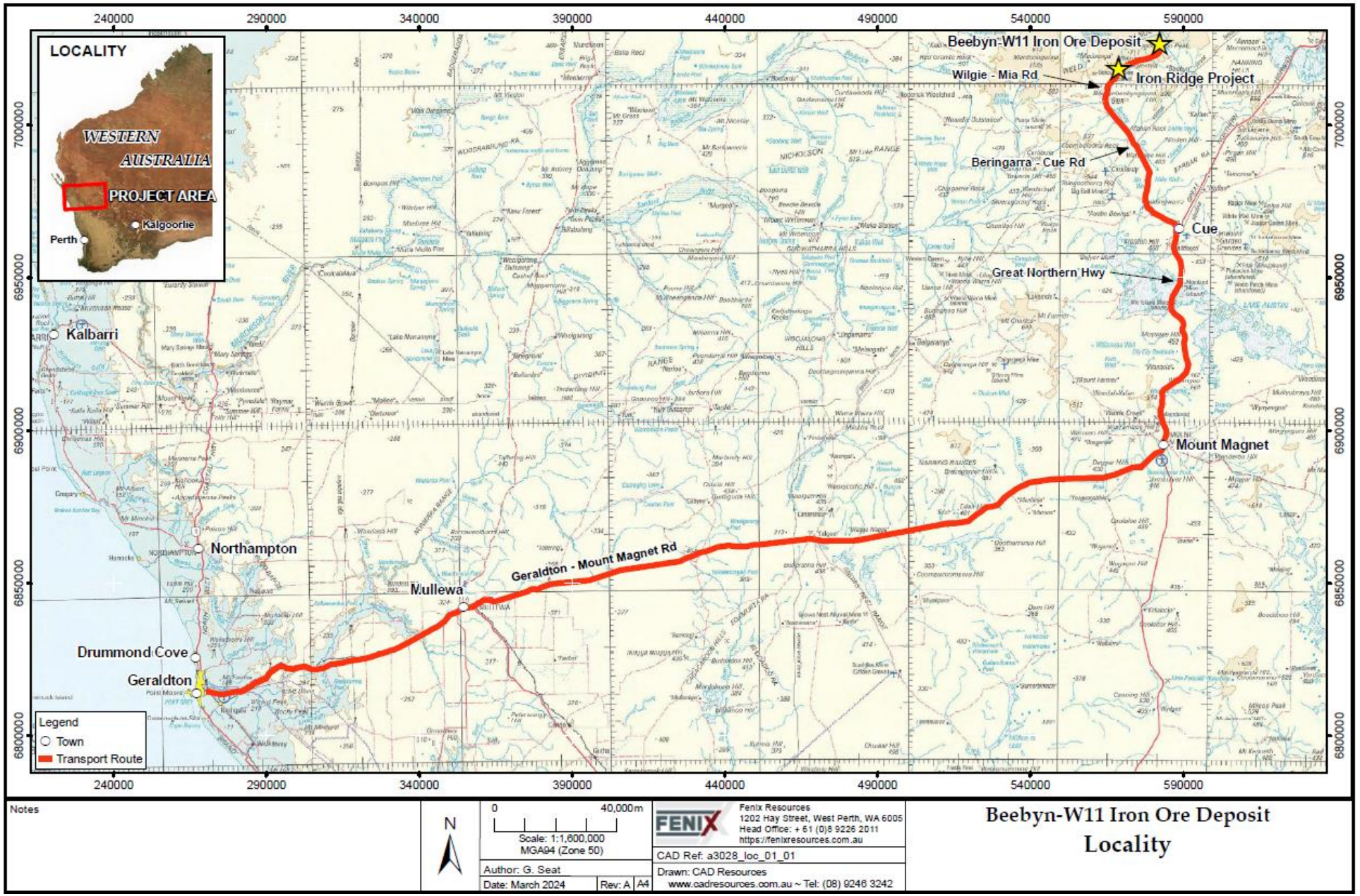


Figure 1.1: Beebyn-W11 Iron Ore Project regional location and transport route.

2 MINE ACTIVITY DETAILS

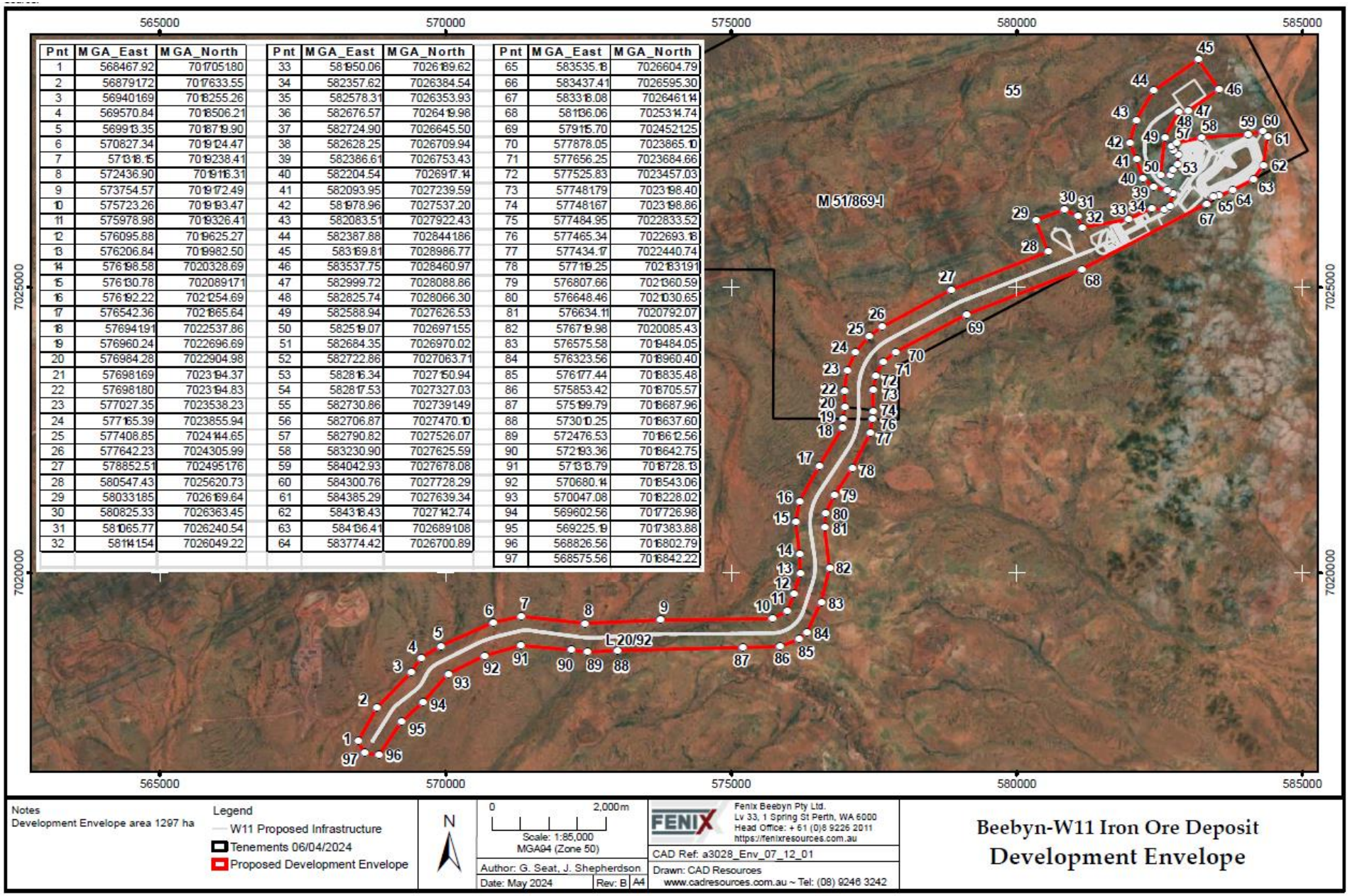
Clearing will be undertaken for a variety of Key Mining Activities and Other Mine Activities, as defined by DEMIRS (2023). Table 2.1, from the project Mining Proposal submitted in May 2024, provides details of the current and proposed mine activity types at the Beebyn-W11 Project.

Figure 2.1 provides the Disturbance Envelope for the project and all disturbance will occur within the defined Disturbance Envelope. Figure 2.2 provides the proposed site layout.

Table 2.1: Current and proposed mine activity and areas of disturbance.

Tenement: M51/869				
Activity Category	**Activity Reference**	**Proposed area (Ha)**	**Current Approved Area (Ha)**	**Total Area (Ha) (proposed + current approved)**
Key Mine Activities				
Waste dump or overburden stockpile (class 1)	Waste dump	68.0	0	68.0
Mining void (depth greater than 5m – below groundwater)	Open pit	15.0	0	15.0
Plant site	Crushing and screening	2.8	0	2.8
Run of mine pad	ROM	6.5	0	6.5
Key Mine Activity Total Area		**92.3**	**0**	**92.3**
Other Mine Activities				
Diversion channel or drain	Diversion channel or drain	*Footprints not required*		
Low-grade ore stockpile (class 2)	Low grade stockpile			
Dam - fresh water	Water storage dam			
Workshop	Magazine			
Borrow pit or shallow surface excavation	Borrow pit			
Laydown or hardstand area	Laydown, parking areas			
Transport or infrastructure corridor	Haul and access roads			
Topsoil stockpile	Topsoil stockpiles			
Land that is cleared of vegetation (other cleared land)	Abandonment bund			
Land that is cleared of vegetation (other cleared land)	Miscellaneous historic disturbance			
Other Mine Activity Total Area		**135.3**	**0**	**135.3**
Total Tenement Activity Area		**227.6**	**0**	**227.6**

Tenement: L20/92				
Activity Category	**Activity Reference**	**Proposed area (Ha)**	**Current Approved Area (Ha)**	**Total Area (Ha)** (proposed + current approved)
Key Mine Activities				
Nil		0	0	0
	Key Mine Activity Total Area	**0**	**0**	**0**
Other Mine Activities				
Transport or infrastructure corridor	Haul and access road	*Footprints not required*		
Topsoil stockpile	Topsoil stockpiles			
	Other Mine Activity Total Area	**34.5**	**0**	**34.5**
	Total Tenement Activity Area	**34.5**	**0**	**34.5**
	Total Mine Activity Area	**262.1**	**0**	**262.1**



Pnt	MGA_East	MGA_North
1	568467.92	7017051.80
2	568791.72	7017633.55
3	569401.69	7018255.26
4	569570.84	7018506.21
5	569913.35	7018719.90
6	570827.34	7019124.47
7	571318.15	7019238.41
8	572436.90	7019116.31
9	573754.57	7019172.49
10	575723.26	7019193.47
11	575978.98	7019326.41
12	576095.88	7019625.27
13	576206.84	7019982.50
14	576198.58	7020328.69
15	576130.78	7020891.71
16	576192.22	7021254.69
17	576542.36	7021865.64
18	576941.91	7022537.86
19	576960.24	7022696.69
20	576984.28	7022904.98
21	576981.69	7023194.37
22	576981.80	7023194.83
23	577027.35	7023538.23
24	577165.39	7023855.94
25	577408.85	7024144.65
26	577642.23	7024305.99
27	578852.51	7024951.76
28	580547.43	7025620.73
29	580331.85	7026169.64
30	580825.33	7026363.45
31	581065.77	7026240.54
32	581141.54	7026049.22

Pnt	MGA_East	MGA_North
33	581950.06	7026189.62
34	582357.62	7026384.54
35	582578.31	7026353.93
36	582676.57	7026419.98
37	582724.90	7026645.50
38	582628.25	7026709.94
39	582386.61	7026753.43
40	582204.54	7026917.14
41	582093.95	7027239.59
42	581978.96	7027537.20
43	582083.51	7027922.43
44	582387.88	7028441.86
45	583169.81	7028986.77
46	583537.75	7028460.97
47	582999.72	7028088.86
48	582825.74	7028066.30
49	582588.94	7027626.53
50	582519.07	7026971.55
51	582684.35	7026970.02
52	582722.86	7027063.71
53	582816.34	7027150.94
54	582817.53	7027327.03
55	582730.86	7027391.49
56	582706.87	7027470.10
57	582790.82	7027526.07
58	583230.90	7027625.59
59	584042.93	7027678.08
60	584300.76	7027728.29
61	584385.29	7027639.34
62	584318.43	7027142.74
63	584136.41	7026891.08
64	583774.42	7026700.89

Pnt	MGA_East	MGA_North
65	583535.18	7026604.79
66	583437.41	7026595.30
67	583318.08	7026461.14
68	581136.06	7025314.74
69	579115.70	7024521.25
70	577878.05	7023865.10
71	577656.25	7023684.66
72	577525.83	7023457.03
73	577481.79	7023198.40
74	577481.67	7023198.86
75	577484.95	7022833.52
76	577465.34	7022693.18
77	577434.17	7022440.74
78	577119.25	7021831.91
79	576807.66	7021360.59
80	576648.46	7021030.65
81	576634.11	7020792.07
82	576719.98	7020085.43
83	576575.58	7019484.05
84	576323.56	7018960.40
85	576177.44	7018835.48
86	575853.42	7018705.57
87	575199.79	7018687.96
88	573010.25	7018637.60
89	572476.53	7018612.56
90	572193.36	7018642.75
91	571313.79	7018728.13
92	570680.14	7018543.06
93	570047.08	7018228.02
94	569602.56	7017726.98
95	569225.19	7017383.88
96	568826.56	7016802.79
97	568575.56	7016842.22

Figure 2.1: Beebyn-W11 Project Disturbance Envelope.

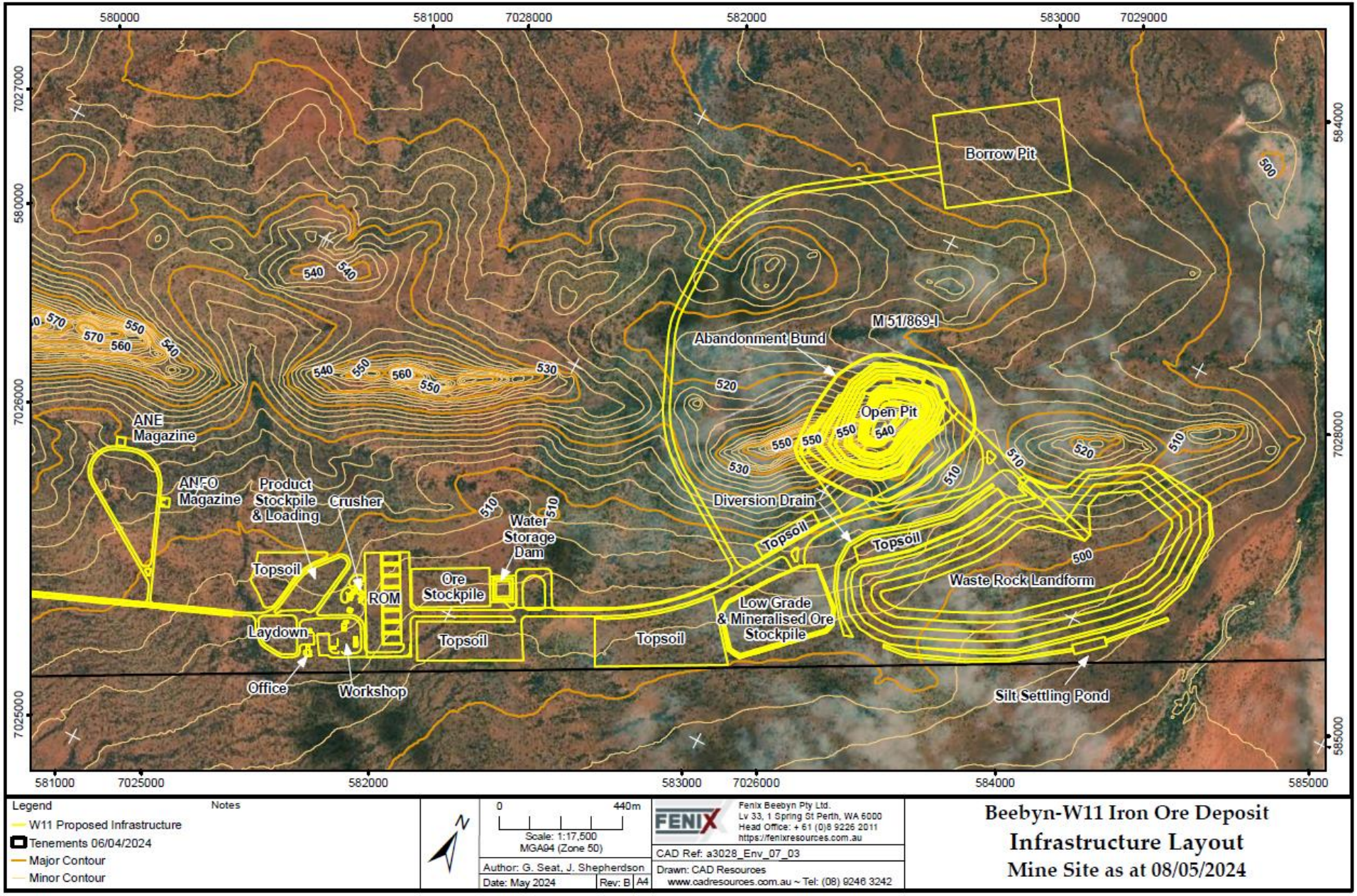


Figure 2.2: Proposed site layout.

3 BASELINE ENVIRONMENTAL DATA

3.1 IBRA 7 Biogeographic subregions

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics. The project area is situated within the Murchison Region according to IBRA 7, which is further divided into two subregions: Eastern Murchison and Western Murchison (DAWE 2019). The study area is situated within the Western Murchison subregion (MUR2).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The Western Murchison subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling granitic and greenstone strata (Desmond et al. 2001). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia.

3.2 Landscape

The Beebyn-W11 Project is located within the Murchison Bioregion of the Interim Biogeographic Regionalisation of Australia (IBRA) and is situated in the Western Murchison subregion (MUR2), close to the boundary of the Eastern Murchison subregion (MUR1).

The MUR2 subregion is described by Desmond et. al. (in DAWE 2019) as follows:

"*Mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia. Contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. Arid climate with bimodal rainfall that usually falls in winter. The subregional area is 7,847,996 ha.*" (DAWE 2019).

Laterite or silcrete mesas are usually found at the top of the landscape in areas of granitic basement. These mesas have lateritic breakaways, kaolinised footslopes (often saline) and are surrounded by gently sloping plains. There are also some low hills, domes and tor fields of granite, gneiss and quartz found in upper parts of the landscape. The bulk of the terrain consists of gently undulating wash plains and sandplains sitting below the mesas and hills. Although wash plains are most common in the north-west, they occur throughout the province with the exception of its eastern margin. These wash plains consist of very gently inclined alluvial surfaces that carry sheet flows. Typically, an almost continuous cemented layer of red-brown hardpan has formed in these deposits. There are often small sandy banks and groves across the wash plains and gravelly mantles are sometimes present. Narrow saline drainage tracts may also be found (Tille 2006).

Soils on the plains are typically red loamy earths and red-brown hardpan shallow loams. Red sandy soils are found along the significant drainage channels. Shallow loams and sands and stony soils are found on the hills and mesas with sandy soils more common on granitic hills. Salt lake soils are found on the valley floors (Tille 2006).

3.3 Biological surveys

Flora and fauna surveys have been completed in and around the project area and the wider Weld Range. The project area and surrounds have been quite extensively covered by prior biological surveys.

A summary of the surveys relevant to the project are presented in Table 3.1. More details are provided in the following sections.

Table 3.1: Flora and fauna surveys in and around Weld Range.

Survey type and location.	Year	Consultants
Flora and vegetation survey - Weld Range Iron Ore; Atlas Iron	2008	Woodman Environmental
Flora and Vegetation of the banded iron formations of the Yilgarn Craton: The Weld Range	2008	Department of Conservation (DEC)
Targeted Shield-backed trapdoor spider, SRE Invertebrate and vertebrate fauna survey	2009	Bamford Consulting Ecologists
Weld Range Level 1 Targeted Fauna Survey; Atlas Iron Ltd	2009	Biologic
Weld Range Vegetation and Flora Assessment Unpublished Report for Sinosteel-Midwest Corporation	2009	*ecologia*
Weld Range Vertebrate Fauna Assessment. Unpublished Report for Sinosteel-Midwest Management	2009	*ecologia*
SRE Invertebrate habitat survey; Atlas Weld Range Project	2011	Biologic
Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012; Atlas Iron Ltd	2012	Woodman Environmental
Weld Range DSO Project, Flora and Vegetation Assessment; Atlas Iron Ltd	2012	Woodman Environmental
Weld Range *Idiosoma nigrum* Survey 2012; Atlas Iron Ltd	2012	Biologic
Idiosoma nigrum Status Review	2019	Biologic
Iron Ridge Flora and Fauna Reconnaissance Survey	2019	*ecologia*
Iron Ridge Biological Survey 2019	2019	*ecologia*
Micromyrtus placoides Targeted Survey	2020	*ecologia*
Beebyn 11 Weld Range Flora and Fauna Survey	2023	Animal Plant Mineral (APM)
Beebyn W11 Targeted Biological Survey	2024	Ecotec (WA) Pty Ltd

The BIF ranges of the Mid West and Goldfields regions are generally considered to have significant biodiversity value because of their unique geology, soils and relative isolation. The values of the ranges are related to the presence of endemic plant species, threatened and restricted plant species, highly restricted and distinct plant communities and ecological communities. The ranges also exhibit very distinct features in their regional landscape and in many cases possess outstanding landscape values. They also have fauna conservation values although these are less well documented than for flora. There are, however, differences between the various BIF ranges in terms of their biodiversity conservation and mineral prospectively/resource values.

The Midwest BIF ranges are considered to be under represented in the State's reserve system (Department of Environment and Conservation [DEC] 2007) however, in the report *Banded Ironstone Formation Ranges of the Midwest and Goldfields - Interim Status Report - Biodiversity Values and Conservation Requirements* by DEC (now DBCA), the Weld Range was described as being a "lower biodiversity value site, although still providing refugial habitats with localised species and vegetation communities" (DEC 2007).

The Beebyn-W11 Project partly coincides with the Priority 1 Priority Ecological Community (PEC) "Weld Range vegetation complexes (banded ironstone formation)" and the 500 m administrative buffer that surrounds it. Rather

than being defined by a specific plant community, the extent of the Weld Range PEC has been determined on the basis of its extent over the banded iron formation of the Weld Range (*ecologia* 2020a).

A survey of the flora and floristic communities of the Weld Range was undertaken by DEC in 2005 (Markey and Dillon 2008). A total of 239 taxa (species, subspecies and varieties) and five hybrids of vascular plants were collected and identified from within the survey area. Of these, 229 taxa were native and 10 species were introduced. Eight priority species were located in this survey, six of these being new records for the Weld Range.

Eight floristic community types (six types, two of these subdivided into two subtypes each) were identified and described for the Weld Range.There did not appear to be any restricted communities within the landform, but some of these communities may be geographically restricted to the Weld Range (Markey and Dillon 2008).

Table 3.2 lists the floristic communities identified during the DEC survey of Weld Range (Markey and Dillon 2008).

Table 3.2: Floristic communities of the Weld Range, as identified by DEC in 2005.

Reference	Description
Community 1a:	Dominated by *Acacia aneura*, *Acacia ramulosa* and/or *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) over sparse shrub cover of *Eremophila* spp., mainly on mid-upper slopes.
Community 1b:	Open shrubland of *Acacia aneura*, *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Grevillea berryana* over shrub cover of *Eremophila* spp. on gentle-moderates slopes.
Community 2:	Open Shrubland of *Acacia* cf. *aneura* var. *microcarpa* and/or *Acacia* cf. *aneura* var. *aneura*, over *Thryptomene decussata*, *Philotheca brucei* subsp*. brucei* and *Eremophila* spp. on BIF on moderate-steep slopes.
Community 3:	Depauperate Shrubland dominated by *Acacia aneura* on scree slopes.
Community 4:	Open Shrubland of *Acacia aneura* with *Acacia pruinocarpa* over shrublands of *Philotheca brucei* var. *brucei* and *Eremophila* spp. on steep rocky hillslopes.
Community 5a:	Open Shrubland of *Acacia aneura* and *Acacia ramulosa* with emergent *Acacia pruinosa*, mainly on lower slopes and outwash areas.
Community 5b:	Open Shrubland of *Acacia aneura* or *Acacia effusifolia* over *Senna* spp. and *Tribulus suberosus* on lower slopes.
Community 6:	Sparse Shrubland of Acacia sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia aneura* and *Acacia speckii* over Shrubland of *Eremophila macmilliana*, *Eremophila mackinleyi* subsp. *spathulate* and *Senna* spp. on dolerite

Knowledge of the faunal biodiversity significance of the BIF environments is incomplete, however current knowledge indicates that these isolated areas provide important refuges for fauna. Nineteen vertebrate fauna and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the project area, predominately recorded within the Weld Range.

3.4 Native flora

Database searches indicated that a total of 28 conservation significant flora taxa have been recorded within a 30 km area around the project site. No Threatened flora species have been recorded in the area. Figure 3.1 provides the recorded locations of Priority listed flora within a 30 km radius of the project.

Ecologia Environment Pty Ltd (*ecologia*) were commissioned by Sinosteel to carry out a Level 2 flora and vegetation survey of the project area and surrounds over four surveys between 2006 and 2009 (*ecologia* 2010b); as well as a targeted conservation significant flora survey of a number of proposed exploration drill lines in the area. The surveys recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species. No Threatened species were recorded. The *ecologia* report is included in Appendix 1.

Animal Plant Mineral Pty Ltd (APM) undertook a detailed flora and vegetation survey of the proposed Beebyn-W11 area during 2023 (APM 2024), recording 77 vascular flora taxa from 21 families and 40 genera. The reduction in taxa recorded when compared to the earlier surveys is primarily due to the region having been in drought conditions for several years and the prevalence of goats, which have had a significant impact on the vegetation.

No Threatened species were recorded; however, a single potential record of the Priority 3 listed species *Hibiscus krichauffianus* was recorded. Insufficient material was available to definitively determine the species, due to seasonal conditions. *Hibiscus krichauffianus* is common in the central parts of Australia and the Queensland mid coast. The nearest known record is approximately 250 km south west of the project area, with most records in WA from the Pilbara. The species has not previously been recorded in the Murchison Region (APM 2024).

Ecotec undertook a vegetation and targeted conservation significant flora survey of the project area in August 2024 (Ecotec 2024). No Threatened species were recorded, however five Priority listed flora species were recorded. The Ecotec report is included in Appendix 1.

Table 3.3 provides a summary of the conservation significant flora recorded during survey work, as well as those species considered to be possible inhabitants of the immediate project area. Except for *Acacia dilloniorum,* all taxa listed have distributions extending over 100 km, consistent with observations by Markey and Dillon (2008) that most species are not endemic to the Weld Ranges (*ecologia* 2010b). Species that were considered as unlikely to occur following the survey are not included in this summary table. Full discussion is included in the APM report (APM 2024), provided in Appendix 1.

The distribution of Priority species recorded in the Ecotec (2024) survey in relation to the proposed development infrastructure is shown on Figure 3.2 and Figure 3.3.

Table 3.3: Conservation significant flora recorded and potentially occurring in the project area.

Species	Conservation Status	Likelihood of occurrence
Acacia dilloniorum	P1	Possible – suitable habitat exists in the project area, no known records in immediate vicinity.
Beyeria lapidicola	P1	Recorded (*ecologia* 2010b, Ecotec 2024)
Euphorbia sarcostemmoides	P1	Recorded (Ecotec 2024)
Stenanthemum mediale	P1	Recorded (Ecotec 2024)
Acacia burrowsiana	P3	Possible – suitable habitat exists in the project area
Hemigenia virescens	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
Hibiscus ?krichauffianus	P3	Recorded (APM 2024)
Homalocalyx echinulatus	P3	Possible - suitable habitat exists in the project area, previous records in immediate vicinity (*ecologia* 2010b)
Micromyrtus placoides	P3	Recorded (Ecotec 2024)
Prostanthera petrophila	P3	Recorded (*ecologia* 2010b, Ecotec 2024)
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity
Verticordia jamiesonii	P3	Recorded (*ecologia* 2010b, Ecotec 2024)
Acacia speckii	P4	Recorded (*ecologia* 2010b, Ecotec 2024)
Dodonaea amplisemina	P4	Recorded (*ecologia* 2010b)
Grevillea inconspicua	P4	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.

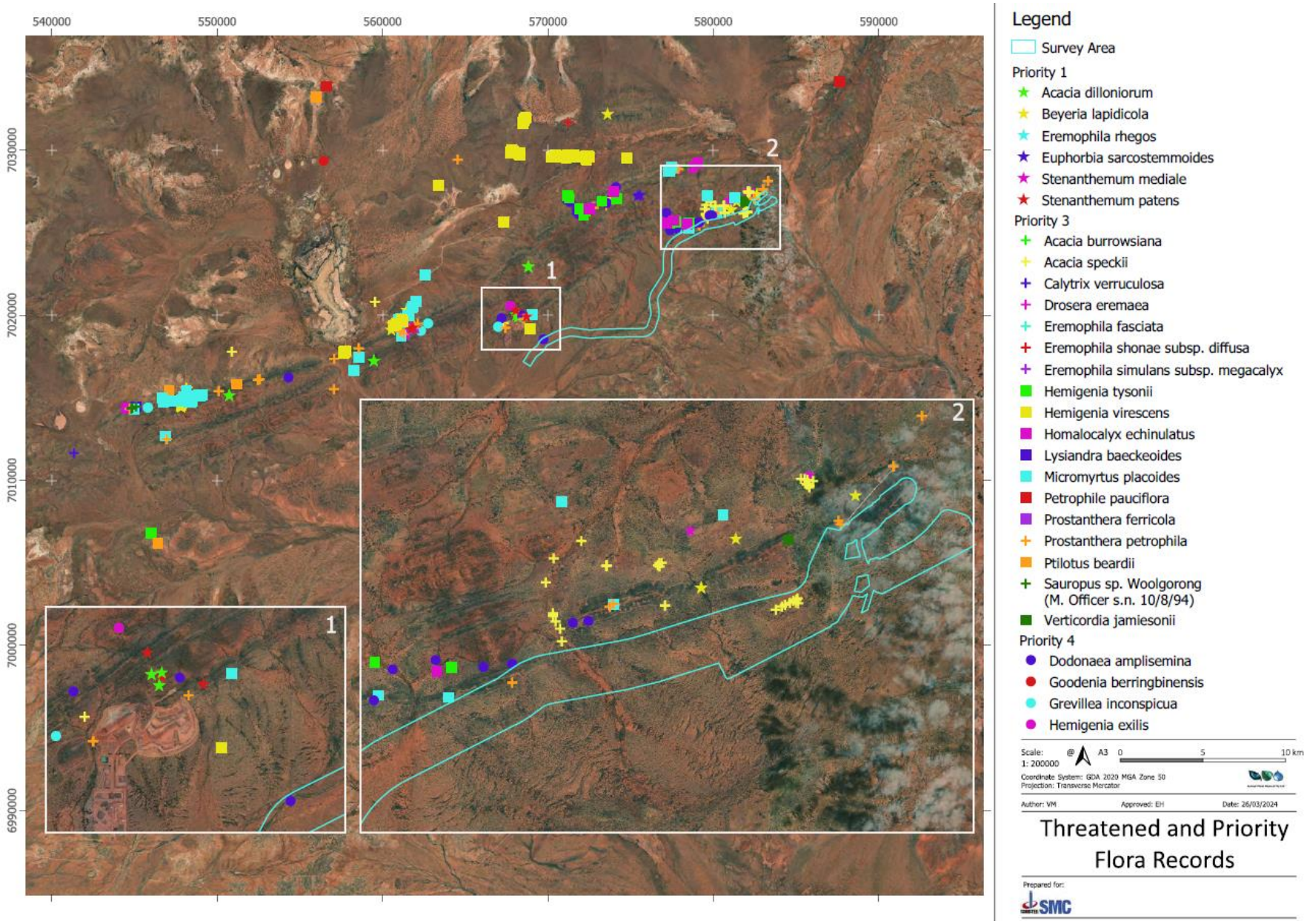


Figure 3.1: Priority flora records within 30 km of the project area.

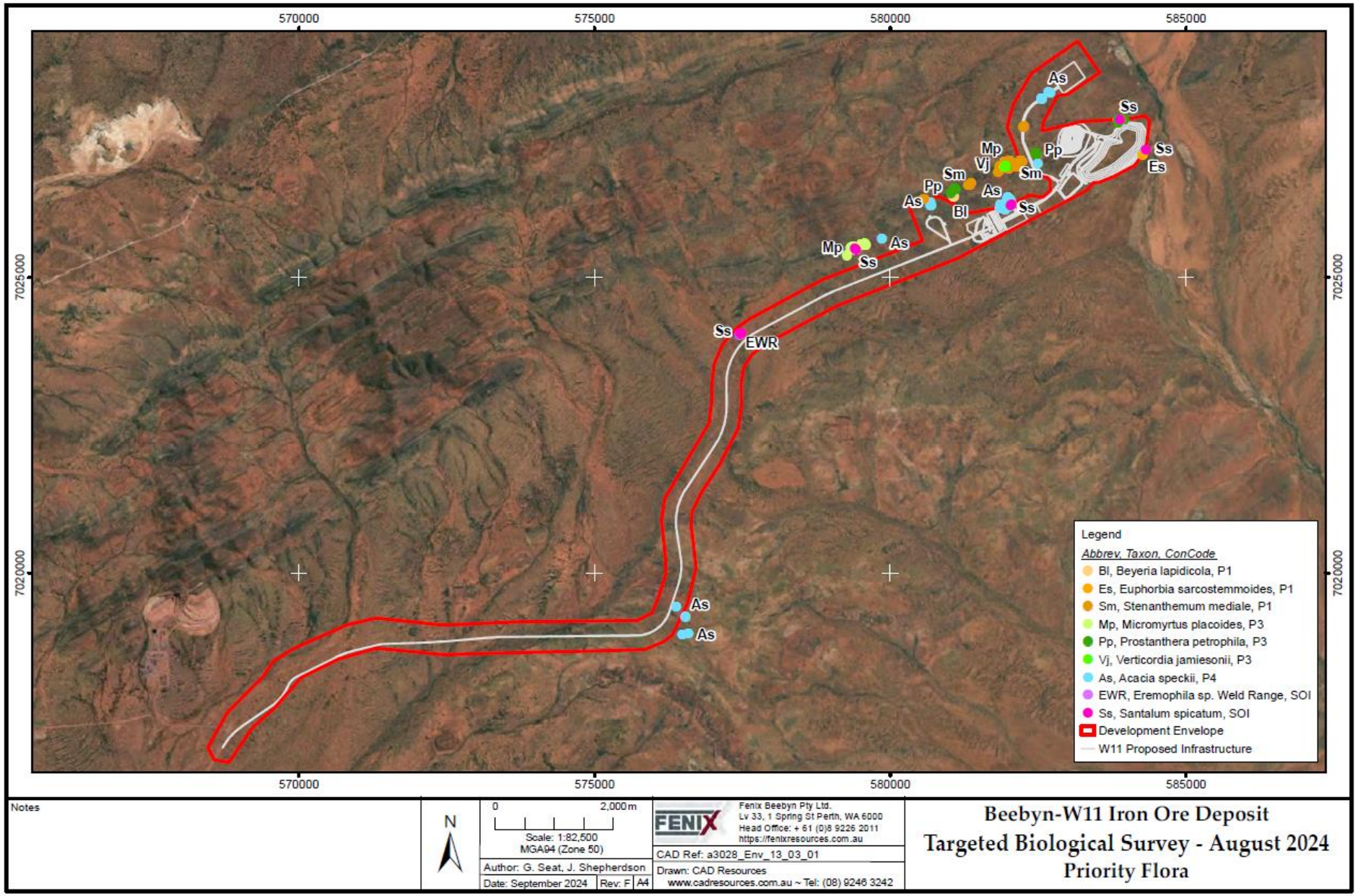


Figure 3.2: Priority flora within the proposed Beebyn-W11 area.

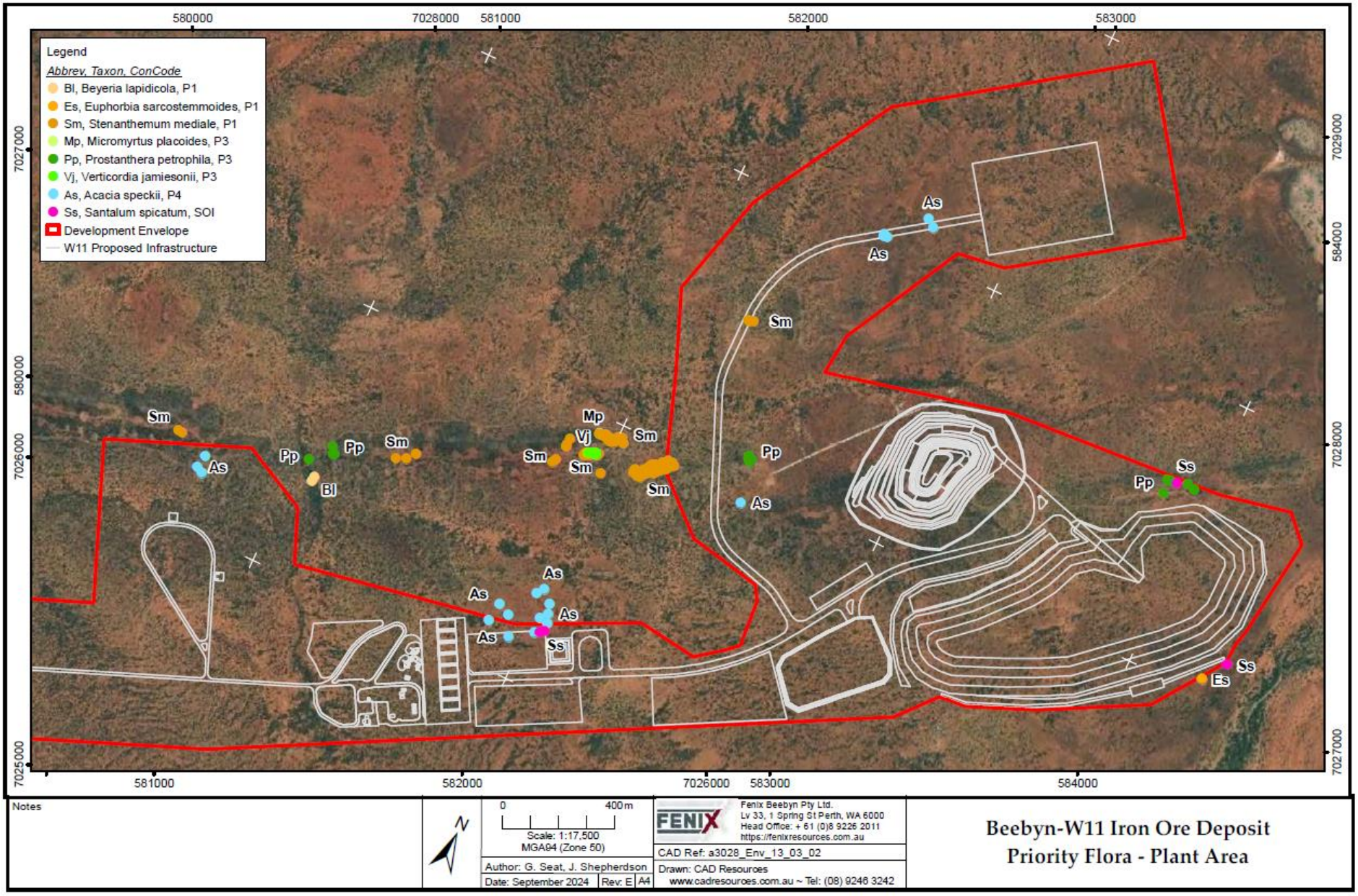


Figure 3.3: Priority flora within the proposed Beebyn-W11 infrastructure area.

Following the survey undertaken by Ecotec (2024), individuals of three of the Priority species recorded will be impacted by the proposed development (Figure 3.3). Table 3.4 lists the Priority species and the number of individuals to be impacted.

No *Hibiscus ?krichauffianus* individuals were recorded in the project area during the Ecotec (2024) survey. It is likely that the individuals of this species previously recorded by APM have since senesced or were misidentified due to lack of reproductive material present at the time of the APM survey. Prior to the Ecotec survey in August 2024, the project area had received average rainfall for the year, with the flora in good condition and many species reproductive (flowering, fruiting) and therefore more easily identifiable (Ecotec 2024).

Table 3.4: Priority species records within proposed infrastructure envelope.

Taxon	Known number of individuals at Weld Range	Individuals recorded within proposed disturbance footprint
Priority 1		
Stenanthemum mediale	186 (*ecologia* 2012) 250 (Ecotec 2024)	4
Priority 3		
Prostanthera petrophila	2,184 (*ecologia* 2012) 108 (Ecotec 2024)	17
Priority 4		
Acacia speckii	1,193 (*ecologia* 2012) 51 (Ecotec 2024)	25

3.4.1 Vegetation

The 2024 Ecotec survey recorded 16 vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008). The vegetation types described in the Ecotec report are listed in Table 3.5 and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008). Figure 3.4 to Figure 3.6 show the distribution of vegetation types within the project area.

Vegetation condition ranged from 'Very Good' to 'Completely Degraded'. Most of the disturbance was a result of moderate to heavy grazing impact from goats and euro, and historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. Historical pastoral grazing has also resulted in the loss of palatable shrubs, grasses and forbs, and a low recruitment of perennial species.

Further detail can be found in the Ecotec report, included in Appendix 1.

Table 3.5: Vegetation types identified in the project area.

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)
1	*Acacia pruinocarpa* open woodland or isolated trees over *Acacia aptaneura, A. caesaneura, A. craspedocarpa* tall sparse shrubland over *Eremophila fraseri* subsp. *fraseri, Acacia tetragonophylla, Rhagodia eremaea, Teucrium teucriiflorum* sparse shrubland over *Ptilotus obovatus, Menkea villosula, Goodenia tenuiloba* low sparse to open shrubland; understory denser under pockets of trees. Not representative of PEC.	71.4	48.4
2	*Acacia pruinocarpa* mostly absent; *Harnieria kempeana* subsp. *muelleri*, *Acacia* sp. Weld Range occasional *Acacia incurvaneura, A. pteraneura, Acacia aptaneura, Grevillea berryana* tall open shrubland over *A. ramulosa* var. *linophylla, Ptilotus rotundifolius, Eremophila fraseri* subsp. *fraseri, E. glutinosa, E. forrestii* subsp. *forrestii* sparse shrubland over *Eragrostis eriopoda, Ptilotus aervoides, Erodium cygnorum,* low sparse tussock grassland. Representative of PEC – aligns with Community 3 identified by Markey & Dillion (2008)	37.1	30.0
3	*Acacia ramulosa var. linophylla, A. rhodophloia* isolated tall shrubs over *Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *latrobei, Acacia ramulosa* var. *linophylla, Harnieria kempeana* subsp. *muelleri, Sida s*p. Golden calyces glabrous open shrubland over *Erodium cygnorum, Goodenia tenuiloba* Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	62.2	45.4
4	*Acacia pruinocarpa, A. incurvaneura* isolated trees over *Eremophila latrobei* subsp. *latrobei, Dodonaea pachyneura, Philotheca brucei* subsp. *brucei, Prostanthera petrophila, Tribulus suberosus* open shrubland over *Ptilotus obovatus, Micromyrtus sulphurea, Eremophila latrobei* subsp. *latrobei, Dysphania rhadinostachya* subsp. *rhadinostachya, Stylidium longibracteatum, Goodenia tenuiloba, Hysterobaeckea occlusa* low open shrubland/ low open forbland. Representative of PEC – aligns with Communities 1b and 2 identified by Markey & Dillion (2008)	8.4	5.7
5	*Acacia incurvaneura* low open woodland/ tall sparse shrubland over *Acacia* sp. Weld Range*, Eremophila macmillaniana* tall sparse shrubland over *Eremophila macmillaniana, Senna glaucifolia, Ptilotus rotundifolius* open shrubland over *Eremophila forrestii* subsp. *forrestii, E. macmillaniana, Hibiscus sturtii* low sparse shrubland over *Maireana melanocoma, Ptilotus aervoides, Goodenia tenuiloba* low sparse chenopod shrubland. Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	46.3	29.5
6	*Acacia incurvaneura, A. pruinocarpa, A. fuscaneura* low woodland over *Acacia ramulosa* var. *linophylla, Psydrax latifolia* tall open shrubland over *Eremophila forrestii* subsp. *forrestii, E. georgei, Rhagodia eremaea, Senna artemisioides* subsp. *xsturtii, S. glutinosa* subsp. *xluerssenii* shrubland over *Erodium cygnorum, Tetragonia cristata, Isoetopsis graminifolia, Menkea villosula, Cheilanthes sieberi* subsp. *sieberi* low forbland. Not representative of PEC.	60.1	24.3
7	*Acacia incurvaneura, A.* sp. Weld Range, *A. speckii* tall sparse shrubland over *Ptilotus rotundifolius, Eremophila fraseri, E. latrobei, Senna artemisioides* subsp. *helmsii* sparse shrubland over *Sida ectogama, Ptilotus aervoides, P. schwartzii , Erodium cygnorum l*ow sparse shrubland. Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	37.5	3.7
8	*Acacia incurvaneura, A. pruinocarpa* tall open shrubland over *Acacia ramulosa, Eremophila latrobei, Scaevola spinescens, Senna glaucifolia,* sparse shrubland over *Eremophila latrobei, Stenanthemum mediale, Sida ectogama, Micromyrtus sulphurea* low sparse	16.7	1.8

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)
	shrubland. Representative of PEC – aligns with Community 2 identified by Markey & Dillion (2008)		
9	*Acacia pruinocarpa* low woodland/ *Acacia incurvaneura, A. ramulosa* tall open shrubland over *Eremophila simulans, E. georgei, E. forrestii* open shrubland patches in tall open shrubland of *Acacia incurvaneura* and *A. ramulosa.* Not representative of PEC.	231.0	66.3
10	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa, A. ramulosa* var. *linophylla, Grevillea berryana,* low open woodland/ tall open shrubland over *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *filifolia, Acacia* spp. open shrubland over *Eremophila jucunda* subsp. *jucunda, E. forrestii* subsp. *forrestii, E. simulans* subsp. *simulans, Sida ectogama, S.* sp. Golden calyces glabrous, *Ptilotus schwartzii, Eragrostis eriopoda* low sparse shrubland. Not representative of PEC.	129.5	9.1
11	*Acacia pruinocarpa, A. incurvaneura* open forest over *Glycine canescens, Santalum spicatum*, Psydrax latifolia vineland/ *Acacia ramulosa, Glycine canescens, Psydrax latifolia, Eremophila forrestii var. hastieana* open shrubland over S*ida ectogama, Ptilotus obovatus, Rhagodia eremaea* low shrubland. Not representative of PEC.	11.3	1.6
12	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa l*ow woodland*/ A. tetragonophylla, A. craspedocarpa, Psydrax latifolia* tall open shrubland*/ Eremophila forrestii* var. *forrestii* or var. *hastieana, A. ramulosa, Eremophila georgei* shrubland*/ Sida ectogama, Cheilanthes sieberi* low shrubland. Not representative of PEC.	89.2	6.6
13	*Acacia pruinocarpa* low isolated trees over *Acacia incurvaneura, A. tetragonophylla* tall sparse shrubland over *Acacia ramulosa* var. *linophylla, A. incurvaneura, Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *latrobei, E. georgei* open shrubland over *Eremophila georgei, E. foliosissima, Ptilotus schwartzii, Stenopetalum filifolium, Menkea villosula, Isoetopsis graminifolia* low open forbland Not representative of PEC.	410.3	33.7
14	*Acacia aptaneura, A. grasbyi* low open woodland over *Eremophila pantonii, Acacia aptaneura, Senna glaucifolia* sparse shrubland over *Maireana thesioides, M. triptera, Senna glaucifolia* low open chenopod shrubland. Not representative of PEC.	9.4	0.7
15	*Acacia aneura, A. sp. Weld Range* tall isolated shrubs over *Eremophila macmillaniana, Acacia* sp. Weld Range*, Acacia speckii* sparse shrubland over *Cephalipterum drummondii, Sida ectogama, Aristida contorta* low sparse forbland. Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	43.5	3.5
16	*Acacia pteraneura, A. fuscaneura* tall open shrubland over *Acacia fuscaneura, Grevillea deflexa, Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Calytrix desolata, Grevillea deflexa* low sparse shrubland over *Calytrix desolata, Grevillea deflexa* low sparse shrubland over *Cymbopogon ambiguus* low sparse tussock grassland. Not representative of PEC.	24.2	2.2
CL	Cleared areas	20.9	8.8
	Total	**1,309.2**	**321.4**

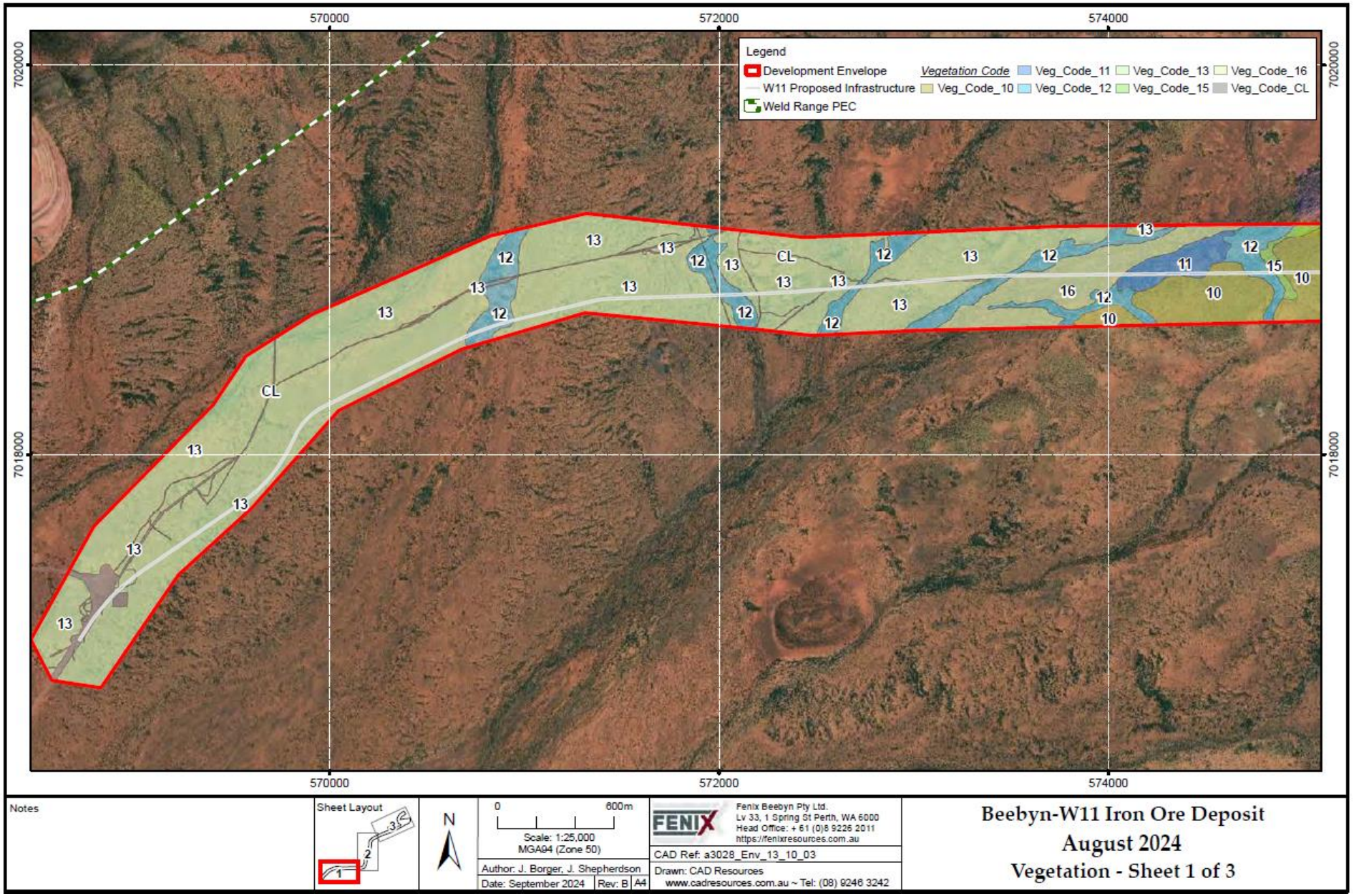


Figure 3.4: Vegetation types associated with the project area – map 1 of 3.

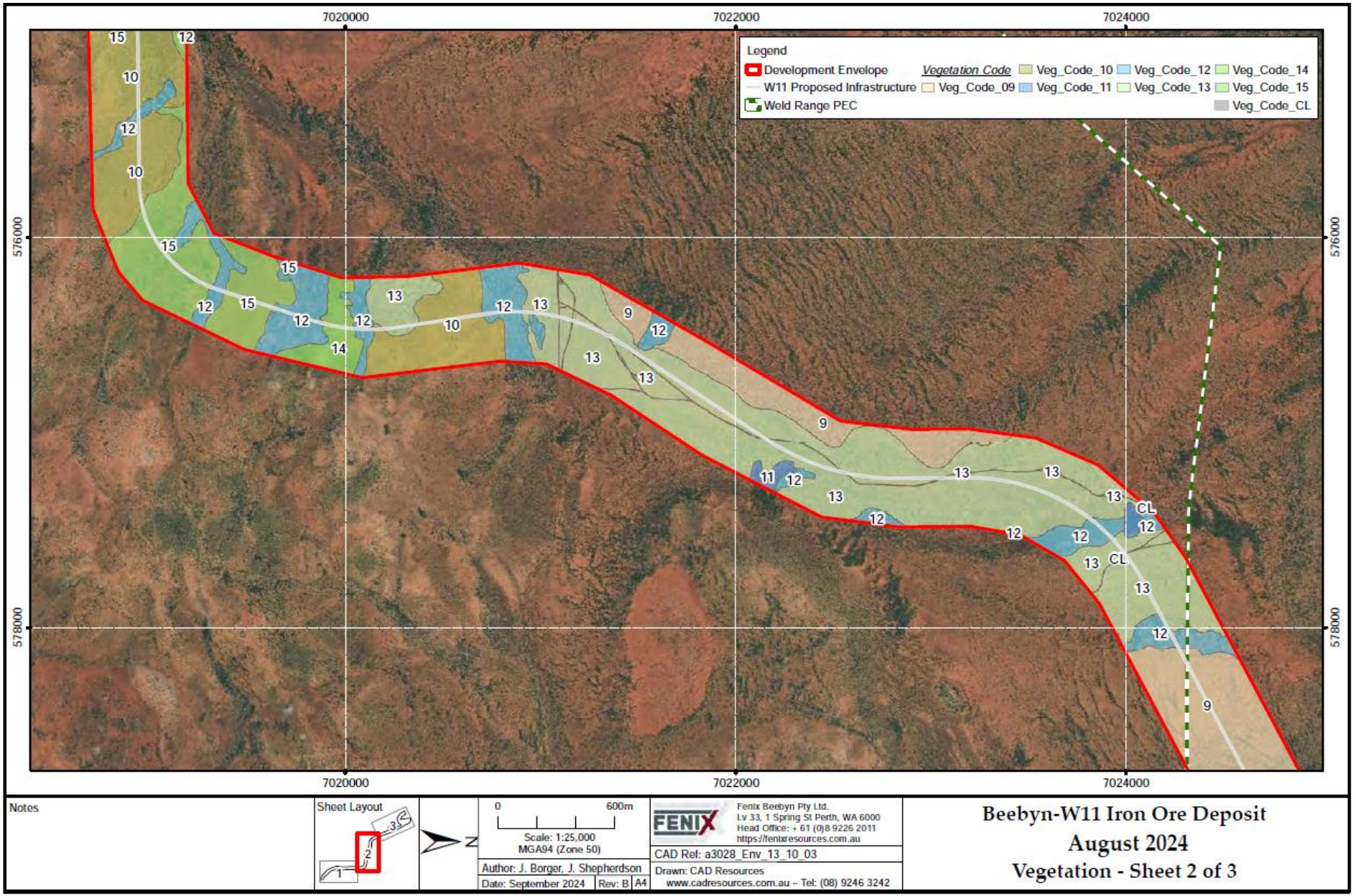


Figure 3.5: Vegetation types associated with the project area – map 2 of 3.

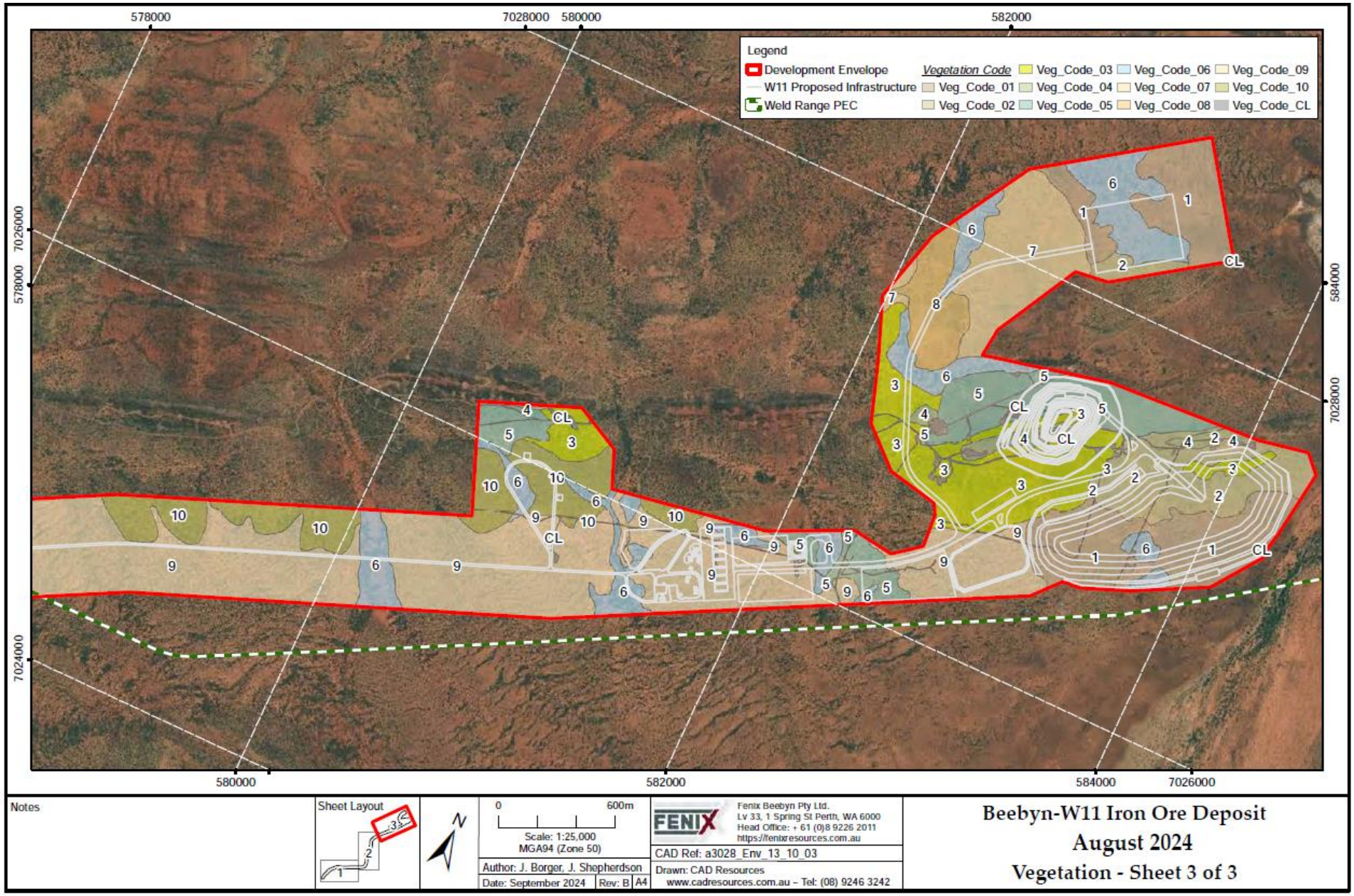


Figure 3.6: Vegetation types associated with the project area – map 3 of 3.

3.5 Significant vegetation and ecological systems

No State (DBCA) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area.

The project area partly coincides with the Priority 1 Priority Ecological Community (PEC) Weld Range Vegetation Complexes (banded ironstone formation). Figure 3.4 to Figure 3.6 show the PEC boundary and vegetation in relation to the proposed project layout. The PEC boundary defined by DBCA includes a 500 m "administrative buffer", which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.3% of this area.

Vegetation types 2, 3, 4, 5, 7, 8 and 15, as identified by Ecotec (2024) correspond to the PEC as delineated by DBCA (2019), with 116.1 ha of disturbance proposed for the project occurring within the PEC, inclusive of the buffer zone (Table 3.6).

Table 3.6: Proportion of project area in PEC (excluding existing disturbance).

Vegetation Code	Disturbance Envelope in PEC (ha)
2	30.0
3	45.4
4	5.7
5	29.5
7	3.7
8	1.8
15	-
Total	**116.1**

3.6 Introduced flora

The desktop survey identified nine introduced (weed) species as potentially occurring within a 30km radius of the project area. No introduced flora were recorded in the project area during the survey by APM (2024); however, Ecotec (2024) recorded one during the August survey (*Oxalis* ?*corniculata*). Additionally, *ecologia* (2010b) recorded five introduced (weed) species in the surrounding area and Ecotec (2021 and 2022) recorded eight weed species at the nearby Iron Ridge project. None of the weed species are listed as Weeds of National Significance. While not previously recorded in the Beebyn-W11 project area, *Rumex vesicarius* is listed as a Declared Pest on the Western Australian Organism List (Department of Primary Industries and Regional Development [DPIRD] 2024) and has been recorded at the Iron Ridge project (Ecotec 2022). Table 3.7 lists the weed species known from the surrounding area.

Table 3.7: Weed species recorded and potentially occurring in the project area.

Scientific name	Common name	Known occurrence
Lysimachia arvensis	Pimpernel	Iron Ridge (Ecotec 2022)
Brassica napus	Canola	Iron Ridge (Ecotec 2022)
Cenchrus ciliaris	Buffel grass	Surrounding area (*ecologia* 2010b)
Centaurea melitensis	Maltese cockspur	Iron Ridge (Ecotec 2022)
Cuscuta epithymum	Lesser Dodder	Surrounding area (*ecologia* 2010b)
Cuscuta planiflora	Small seeded dodder	Iron Ridge (Ecotec 2021)
Oxalis ?corniculata	Yellow wood sorrel	Project area (Ecotec 2024)
Portulaca oleracea	Purslane	Surrounding area (*ecologia* 2010b)
Rostraria pumila	Rough cats' tail	Iron Ridge (Ecotec 2021)
Rumex vesicarius	Ruby dock	Iron Ridge (Ecotec 2022)
Solanum nigrum	Black berry nightshade	Surrounding area (*ecologia* 2010b)
Sonchus asper	Rough sow thistle	Iron Ridge (Ecotec 2022)
Sonchus oleraceus	Common sow thistle	Iron Ridge (Ecotec 2022), surrounding area (*ecologia* 2010b)

3.7 Fauna and habitat

ecologia (2010a) undertook a Level 2 vertebrate survey of the project area and surrounds over four site visits between 2006 and 2007; recording 148 vertebrate species in and around the project area, including 80 bird species, 44 reptiles, 23 mammals (17 native and six introduced) and one amphibian.

Twenty vertebrate fauna species and two invertebrate species of conservation significance were identified from database searches of a 30 km radius from the study area including seven mammals, 11 birds and two reptiles (APM 2024). Species listed as Marine or species not known to inhabit terrestrial environments are considered very unlikely to inhabit the project area and have been excluded from further discussion. Table 3.8 provides a summary of those conservation significant species occurring or likely to occur within the Project area. Previously recorded locations of conservation significant fauna are presented in Figure 3.7.

At the Weld Range, the long-tailed dunnart has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex (*ecologia* 2009a). Within the project area, APM (2024) found suitable habitat exists in the Banded Ironstone and Drainage Line habitats.

Old, inactive malleefowl mounds have been recorded in the project area; however, mounds may last decades after abandonment and the presence of inactive mounds is not a reliable indication of current presence. The species is not expected to be a resident at Weld Range but may persist in surrounding areas of unburnt habitat (APM 2024).

The project area is on the northernmost extent of malleefowl distribution at this longitude in WA, and the closest records are over 50 km to the south. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or

near the larger drainage features low in the plains (APM 2024). The Drainage Line habitat represents a small portion of the total project disturbance area (<15%).

Ecotec undertook a habitat and targeted conservation significant fauna survey of the project area in August 2024. Nine possible extinct (long unused and unlikely to be used again, low and flat profile without a peak or crater) malleefowl mounds were recorded during the survey (Figure 3.8). While it is considered reasonably likely that the structures observed are long-extinct mounds, it is possible that some are former rabbit warrens or even geologic formations. If they were constructed by malleefowl they have not been used for decades (Ecotec 2024).

The project area is likely to have supported malleefowl in the past but is now at the northern extent of the species' range. Suitable habitat requirements include dense vegetation with abundant leaf litter, which is used to fill the mounds to incubate the eggs as it composts. The survey area now lacks much of the understorey biomass that was once present (as a result of grazing on the pastoral station) and is therefore lacking in leaf litter, food resources and cover provided by denser vegetation. It was concluded that malleefowl are unlikely to occur in the project area (Ecotec 2024).

The project area contains some large trees that may be suitable for development of hollows by the Southern whiteface (a bird listed as Vulnerable); however, the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats, and historic clearing for mining exploration. The understory is sparse and the litter layer sparse to absent, but thicker in narrow bands around the drainage lines. Due to the poor condition of the understory, the area is unlikely to host habitat critical to the survival of the Southern whiteface (APM 2024).

Suitable foraging habitat for the grey falcon is present within the area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Known records are more than 50 km away and whilst the grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species (APM 2024).

The Western spiny-tailed skink typically resides in family groups in coarse woody debris, such as fallen log piles (Bradley et. al 2022) or, in inland areas, burrows under boulders and exfoliated sheets of granite (*ecologia* 2010; Ecotec 2024). This species is generally easy to detect as the animals use a communal latrine which persists for many months even when the animals are concealed or absent. The species was not recorded in the project area during the recent fauna surveys (APM 2024; Ecotec 2024).

The West Coast mulga slider has been recorded in Weld Range including locations close to the project area; however, APM (2024) found the habitats within the project area were generally of poor quality. Leaf litter is scarce within the project area and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable.

ecologia conducted a targeted *Idiosoma nigrum* survey at Weld Range (ecologia 2009b), which included a collection of detailed data on the spider's demography, population structure and habitat preference. A total of 76 ha was surveyed for *Idiosoma nigrum*, with 1,708 burrows found, all within the boundaries of drainage lines and underneath Acacia vegetation, predominately on the southern face of hill slopes. Within the Beebyn-W11 project area, 393 burrows were recorded, with an estimated population size of 274 ± 197 individuals (*ecologia* 2009b).

Biologic Environmental Survey Pty Ltd (Biologic) undertook a status review of the species in April 2019 and confirmed that the trapdoor spider found in the Weld Range area is now regarded as *Idiosoma clypeatum*, a Priority 3 species under the WA Biodiversity Conservation Act (Biologic 2019). The letter report provided by Biologic is included in Appendix 1.

Intensive targeted surveys have previously been conducted throughout the Weld Range when the northern shield-backed trapdoor spider was regarded as *I. nigrum* and listed as a Vulnerable species under the *WA Wildlife Conservation Act 1950*. Over 1800 trapdoor burrows have been identified from database searches, the majority of which are from within the Weld Range. Biologic (2012) estimated the population size of *I. clypeatum* across the Weld Range to be more than 14,000 individuals. The Biologic report is included in Appendix 1.

Ecotec (2024) found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees and shrubs in areas where there is evidence of surface water sheet flow or in denser vegetation adjacent to ephemeral drainage.

Ecotec undertook searches of the main areas of Drainage Line habitat, which is present from the western end of the W11 infrastructure area and along the haul road route. Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey. None were located within the proposed disturbance footprint.

Several previous records (as identified by Ecologia (2009b)) within the proposed footprint and associated mainly with south-facing slopes were investigated by Ecotec during the 2024 survey. No evidence of trapdoor burrows was located at the time of the survey. Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions (Ecotec 2024).

The location of recorded *I. clypeatum* burrows in relation to the proposed disturbance is presented in Figure 3.9. The proposed Beebyn-W11 project avoids disturbance to all known burrows (as recorded by Ecotec 2024). The Ecotec report is included in Appendix 1.

Table 3.8: Conservation significant fauna likelihood of occurrence.

Common name	Scientific name	EPBC status	WA status	Comments	Likelihood of occurrence
Mammals					
Bilby	*Macrotis lagotis*	VU	VU	The local record has a low level of certainty and was recorded in 1984.	Unlikely
Black-flanked rock-wallaby	*Petrogale lateralis lateralis*	EN	EN	Historical local record is a fossilised specimen	Unlikely
Brush-tailed mulgara	*Dasycercus blythi*		P4	Historical local record is a fossilised specimen	Unlikely
Ghost bat	*Macroderma gigas*	VU	VU	Historical local record is a fossilised specimen	Unlikely
Gould's mouse	*Pseudomys gouldii*	VU	VU	Historical local record is a fossilised specimen	Unlikely
Greater stick-nest rat	*Leporillus conditor*	VU	CD	Historical local record is a fossilised specimen	Unlikely
Long-tailed dunnart	*Antechinomys longicaudata*		P4	Suitable habitat present in the BIF	Recorded
Birds					
Curlew sandpiper	*Calidris ferruginea*	CR, MI	CR	No suitable habitat present	Unlikely
Fork-tailed swift	*Apus pacificus*	MI	IA	All habitats suitable, predominantly a coastal non-breeding visitor to Australia. Project area is outside of likely habitat range.	Unlikely
Grey falcon	*Falco hypoleucos*	VU	VU	Suitable foraging habitat present. No suitable nesting habitat.	Possible
Grey wagtail	*Motacilla cinerea*	MI	MI	No suitable habitat present	Unlikely
Malleefowl	*Leipoa ocellata*	VU	VU	Inactive mounds have been recorded	Possible
Night parrot	*Pezoporus occidentalis*	EN	CR	No suitable habitat present	Unlikely
Pectoral sandpiper	*Calidris melanotos*	MI	IA	No suitable habitat present	Unlikely
Peregrine falcon	*Falco peregrinus*		OS	Foraging habitat present	Possible
Sharp-tailed sandpiper	*Calidris acuminata*	VU, MI	IA	No suitable habitat present	Unlikely
Southern whiteface	*Aphelocephala leucopsis*	VU	-	All habitats suitable, project area unlikely to host habitat critical to survival.	Possible
Yellow wagtail	*Motacilla flava*	MI	MI	No suitable habitat present	Unlikely
Reptiles					
West coast mulga slider	*Lerista eupoda*		P1	Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.	Possible
Western spiny-tailed skink	*Egernia stokesii badia*	EN	VU	No granite outcrops are present but suitable habitat may be present in the BIF outcrops	Possible
Invertebrate					
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*		P3	Recorded within the study area, then identified as *I. nigrum*	Recorded
Shield-backed trapdoor spider	*Idiosoma nigrum*	VU	EN	All specimens in the Murchison region determined to be *I. clypeatum*	Unlikely

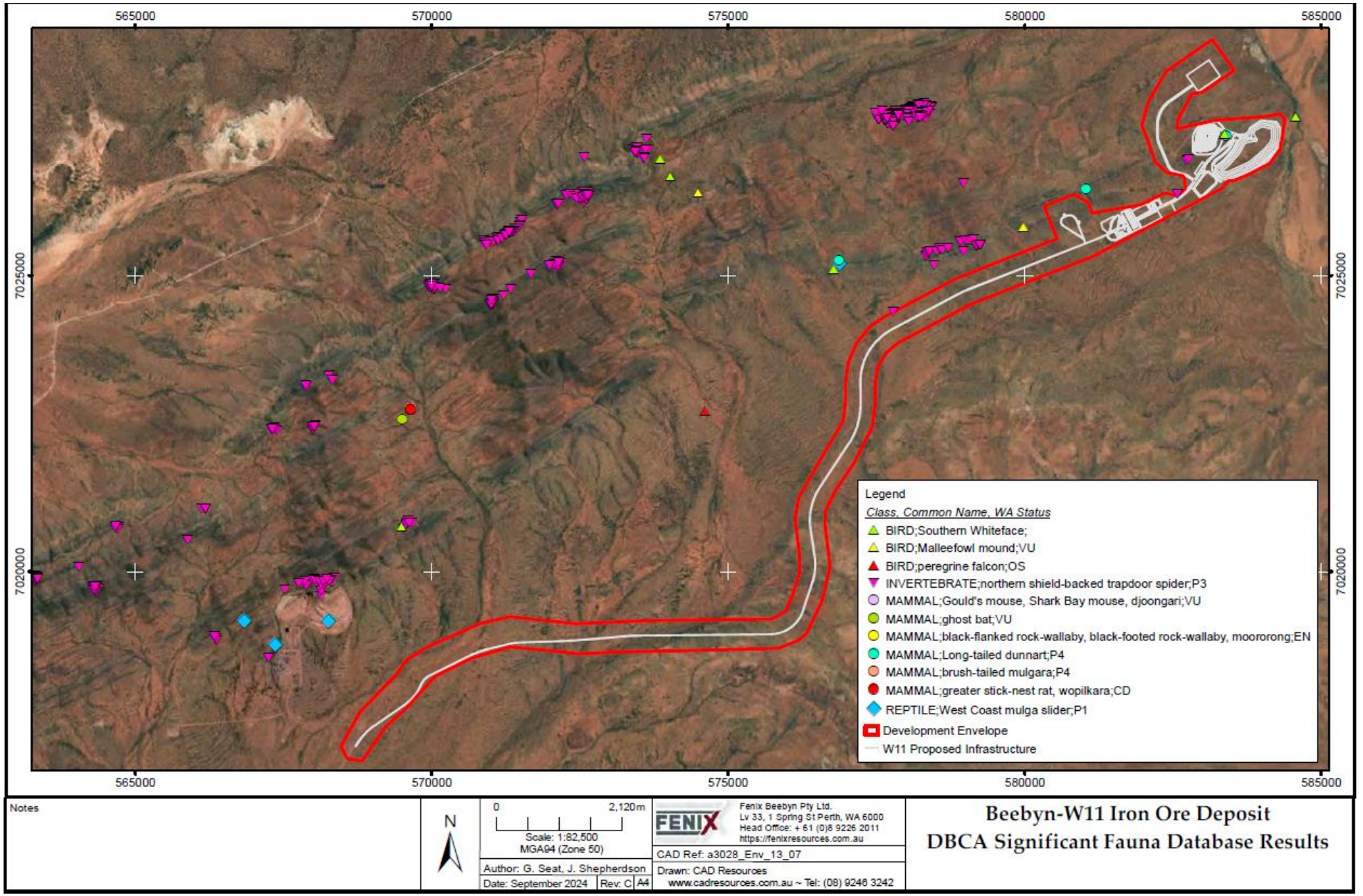


Figure 3.7: Database search records of conservation significant fauna within 30 km of the project area.

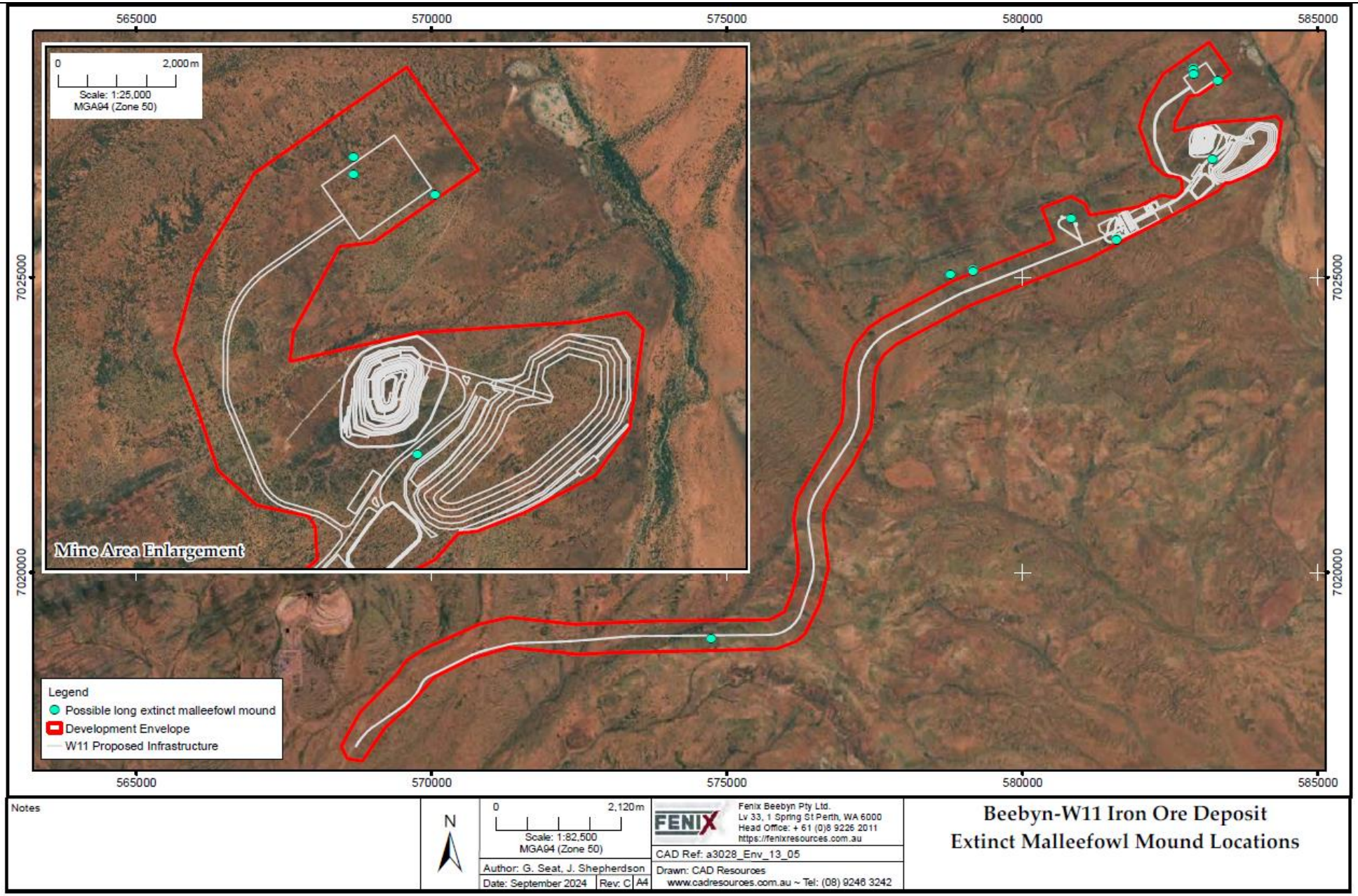


Figure 3.8: Possible extinct malleefowl mounds recorded in the project area.

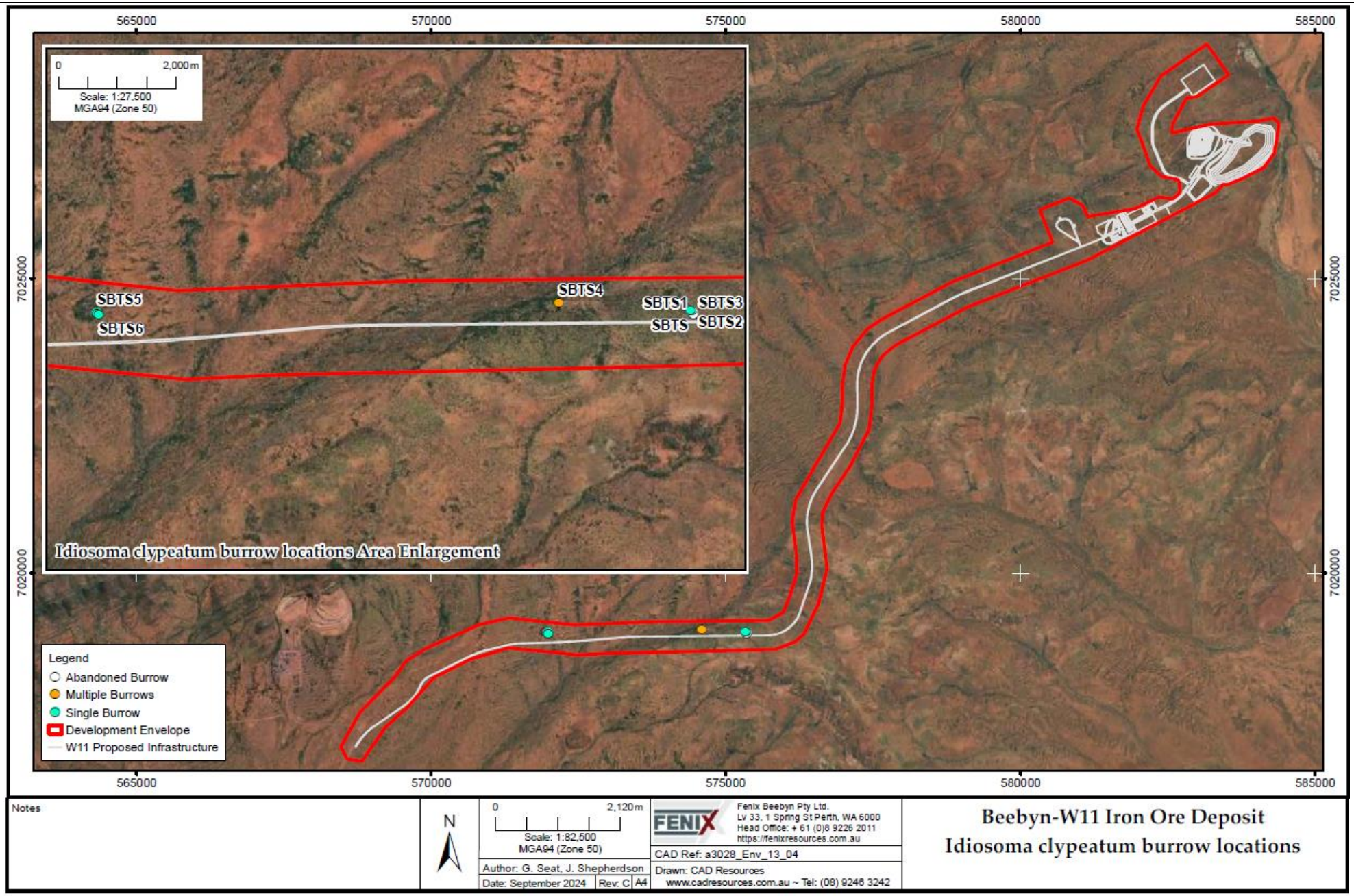


Figure 3.9: Recorded *Idiosoma clypeatum* locations in the Beebyn-W11 project area.

APM (2024) identified four main habitat types in the project area, described in described in Table 3.9 and shown on Figure 3.10. The habitat types are similar to those identified at the nearby Iron Ridge project (*ecologia* 2020a, Appendix 1). Approximately 122 ha were not covered in the survey undertaken by APM and was assessed by Ecotec in a follow-up survey (Ecotec 2024). The Ecotec survey confirmed the habitat aligned with *Mulga Woodland on Hill Slope* and *Acacia Sand Plain*.

Table 3.9: Fauna habitat recorded in the study area.

Habitat type	Development Envelope (ha)	Disturbance Envelope (ha)	Beebyn-W11 impact to local area (%)
Acacia Sand Plains	709.1	105.7	14.9
Rocky ridge or outcrop	118.2	41.4	35.0
Drainage Line	160.7	32.6	20.3
Acacia (Mulga) on Hill Slope	300.3	132.9	44.3
Disturbed	20.9	8.8	-
Total	**1,309.2**	**321.4**	**-**

Acacia Sand Plains habitat occurs predominantly on the lower slopes of the study area, where the haul road is proposed to be developed. Associated soils include sandy to lightly rocky clay loam. The project will result in localised impact to this habitat.

Mulga Woodland on Hill Slope habitat is dominated by *Acacia pruinocarpa* trees and *Acacia aneura* shrublands over on sandy or stony clay loam on hill slopes and is the most widespread habitat present in the area. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider. This habitat is considered widespread in the Weld Range area. Most disturbance associated with the project will occur in this habitat type; therefore, impact to a localised area will result from the proposed development.

Drainage Line habitat provides suitable habitat for the west coast mulga slider. Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range in leaf litter fringing drainage lines. A limited extent of this habitat exists around the project area and the project will result in localised impact to this habitat.

Rocky ridge or outcrop habitat occurs in a small portion in the north of the project area and is the least widespread habitat present in the area. The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas, such as this habitat type. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes. Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory). The species was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats, especially banded iron formation ranges within the Midwest. A limited extent of this habitat exists around the project area and the project will result in localised impact to this habitat.

3.8 Introduced fauna

Seven species of introduced mammal have previously been recorded around the project area. These include the dog, European red fox, feral cat, rabbit, house mouse, goat and cow. Goats, both feral and raised as pastoral stock, are known to generate high grazing pressure on the native vegetation of parts of the Weld Range.

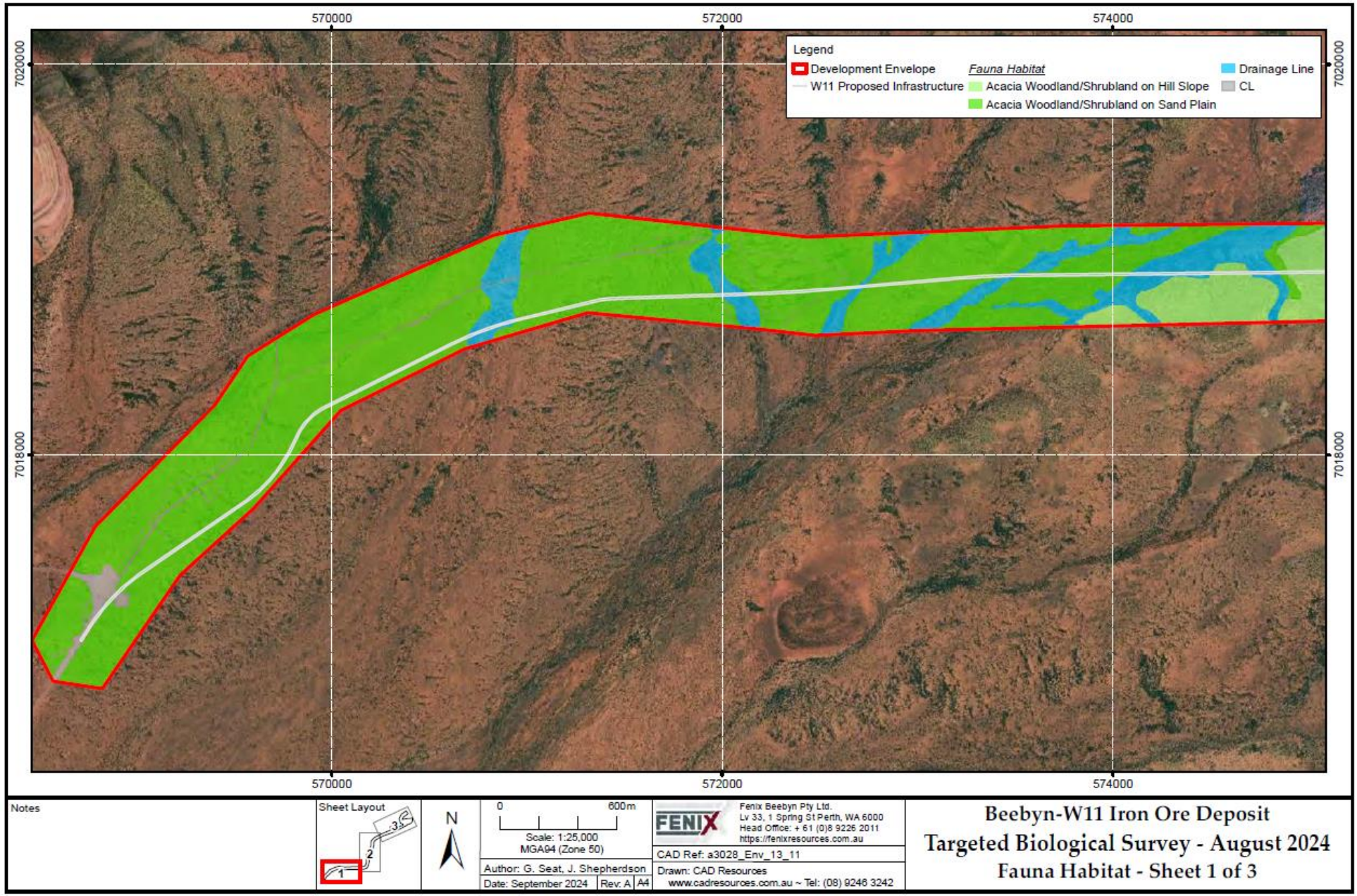


Figure 3.10: Fauna habitat in the project area – map 1 of 3.

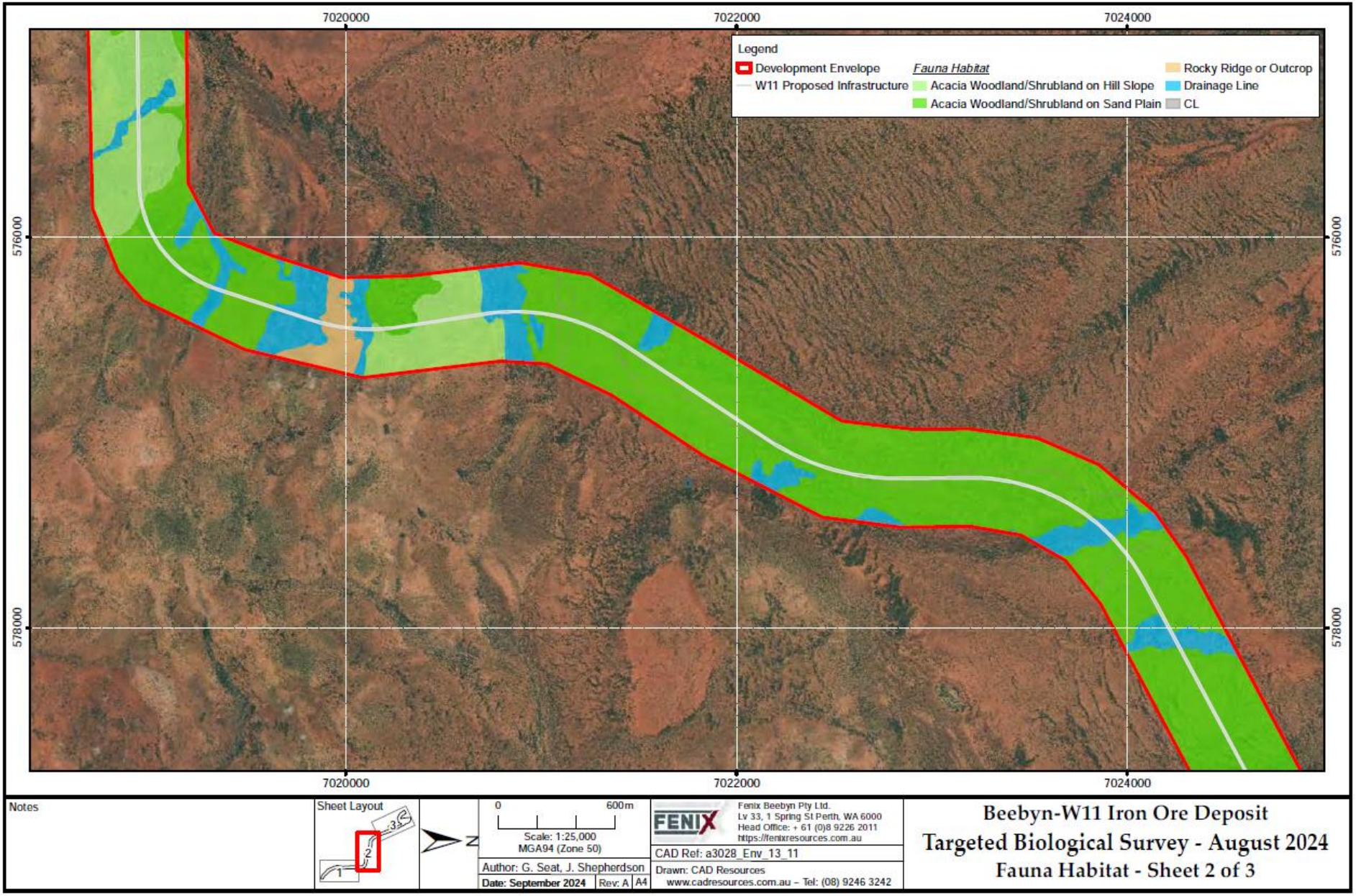


Figure 3.11: Fauna habitat in the project area – map 2 of 3.

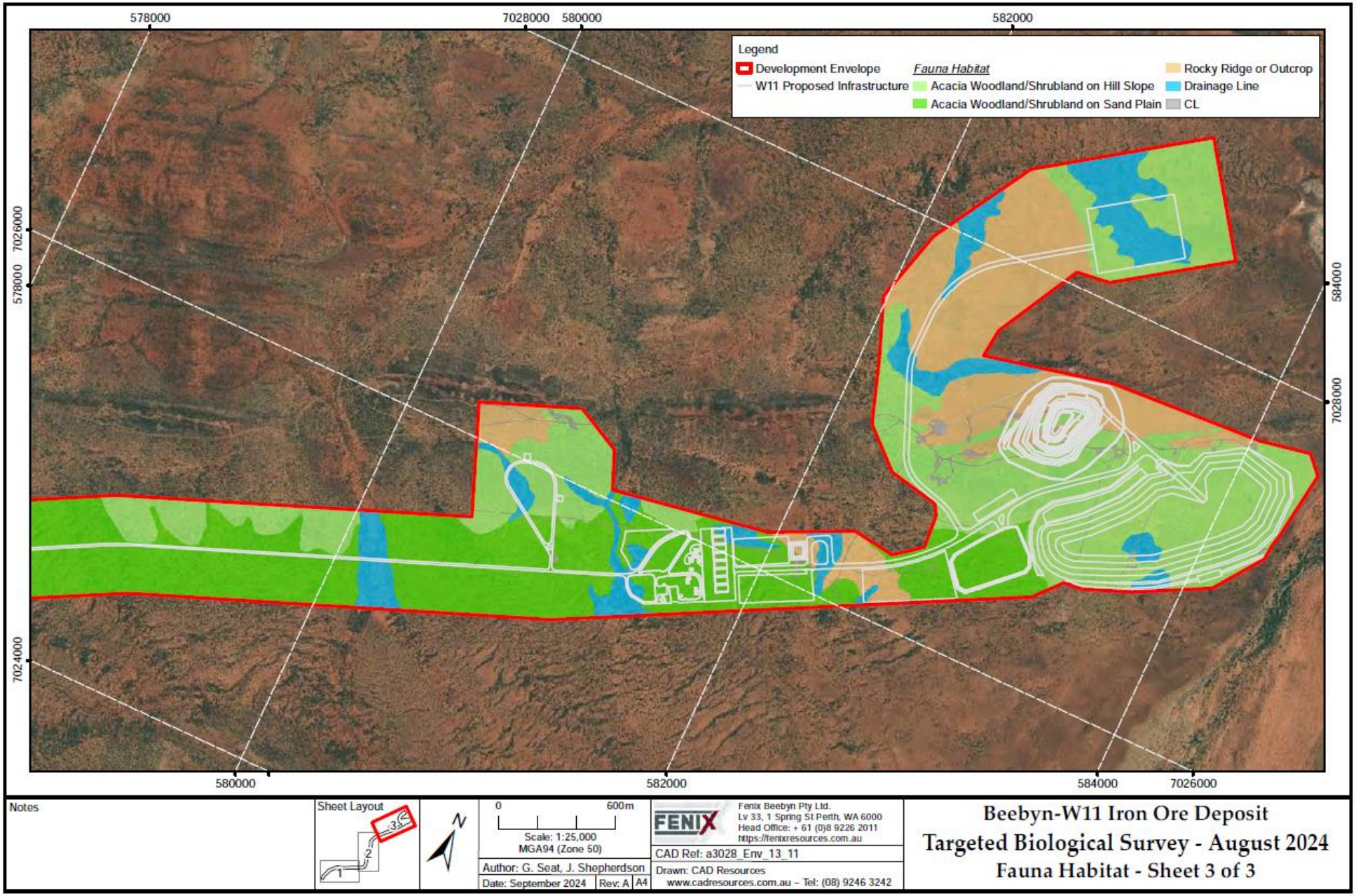


Figure 3.12: Fauna habitat in the project area – map 3 of 3.

3.9 Short-range endemics and subterranean fauna

Short-range endemics (SREs) are those fauna that have a naturally small range of less than 10,000 km^2. In addition, these species possess similar ecological traits including poor powers of dispersal, confinement to specialised often discontinuous habitats, slow growth and low fecundity (*ecologia* 2020b).

A potential SRE from a species complex *Cethegus* 'fugax'(curtain web spider) was identified during the *ecologia* survey (2010a). The geographic distribution of *Cethegus* fugax complex extends from the sub coastal areas along the Nullabor Plain to south-western Australia and near the coast as far north as Geraldton. Both morphological and genetic studies confirmed that *Cethegus* at Weld Range belonged to a new, undescribed species. Aerial dispersal may possibly enable *Cethegus* to escape disturbance on a very local scale (i.e. < 1km) but it does not function as a long‐distance vector (*ecologia* 2010a). It is found in shaded microhabitats, mostly associated with vegetated areas on southern slopes (*ecologia* 2009c).

Three records of *Cethegus* 'fugax' were recorded in the project area, to the west of the proposed laydown area and outside the disturbance footprint. An additional 33 records occur further to the west of the Beebyn-W11 project area (*ecologia* 2010a). Impact to this species as a result of project implementation is expected to be negliglible.

Invertebrate Solutions (2024) undertook a desktop review of *Cethegus* fugax distribution and species limit to determine the potential for this species to be SRE. Since the ecologia (2010a) survey, *C. fugax* has been recorded much further north than Geraldton and are known to occur throughout the Mid-West, with populations known from both Weld Range and Robinson Range (Invertebrate Solutions 2024).

Review of genetic data and analysis found the population of Mid-West *C. 'fugax'* show some genetic structuring by geographical location; however, the assertion that these represents distinct subspecies is not supported by the data, as the analysis shows weak support for most of the clades and no morphological differences were evident. It is to be expected that some genetic structuring over the wide geographical distances between population in the Mid-West would be present, and a similar pattern of genetic structuring was found with the widespread *Idiosoma clypeatum* (Rix et al. 2018) occurring throughout the Mid-West (including Weld Range and Jack Hills) when the genus was revised. *Idiosoma clypeatum* shows similar clumped distributions around Weld Range and Jack Hills with similar levels of genetic structuring to that seen in C. 'fugax – Mid west' and was ultimately described as a single widespread species due to the similar morphological characters of the populations and the genetic distances being below interspecific variation (Invertebrate Solutions 2024).

Invertebrate Solutions found that the genetic and morphologic data obtained by *ecologia* support the existence of an undescribed species of *Cethegus* in the Mid-West, however the species is widespread, and based upon current records is not considered to be an SRE. The Invertebrate Solutions report is included in Appendix 1.

In 2009 *ecologia* conducted a baseline stygofauna survey at Weld Range and surrounding pastoral land, which included sampling 84 drill holes (26 at Beebyn-W11, 40 at Madoonga and 18 at the surrounding pastoral land outside the proposed area of impact), laboratory identifications and reporting, interpretation of the potential impacts and an associated risk assessment of the various project components on stygofauna communities or species (*ecologia* 2010a and 2020b).

No stygobitic species or communities were identified during the stygofauna survey within the Beebyn-W11 impact area or in the regional pastoral bores, although stygophylic representatives of two crustacean orders (Ostracoda and Copepoda) and one annelid sub-class were recorded from nine pastoral wells. One stygobitic copepod from the order Calanoida found in a troglofauna trap at Madoonga suggests that stygofauna may be present in the wider area, though this was not able to be confirmed by stygofauna sampling in nearby bores. The stygophilic copepod found in regional bores, *Mesocyclops brooksi*, is known from both surface waters and ground waters, and it is widespread in Western Australia. The ostracods, *Cypridopsis vidua* and *Sarscypridopsis oschracea* are often found in wells in arid Western Australia but are typically surface species inhabiting open freshwater bodies in southern Western Australia. The results of the 2009 survey suggest that the groundwater habitat in and around the Beebyn impact area is depauperate of true stygofauna and therefore no risk assessment or management recommendations were necessary (*ecologia* 2010a and 2020b).

The *ecologia* stygofauna report is included in Appendix 2.

Ecologia also conducted a two phase troglofauna study of the project area and surrounds in 2007 and 2008,

sampling 143 bore holes (50 at Beebyn-W11, 51 at Madoonga and 42 outside the then proposed area of impact).

A single centipede specimen (likely from the Cryptopidae family) was collected from a single bore within the Beebyn-W11 area. Cryptopids have been collected elsewhere in Western Australia; however, no records exist near Weld Range or other ranges in the Midwest region (*ecologia* 2011). The presence of this species was not confirmed elsewhere in the survey despite a comprehensive number of bores being sampled. Furthermore, no other troglobitic species were found in the survey area.

Examination of the bore hole with the troglofauna record showed that the hole contained at least two geological strata with voids suitable for troglofauna habitation. The most common stratum was dolerite, and this habitat has been classified as 'suitable' due to its common fractures. The other stratum was Banded Iron Formation (BIF), which showed some degree of porosity but was mostly located below the water table and thus its use for troglofauna was assessed as not suitable. The suitable troglobitic habitat (dolerite) is widespread throughout the range. Additionally, both dolerite and BIF strata are continuous to the west from the project area and also occur in the Wilgie Mia Aboriginal Reserve. Impact on the potential troglofauna habitat at Weld Range as a result of the Beebyn-W11 project is expected to be low.

3.10 Hydrology

3.10.1 Surface water

Weld Range rises above the centre of a drainage basin that is surrounded in the north by topographically higher flat‐topped breakaways. The main drainage lines converge at the southeastern part of the basin on its western path to form the Sanford River, a tributary of the Murchison River. The major drainage line (Berhing Creek) drains through the Weld Range to the west of the proposed project area (*ecologia* 2010a).

Rainwater falling in the area drains quickly off the Weld Range ridges through narrow channels which widen substantially as the water drains onto the flatter areas, in some cases forming pans. In the flatter areas the flow of water can become ambiguous with streams dividing, in some cases the divisions flow in quite different directions. The bed conditions of the main channels of all watercourses comprise of coarse sand, rocks and cobbles; whilst the banks comprise silty sand which is easily eroded.

Pentium Water Pty Ltd (Pentium) was commissioned by Fenix to undertake a surface water assessment of the potential impact of flood flows on the mining area and to determine any bunding and drainage requirements for the mining area and infrastructure (Pentium 2024).

The infrastructure area lies on the southern end of one major catchment (Beebyn Creek) with an area of approximately 225 km^2 (Figure 3.13). The ephemeral watercourse draining this catchment area flows south through Beebyn Gap (Pentium 2024).

Detailed flood flows using the HECRAS model found the Beebyn Creek comprised one main channel running south past the proposed Beebyn-W11 infrastructure. Critical duration for the Beebyn Creek was 36 hours (Pentium 2024). The estimated 20, 50 and 100 year average recurrence interval (ARI) design peak flows are shown in Table 3.10.

Table 3.10: Adopted design flows from HECRAS modelling.

ARI (years)	Adopted design flows (m^3/sec)
20	150
50	235
100	312

Analysis of the impact of a 1% AEP rainfall event found that Beebyn Creek floods to about 1m deep as it flows past the Beebyn-W11 project site but does not impact mine infrastructure. The 1% AEP flood extent encroaches to within approximately 170m of the pit and waste dump (Figure 3.14).

The mine generally lies near the top of a ridge, and catchments and surface water flows impacting site infrastructure are relatively small. A standard pit bund will be sufficient to prevent surface water flows from entering the pit (Pentium 2024).

Minor flow paths run through the site and the proposed pit, waste dump and plant boundaries; therefore, these areas will require drainage management to prevent ponding. The diversion channel and bunds required are all minor. Ponding against the northern side of the waste dump may occur, depending on the development and configuration of the waste dump, and in the operational phase, will evaporate and infiltrate in situ (Pentium Water 2024). Provision has been made for a diversion channel in this area if required.

The borrow pit was included in the mine design after the surface water assessment was completed. The borrow pit lies outside any catchment flow paths and will not impact surface water flows or require surface water management infrastructure.

Several flow paths cross the proposed road route (Figure 3.15), with a 1% AEP peak flow ranging from 0.7 (CS_08) to 28 m^3/s (CS_04). Fenix is currently undertaking a lidar survey to accurately design the road and waterway, however, due to the short life of mine and relatively small catchments, Pentium (2024) concluded that floodways (with culverts if required) would be suitable. The length of floodways may be determined by the selected design flood event and permissible water depth of road trains.

The Pentium report is included in Appendix 3.

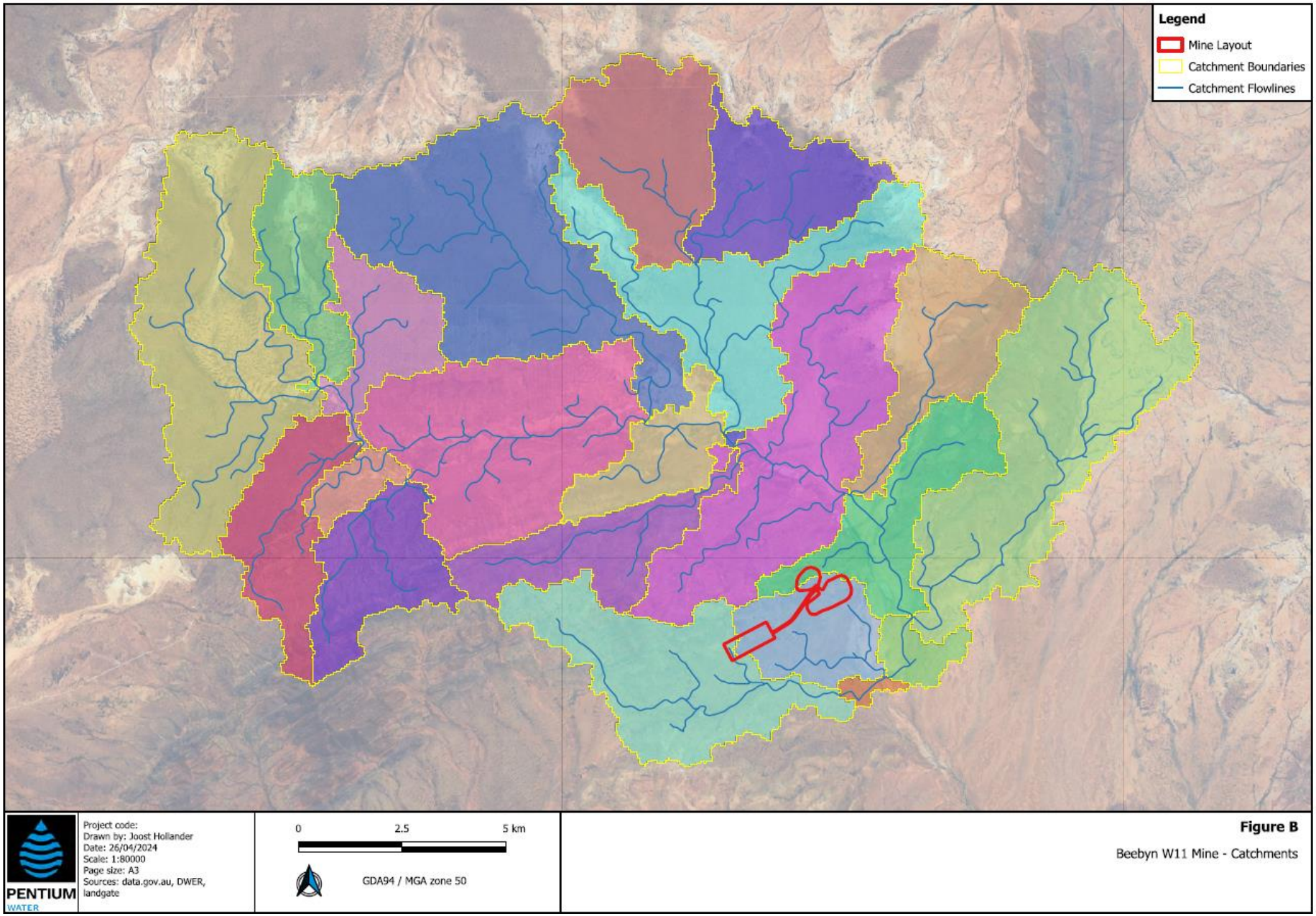


Figure 3.13: Surface water catchments of the infrastructure area.

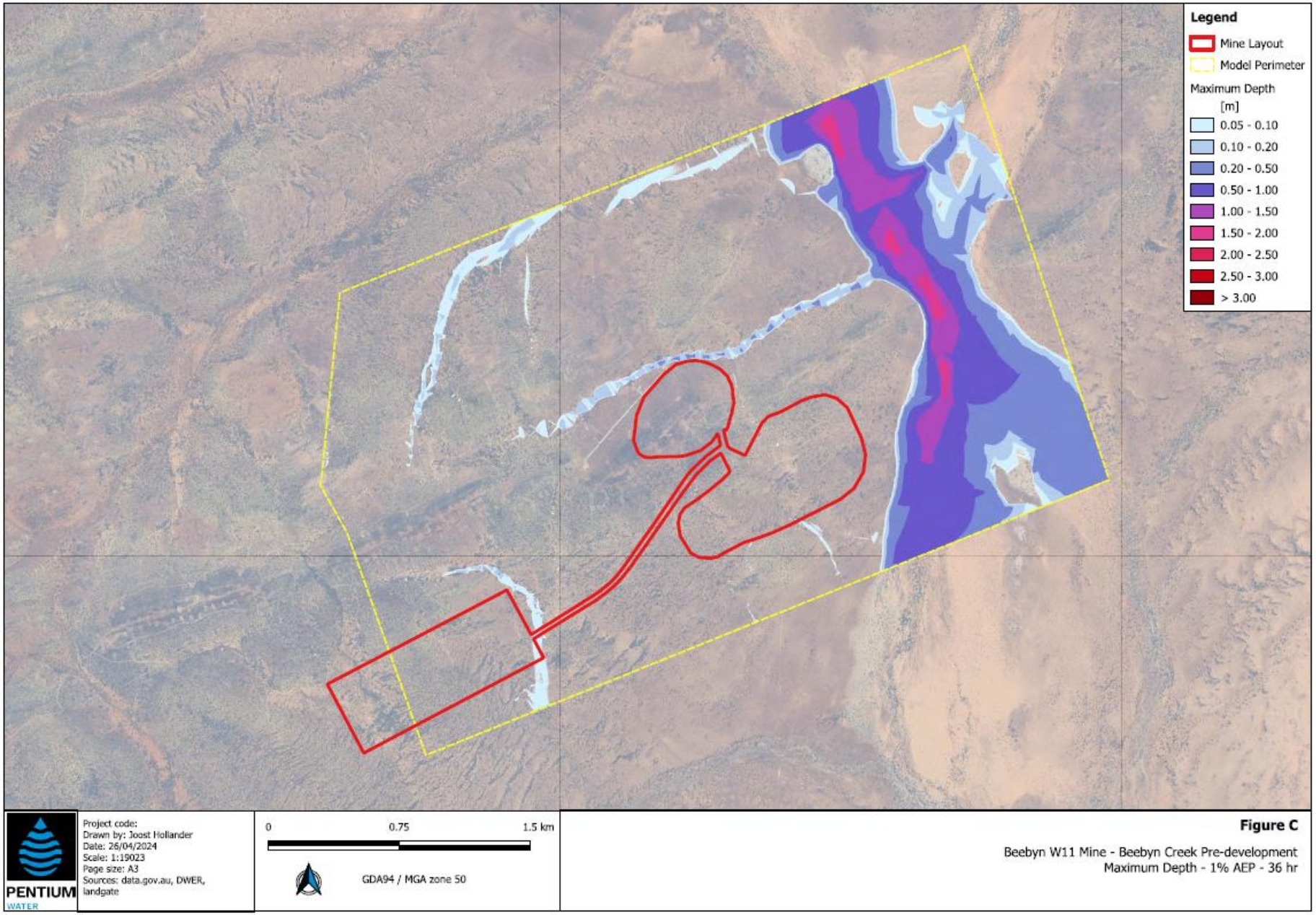


Figure 3.14: Beebyn-W11 project flood risk (infrastructure area) for a 1 in 100-year AEP.

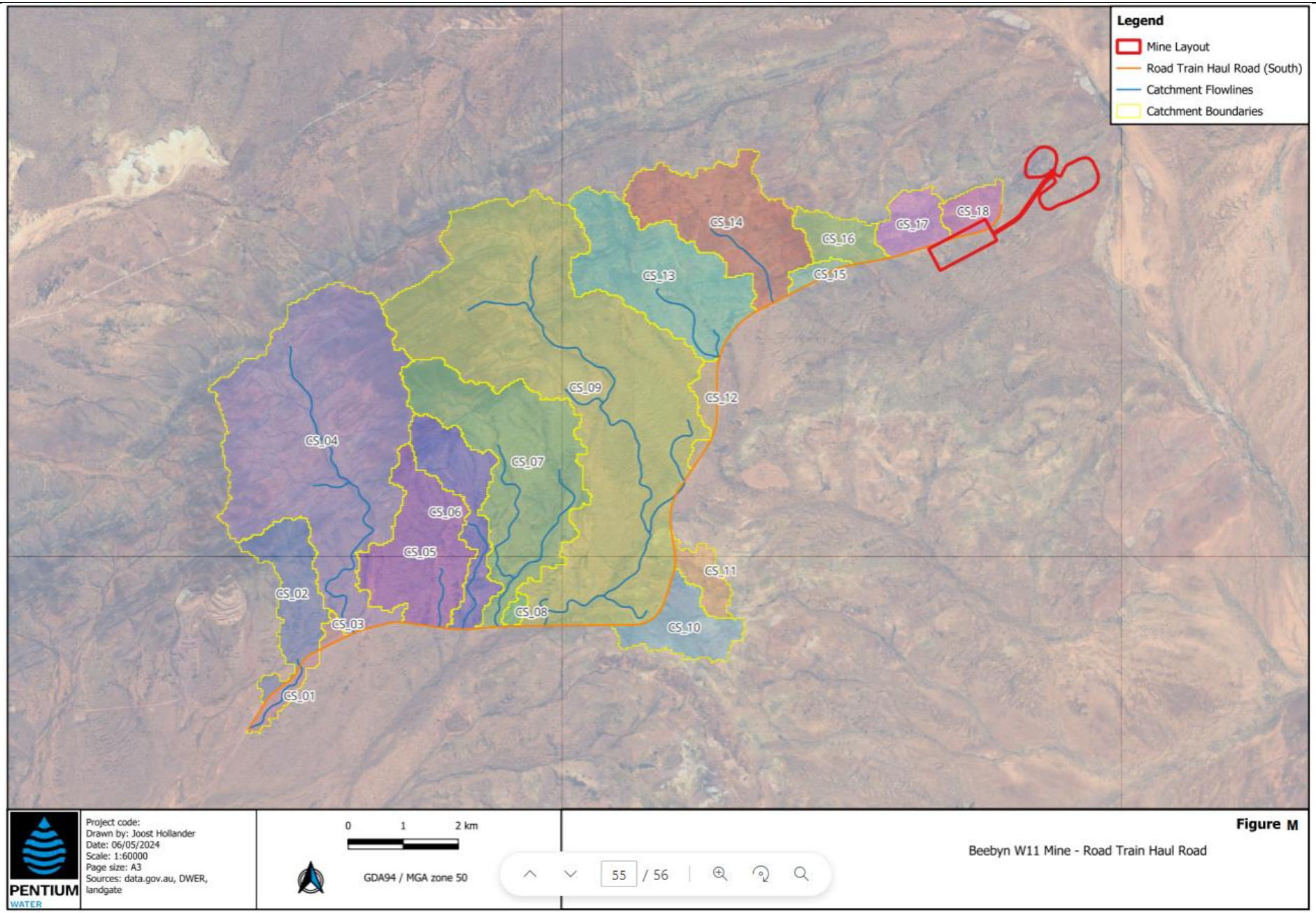


Figure 3.15: Surface water catchments of the haul road area.

3.10.2 Groundwater

The Weld Range is located in the East Murchison groundwater management unit. The groundwater in this area is characterised by fractured-rock and palaeochannel aquifers, alluvium and localised calcrete aquifers. Groundwater from fractured-rock aquifers can vary widely in terms of quality and quantity. At Weld Range, groundwater occurs at relatively shallow depths (typically 5 – 50 m below ground level (bgl)) beneath the alluvial plain and occurs within the bedrock sequence that forms Weld Range. The groundwater is fresh to slightly brackish in the BIF and shallow alluvial aquifers and is highly saline in alluvium and the palaeochannel aquifer west and south of the project area (*ecologia* 2010a).

The main aquifers in the region are alluvium and colluvium with a tertiary palaeochannel passing through the Weld Range. The Banded Iron Formation (BIF) strata which include the Beebyn-Beebyn-W11 deposit are commonly fractured, jointed and vuggy, and constitute aquifers of moderate to high permeability. The granitic and greenstone basement rocks (other than BIF) are generally of low permeability, including the dolerite associated with the BIF. The groundwater is recharged by the infiltration of rainfall and streamflow following high rainfall events. Groundwater flows in a north to southeast direction through the Weld Range and discharges into Lake Austin or a smaller temporary lake to the north.

Existing groundwater extraction in the area consists of water for domestic use and stock watering at homesteads and on stations, and dewatering associated with the Iron Ridge project to the west. The nearest recorded wells are Wilgie Mia and Yallon Wells, approximately 5 km to the south and south-south-east respectively.

The three bores constructed for water abstraction encountered the water table between 29.6 m (hole ID B_WB2_01) and 49.7 m (hole ID B_WB2_02). The water level in the project area was found to be around 480 m RL, with salinity of 690 – 1,400 mg/L TDS and neutral to slightly alkaline pH between 7.6 and 8.6. Table 3.11 summarises the water quality.

The Pentium report is included in Appendix 3.

Table 3.11: Laboratory analysis of water samples from the project area.

Analyte	Unit	B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02	Livestock drinking water trigger value
Date Sampled		15/7/2019	16/7/2019	17/7/2009	18/7/2019	
Acidity	pH	7.8	7.6	8.6	7.6	
Electrical Conductivity @ 25°C	µS/cm	1200	1400	2300	1600	
Total Dissolved Solids @180°C	mg/L	690	830	1400	950	4000
Total Hardness as $CaCO_3$	mg/L	250	330	500	310	
Carbonate, CO_3	mg/L	<1	<1	14	<1	
Bicarbonate, HCO_3	mg/L	290	370	380	370	
Chloride, Cl	mg/L	180	220	450	260	
Sulphate, SO_4	mg/L	88	130	190	160	1000
Nitrate, NO_3	mg/L	55	28	<0.2	14	
Sodium, Na	mg/L	170	180	190	230	
Potassium, K	mg/L	11	14	180	12	
Calcium, Ca	mg/L	37	45	50	39	1000
Magnesium, Mg	mg/L	38	54	92	52	Not toxic
Soluble Iron, Fe	mg/L	<0.02	<0.02	<0.02	<0.02	
Fluoride, F	mg/L	0.4	0.3	0.5	0.3	
Free Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01	

Analyte	Unit	B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02	Livestock drinking water trigger value
Aluminium, Al	mg/L	<0.02	<0.02	<0.02	<0.02	0.04
Arsenic, As	mg/L	0.005	<0.002	0.24	<0.002	
Manganese, Mn	mg/L	0.007	0.007	0.074	0.29	Not toxic
Lead, Pb	mg/L	<0.005	<0.005	<0.005	<0.005	
Cadmium, Cd	mg/L	<0.001	<0.001	<0.001	<0.001	
Copper, Cu	mg/L	<0.005	<0.005	<0.005	<0.005	
Antimony, Sb	mg/L	<0.0005	<0.0005	0.05	<0.05	
Mercury, Hg	mg/L	<0.05	<0.05			
Silver, Ag	mg/L	<0.005	<0.005	<0.005	<0.005	
Boron, B	mg/L	1	0.9	0.7	1.2	
Barium, Ba	mg/L	<0.005	<0.005	0.02	<0.01	
Beryllium, Be,	mg/L	<0.005	<0.005	<0.005	<0.005	
Cobalt, Co	mg/L	<0.01	<0.01	<0.01	<0.01	
Chromium, Cr	mg/L	<0.005	<0.005	<0.005	<0.005	
Molybdenum, Mo	mg/L	<0.01	<0.01	<0.01	<0.01	
Nickel, Ni	mg/L	0.007	0.005	0.06	0.008	

3.10.3 Groundwater Dependent Ecosystems

No Groundwater Dependent Ecosystems (GDE's) have been identified within the project area and no vegetation considered to be groundwater dependent has been recorded in the various surveys completed (APM 2024, *ecologia* 2010a). Phreatophytic vegetation types were recorded by *ecologia* (2010a) approximately 10 km north east and 20 km south west of the proposed project, outside the disturbance area and extent of predicted drawdown associated with the proposal.

3.10.4 Pit lake formation

Once mining is completed, the water level in the pit will rapidly rise for the first five years, followed by a slower recovery over time until a balance is established between the groundwater inflows plus rainfall accumulation and evaporation losses. The pit will extend down from ground levels of approximately 520 m AHD to a base elevation of 395 m AHD, 125 m below the average natural ground level.

The water recharge predicted post mining is given in Table 3.12. The water level in the pit lake will rise up to approximately 466 m RL post mining. It is predicted that a rapid recovery of the water table will occur in the first five years and then plateau after this time.

Groundwater modelling indicates that the pit will function as a sink, with groundwater flowing towards it. Therefore, there would be no flow from the pit lake to groundwater and so there is no potential for groundwater contamination.

The concentration of solutes within the pit lakes will increase over time due to high evaporation and low precipitation in the area. The salinity of the pit water would gradually increase from about 900 mg/L TDS when the pit first begins to fill with water, to about 12,000 mg/L TDS 100 years after the end of mining (Pentium 2024).

The Pentium report is included in Appendix 3.

Table 3.12: Pit recharge water balance.

Time post mining (yr)	Pit lake water level (m RL)
1	419
2	428
5	443
10	454
25	463
100	466

4 IMPACTS AND MANAGEMENT

4.1 Impact to conservation significant flora

Nine Priority listed flora species have been recorded in and around the project area. Based on the survey by Ecotec (2024), individuals from three of the Priority species recorded will be impacted by the proposed development. Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint.

Impact to each species is minimal and most records of conservation significant flora occur to the west of the project area. All species are widespread and well represented in the Weld Range and surrounding area.

4.1.1 Management actions

To minimise potential impacts to Priority flora species, Fenix will:

- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing.
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record (“pick up”) cleared areas on completion.
- maintain records of clearing undertaken.
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant species and highlight the importance of clearing protocols.

4.2 Impact to conservation significant vegetation and ecological systems

No State (BC Act) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area. A portion of the Beebyn-W11 Project area coincides with the Priority 1 PEC Weld Range Vegetation Complexes (banded ironstone formation) (*ecologia* 2020a). Ecotec (2024) determined that vegetation units 2, 3, 4, 5, 7, 8 and 15 correspond to the PEC as delineated by DBCA (2019) (refer to Section 3.5).

The Priority 1 PEC Weld Range Vegetation Complexes (banded ironstone formation) occupies an area of 20,318 ha.

Table 4.1 summarises the significance of each of the vegetation types in the project area that are associated with the PEC and the planned area of disturbance to each. The area of project disturbance (excluding existing disturbance in the area) to vegetation associated with the Weld Range PEC equates to less than 0.6% of the PEC (20,318 ha) and is therefore not considered to be a significant impact.

Table 4.1: Impact to PEC vegetation.

Vegetation Code	Disturbance Envelope in PEC (ha)
2	30.0
3	45.4
4	5.7
5	29.5
7	3.7
8	1.8
15	-

Vegetation Code	Disturbance Envelope in PEC (ha)
Total	**116.1**

4.2.1 Management actions

To minimise further impact to vegetation associated with the Weld Range PEC, Fenix will:

- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing.
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record ("pick up") cleared areas on completion.
- maintain records of clearing undertaken.
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant vegetation and highlight the importance of clearing protocols.
- a targeted survey will be undertaken in late July 2024 to confirm the location and numbers of conservation significant flora.

4.3 Introduced flora species

The vegetation in the vicinity of the Beebyn-W11 Project is in good condition. Minor occurrences of existing weed species have been recorded in the area (refer to 3.6).

Weed seeds can be transported in soil and vegetative material attached to the machinery and equipment. Weeds can be introduced to site via machinery and equipment that has come from weed infested areas without being cleaned.

4.3.1 Management actions

To minimise the potential for new (and potentially invasive) weed species to be introduced to the site, Fenix will require that:

- machinery and equipment is thoroughly cleaned prior to being mobilised to site.
- contractors provide a weed hygiene certificate for each item of machinery bought to site.
- machinery and equipment that arrives on site will be inspected. Machinery that does not meet the hygiene requirements will require removal and additional cleaning in an appropriate location.

The potential spread of weed species and establishment of new weed populations will be minimised by:

- regular monitoring of disturbed areas and road verges to identify weeds
- identifying weeds species, abundance and cover during rehabilitation monitoring
- control of weed outbreaks using herbicide or manual removal
- preventing stock access to rehabilitated areas
- educating site personnel by way of the site induction.

4.4 Impact to conservation significant fauna or their habitat

Clearing of vegetation for development of project infrastructure will remove a portion of habitat types suitable for a number of Priority fauna species.

The proposed site layout avoids impact to known locations of *Idiosoma clypeatum* (P3). The species is widespread in the surrounding region.

Disturbance to some suitable habitat in the project area for *Lerista eupoda* (P1) will occur where creek crossings are constructed for access roads. There is a limited extent of habitat (Drainage line) within the project area suitable for *Lerista eupoda* (P1) (refer to Figure 3.10 - Figure 3.12).

A limited extent of habitat (Rocky ridge or outcrop) potentially suitable for *Antechinomys longicaudata* (P4) exists around the project area and additional habitat occurs across the Weld Range.

There is no suitable habitat (granite outcropping) in the project area for the western spiny-tailed skink.

4.4.1 Management actions

To minimise further impact to fauna habitat, Fenix will:

- ensure clearing is undertaken in accordance with the approved Clearing Permit
- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing
- undertake clearing in a progressive manner and kept to the minimum required for the project
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record (“pick up”) cleared areas on completion
- maintain records of clearing undertaken
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant fauna and highlight the importance of clearing protocols.

5 ASSESSMENT AGAINST THE 10 CLEARING PRINCIPLES

(1) **Native vegetation should not be cleared if it comprises a high level of biological diversity.**

The survey of the project area by APM (2024) recorded 77 vascular plant taxa from 21 families and 40 genera. The survey prior (*ecologia* 2010b) recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species.

The 2024 Ecotec survey recorded 16 vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008) and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008).

The Priority 1 Weld Range PEC occurs within the area.

While BIF ranges in general are considered to have significant biodiversity value because of their unique geology, soils and relative isolation, the Weld Range was described as being a "lower biodiversity value site, although still providing refugial habitats with localised species and vegetation communities" (DEC 2007).

Less than 0.6% of vegetation associated with the Weld Range PEC will be impacted by the development.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

(2) **Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.**

Although areas of suitable habitat for several species of conservation-significant fauna occurs within the project area, the area is not considered to provide habitat necessary for the survival of these species. The fauna habitat to be impacted by the project is represented in the surrounding area and accounts for a very small proportion of available habitat.

The proposed site layout avoids impact to known locations of *Idiosoma clypeatum* (P3). The species is widespread in the surrounding region (refer to Figure 3.8).

There is a limited extent of habitat (Drainage line) outside the project area suitable for *Lerista eupoda* (P1) (refer to Figure 3.10) and disturbance will occur where creek crossings are constructed for access roads.

A limited extent of habitat (Rocky ridge or outcrop) potentially suitable for *Antechinomys longicaudata* (P4) exists around the project area and additional habitat occurs across the Weld Range.

There is no suitable habitat (granite outcropping) in the project area for the western spiny-tailed skink.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

(3) **Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.**

The area does not coincide with any previously recorded Rare flora taxa, and no Rare flora species are listed as potentially occurring in the area. Accordingly, the area is not considered necessary for the continued existence of Rare flora.

Nine Priority listed flora species have been recorded in and around the project area. Based on the survey by Ecotec (2024), individuals from three of the Priority species recorded will be impacted by the proposed development. Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint. Impact to each species is minimal and most records of conservation significant flora occur to the west of the project area (Figure 3.2). All species are widespread and well represented in the Weld Range and surrounding area.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(4)* Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.**

The project area does not coincide with any Threatened Ecological Communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th). Accordingly, the area is not considered necessary for the maintenance of a Threatened Ecological Community.

Development of the project will result in impact to less than 0.6% of vegetation associated with the Priority 1 Priority Ecological Community "Weld Range vegetation complexes (banded ironstone formation)".

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(5)* Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

The project area supports 16 distinct vegetation types, none of which have been extensively cleared nor can be considered remnant vegetation.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(6)* Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

The project area does not contain native vegetation that is within or associated with any significant watercourse or wetland. The nearest significant surface water feature is Lake Austin, more than 50 km from the site.

Several minor ephemeral drainage lines pass through the area. The project has been designed to avoid these in the majority. Road crossings will be required at several locations but disturbance to vegetation will be minimal.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(7)* Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

None of the vegetation in the area is associated with land that is recognised as being particularly susceptible to land degradation. Appropriate surface water drainage and containment around cleared areas will minimise the potential for surface water erosion. Land degradation resulting from clearing of vegetation is considered unlikely.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(8)* Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

The project area partly coincides with Priority 1 PEC "Weld Range vegetation complexes (banded ironstone formation)". Approximately 116.1 ha (excluding existing disturbance in the area) of disturbance proposed for the project will occur within the PEC, inclusive of the buffer zone. This equates to less than 0.6% of the buffered Weld Range PEC (20,318 ha).

Clearing of native vegetation within the area is not considered to be at variance to this principle.

***(9)* Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

The project has been designed to minimise impact to a number of small ephemeral drainage lines. Drainage and containment structures incorporated into the development areas will ensure surface water runoff is controlled and

minimise the potential for contaminants and sediment to enter the surface water system.

Clearing of vegetation is not anticipated to have any impact on the groundwater system. Clearing of native vegetation within the area is not considered to be at variance to this principle.

(10) **Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

The project area is elevated with surface water runoff flowing generally in a southerly direction. Runoff from cleared areas will be directed toward the perimeter where appropriate drainage and containment structures will be in place. Flooding of the area is considered very unlikely.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

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BEEBYN-W11 PROJECT

CLEARING PERMIT APPLICATION SUPPORTING INFORMATION

APPENDICES

Date: September 2024

Prepared by
Ecotec (WA) Pty Ltd for:

Fenix Beebyn Pty Ltd
Level 33, 1 Spring Street
Perth, WA 6000

Contact: Goran Seat

Email: goran@fenixresources.com.au

Appendix 1

Flora and Fauna Reports

1a: Flora and Vegetation Assessment – ecologia 2010

1b: Flora, Vegetation and Fauna Assessment – APM 2024

1c: Iron Ridge Biological Survey– ecologia Environment 2020

1d: Status review of Idiosoma clypeatum – Biologic Environmental Survey 2019

1e: Weld Range Idiosoma nigrum Survey – Biologic Environmental Survey 2012

1f: W11 Targeted Biological Survey – Ecotec 2024

1g: Review of Cethegus species limits and SRE status – Invertebrate Solutions 2024

JULY 2010



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WELD RANGE FLORA AND VEGETATION ASSESSMENT

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WELD RANGE
VEGETATION AND FLORA
ASSESSMENT

中钢澳洲中西矿业公司
SINOSTEEL MIDWEST CORPORATION LIMITED

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				Name	**Distributed To**	**Date**
1	Melissa Hay Amy Capobianco Scott Hitchcock Zoe Benham	Christina Cox	26 Mar 2009	C. Cox	Wayne Ennor Sue Osbourne (DEC)	30 March 2009
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3	Carol Macpherson	Rebecca Gabbitus	11 June 2010	Carol Macpherson	Wayne Ennor, SMC	25 June 2010

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ecologia Environment
1025 Wellington Street
WEST PERTH WA 6005
Phone: 08 9322 1944
Fax: 08 9322 1599
Email: admin@ecologia.com.au

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ACRONYMS

List all acronyms used in the report here. Format alphabetically as follows:

DEC Department of Environment and Conservation

EPA Environmental Protection Authority

EPBC *Environment Protection and Biodiversity Conservation Act 1950*

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EXECUTIVE SUMMARY

Background

Sinosteel Midwest Corporation Ltd (SMC) is currently assessing the viability of the Weld Range Mining Proposal.

The Weld Range is located approximately 70 km south-west of Meekatharra and 80 km north-west of Cue. It is part of a series of greenstone ridges that forms the northerly extent of the Yilgarn Craton.

As part of the project feasibility studies, and to facilitate the environmental legal approvals processes, an assessment of the vegetation and flora of the Weld Range was undertaken. The purpose of this assessment was to provide information on the conservation significance of the vegetation and flora of the project area as part of the public environmental review (PER) process for the project. An assessment of the vegetation and flora of the Weld Range is presented in this report.

Methods

The main fieldwork component of the vegetation and flora survey was conducted in November 2006 (spring), April 2007 (autumn) and May 2008 (winter). These field surveys involved both quadrat-based and opportunistic floristic sampling. Targeted threatened flora surveys were undertaken in addition to the quadrat-based surveys.

The data matrix detailing the presence / absence of species and their abundance in the quadrats surveyed was analyzed using multivariate statistics. The analysis resulted in a classification of the vegetation communities present at Weld Range; these vegetation communities were mapped at a scale of 1: 15,000. Voucher specimens of each vascular flora species were collected and identified using current literature, with reference to the WA Herbarium collection. Documented voucher specimens of all flora of conservation significance will be lodged with the WA Herbarium.

Flora surveys undertaken as part of the environmental impact assessment (EIA) process are required to address the Environmental Protection Agency's (EPA) Position Statement No. 3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* and Guidance Statement No. 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*. Table S.1 below lists requirements detailed in these statements and outlines the compliance of this survey to these guidelines.

- **Table S. 1 - Conformance of Project to Relevant EPA Statements**

Requirement	EPA Statement	Relevance to Project	Project Compliance
Impact on Biodiversity	Position Statement No. 3	Where impact on biodiversity cannot be avoided, the proponent must demonstrate that the impact will not result in unacceptable loss.	The Study Area of 51,557 ha encompasses sections of Madoonga, Beebyn and Glen Stations, all of which have been stocked with sheep or cattle for many years. Feral goat numbers have also increased over the past decade. The vegetation of the much of the area, particularly on the plains and lower slopes has been affected by grazing. A number of small mines (including the oldest known ochre mine) have been worked in the area in the past, and small scale exploration activities have been undertaken at Weld Range (particularly on the western section) for approximately 10 – 20 years. For the past three years SMC has been carrying out exploration activities on its tenements at Weld Range. Based on the three infrastructure options indicated in the report (and the area of each vegetation community mapped within SMC's project area) the reduction of area of vegetation communities mapped at Weld Range will be: • 14 % to Community types 1 and 2 (mapped as a single unit) and considered of conservation significance due to their apparent restricted distribution regionally, with 12.5% impact to the area of this unit within the PEC; • 77% and 39% to Community sub-types 5b and 7b respectively, both of which are encompass small areas in the Study Area; • 29% to Community 6a; • Less than 20% for all other community types mapped. Twenty-seven priority flora species have been recorded in the study area (25 during the current survey) including six P1 taxa. Potential impacts to these species have been calculated based on the information collected during these surveys and data previously available from the DEC. Estimates of impact are likely ot overestimate the proportion of locations and plants insidet the Study Area and areas of impact due the much greater intensity of survey. The taxon which would be most affected by Option 1, the preferred option, is *Micromyrtus placoides*(P3), followed by *Beyeria lapidicola*(P1) which will have 44.4% and 41.7% respectively of all locations impacted. *Eremophila rhegos* (P1) and *Goodenia lyrata*(P1) will also be impacted by 33% and 30% respectively. The impacts of Option 2 are identical for these species, as all of the impacted locations lie within the pits and dumps which are common to both. The Base Case option would have significantly more

Requirement	EPA Statement	Relevance to Project	Project Compliance
			impact, with 80% of all known locations of *Homalocalyx echinulatus* impacted, and *Beyeria lapidicola, Eremophila rhegos, Goodenia lyrata, Sauropus* sp. *Woolgorong* (M. Officer s.n. 10/8/94), *Hemigenia tysonii* and *Micromyrtus placoides* also impacted by between 30 and 41%.
State, National and International Agreements, Legislation and Policy on Biodiversity	Position Statement No. 3	Information gathered for environmental impact assessment in Western Australia is to address State, national and international agreements, legislation and policy in regard to biodiversity conservation.	Impacts to species and communities listed under relevant legislature and to the general vegetation of the project area are addressed in Section 6 of this report. Relevance of the information gathered to the *Environmental Protection Act 1986, Wildlife Conservation Act 1950* and *Environment Protection and Biodiversity Conservation Act 1999* is discussed in Sections 1.2, 1.3 and 5.
EPA Standards, Requirements and Protocols	Position Statement No. 3	The quality of information and scope of field surveys is to meet the standards, requirements and protocols as determined and published by the EPA.	The current survey conforms to a Level 2 vegetation and flora survey, comprising a reconnaissance survey, a comprehensive three phase botanical survey and mapping of the vegetation of the area, as per EPA Guidance Statement 51.
Biodiversity Conservation and Ecological Function Values	Position Statement No. 3	Sufficient information is to be provided to address biodiversity conservation and ecological function values.	The value of the vegetation communities and conservation significant flora taxa occurring in the project area is discussed in a bioregional context in Section 6. Impacts to biodiversity and ecological function are discussed in Section 7.
State Biological Databases	Position Statement No. 3	Terrestrial biological surveys will be made publicly available and will contribute to the bank of data available for the region.	Voucher specimens for all priority flora species collected during the survey will be lodged at the WA Herbarium. Information collated from this survey will be included in public documents available for use by others.
Sampling Design and Intensity at Two Levels – Regional and Area Specific	Guidance Statement No. 51	Sites to be assessed at an appropriate level.	Data was collected on an area specific level. Sites were established mostly on SMC's lease at Weld Range and were concentrated on habitats to be impacted by the project footprint. Regional data is available from the DEC surveys carried out on a number of BIF ranges of the Yilgarn Craton.
Landform – Scale, Rarity, Heterogeneity	Guidance Statement No. 51	Sites are to be established in representative landforms of the project area.	Vegetation communities occurring on the different landforms of the area were ground truthed in the field, and sites were assessed based on their representation on those landforms. Multiple sites were assessed on these landforms.
Habitat – Scale, Rarity, Heterogeneity	Guidance Statement No. 51	Sites are to be established in representative habitats of the project area.	Sites were selected from aerial photography before going to the field while ground-truthing of the vegetation communities occurring in the different habitats of the project area took place during the survey. Multiple sites were assessed in

Requirement	EPA Statement	Relevance to Project	Project Compliance
			each habitat.
Vegetation Structure, Diversity and Seasonality	Guidance Statement No. 51	Sufficient information is to be provided in the report on vegetation structure, diversity and seasonality.	The report details the results of a vegetation mapping exercise carried out over the Weld Range. Multivariate analysis was carried out on the data collected from 239 quadrats assessed at Weld Range. Following analysis the structure of the vegetation communities occurring at Weld Range was described and the main communties were mapped. The vegetation was surveyed over three phases – each phase at a different time of year (spring, autumn and winter). Diversity and seasonality of the vegetation are reflected in the species lists produced for each phase of the survey. Additional information was available from sites assessed in June 2009 within a potential rail corridor at Weld Range.
Potential for Conservation Significant Flora to occur, Based on Habitat Analysis	Guidance Statement No. 51	Sufficient information is to be provided to indicate the potential for significant flora to occur based on habitats in the area.	A list of the 27 conservation significant taxa recorded (to date) at Weld Range is provided in 5.4.3. Since July 2006 *ecologia* has carried out in excess of 20 surveys associated with SMC's exploration programme at Weld Range (Appendix A). Twenty-five priority flora taxa have been recorded during these surveys. Database searches produced a list of conservation significant taxa that could potentially occur at Weld Range. A list of these taxa is included in Appendix B, and the table includes a comment on the likelihood of each species occurring in the habitats of the Weld Range.
Results Including Species/Area Curves, Species and Ecosystem diversity and Heterogeneity	Guidance Statement No. 51	Adequate information is to be provided in the report to comply with this requirement.	Species / area curves are included in Section 5.3. Details on the flora of the project area are included in this report and comparisons with the flora of other ranges in the region are also included in Section 6.1.2.4. A vegetation map and detailed vegetation descriptions are provided for the project area.
Information on Adjacent Areas – Previous Surveys and Herbarium Records	Guidance Statement No. 51	Information is to be included in the report on the results of other surveys in the area and region.	Information was requested from relevant government databases and was collated from reports available on other vegetation surveys undertaken in the vicinity of Weld Range. A review of data collected by the DEC on selected BIF ranges in the region is included in this report.

Vegetation

Seven main vegetation communities, incorporating 17 sub-communities were identified:

1a Acacia aneura low open woodland over *Acacia* sp. Weld Range, *A. ramulosa* var. *linophylla* and *Thryptomene decussata* open mid shrubland over mixed *Eremophila* spp. low shrubland.

1b *Acacia aneura* low open woodland over *Acacia cockertoniana* open mid shrubland over mixed mid shrubland over *Ptilotus obovatus* low shrubland.

2a Scattered *Acacia pruinocarpa* trees over *A. aneura* mid sparse shrubland / scattered shrubs over *Ptilotus obovatus* low shrubland with *Cymbopogon ambiguus* tussock grasses.

2b *Acacia aneura* sparse shrubland over mixed sparse mid shrubland over *Micromyrtus sulphurea* and *Ptilotus obovatus* low open shrubland.

3a +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.

3b +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.

3c Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.

3d *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.

4a *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.

4b *Acacia* sp. Weld Range and *Acacia speckii* (Priority 3) shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* (Priority 4) and *Dodonaea amplisemina* (Priority 3) open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.

5a *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.

5b +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.

6a Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.

6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.

6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.

7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.

7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.

Units 1 and 2 were combined for the purposes of mapping their distribution, as the distinctions in vegetation composition visible at ground level could not be reliably discriminated on the aerial photography.

Vegetation of Conservation Significance

Searches of government databases indicate that no threatened ecological communities occur at Weld Range. However, the Priority 1 priority ecological community (PEC) "Weld Range vegetation complexes (banded ironstone formation)" has been listed and incorporates much of the vegetation within the Study Area.

Flora

A total of 393 taxa resulted from the combined records of all surveys within the Study Area, including species, subspecies, varieties, forms and affinities. Of this total, six were naturalised alien flora.

Flora of Conservation Significance

One nationally-listed threatened flora species have been recorded within the Murchison bioregion; *Conospermum toddii* but was not recorded within the Study Area.

Two State-listed DRF species occur in the Murchison; *Conospermum toddii* and *Eremophila rostrata* subsp. *rostrata* but were not recorded within the Study Area.

One hundred and fifty declared rare or priority flora species are listed by the DEC as occurring in the Murchison botanical region.

To date, 27 priority taxa have been recorded within the Study Area, twenty-five of which were recorded during the surveys detailed in this report. In addition two potentially new, undescribed taxa were recorded during the survey.

Seventeen taxa, seven of which have Priority status, have range extensions of greater than 150 kilometres from the previously lodged records. The relatively large number of Priority taxa and range extensions is considered a product of two factors:

- the sporadic history of collection in the vicinity of the Study Area, resulting in an incomplete knowledge of the distributions of many taxa; and in at some instances; and
- specific requirements of some taxa for habitats which are genuinely restricted in the bioregion, resulting in restricted or disjunct distribution.

Naturalised Alien Taxa (Weeds)

Six alien taxa were recorded during the Weld Range survey; **Anagallis arvensis*, **Cenchrus ciliaris*, **Cuscuta epithymum*, **Portulaca oleracea*, **Solanum nigrum* and **Sonchus oleraceus.* None of these species are classified as Weeds of National Significance (WONS) or Declared Weeds under State listings. **Cenchrus ciliaris* is rated as a weed of high impact, whilst **Anagallis arvensis, *Solanum nigrum* and **Sonchus oleraceus* have been rated as of moderate impact by the Environmental Weed Strategy of WA.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Sinosteel Midwest Corporation (SMC) is proposing to develop a new iron ore mine (the Project) at Weld Range, located approximately 600 km north-north-east of Perth and 85 km southwest of Meekatharra. The tenements that form the basis for the Project cover a series of hills that rise approximately 250 m above the surrounding plains. The range is some 3 km wide, extends for up to 60 km in length from southwest to the northeast, and consists of a series of parallel ridges with deep incised valleys.

To facilitate the environmental legal approvals process, an assessment of the vegetation and flora of the proposed project area was required. SMC commissioned ecologia Environment (ecologia) to undertake a baseline survey of the vegetation and flora of its tenements at Weld Range. The results of this assessment are presented in this report, the purpose of which is to provide botanical information as part of the public environmental review (PER) process for the project.

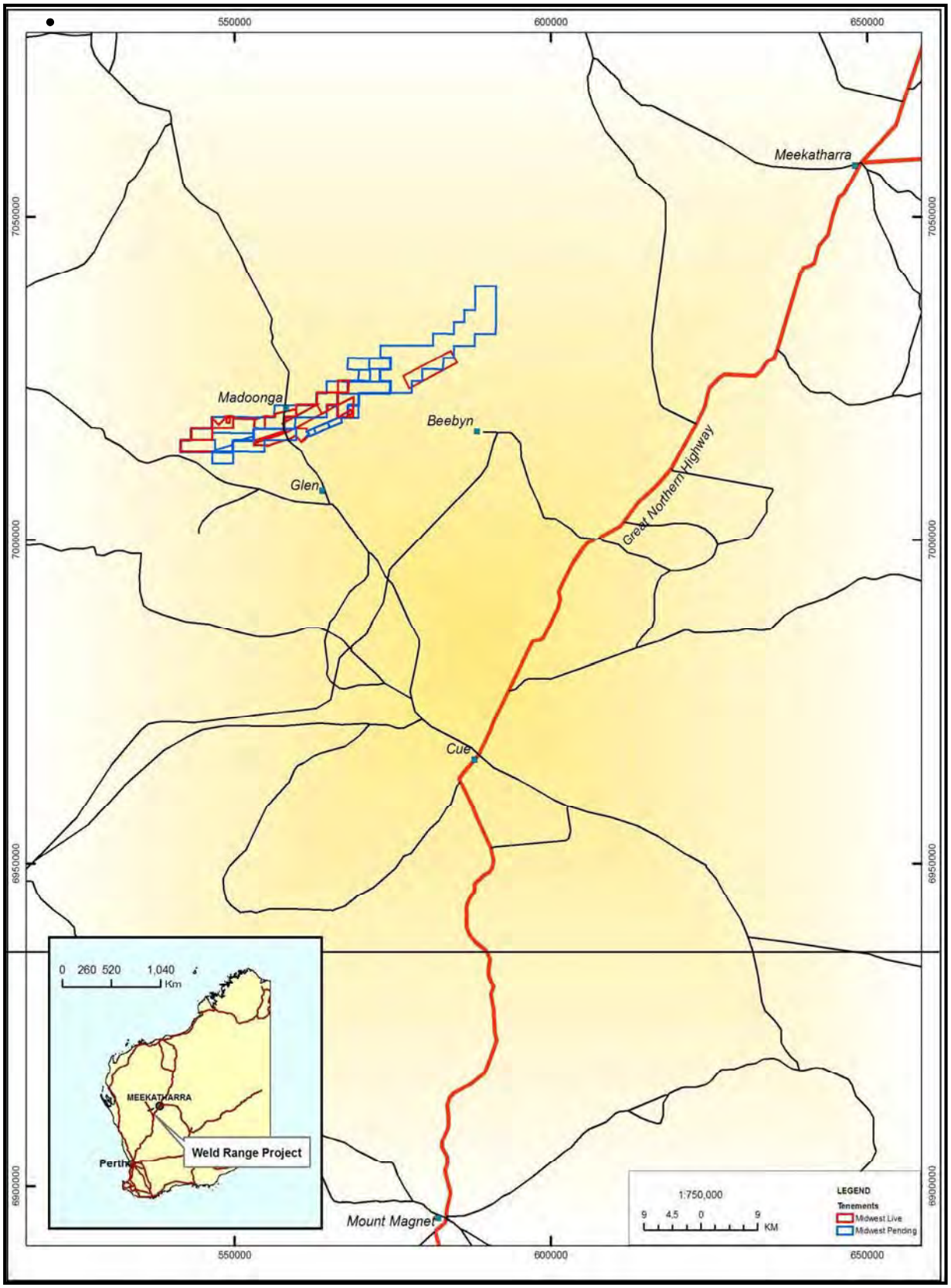
Sites were surveyed within the following tenements, covering an area of 26,784 ha at Weld Range:

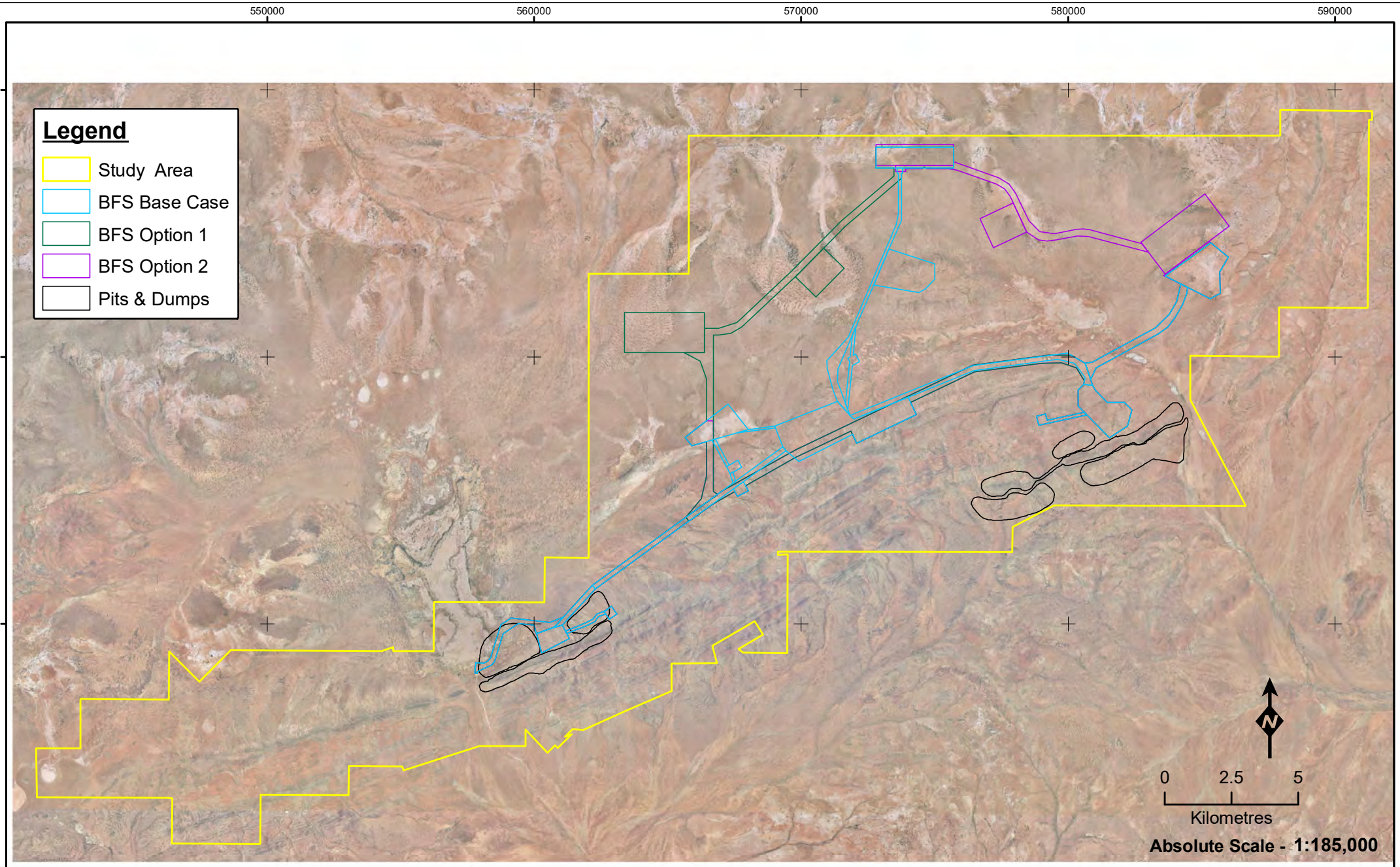
E20/0450, E20/0459, E20/0457, E20/0208, E20/0595, E20/0402, E20/0474, E20/0476, E20/0633, E51/0981, E51/0907, M20/0403, M20/0311 and TR70/3902.

Sites were concentrated in those areas to be directly impacted by the Project. However the vegetation of a larger area (the Study Area) of 51,557 ha encompassing the above leases and some portions of surrounding leases was mapped (Figure 1.1).

SMC has considered three potential infrastructure footprint options; BFS Base Case option, BFS Option 1 and BFS Option 2, with Option 1 being the preferred option (Figure 1.2).

Figure 1.1 – Location of the SMC Weld Range Iron Ore Project





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SINOSTEEL MIDWEST CORPORATION LIMITED

Infrastructure options of the project

Figure: 1.2
Project ID: 722

Drawn: SV
Date: 24/06/10

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

Unique Map ID: S142

A4

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1.2 LEGISLATIVE FRAMEWORK

Federal and State legislation applicable to the conservation of native flora and fauna includes, but is not limited to, the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*), the *Wildlife Conservation Act 1950* (*WC Act*), and the *Environmental Protection Act 1986* (*EP Act*). Section 4a of the *EP Act 1986* requires that developments take into account the following principles applicable to native flora and fauna.

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 Principles 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 Conservation of Biological Diversity and Ecological Integrity

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

Furthermore, biological surveys undertaken as part of the environmental impact assessment (EIA) process are required to address the Environmental Protection Authority's (EPA's) Position Statement No. 3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA, 2002), Guidance Statement No. 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004a), and Guidance Statement No. 56: *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004b).

Native flora and fauna in Western Australia are protected at a federal level under the *EPBC Act* and at a State level under the *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 are 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 23rd February 2010.

1.3 SURVEY OBJECTIVES

The EPA's objectives with regards to the 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 WC Act 1950.
- Protect other flora species of conservation significance.

The primary objective of this survey 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.

Specifically, this survey was to satisfy the requirements documented in EPA's Guidance Statement 51 and Position Statement No. 3, thus providing:

- 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 species 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 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 EXISTING ENVIRONMENT

2.1 CLIMATE

The closest Bureau of Meteorology (BOM) weather reading station is at Meekatharra Airport approximately 70 km north-east of Weld Range. The local climate is dry with hot summers and mild winters and is strongly influenced by a band of high pressure known as the sub tropical ridge. The ridge is located to the south–east for most of the year, occasionally moving close enough to allow cold fronts to pass over the area, bringing little, if any rain. The reliable rainfall periods are associated with the tropical cloud bands during May to July (BOM, May 2009) (Figure 2.1).

Annual rainfall at Meekatharra is variable and an average of 237 mm falls over an average of 46 days. According to the BOM rainfall map of Western Australia, the Weld Range falls between the 200 mm and 175 mm rainfall isohyets and, as a result falls within the desert bioclimatic region that receives both summer and winter rainfall (Beard, 1976).

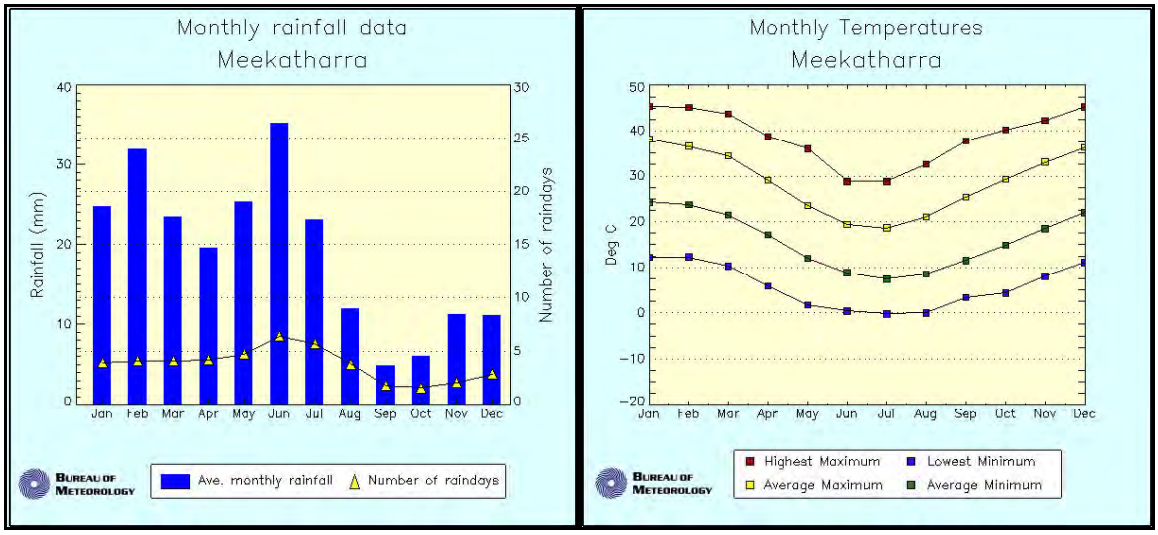


Figure 2.1 – Summary of Climatic Data for Meekatharra Airport (Source, BOM, 2009).

The most reliable rainfall period occurs during winter from May to July. June is the wettest winter month, with an average of 31 mm falling on six rainfall days. A second period of rainfall period occurs from January to March, associated with thunderstorms that infrequently produce heavy, localised falls during these hotter months. February is the wettest summer month, with an average of 36 mm of rain falling over four rain days.

The hottest month is January with an average maximum temperature of 38.3°C (Table 2-1); hot, dry north-east to north-west winds often result in temperatures above 41°C. July temperatures range from an average maximum of 19°C to an average minimum of 7.4°C; overnight, the temperature may drop below 5°C (BOM, May 2009).

Humidity in this area is low, with the average morning relative humidity reaching 63% in June and the average afternoon relative humidity dropping below 17% in November and December. Evaporation greatly exceeds precipitation, with the average daily evaporation rate as high as 16.2 mm per day in January, and dropping to 3.8 mm per day in June.

Table 2-1 – Climatic Averages for Meekatharra Airport Weather Station.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean maximum temperature (°C)													
38.3	36.6	34.3	29.1	23.7	19.6	19	21.3	25.6	29.5	33.2	36.4	28.9	1950 - 2009
Mean minimum temperature (°C)													
24.3	23.7	21.3	17	12.1	8.7	7.4	8.5	11.5	15	18.6	22	15.8	1950 -2009
Mean 9 am relative humidity (%)													
30	37	38	45	52	63	61	51	40	33	29	28	42	1950 - 2009
Mean 3 pm relative humidity (%)													
18	24	23	28	34	41	38	30	22	17	16	16	25	1950 - 2009
Mean rainfall (mm)													
27.5	35.9	28.6	20.9	23.9	31	22.1	11.4	4.6	6.4	11.6	12.2	236.2	1944 - 2009
Highest monthly rainfall (mm)													
135.4	174.2	259	159.2	96	186.6	165.7	56.2	40.8	61.8	113.2	91.4	573.2	1944 - 2009
Mean number of rain days													
4.2	4.5	4.2	4.3	4.5	5.8	5.6	3.6	1.9	1.7	2.4	3	45.7	1944 - 2009
Mean number of days of rain ≥ 1 mm													
2.7	3.2	2.7	2.6	2.8	3.6	3.7	2.1	0.8	1	1.5	1.9	28.6	1944 - 2009
Mean evaporation (mm)													
16.2	14.2	11.9	8.2	5.5	3.8	3.9	5.4	8.1	11.1	13.5	15.1	9.7	1967 - 2009

BOM Station - 'Meekatharra Airport' [007045], accessed 19 May 2009. Location: 26.61 °S 118.54 °E, elevation: 517 m.

Rainfall in the four months preceding the first phase (November 2006) of the Weld Range survey was 49.6 mm, 5.1 mm above the long-term average for those months (Table 2.2). During 2006, 80% more rain than the long-term average was recorded. Rainfall in the four months preceding the second phase survey (April 2007) was 66.2 mm, 38.4 mm less than the long-term average for those same four months (104.2 mm). Rainfall in the four months preceding the third phase survey (July 2008) was 84 mm, 20.4 mm less than the long-term average for those same four months (104.4 mm). Rainfall in the four months preceding the rail corridor survey (June 2009) was 26.4 mm, 82.5 mm below the long-term average for those four months.

Table 2-2 – Climatic Averages for Meekatharra Airport Weather Station (BOM, 2009)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2006	86.8	85.8	138	26.4	1.8	0.8	3.6	0.8	8.4	36.8	7.2	28.6	425
2007	23.8	13.8	0	24.8	9.2	2.6	21.6	0.8	1.2	1.2	1	19	119
2008	5.4	128	57.2	13.8	2.2	10.8	16.8	17.6	0	6.2	29.8	14.8	302.2
2009	28.8	11.8	2.6	10.0	2.0	18.6	18.2	4.2	3.0	3.4	12.4	4.0	119.0

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Annual Rainfall (mm)**	**27.1**	**35.3**	**28.1**	**20.7**	**23.2**	**30.8**	**22.0**	**11.3**	**4.6**	**6.3**	**11.6**	**12.1**	**236.9**

BOM Station - 'Meekatharra Airport' [007045], June 2010 Location: 26.61 °S 118.54 °E, elevation: 517m. **Average annual rainfall records from 1944 to 2009.

2.2 GEOLOGY AND LAND SYSTEMS

2.2.1 Geology

The Weld Range is located at the northern extent of the Yilgarn Craton, the sediments of which are derived from either the erosion of the Archaean bedrock, or the reworking of the older pre-existing sediments. They are highly variable in origin, composition and thickness, predominantly characterised by shallow, sandy and infertile soils underlain by a red-brown siliceous hardpan (Anand & Paine, 2002).

The landscape is gently undulating, composed of Archaean rocks, predominantly granite with north to north-west trending belts of greenstone rocks. These greenstone rocks form hill ranges that are separated widely by the very flat plains derived from colluvium and alluvium. The topography of this area results from a complex history of extensive weathering, affecting most of the geological provinces across it. The depth of weathering on the mantle is highly variable, and it can be up to approximately 150 m in depth (Anand & Paine, 2002).

The greenstone belts of the Weld Range exhibit banded ironstone formations (BIF) over strike lengths of 40 – 50 km. BIF and related rocks are comprised of silica, hematite, magnetite and iron silicates, with the majority of BIF in the Weld Range being of the jaspilite type. Jaspilite consists of red chert bands in conjunction with white and/or black bands; fine hematite dust gives the red colouration. The informally named Madoonga, Lulworth and Wilgie Mia beds represent the three laterally persistent units of jaspilite at the Weld Range (from north to south). The Weld Range jaspilite has a grain size of 10 – 30 µm and contains 20 – 60% magnetite (Elias, 1982).

Dolerite intrudes into the BIF with minimal disruption to bedding, and exists as multiple sheets which range from less than 50 m to exceeding 150 m in outcrop width. Approximately 90% of the thickness of the sequence at Weld Range is attributed to dolerite.

Large amounts of iron ore occur at Weld Range, formed by supergene enrichment of BIF during the Tertiary lateritization period. Ochre also exists in the jaspilites of the range (Elias, 1982).

2.2.2 Land Systems

Curry et al. (1994) undertook a regional inventory of the Murchison River catchment and surrounds to document the land systems present in the area and the condition of each. The survey area covered 88,360 km2, and spanned between Meekatharra and Mount Magnet in the east, to the catchments of the Greenough and Wooramel Rivers in the west.

The Weld Range Project is primarily located on the Weld land system (350 km2), described as rugged ranges and ridges of mainly Archaean metamorphosed sedimentary rocks supporting Acacia species shrublands (Curry et al., 1994). It is composed of three major landscape units (Figure 2.2):

1. *Mountain ranges*, *peaks and summits* – characterised by ridges forming steep rocky outcrops of ironstone and jaspilite. These have soils described as skeletal lithosols confined to pockets of dark red loamy or clayey sands, with infrequent clay subsoils less than 50 cm deep, overlying parent material.

2. *Footslopes and interfluves* – characterised by broad concave inclines generally covered by dense quartz or ironstone mantles. The soils are described as reddish-brown or dark red shallow earths less than 50 cm deep.

3. *Valley floors* – occurring between ridges with creek channels dissecting into the bedrock with soils described as red earthy sands overlying metamorphic rock fragments less than 50 cm deep (Curry *et al*., 1994).

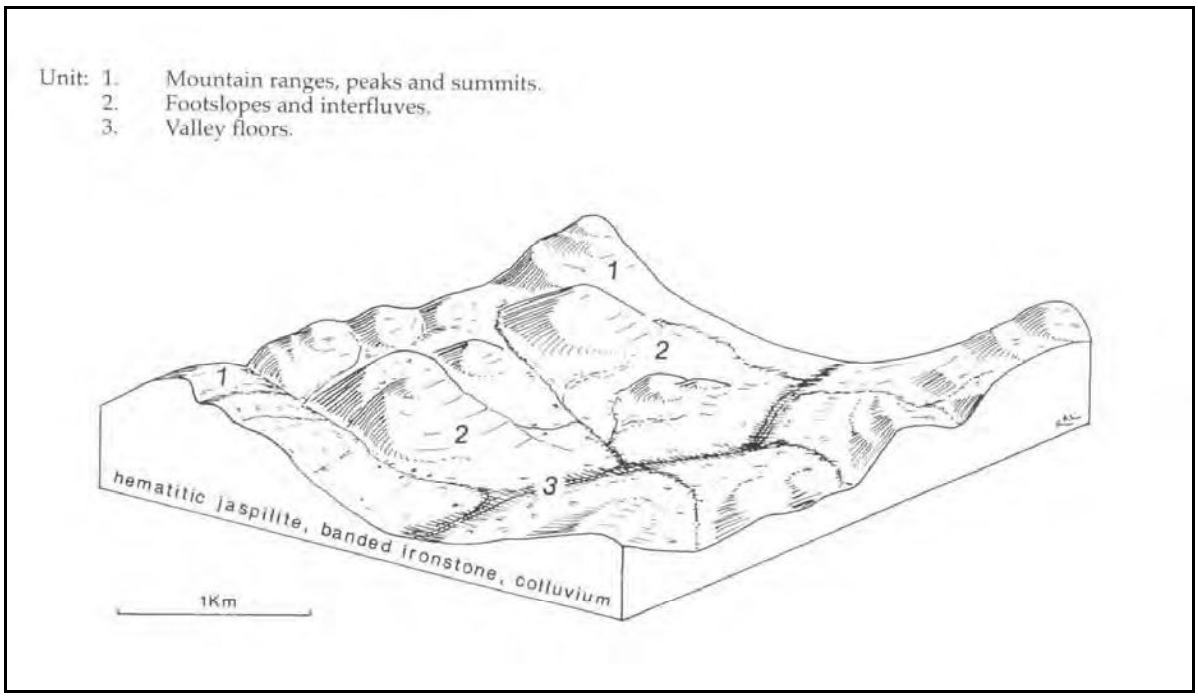


Figure 2.2 – The Three Major Landscape Units Comprising the Weld Land System (source: Curry et al., 1994).

Most of the surrounding area within the Project lies within the Yarrameedie, Violet and Jundee land systems, with smaller areas of the Sherwood, Mileura, Norie, Cunyu, Kalli, Gabanintha, Breberle, Koonmarra, Waguin, Wiluna, Yandil and Yanganoo land systems (Figure 2.3) also present. These land systems and their associated land types are described in Table 2-3.

550000 560000 570000 580000 590000

7040000 7030000 7020000

Legend

- Project Area
- Pits and Dumps
- BFS Base Case
- BFS Option 1
- BFS Option 2

Yanganoo Land System
Sherwood Land System
Koonmarra Land System
Mindura Land System
Waguin Land System
Kalli Land System
Norie Land System
Cunyu Land System
Gabanintha Land System
Breberle Land System
Yandil Land System
agahong Land System
Mileura Land System
Violet Land System
Weld Land System
Yarrameedie Land System
Wiluna Land System
Jundee Land System

N

0 3 6

Kilometres

Absolute Scale - 1:130,000

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Landsystems of the Weld Range Project Area

Figure: 2.3
Project ID: 722

Drawn: SG
Date: 01/07/10

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

Unique Map ID: S144

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Table 2-3 – Summary of Land Systems Occurring within the Weld Range Project Area (From Curry et al. 1994).

Land System (Total Area in Murchison)	Land Type	Description
Weld (350 km^2)	1: Rough Hills with *Acacia* spp. shrublands	Rugged ranges and ridges of mainly Archaean metamorphosed sedimentary rocks; supports *Acacia* species shrublands; major system of Weld Range and Jack Hills.
Norie (1321 km^2)		Granite hills with exfoliating domes and extensive tor fields, supporting *Acacia* species shrublands.
Gabanintha (962 km^2)		Ridges, hills and footslopes of various metamorphosed volcanic rocks (greenstones), supporting sparse *Acacia* species and other mainly non-halophytic shrublands.
Wiluna (1294 km^2)	2: Hills and plains with mulga, snakewood-halophytic shrublands	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supports sparse mulga shrublands with patches of halophytic shrubs.
Yarrameedie (519 km^2)	3: Low hills and quartz strewn plains with mulga shrublands	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld Land System) supporting sparse mulga shrublands.
Sherwood (4839 km^2)	4: Breakaways, stony plains and sandy surfaced plains on granite with mulga and halophytic shrublands	Extensive, gently sloping stony and sandy plains on granite and gneiss below saline footslopes of lateritised breakaway and outcrops of weathered rock; mainly supports scattered mulga shrublands with understorey of non-halophytic shrubs.
Violet (1078 km^2)	7: Irregular plains on laterite and parent rock with mulga and halophytic shrublands	Gently undulating gravely plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supports mulga and bowgada-dominated shrublands, with dense mulga groves and patchy halophytic shrublands.
Kalli (6097 km^2)	10: Sandplains and drainage floors with grassy and halophytic shrublands	Elevated, gently undulating red sandplains edged by stripped surfaces on laterite and granite; tall *Acacia* species shrublands and understorey of wanderrie grasses.

Land System (Total Area in Murchison)	Land Type	Description
Jundee (1346 km^2)	14: Wash plains on hardpan with mulga shrublands	Hardpan wash plains with variable dark gravely mantling and weakly groved vegetation; minor sandy banks; supports scattered mulga shrublands.
Yanganoo (12,433 km^2)		Almost flat hardpan wash, with or without small wanderrie banks and showing variable development of weak groving; supports mulga shrublands.
Yandil (3402 km^2)		Flat hardpan wash plains, with occasional wanderrie banks and groves; supports mulga shrublands.
Cunyu (1083 km^2)	15: Calcreted river plains with grassy shrublands.	Calcreted drainage on hardpan, alluvial plains with raised calcrete platforms dissected by major flow zones and channels, supporting variable non-halophytic shrublands and shrubby grasslands.
Mileura (1007 km^2)		Saline and non-saline calcreted river plains, with clayey flood plains interrupted by raised calcrete platforms supporting diverse and very variable tall shrublands, mixed halophytic shrublands and shrubby grasslands.
Breberle (115 km^2)	16: Sandplains and drainage floors with acacia and halophytic shrublands	Level saline drainage plains adjacent to ephemeral lakes, claypans and swampy drainage foci with sandy margins and occasional sand dunes; supports tall acacia shrublands and other fringing shrublands with zonations of perennial grasses and halophytes.
Koonmarra (5335 km^2)	17: Stony plains with *Acacia* spp. shrublands	Quartz-strewn stony plains and low rises with outcropping granite, gneiss and schists; supports scattered mulga and other mainly non-saline shrubs.

Land System (Total Area in Murchison)	Land Type	Description
Waguin (748 km^2)	7: Mesas, breakaways and stony plains with acacia or eucalypt woodlands and halophytic shrubs.	Sandplains and stripped granite or laterite surfaces with low fringing breakaways and lower plains; supports bowgada and mulga shrublands with wanderrie grasses and minor mixed halophytes.

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2.3 HYDROGEOLOGY

Drainage in the project area occurs within the upper Murchison River Catchment, part of the drainage basin of the Murchison River. Water flows northwards and is ephemeral. Most of the drainage runs towards the Indian Ocean, with a small part draining inland towards the salt lakes of the area.

As the rainfall and associated surface water have erratic seasonal distributions the dominant land uses, mining and pastoralism, are dependent on the extensive shallow aquifers found in the area. The area contains a variety of Precambrian bedrock aquifers ranging from granite to metamorphic and sedimentary rocks, overlain by alluvium and calcrete.

Groundwater salinity decreases northwards towards the Gascoyne area and ranges from hypersaline in the upper parts of the Yarra Yarra and Murchison catchments, to fresh – brackish conditions in the Gascoyne catchment (Department of Fisheries, 2004).

The following aquifer types are found within the Murchison:

- Alluvium aquifer; alluvial sediments lie along the main river valleys of the Yilgarn Craton, overlying calcrete, palaeochannels and fractured rock. It is not known as a major aquifer source, but is utilised by wells and bores for stock and mining. Groundwater salinity ranges from fresh on the valley sides and increases towards the centre.
- Calcrete aquifer; calcrete is a chemically precipitated limestone contained by the alluvium, close to the centres of the valleys. Calcrete aquifers have the most potential for shallow, large supplies of brackish to saline groundwater in the Murchison catchment.
- Palaeochannel aquifer; palaeochannels are the basal infilling of ancient river valleys. One major palaeochannel aquifer occurs at Windimurra in the Murchison, and it is used for mining. The groundwater salinity is generally high.
- Fractured rock aquifer; this includes a variety of metamorphic and igneous rocks. Fractured rock aquifers are the main source of water for mining in the Murchison, with groundwater salinity ranging from brackish to hypersaline.

2.4 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater dependent ecosystems (GDEs) are defined as “ecosystems that must have access to groundwater to maintain their ecological structure and function” (Murray et al., 2006) or “ecosystems that are dependent on groundwater for their existence and health” (National Water Commission, 2006).

The extent to which ecosystems are dependent on groundwater is classified into five categories: ecosystems entirely dependent on groundwater; ecosystems highly dependent on groundwater; ecosystems with proportional dependence on groundwater; ecosystems which may only use groundwater opportunistically or to a very limited extent; and ecosystems with no apparent dependence on groundwater (Hatton and Evans, 1998). The dependency of ecosystems on groundwater is based on groundwater flow or flux, level, pressure and quality. The ecosystem response to alterations in these groundwater parameters is variable (Sinclair Knight Merz Pty Ltd, 2001).

Less than 1% of the land area of Australia is represented by ecosystems that are entirely dependent on groundwater, and similarly for ecosystems highly dependent on groundwater. Less than 5% of the land area is associated with ecosystems that are proportionally dependent on groundwater (Hatton and Evans, 1998). These ecosystems represent a small but unique and important part of the Australian environment (Hatton and Evans, 1998; Sinclair Knight Merz Pty Ltd, 2001).

Examples of Australian GDEs that are entirely dependent on groundwater include riparian (streamside) vegetation in the central Australian arid zone and arid zone calcrete aquifer ecosystems of central Western Australia (Sinclair Knight Merz Pty Ltd, 2001).

There is a range of wetland and riparian ecosystems in Australia that initially appear to be groundwater dependent, but prove not to be. Examples of this include intermittent and episodic wetlands and lakes of the arid zone and of the Western Australian sandplain and Yilgarn Plateau (Sinclair Knight Merz Pty Ltd, 2001).

Currently, six distinct types of GDEs are recognized in Australia: terrestrial vegetation, river base flow systems; aquifer and cave ecosystems; wetlands; terrestrial fauna; and estuarine and near-shore marine ecosystems (Sinclair Knight Merz Pty Ltd, 2001).

Terrestrial vegetation GDEs do not rely on surface water to survive, but depend seasonally or episodically on groundwater that would be locally recharged in the wet season. These terrestrial vegetation GDEs are influenced by groundwater level, flux and quality (Sinclair Knight Merz Pty Ltd, 2001).

The determination of environmental water requirements of GDEs is associated with the following factors: the nature of ecosystem dependency on groundwater; the water requirements of the ecosystem; the groundwater regime that will meet the requirements of the ecosystem; and impacts of change in groundwater regime on ecological processes (Sinclair Knight Merz Pty Ltd, 2001). Sustainable borefield developments require an understanding of the use of ecosystem groundwater requirements and adaptability (Eamus and Froend, 2006).

Phreatophytes (deep-rooted plants that can access the water table) show seasonal variability in both the quantity of groundwater used and the relative importance of groundwater as a water source. Phreatophytes utilise groundwater the most during the driest season of the year, when alternative sources of water become exhausted and transpiration is highest (Eamus and Froend, 2006). With regard to borefield operations, the timing and modification of abstraction and the magnitude and rate of drawdown affects the risk to GDEs. For example, the risk to GDEs may be lowered considerably by avoiding periods of peak environmental demand and allowing adaptation of dependent biota to a lower water table. Information concerning the process of adaptation to changes in groundwater availability is limited (Eamus and Froend, 2006).

The maintenance of GDEs is directly related to the maintenance of specific ecosystem processes such as: flowering, seed set and germination; growth and persistence; seedling establishment and recruitment to reproductive age; mortality; and nutrient cycling (Eamus *et al.,* 2006). A GDE may experience a decline in the functioning of the ecosystem following the extraction of groundwater, as opposed to a total collapse of the ecosystem (Murray *et al*., 2006).

In March 2009, the National Water Commission (2009) initiated a project that seeks to identify major GDEs across Australia, in order to produce a national comprehensive geographic database inventory (an “atlas”) of GDEs.

2.5 BIOGEOGRAPHIC REGION

The Interim Biogeographic Regionalisation for Australia (IBRA) categorises the Australian continent into regions of similar geology, landform, vegetation, fauna and climate. The Weld Range lies within the Western Murchison sub-region (MUR2) (Figure 2.4) in the Eremaean botanical province of the arid zone of Western Australia (Environment Australia, 2007). The MUR2 is described as:

" Mulga low woodlands, rich in ephemerals (usually with bunched grasses), on outcrop and fine-textured Quaternary alluvial and eluvial surfaces. Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains dominate and characterise the subregion) mantling granitic and greenstone rocks outcrops in the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage systems occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia." (Desmond *et al*., 2001).



Figure 2.4 – The Interim Biogeographic Regionalisation for Western Australia (IBRA).

2.6 PREVIOUS BIOLOGICAL SURVEYS

Vegetation communities and land systems of the Weld Range were described by Speck and Mabbut *et al* (1963) respectively as part of a regional survey of the Wiluna to Meekatharra area.

The vegetation communities of the area were mapped by Beard (1976) in his regional survey of the Murchison at a scale of 1: 1 000 000, describing the region as providing optimum conditions for the presence of mulga (*Acacia aneura*) woodlands.

A finer-scale survey of the vegetation was undertaken by Curry *et al.* (1994), using the land systems of Mabbut *et al* as part of their regional survey of rangelands within the Murchison River Catchment. The vegetation communities of the greenstone ranges of Weld Range (the Weld land system) were surveyed between 1985 and 1988 and were reported to be dominated by *Acacia* species and rocky hill mixed shrublands, stony mulga mixed shrublands, and creekline shrublands.

A survey of the vegetation communities and flora of the Weld Range was conducted by the DEC in late August 2005 (Markey & Dillon, 2008). The aim of the survey was to resolve floristic communities within the Weld Range at a finer scale than had been attained by the regional surveys. Fifty-two quadrats were established at the Range, and 239 taxa were collected. Of these taxa, eight were identified as priority flora and six were new records for the Weld Range.

From July 2006 to July 2009 *ecologia* conducted 26 flora surveys at Weld Range for various programme of works applications. The results of these surveys are summarised in Appendix A.

2.7 LANDUSE HISTORY

Much of the Murchison area was vacant crown land until the 1900s. A rapid expansion of pastoral leases occurred over the following three decades (Curry *et al.* 1994). The Murchison pastoral areas are still active and primarily run sheep and cattle. Large numbers of feral goats are also caught and exported to supplement station incomes. Meekatharra is a major service centre for the pastoral industry and mining exploration in the Murchison region of Western Australia.

The first discovery of gold in the Murchison occurred in July, 1890 (Edwards, 1994). Gold was found at Nannine in 1891 and soon afterwards at Garden Gully and Meekatharra, leading to the establishment of thriving mining centres (Elias, 1982). Meekatharra was first settled in 1894. The 'Meekatharra' 90N gold mine gave the name to the town, when gold was found in 1896. This early success was short-lived and it wasn't until a second gold discovery was made in 1899 that the town's survival was ensured. The Meekatharra State Battery commenced operations in 1901, and closed down in 1987. Meekatharra became a railhead in 1910, forming an important part of the pastoral industry. Cattle arrived at the stockyards from the Pilbara and Kimberley regions, and the shipment of wool was facilitated by the rail line, which subsequently closed down in 1978 (Edwards, 1994).

Gold and iron ore mining became established at Weld Range in the early 20th century. The potential for iron ore mining at Weld Range has been recognised for over 100 years and modern exploration efforts started in 1959. The resources region in the Midwest has developed into a major contributor in this area, and in 2004 provided 7% (or $1.9 billion) of the state revenue (The Chambers of Minerals and Energy, 2006).

A deposit of red ochre at Wilgie Mia, an ochre mine on the Weld Range, has been used by Aboriginals for over 1000 years while Europeans started red ochre production from the area in 1945 (Elias, 1982).

3 METHODOLOGY

3.1 GUIDING PRINCIPLES

The survey methods adopted by *ecologia* were formulated using:

- The Western Australian EPA's position paper on terrestrial biological surveys as an element of biodiversity protection (EPA, 2002);
- The EPA's guidance statement on terrestrial flora and vegetation surveys for environmental impact assessment (EPA, 2004a); and
- Consultation with regional Department of Environment and Conservation (DEC) and other relevant government officers.

The Weld Range and other Banded Iron Formation Ranges are important landforms in the Murchison region. Although representing a very small proportion of the total area of the Murchison bioregion, their unique geology, soils and relative isolation has produced distinctive vegetation communities, many of which have restricted distributions in the region. Many of the BIF ranges support threatened, and in some instances locally endemic, species. As a consequence they are considered to have very significant biodiversity values and a multiphase Level 2 floristic survey consistent was considered appropriate within the current Project area. The survey combined the following methodological approaches:

- *Background research:* to gather background information on the footprint or target area (i.e. search of literature, data and map-based information).
- *Reconnaissance:* to verify the accuracy of the background information, further delineate and characterise the flora and range of vegetation units present in the footprint and to identify potential impacts.
- *Detailed survey:* to enhance the level of knowledge of the flora and vegetation at the local scale and its local context or significance (if the broader scale is well known).

Level 2 surveys require one or more visits to the target area in the main flowering season and visits in other seasons. Replication of plots in each vegetation unit is required to thoroughly sample the flora and all the vegetation units over their full extent in the target area, to enable maps of these vegetation units to be produced at an appropriate scale. An assessment of vegetation condition are also required.

3.2 SURVEY METHODS

3.2.1 Database Searches

A search of the following databases were undertaken in July 2006 prior to commencing the first survey and again in June 2010, to determine species of conservation significance previously recorded in the vicinity of the Project area:

- DEC Threatened (Declared Rare) Flora Database (DEFL);
- DEC Declared Rare and Priority Flora List;

- DEC Western Australian Herbarium Specimen Database (WAHERB);
- DEC Threatened Ecological Community Database; and
- the Department of the Environment and Water Resources Protected Matters Database.

Details of the 2010 search are included in Table B.1, Appendix B.

3.2.2 Survey Timing and Objectives

The vegetation and flora of the Weld Range project area were surveyed over fifty three person days over three phases**:**

- 3rd to the 12th of November, 2006 (spring phase);
- 14th to the 21st of April 2007 (autumn phase); and
- 3rd to the 10th of July 2008 (winter phase).

In addition a linear rail corridor survey at Weld Range was conducted in June 2009, a portion of which occurred within the current Study Area. The species collected during this survey were also added to the overall species list for the Project. An additional three person survey days were spent within the Study Area during this survey.

The objectives of these surveys 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.

3.3 DETAILED FLORISTIC SURVEY METHODS

The three-phase survey involved a combination of sampling within bounded quadrats and a series of linked field traverses. Linked traverses are more time efficient than bounded quadrats to maximise the sampling of the entire area and thus the probability of locating flora of potential significance. However quadrats were utilized to characterise the vegetation units and to facilitate multivariate analysis of the vegetation. Both methods contributed to the delineation of small scale vegetation units and to a comprehensive floristic inventory of the survey area.

3.3.1 Quadrat based surveys

To ensure that all floristic communities and habitats present within the survey area were represented in the data collected, sampling sites were selected using aerial photography, topographical features and field observations. The number of sites established was determined by the size and the heterogeneity of the study area. Two-hundred and thirty-nine quadrats were

established during the three phase survey over the project area. One hundred and three quadrats were assessed during Phase 1, with 72 additional quadrats assessed and 37 Phase 1 quadrats re-assessed during Phase 2, and a further 64 quadrats during Phase 3. Information from an additional 19 sites within the project area assessed during a rail corridor survey was also used to further refine vegetation boundaries; however data collected during this survey were not included within the statistical analysis. The location of quadrats is detailed in Figure 3.1. The coordinates of quadrats are listed in listed in Appendix C.

Quadrats measured 20 m x 20 m (400 m^2) or an equivalent area when sites were located in drainage lines or irregularly shaped patches of vegetation. The following parameters were recorded at each quadrat:

- location details, including GPS co-ordinates;
- 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 stratum;
- maximum height and foliage projective cover for each species within the site, including introduced species;
- vegetation condition; and
- the estimated time since the last fire at each site.

Plant specimens were collected for later identification and verification. Nomenclature and taxonomy follow the conventions currently adopted by the Western Australian Herbarium (2010).

Vegetation type, life-form strata and percentage cover for each stratum were recorded using the National Vegetation Information System (NVIS) vegetation classifications (Appendix D). Site descriptions are included as Appendix E.

3.3.2 Transect based surveys

Surveys targeting taxa of conservation significance previously recorded during the quadrat-based surveys were conducted between May 2008 and August 2009. In total 1053 transects over 94 person days were conducted inside and outside proposed areas of infrastructure. Because the proposed infrastructure areas are large (approximately 4500 ha including buffer zones) they could not be systematically grid searched and therefore sub-plots of each area were surveyed.

Transects surveying a 10 m width were walked and the locations and abundance of all Priority taxa observed were recorded using a handheld GPS. The spacing between transects varied to some degree but the majority of transects were separated by 100 m. Transect length was determined by the dimensions of each habitat occurring in a particular search polygon. The number of transects walked in each habitat depended on the total area of that habitat and on the typical densities of Priority taxa occurring within them.

Individual coordinates and the exact number of plants present were recorded for isolated or small clusters of plants. Boundary waypoints were recorded for large populations and of the number of plants present within those boundaries was estimated. The vegetation community, habitat and orientation relative to the ranges at which each cluster was located were noted. Any plants observed between transects or outside the boundaries of grids searched were recorded as opportunistic collections, and the number of plants and locations similarly recorded.

The transects were located such that the range of topography and vegetation types present within the proposed infrastructure areas were represented and is illustrated relative to the land systems present in Figure 3.2.

An additional 34 transects were surveyed within the Wilgie Mia Reserve in September 2008 subsequent to permission being granted by the Wajarri Community. Priority flora locations and vegetation structure were recorded, and collections were made of any taxa not previously recorded during surveys within the Study Area. Specimens of known and suspected conservation significant flora species recorded during the threatened flora surveys were collected for verification by an experienced taxonomist.

3.3.3 Vegetation Condition

Vegetation condition was assessed at all quadrats using the rankings based on criteria described in Table 3-1.

Table 3-1 – Vegetation Condition Scale (BushForever, 2000 after Trudgen,1991)

Vegetation condition	Criteria
Excellent	Pristine or nearly so, no obvious sign of damage caused by European man
Very good	Some relatively slight signs of damage caused by the activies of European man. E.g. damage to tree trunks by repeated fires, the presence of some relatively non-aggressive weeds or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of European man, including some obvious impact to vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of European man such as grazing or partial clearing or very frequent fires. Presence of some more aggressive weeds.
Very poor	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 weeds species including aggressive species.
Completely Degraded	Areas that are completely or almost completely without native vegetation e.g. areas that are cleared or parkland cleared with their flora comprising weed or crop species with isolated native trees or shrubs.

3.3.4 Vegetation Mapping

Vegetation mapping is the delineation of plant communities based on distinctive characteristics that these communities share such as the vegetation structure, dominant species and species composition. A combination of multivariate analysis of species composition of quadrats and ground truthing was employed to define communites. This method provides an objective means of defining vegetation communities and provides insight into the hierarchical relationship between communities based on the degree of similarity in species composition and abundance. The boundaries of communities were then estrapolated to the entire Study Area based on their appearance in 1:15,000 aerial imagery.

The species by site matrix utilized in the statistical analysis included perennial taxa identified to species level. Annuals and singletons (species occurring at only one quadrat) were removed from the species list. All *Acacia aneura* varieties were grouped as *Acacia aneura* and *Solanum ashbyae* and *S. lasiophyllum* were combined into a single entity, *Solanum ashbyae / lasiophyllum* given the

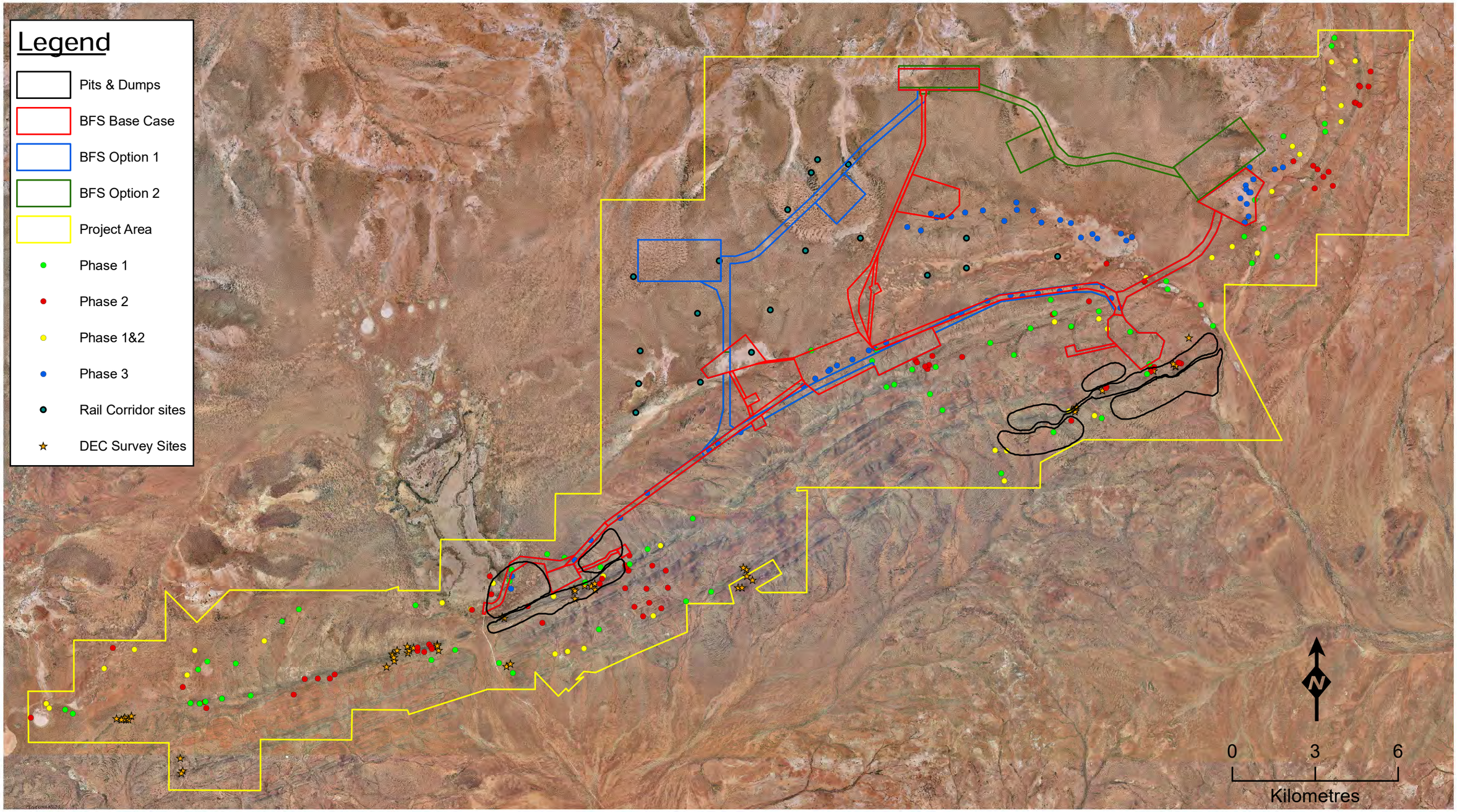
difficulty in reliably discriminating non-reproductive specimens of these taxa. This treatment follows that utilized by Markey and Dillon (2008) in their analyis of DEC quadrats located on Weld Range.

Multivariate analysis of the site by species matrix (present/absent data) was performed using the complete linkage algorithms in PATN™. The data from quadrats surveyed by the DEC in 2005 survey at Weld Range were compared with that collected by ecologia. This analysis was useful in providing a means of objectively comparing patterns observed in the data collected by the DEC and ecologia.

Multivariate analysis of the species matrix data collected at quadrats during ecologia's three-phase survey were also analysed using the multivariate programme SYSTAT™. Both present/absent and cover-weighted matrices were analysed using Pearson complete linkage algorithms. to produce dendrograms showing similarities between sites. The DEC data was omitted from this analysis as cover-weighted rankings were not available.

A combination of aerial photography and topographic maps was used to interpret the vegetation patterns of the Study Area. Due to the size of the Study Area, the mapping was constrained by the number of quadrats surveyed and was supplemented by habitat and vegetation descriptions collected during the transect-based surveys and during the survey of the rail corridor.

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Absolute Scale - 1:137,101

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Quadrats Surveyed Across the Weld Range Project Area

Figure: 3.1
Project ID: 722

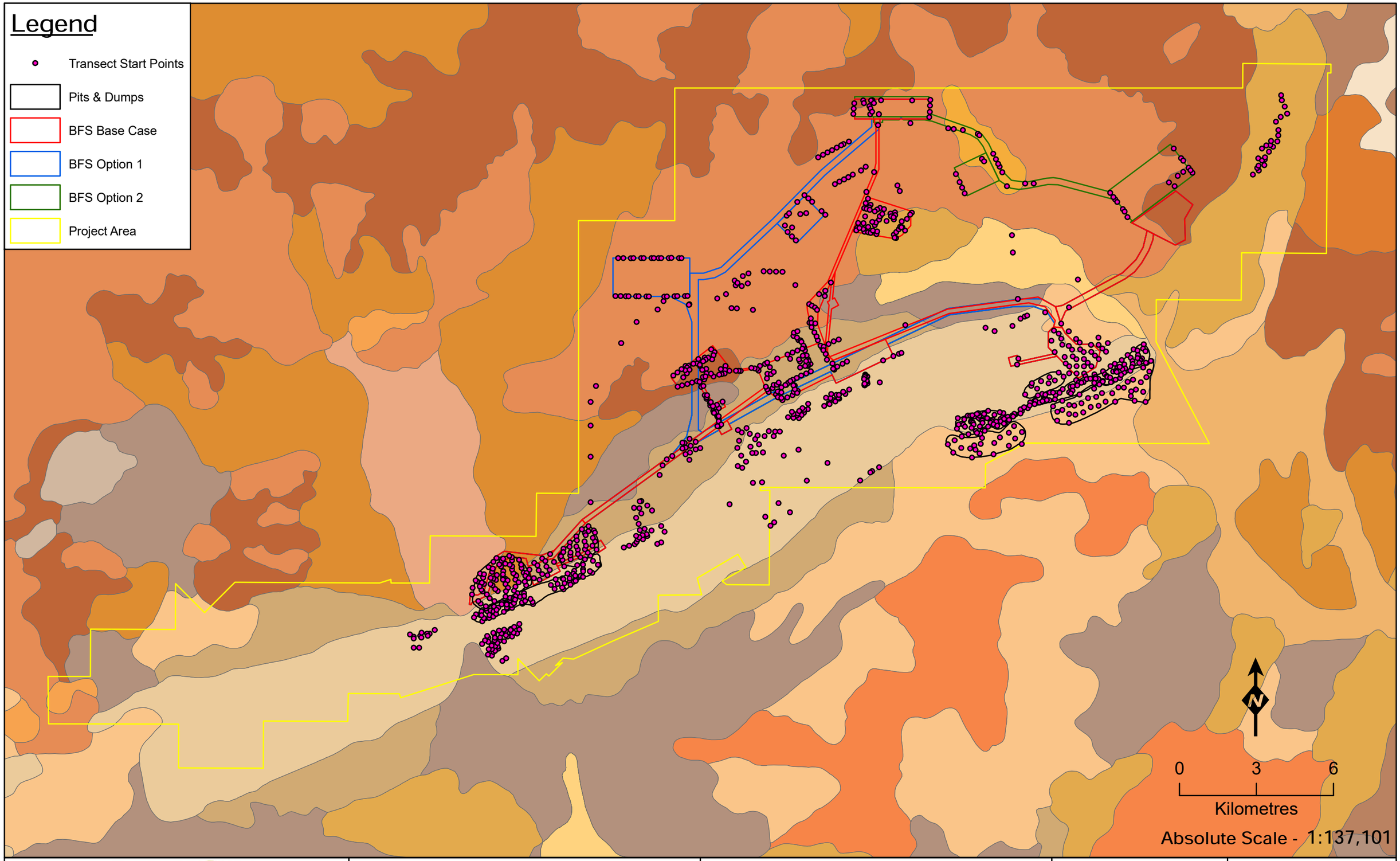
Drawn: SH
Date: 06/11/2009

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

Unique Map ID: S060

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Locations of Threatened Flora Transects Across the Land Systems of the Weld Range Project Area

Figure: **3.2**
Project ID: 722

Drawn: SH
Date: 06/11/2009

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

Unique Map ID: S061

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3.3.5 Survey Limitations and Constraints

According to the EPA Guidance Statement for Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004a), flora and vegetation surveys may be limited by a number of factors. These factors and their relevance to the current survey are detailed in Table 3.1.

Table 3-2 – Limitations of the Flora and Vegetation Survey

Limitation	Relevance to current survey
Sources of information and availability of contextual information (i.e. pre-existing background versus new material)	A number of other botanical surveys associated with mining activities have been completed in the surrounding area and in the Western Murchison region generally which were accessible. In particular: • The DEC surveyed 52 bounded quadrats at Weld Range in August 2005. The DEC has described the floristic communities at the Weld Range and at other BIF ranges of the Yilgarn Craton. • More than 20 targeted flora surveys have been carried out by *ecologia* within the Study Area and some nearby leases. • In June 2009 the Weld Range section of a linear rail corridor was surveyed for OPR (ecologia 2010i). SMC and OPR agreed to share relevant data in this area hence data collected has been used to verify the vegetation mapping and to supplement the species inventory.
The scope (i.e. what life forms were sampled)	The vascular flora and vegetation of the Study Area was sampled during spring, autumn and winter.
Proportion of flora collected and identified (based on sampling, timing and intensity)	Over the three phases of the survey (and including the additional rail corridor sites) approximately 3,500 plant specimens were collected within the Study Area, and 393 taxa (including species, subspecies, varieties, forms and affinities) were identified. Based on species accumulation analysis it is estimated that 93% of the species potentially present were recorded. 4 taxa were identified to genus level only Forty-four annual or weakly perennial species were recorded during Phase 1 of the survey, 12 during Phase 2, 27 during Phase 3 and 7 during the rail corridor survey.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	The Study Area encompassed 51,557 ha, approximately twice the area within the SMC Project, allowing the vegetation mapped to be viewed in a broader local context. Survey intensity was greatest in areas of proposed infructure, however as the locations of some structures were unknown at the time of survey, supplementary surveys will be required to identify and mark populations of priority flora in some areas areas.
Mapping reliability	Aerial imagery at a scale of 1:15,000 was used to select sites to be sampled during the survey and to produce a digitised map of the vegetation associations occurring in the study area. The distribution of quadrats within the Study Area was concentrated in the areas of proposed infrastructure and along the BIF range, therefore a greater degree of extrapolation was required at the boundaries of the survey area. However the number of quadrats (239 plus an additional 19 from the OPR rail corridor is considered to have provided adequate data fro this purpose.
Timing/weather/season/cycle	Rainfall in the four months preceding each phase relative to the long term average (LTA) for these months was as follows: Phase 1, Nov. 2006: 49.6 mm, 5.1 mm > LTA Phase 2, Apr. 2007: 66.2 mm, 38.4 mm < LTA Phase 3, Jul. 2008 (Table 2.2). 84.0 mm, 20.4 mm < LTA.

Limitation	Relevance to current survey
	Rail Corridor, Jun. 2009: 26.4 mm, 82.5 mm < LTA. Annual rainfall during 2006 was 56.4% greater than the LTA annual rainfall. It is considered that, although rainfall was significantly below the LTA during the 2007 Autumn survey, the survey timing was adequate given the higher than average rainfall during 2006.
Disturbances (e.g. fire, flood, accidental human intervention)	Isolated, small pockets of burnt vegetation are present across the Study Area. Due to their small size and broad distribution, they did not impact survey adequacy.
Intensity (in retrospect, was the intensity adequate?)	In total 56 person days (53 during Phases 1 to 3 and a further 3 during the rail corridor) have been expended on the quadrat based survey. A further 94 days were expended during transect based surveys. The survey is considered adequate in intensity and will add significantly to the existing knowledge on the vegetation and flora of the project area.
Resources	The number of personnel employed and the physical resources available to facilitate the survey were adequate. The survey effort was not impeded by a lack of resouces.
Access problems	Access was reasonable to most of the survey area. A relatively small area toward the centre of the range proved difficult to access during each phase of the survey as higher than average rainfall in 2006 had washed out many of the pastoral and old exploration tracks providing access to this area. However this area was surveyed by within the transect based surveys and the data collected used to supplement the vegetation mapping.
Experience levels (e.g. degree of expertise in plant identification to taxon level)	The field botanists have conducted numerous surveys in the Murchison biogeographic region. Plant specimens were collected from all quadrat assessed to ensure taxonomic accruacy. The two taxonomists responsible for identifying the specimens collected during the three phases and additional rail corridor surveys each have more than 10 years of experience in plant taxonomy. *ecologia's* Principal Botanist has more than 19 years of experience in vegetation mapping and supervised data analysis and interpretation prior to production of the vegetation map.

4 VEGETATION

4.1 REGIONAL VEGETATION

The Weld Range project area is situated within the Murchison botanical district of the Eremaean botanical province. The boundaries of this province approximate the geological boundaries of the Yilgarn Block, which forms the nucleus of the West Australian Shield (Beard, 1976). The region is well known for the dominance of mulga (*Acacia aneura*) woodlands, and the extensive flats and plains provide optimum conditions for the occurrence of these woodlands (Beard, 1976). The Murchison botanical district is divided into two subregions, and the Weld Range falls within the boundaries of the upper or Western Murchison subregion (MUR2). Data recorded from flora surveys and opportunistic collections in the region indicate that the Murchison bioregion encompasses a rich flora with at least 2,210 known species (Western Australian Herbarium, 2010).

Mulga shrublands make up the vast majority of vegetation types encountered in the Murchison region. On the more favorable soils (plains and valleys) *Acacia aneura* generally grows in the form of a tree with a single erect trunk and forms low woodlands. On less favorable soils, such as those present on hill slopes and ridges, it takes the form of a shrub producing shrublands/scrublands (Beard, 1976). As a result, the bulk of landscapes are dominated by mixed shrubland/scrubland, with few or no trees or perennial grasses, randomly scattered or loosely aggregated shrubs, with large areas of bare ground with exposed shallow red soils between them (Curry et al., 1994).

4.2 PREVIOUS DOCUMENTATION OF THE VEGETATION OF THE WELD RANGE

The vegetation of the Weld Range has been mapped on a broad scale (1:1,000 000) by Speck (1963) and Beard (1976). Beard classified the vegetation of the Study Area into seven main types as described in Table 4.1 below and shown in Figure 4.1.

Table 4-1 – Summary of Beard's Vegetation Units Located Within the Study Area.

Vegetation Code	Vegetation Description
$a_1 S_i$	*Acacia aneura* (mulga) scrub.
$a^1_{14} Si$	*Acacia aneura* and *Acacia quadrimarginea* scrub.
$a_1 Li$	*Acacia aneura* low woodland.
$a^1_9 Li$	*Acacia aneura, Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland.
$a^1_{17} Li$	*Acacia aneura* and *Acacia grasbyi* low woodland.
$a_9 Si$	*Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) scrub.

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550000 560000 570000 580000 590000

7040000 7030000 7020000 7010000

Legend

- Pits & Dumps
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Project Area

a1Si
a1,9Li
a1,17Li
a9Si
a1Li
a1,14Si
a1,8Sr k1,2Ci

N

0 4 8

Kilometres

Absolute Scale - 1:135,775

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Beard's Vegetation Units of the Weld Range Project Area

Figure: 4.1
Project ID: 722

Drawn: SH
Date: 19/10/09

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

Unique Map ID: M048

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More recently the DEC (Markey & Dillon, 2008) surveyed the Weld Range and documented six main vegetation communities and four sub-communities occurring on the hills, footslopes and outwash plains (Table 4.4)

Table 4-2 – Weld Range Vegetation Communities Described by the DEC (Markey & Dillon, 2008).

Community Type	Landform Description	Vegetation Description	Characteristic Species
1a	Moderate hill slopes, very rocky terrain and outcrops of BIF.	*Acacia aneura*, A. *ramulosa* and / or *Acacia* sp. Weld Range (A. Markey and S. Dillon 2994), over sparse *Eremophila* species.	*Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei* and *Santalum spicatum.*
1b	Rocky, gentle to moderate inclines.	Open to sparse shrubland of *Acacia* aneura (var. *microphylla*, *aneura and argentea*), *Acacia* sp. Weld Range and *Grevillea berryana*, over *Eremophila* spp. low shrubs.	*Prostanthera petrophila* & *Cheilanthes sieberi* subsp. *sieberi.*
2	Massive rocky outcrops of BIF, moderate to steep hill slopes.	Sparse to open shrubland of *Acacia aneura* var. *microcarpa* and / or A. *aneura* var. *aneura*, over mid stratum shrub layer of *Thryptomene decussata*, *Philotheca brucei* subsp. *brucei*, and *Eremophila* species.	*Philotheca brucei* subsp. *brucei*, *Micromyrtus sulphurea*, *Dodonaea pachyneura* and *Stylidium longibracteatum.*
3	Mid and low to moderate hillslopes. Loose ironstone gravel and scree.	Open shrubland of *Acacia aneura* over isolated *Solanum ashbyae* and *Tribulus suberosus* low shrubs.	*Cheilanthes sieberi* subsp. *pseudovellea*.
4	Steep rocky hillslopes with relatively high levels of exposed bedrock.	Open shrubs of *Acacia aneura* and emergent trees of *Acacia pruinocarpa*, over *Philotheca brucei* subsp. *brucei* and *Eremophila* species.	*Abutilon oxycarpum*, *Dodonaea pachyneura* and *Enneapogon caerulescens* – all characteristic of fractured rocky substrates.
5a	Moderately inclined lower hillslopes and outwash plains.	Isolated emergent trees of *Acacia pruinocarpa* over *Acacia aneura* / *Acacia ramulosa*, over an open mid-stratum of shrubs.	No significant indicator species. Distinguished from community type 5B by *Acacia aneura* var. *major, Sida excedentifolia* and *Acacia pruinocarpa*.
5b	Moderately inclined lower hillslopes and outwash plains.	Sparse to open *Acacia* shrubland (A. *aneura* cf. var. *tenuis* or *aneura* and / or *Acacia effusifolia*), over sparse *Senna* species and *Tribulus suberosus* low shrubs.	*Acacia aneura* var. *tenuis, Senna glaucifolia* and *Hibiscus sturtii.*
6	Associated with dolerite substrates.	Open shrubland of *Acacia* sp. Weld Range (A. Markey and S. Dillon 2994), *Acacia aneura* and *Acacia speckii*, over sparse mid stratum of *Eremophila macmillaniana*, *Eremophila mackinlayi* subsp. *spathulata* and *Heliotropium ovalifolium.*	*Senna* spp. and *Eremophila macmillaniana*.

4.3 VEGETATION COMMUNITIES IDENTIFIED WITHIN THE STUDY AREA DURING THE CURRENT SURVEY

The vegetation within the study area was mapped at a scale of 1:15,000 using aerial photography, ground truthing and multivariate analysis of the floristic composition and vegetation structure of quadrats (Figure 4.2). Not all vegetation communities visible at ground level and evident within the multivariate analysis could be reliably discriminated using aerial photography. In particular vegetation communities 1a and 1b, and 2a and 2b could not be distinguished and have been mapped as a single unit, 1 and 2.

Seven major vegetation communities, and 16 sub-communities, as identified by the multivariate analysis are described in Table 4.5. The dendrogram resulting from this analysis is shown in Appendix F and the site by species matrix used to conduct the analysis is included as Appendix G.

Higher resolution vegetation maps of the whole area are included as Appendix H (Figures H.1 to H.5).

4.4 VEGETATION CONDITION

As detailed in Table 4-3, the condition of vegetation within bounded quadrats ranged from very good to poor, with the majority of quadrats assessed as in good condition.

Table 4-3 – Assessment of Vegetation Condition of Quadrats

Vegetation Condition	Proportion of Quadrats (%)
Excellent	0
Very Good	14
Good	77
Poor	9
Very Poor	0
Degraded	

Vegetation condition at sites on the flat sand plains of the survey area ranged from good to poor, with most damage due to extensive grazing by feral goats and livestock across these areas of the pastoral lease. There was no evidence of cattle grazing at sites located higher in the landscape, but some evidence of grazing by goats.

Vegetation across the Study Area, particularly on the rocky ironstone ridges, had been disturbed by tracks and clearing for exploration activities.

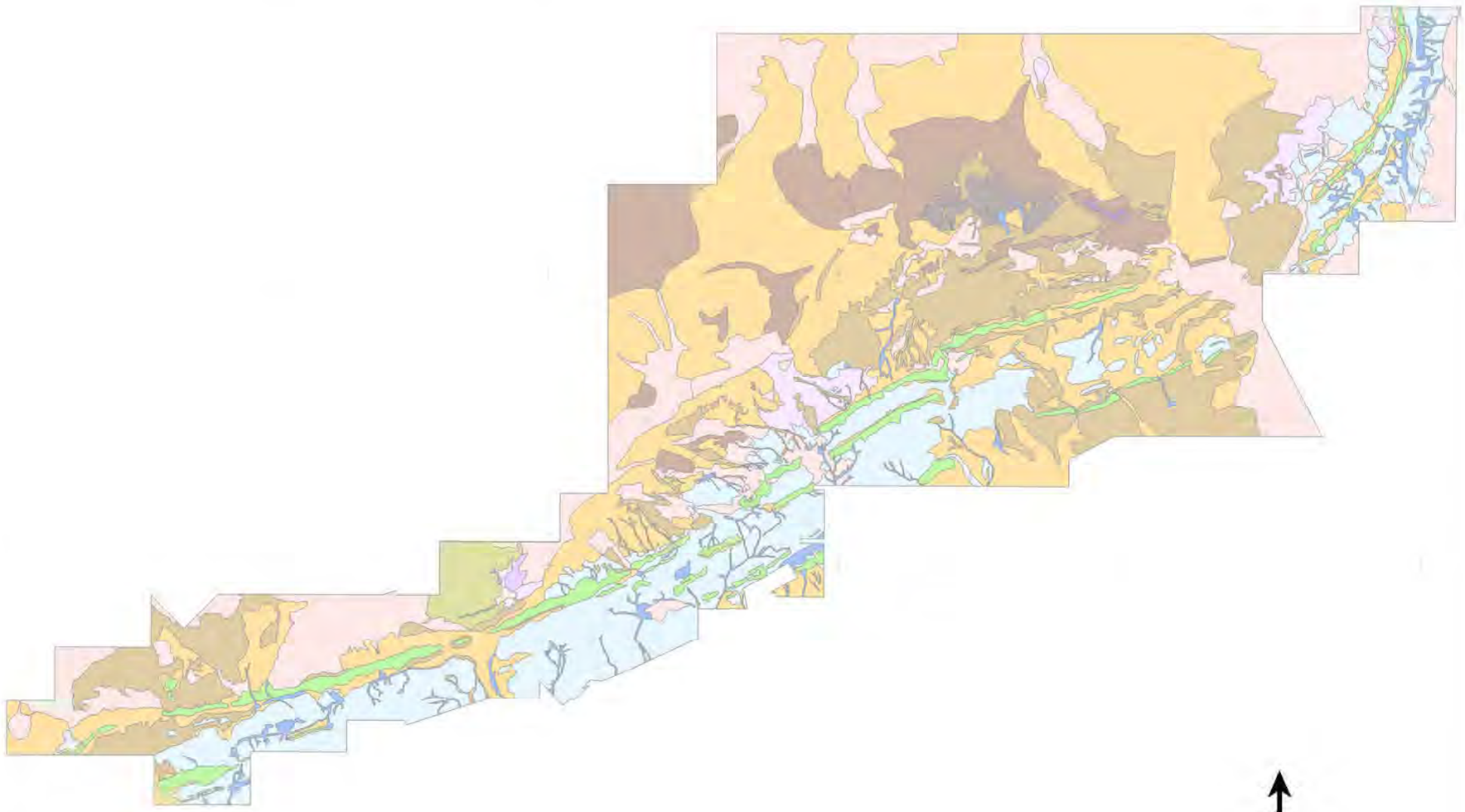
Weed abundance is generally low across the lease. Most weeds are recorded on sites lower in the landscape where most grazing is more prevalent.

530000 540000 550000 560000 570000 580000 590000

7040000 7030000 7020000 7010000

Legend

- 1a *Acacia aneura* low woodland over mixed open shrubs.
- 3a +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* sparse shrubland over mixed *Eremophila* open shrubland over scattered low shrubs of *Ptilotus obovatus* var. *obovatus* over open tussock grasses.
- 3b +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* closed shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 3c Scattered *Eucalyptus mallees* / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea, Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 3d *Acacia aneura* and *Acacia cockertoniana* open tall shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.
- 4a *Acacia* sp. Weld Range and *A. aneuria* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 4b *Acacia* sp. Weld Range and *Acacia speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemmina* open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.
- 5 *Acacia craspedocarpa* tall shrubland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* var. *obovatus* low shrubland over mixed low tussock grassland.
- 6a Scattered *Acacia* shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* var. *obovatus* sparse shrubland over mixed *Maireanna* spp. chenopod shrubland.
- 6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus* var. *obovatus Maireana georgeii* and *Sclerolaena diacantha* low chenopod shrubland.
- 6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.
- 6d *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.
- 7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.
- 7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.



N

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Kilometres

Absolute Scale - 1:175,000

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Weld Range Vegetation Overview Map

Figure: 4.2
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S145

A3

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Table 4-4 – Vegetation Communities of the Study Area.

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
1 *Acacia aneura* low woodland over mixed open shrubs				
These woodlands are widely distributed across the banded ironstone formation (BIF) ranges of the survey area, generally covering the mid and upper slopes. The overstorey is dominated by an open to moderately dense stratum of mixed *Acacia aneura* varieties The mid stratum consists of open to moderately dense mixed shrub species with the Priority 3 taxon *Prostanthera petrophila* occasionally occurring as a co-dominant. *Allocasuarina acutivalvis* subsp. *acutivalvis* was recorded at three locations within this community type. It occurred as a dominant overstorey shrub to the west of the range and also around the centre of the range on higher, steep relief hills. Ground cover is often dominated by annual herbs and *Cheilanthes* spp. in favourable seasons and scattered *Eriachne pulchella* subsp. *pulchella* tussock grasses. Two sub-communities resulted from the statistical analysis, however, their boundaries could not be consistently differentiated on the aerial photography and they were not mapped separately.				
1a *Acacia aneura* low open woodland over *A.* sp. Weld Range, *A. ramulosa* var. *linophylla* and *Thryptomene decussata* open mid shrubland over mixed *Eremophila* spp. low shrubland. *Micromyrtus placoides, Prostanthera petrophila* **(Priority 3)** and *Beyeria lapidicola* **(Priority 2)** were recorded mostly in this community, on prominent BIF outcroppings. Mean species richness = 13 ± 3.52 (n = 20).	*Acacia aneura* var. *aneura*, *A. aneura* var. *microcarpa*, *A.* sp. Weld Range, *A. ramulosa* var. *linophylla*, *Thryptomene decussata*, *Eremophila latrobei* subsp. *latrobei*, *E. glutinosa*, *E. georgei.*	BIF mid to upper slopes and outcropping.	10a, 11, 12, 23, 30, 69, 71, 89, 108, 117, 151, 153, 156, 158, 165, 171, 175, 177, 183 and BPW09.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
1b *Acacia aneura* low open woodland over *A. cockertoniana* open mid shrubland over mixed mid shrubland over *Ptilotus obovatus* low shrubland. *Goodenia lyrata* **(Priority 1)** and *Hemigenia tysonii* **(Priority 3)** occurred within this community on the rocky BIF slopes to the west of the lease. Mean species richness = 14 ± 2.89 (n = 16).	*Acacia aneura* var. *aneura*, *A. aneura* var. *microcarpa*, *A. cockertoniana*, *Thryptomene decussata*, *Eremophila glutinosa*, *E. latrobei* subsp. *latrobei*, *E. georgei*, *Ptilotus obovatus.*	BIF upper slopes and outcropping.	7, 27, 52, 97, 128, 132, 133, 150, 152, BPW01, BPW03, BPW04, BPW05, BPW06, BPW13 and HR05.	
2 ***Acacia aneura* sparse shrubland over *Ptilotus obovatus* low shrubland**				
This community is predominantly restricted to ridge tops and the upper slopes of higher elevation BIF ridges. Scattered *Acacia pruinocarpa* trees occasionally occurred in the overstorey. The upper stratum is dominated by sparse *Acacia aneura* shrubs with mixed mid stratum shrubs. The lower stratum was dominated by open to moderately dense *Ptilotus obovatus* over sparse mixed tussock grasses. Two sub-communities resulted from the statistical analysis, however as their boundaries could not be consistently differentiated on the aerial imagery they could not be mapped separately.				

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
2a Scattered *Acacia pruinocarpa* trees over *A. aneura* mid sparse shrubland / scattered shrubs over *Ptilotus obovatus* low shrubland with *Cymbopogon ambiguus* tussock grasses. *Sauropus* sp. Woolgorong **(Priority 1)** and *Prostanthera petrophila* **(Priority 3)** were both recorded within this community. Mean species richness = 11 ± 3.30 (n = 18).	*Acacia aneura* var. *microcarpa, A. pruinocarpa, A. aneura* var. *aneura, A. aneura* var. *tenuis, Solanum ashbyae / lasiophyllum, Ptilotus obovatus, Thryptomene decussata, Sida* sp. Golden calyces glabrous (H.N. Foote 32), *Cymbopogon ambiguus.*	Ridge tops of BIF ranges.	37, 51, 67, 118, 124, 126, 127, 139, 140, 143, 146, 154, 157, 159, 163, 176, 178 and 179.	
2b *Acacia aneura* sparse shrubland over mixed sparse mid shrubland over *Micromyrtus sulphurea* and *Ptilotus obovatus* low open shrubland. *Prostanthera petrophila* **(Priority 3)** and *Baeckea* sp. Melita Station **(Priority 4)** were commonly recorded within this community. Mean species richness = 17 ± 3.86 (n = 14).	*Acacia aneura* var. *aneura, A. aneura* var. *microcarpa, Dodonaea pachyneura, Eremophila glutinosa, E. latrobei* subsp. *latrobei, Thryptomene decussata, Solanum ashbyae / lasiophyllum, Ptilotus schwartzii, P. obovatus* var. *obovatus, Philotheca brucei* subsp. *brucei, Micromyrtus sulphurea.*	Mid to upper slopes and broad ridge tops of BIF ranges and ridge tops of breakaways.	4a, 8, 10, 26, 48, 68, 70, 109, 110, 111, 144, 168, 180 and BPE03.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
3 *Acacia* spp. shrubland over open mixed shrub species and tussock grasses				
This was the most widespread community occurring across sand plains and minor drainage areas associated with outwash plains and on the footslopes of hills. The upper stratum is characterised by moderately tall *Acacia* spp. shrubs occasionally with scattered *A. pruinocarpa* or *Corymbia lenziana* trees. The mid stratum is dominated by a diverse array of *Eremophila* species. The lower stratum consists predominantly of sparse to open shrubs with mixed tussock grasses. An isolated patch of Community 3a was recorded to the north of the ranges with *Triodia shinzii* occurring as a dominant in the lower stratum. This was not recorded at any other location and appeared to be restricted to an isolated area of yellow sand plain. Four sub-communities were differentiated by the statistical analysis and these are described below. Sub-communities 3a and 3b, have similar floristic assemblages, however, plant densities differ significantly.				
3a +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland. No priority species were recorded within this community. Mean species richness = 16 ± 3.42 (n = 8).	*Acacia ramulosa* var. *linophylla, A. aneura* var. *aneura, Eremophila forrestii* subsp. *forrestii, E. granitica, E. foliosissima, E. simulans* subsp. *simulans, Solanum ashbyae / lasiophyllum, Ptilotus obovatus, Monachather paradoxus, Eragrostis eriopoda.*	Sandy outwash and gravelly plains and footslopes of BIF ranges.	1, 17, 55, 56, 98, 147, BPE06 and HR13.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
3b +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland. Isolated individuals of *Grevillea stenostachya* **(Priority 3)** were commonly recorded within this community. Mean species richness = 17 ± 5.26 (n = 59).	*Acacia aneura* var. *aneura, A. aneura* var. *microcarpa, A. ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii, E. spectabilis* subsp. *brevis, Ptilotus obovatus*, *Eragrostis eriopoda.*	Drainage lines and low lying areas on sandy and outwash plains.	3, 4, 5, 6, 13, 14, 15, 16, 18, 22, 28, 32, 34, 35, 36, 38, 39, 40, 41, 42, 49, 50, 53, 54, 59, 60, 66, 72, 77, 82, 83, 84, 86, 102, 141, 142, 145, 156a, 172, BPC03, BPC07, BPE02, BPE12, BPE14a, HR01, HR02, HR09, HR11, HR14, HR15, HR16, HR18, HR19, HR21 HR23a, HR23b, HR25, HR26 and HR27.	
3c Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland. No priority flora taxa were associated in this community. Mean species richness = 19 ± 1.26 (n = 4).	*Corymbia lenziana, Eucalyptus striaticalyx* subsp. *striaticalyx, Enchylaena tomentosa, Solanum ashbyae / lasiophyllum, Eremophila forrestii* subsp. *forrestii, E. spectabilis* subsp. *brevis, Rhagodia eremaea, Ptilotus obovatus, Monachather paradoxus.*	Sandy plains.	33, 85, BPW02, and HR10.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
3d *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland. *Hemigenia tysonii* **(Priority 3)** commonly occurred within this community, often as a co-dominant within the lower stratum. Mean species richness = 9 ± 2.65 (n = 5).	*Acacia aneura* var. *aneura, A. cockertoniana, Eremophila simulans* subsp. *simulans, Aluta aspera* subsp. *hesperia.*	Gravelly plains and low hills.	BPW07, BPW08, BPW10, HR03 and HR07.	
4 ***Acacia* sp. Weld Range shrubland over mixed open shrubs**				
This community was widely distributed across the lease occurring predominantly on scree slopes of granite and dolerite and along minor and major drainage lines. *Acacia* sp. Weld Range is the dominant overstorey shrub with a mixed mid shrub layer of *Eremophila* and *Senna* spp. over a lower stratum of a diverse range of shrubs. Two sub-communities resulted from the statistical analysis and these are described below.				

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
4a *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland. *Acacia speckii* **(Priority 3)** was commonly recorded within this community, as was *Dodonaea amplisemina* **(Priority 3)** *Ptilotus astrolasius* var. *luteolus* **(Priority 1)** within the north- eastern extent of the lease. The currently undescribed species, *Acacia* sp. nov. (aff. *kochii*) and *Hemigenia* sp. nov. (aff. *exilis*), were recorded within this community both inside the lease, and within Wilgie Mia during the threatened flora surveys. Mean species richness = 15 ± 3.75 (n = 23).	*Acacia* sp. Weld Range, *A. aneura* var. *microcarpa, A. speckii, Eremophila macmillaniana, E. mackinlayi* subsp. *spathulata, Senna artemisioides* subsp. *helmsii, S. glaucifolia, Ptilotus obovatus.*	Undulating scree plains and mid to low slopes of granite and dolerite.	29, 75, 76, 78, 79, 80, 81, 94, 95, 101, 104, 129, 130, 134, 135, 137, 160, 161, 166, 170, 174, 182 and HR29.	
4b *Acacia* sp. Weld Range and *Acacia speckii* **(Priority 3)** shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* **(Priority 4)** and *Dodonaea amplisemina* **(Priority 3)** open shrubland over *Cymbopogon ambiguus* sparse tussock grassland. The priority species *Acacia speckii* **(Priority 3)**, *Grevillea inconspicua* **(Priority 4)**, and *Dodonaea amplisemina* **(Priority 3)** were recorded consistently within this community. S*tenanthemum patens* **(Priority 1)** was recorded at two sites within this community. Mean species richness = 17 ± 5.77 (n = 10).	*Acacia* sp. Weld Range, *A. speckii*, *A. tetragonophylla*, *Senna* sp. Meekatharra, *S. artemisioides* subsp. *helmsii*, *S. glaucifolia*, *Eremophila macmillaniana*, *E. exilifolia*, *Grevillea inconspicua*, *Dodonaea amplisemina*, *Cymbopogon ambiguus.*	Minor drainage areas, creek lines and midslope of low dolerite and granite hills.	125, 136, 162, 167, 169, 181, BPE01, BPE07, HR04 and HR28.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
5 *Acacia craspedocarpa* open shrubland over open low shrubs				
This association occurred predominantly on and around salt affected, low lying and riparian areas. The upper stratum is dominated by *Acacia craspedocarpa* and *A. tetragonophylla* tall shrubs. The lower stratum is dominated by mixed low shrubs. Open to moderately dense tussock grasses dominate the ground cover with scattered mixed herb species. This community was often heavily grazed by cattle. Two sub-communities were differentiated within this community.				
5a *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland. The priority species *Acacia speckii* **(Priority 3)** and *Grevillea inconspicua* **(Priority 4)** were recorded within this community. Mean species richness = 16 ± 5.56 (n = 33).	*Acacia aneura* var. *aneura, A. tetragonophylla, A. craspedocarpa, Eremophila foliosissima, Solanum ashbyae / lasiophyllum, Ptilotus obovatus, Cymbopogon ambiguus, Aristida contorta, Eragrostis dielsii* subsp. *dielsii.*	Ridge tops and upper slopes of BIF ridges, low lying semi-saline flats, riparian areas and ironstone scree flat plains.	2, 19, 24, 25, 43, 44, 45, 46, 47, 57, 65, 87, 88, 88a, 90, 92, 96, 100, 114, 115, 116, 122, 123, 131, 138, 148, 149, 164, 173, BPE14b, BPE16, HR06 and HR12.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
5b +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland. The priority species Goodenia lyrata **(priority 1)** and *G. berringbinensis* **(Priority 3)** were recorded within this community. Mean species richness = 16 ± 3.61 (n = 3).	*Grevillea striata, Acacia craspedocarpa, Scaevola spinescens, Austrostipa elegantissima, Acacia tetragonophylla, Grevillea nematophylla* subsp. *supralunar.*	Flat plain adjoining seasonally inundated wetland.	63, 64 and MWD01.	
6 Mixed open chenopod shrubland				
This association occurs predominantly adjacent to seasonally inundated salt lakes and saline affected drainage lines as well as on undulating plains with a surface layer of gypsum or calcrete stones and pebbles. The upper stratum is dominated by *Acacia* spp. shrubs with the mid stratum dominated by mixed *Senna* spp. shrubs over sparse low shrubs. Low chenopods often dominate the ground layer. Three sub-communities were differentiated within this community.				

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
6a Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland. The priority species *Ptilotus beardii* **(Priority 3)** was commonly recorded within this community. Mean species richness = 20 ± 4.43 (n = 8).	*Acacia aneura* var. *microcarpa, A. craspedocarpa, A. tetragonophylla, Senna artemisioides* subsp. *helmsii, S. artemisioides* subsp. *filifolia, S. glaucifolia, Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus, Maireana georgei, Solanum ashbyae / lasiophyllum.*	Mainly occurring in and around seasonally inundated areas and salt affected drainage lines	91, 93, 99, 103, BPE05, HR17, HR30 and MWD02.	
6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland. No priority species were recorded within this community type. Mean species richness = 13 ± 3.12 (n = 8).	*Acacia aneura* var. *tenuis,* *A. burkittii,* *Scaevola spinescens,* *Ptilotus obovatus,* *Ptilotus exaltatus,* *Maireana georgei.*	Undulating plains with a surface layer of gypsum and calcrete.	BPC01, BPC02, BPC04, BPC08, BPC09, BPC10, BPE08 and BPE09.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland. No priority species were recorded within this community. Mean species richness = 6.0 ± 1.0 (n = 3).	*Eremophila maculata* subsp. *brevifolia, Sclerolaena diacantha, Enneapogon cylindricus.*	Seasonally inundated salt pan.	BPC05, BPC06 and BPE15.	
7 Halophytic shrubland				
This community is the most distinctive in the data analysis and separated at the highest level in the dendrogram. It occurred in and around saline claypans and seasonally inundated wetlands. It was characterised by halophytic shrubs over mixed tussock grasses. A subset of this community is dominated by *Eucalyptus* spp. over shrub species. Two sub-units occur within this community.				
7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland. The priority species *Goodenia lyrata* **(Priority 1)** and *Tecticornia cymbiformis* (**Priority 3**) were recorded within this community. Mean species richness = 18 ± 2.08 (n = 3).	*Melaleuca stereophloia, Cratystylis subspinescens, Eremophila glabra* subsp. *glabra, Frankenia laxiflora, Scaevola spinescens, Leptomeria preissiana, Senna artemisioides* subsp. *filifolia, Tecticornia doleiformis, Tecticornia indica* subsp. *leiostachya, Atriplex vesicaria.*	Seasonally inundated claypan.	62, 120 and 121.	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses. No priority species were recorded within this community. Mean species richness = 19 ± 2.89 (n = 3).	*Eucalyptus trivalva, E. carnei, Cratystylis subspinescens, Muehlenbeckia florulenta, Eremophila glabra* subsp. glabra, *Scaevola spinescens, Leptomeria preissiana, Senna artemisioides* subsp. *filifolia, Tecticornia doleiformis, Tecticornia indica* subsp. *leiostachya.*	Occurring as a band across a seasonally inundated wetland.	58, 61 and 119.	

Notes: Mean species richness expressed ± standard deviation

HR = haul road; BPW = borrow pit west; BPE = borrow pit east, BPC = borrow pit centre; MWD = Madoonga waste dump.

4.5 ECOLOGICAL COMMUNITIES OF CONSERVATION SIGNIFICANCE WITHIN THE STUDY AREA

Ecological communities are naturally occurring biological assemblages found in a particular type of habitat. At a national level, flora and threatened ecological communities (TECs) are protected under the EPBC Act. TECs are listed as Critically Endangered, Endangered or Vulnerable (refer to Table I.1, Appendix I for category definitions). The Department of the Environment and Water Resources does not currently list any TECs as occurring within the Weld Range survey area.

The Western Australian DEC maintains a list of TECs that are Presumed Totally Destroyed, Critically Endangered, Endangered or Vulnerable. No State-listed TECs occur within or near to the project area.

Potential TECs that do not meet survey criteria, or that are not adequately defined, are added to a list of priority ecological communities (PECs). Communities are placed in this category while consideration can be given to their declaration as TECs. PECs are classified into one of five possible priority ranks based on frequency of ecological community occurrence and known threatening processes (refer to Table I.2, Appendix I for category definitions).

One Priority 1 PEC occurs in the vicinity of the Study Area; “Weld Range vegetation complexes (Banded Ironstone Formation) (BIF)”. A significant proportion of the Study Areas lies within the currently defined boundaries of this PEC (Figure 4.3). The Priority 1 PEC ranking at Weld Range has been assigned on the basis that it represents a rare vegetation complex that is considered currently under threat of mining (DEC, 2008).

The current PEC boundary is based on information that was available at the time the Weld Range vegetation complexes (BIF) PEC was listed and is approximate, based on geology and vegetation layers available in GIS databases. It is possible the boundary will be reviewed as more data in relation to the vegetation of the BIF Ranges and surrounding plains becomes available.

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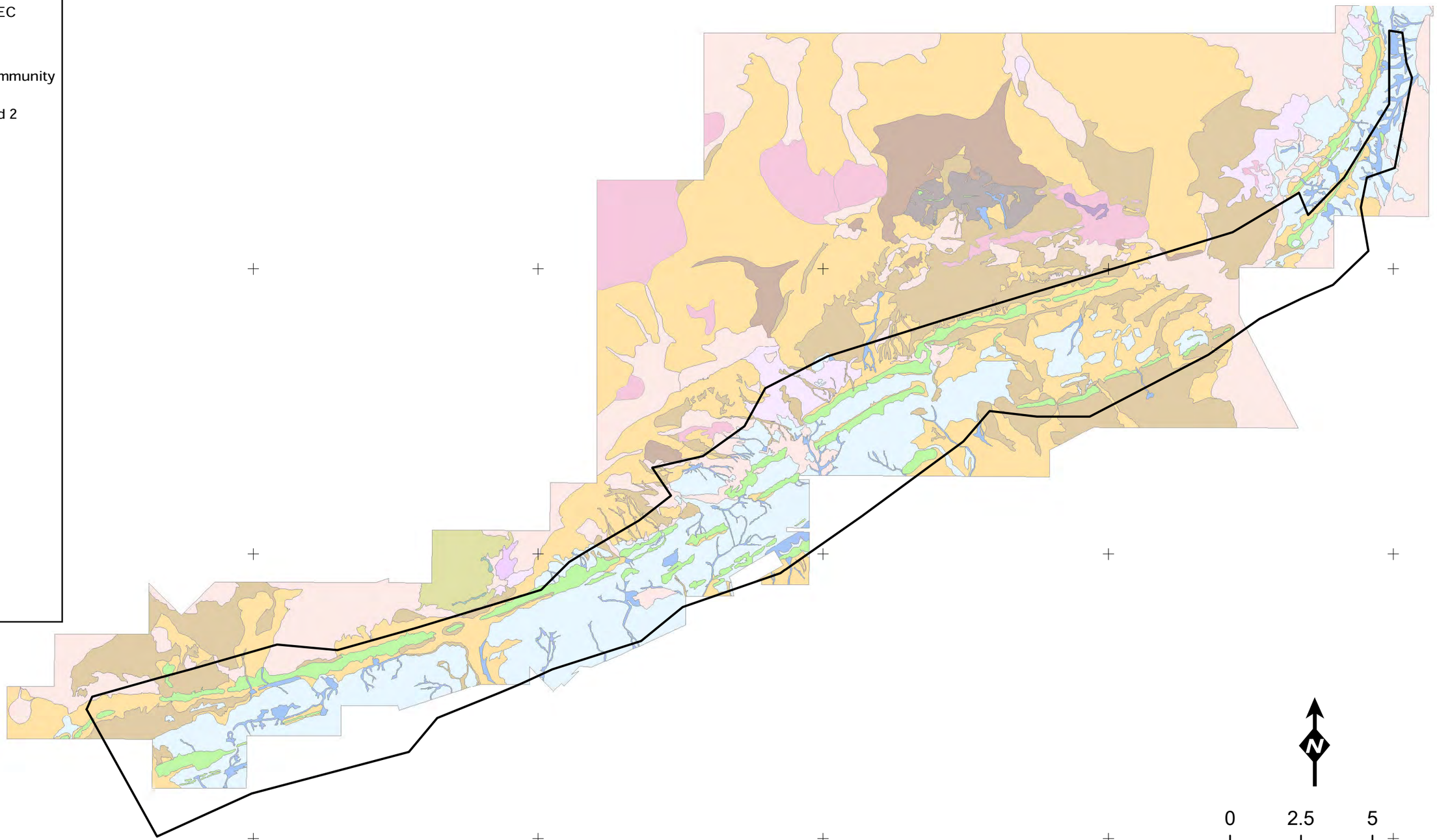
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Legend

Weld Range PEC

Vegetation Community

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b



N

0 2.5 5

Kilometres

Absolute Scale - 1:140,000

ecologia ENVIRONMENT

中钢澳洲中西矿业公司 SINOSTEEL MIDWEST CORPORATION LIMITED

Current Weld Range PEC Boundary (as supplied 25/05/09) over Mapped Vegetation Communities

Figure: 4.3
Project ID: 722

Drawn: SG
Date: 23/10/09

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

Unique Map ID: S047

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5 FLORA

5.1 FLORISTIC INVENTORY

A total of 393 taxa (including species, subspecies, varieties, forms and affinities) were recorded within the Study Area. Four taxa were could not be beyond genus level only due to insufficient reproductive material. Six naturalised alien flora taxa were located during the survey. A complete list of the flora recorded is included as Table J.1, Appendix J.

The taxonomic composition of the flora is summarised in Table 5-1.

Table 5-1 – Taxonomic Composition of the Weld Range Flora.

	Phase 1	Phase 2	Phase 3	Rail Corridor	Combined
Date surveyed	Nov-06	Apr-07	Jul-08	Jun-09	
Number quadrats surveyed	103	109 (including 37 RPT)	64	19	258
Number taxa recorded	260	188	195	74	393
Number families	43	38	41	17	57
Number genera	107	72	82	28	140
Number annual taxa (%)	44 (16.9)	12 (6.4)	27 (13.9)	7 (9.6)	77 (19.6)
Number perennial taxa (%)	216 (83.1)	176 (93.6)	167 (86.1)	67 (90.5)	315 (80.4)

It can be seen that the highest proportion of annual taxa was recorded during the Phase 1 survey, in which rainfall in the four months was significantly higher than the long term average.

The families represented by the greatest number of taxa in the combined species list were Mimosaceae (43 taxa), Myoporaceae (41 taxa), Chenopodiaceae (38 taxa), Poaceae (31 taxa), and Asteraceae (26 taxa). Genera represented by the greatest number of taxa were *Acacia* (43 taxa), *Eremophila* (41 taxa), *Senna* (17 taxa), *Ptilotus* and *Maireana* (15 taxa each). This pattern of dominance is consistent to that described by Beard (1976) within the Murchison botanical district, reflecting the dominance of shrublands dominated and *Acacia* and *Eremophila* species, and the abundance of saline loams on the plains which support many species of Chenopodiaceae.

Species richness per unit area was observed to be greatest at quadrats located in areas of higher water availability: creek beds and banks, gentle slopes; and was lowest on steeper slopes, rocky crests or midslopes, and saline pans and associated drainage lines.

5.2 FLORISTIC DIVERSITY RELATIVE TO OTHER SURVEYS WITHIN THE MURCHISON BIOREGION

The number of species, families and dominant families / genera recorded during this survey can be compared with information recorded during other surveys conducted at Weld Range and Jack Hills Table 5-2.

Although the density of quadrats/unit area and land systems present vary between surveys, broad comparisons of floristic composition are possible.

Table 5-2 – Comparison of Florisitic Diversity from Surveys Conducted at Weld Range and Jack Hills

Survey	*ecologia* Weld Range	DEC Weld Range	DEC Jack Hills	Mattiske Jack Hills
Date of survey	November 2006 April 2007 July 2008 June 2009	August 2005	August 2005	October 2004 June 2005 October 2005
Survey intensity	258 x 400 m^2 quadrats Includes 19 quadrats within the Study Area from the OPR rail corridor survey	52 x 400 m^2 quadrats surveyed	50 x 400 m^2 quadrats surveyed	122 x 400 m^2 quadrats Includes 4 quadrats established on Mount Gould / Robinson Ranges.
Total number taxa recorded	393	244	209	211
Total number families recorded	57	50	43	36
Dominant families (no taxa recorded)	Mimosaceae (43) Myoporaceae (41) Chenopodiaceae (38) Poaceae (31) Asteraceae (26)	Asteraceae (46) Poaceae (22) Mimosaceae (13) Myoporaceae(12) Amaranthaceae (11) Chenopodiaceae (11)	Asteraceae (41) Poaceae (17) Mimosaceae (16) Malvaceae (12) Myoporaceae (12)	Mimosaceae (35) Myoporaceae (22) Poaceae (18) Chenopodiaceae (16) Asteraceae (15)
Dominant genera (no taxa recorded)	*Acacia* (43) *Eremophila* (41) *Senna* (17) *Ptilotus* (15) *Maireana* (15)	*Acacia* (13) *Eremophila* (12) *Ptilotus* (10) *Rhodanthe* (8) *Senna* (7)	Not specified in report	Not specified in report
Source	Current report	(Markey & Dillon, 2008)	(Meissner & Caruso, DRAFT 2008)	(Mattiske, 2005)

It can be seen that the pattern of dominance of the families Mimosaceae, Myoporaceae, Chenopodiaceae, Poaceae and Asteraceae is common to all the surveys. Asteraceae (primarily ephemeral daisies) was the most speciosa family in both DEC surveys, reflecting the high rainfall in 2005 which preceded these surveys. Fifty two percent of the total number of taxa recorded during the DEC survey of Weld range were classified as annuals, compared with 16.8% in the current survey.

5.3 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 (i.e. the number of quadrats surveyed increases), the rate at which new species are recorded decreases and ultimately becomes asymptotic. This asymptote provides an estimate of the total number of species that might be expected from a particular survey area.

Flora sampling adequacy was estimated using species accumulation curve analysis (Colwell, 2006) and extrapolation of the curve to the asymptote using Michaelis-Menten modelling (Figure 5.1).

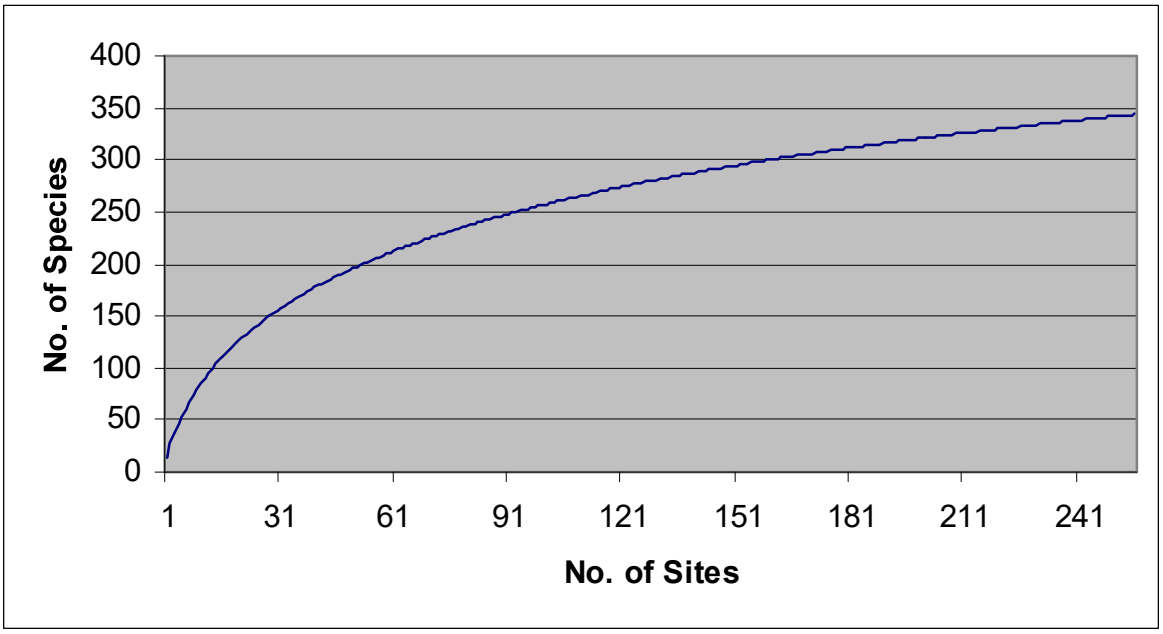


Figure 5.1 –Species Accumulation Curve for the Weld Range Survey (Average Randomised, 258 quadrats)

Using this analysis, the incidence-based coverage estimator of species richness (ICE Mean, Chao 2 Mean) was determined as 424. With a total of 344 taxa recorded from the 258 quadrats surveyed (three phases plus rail corridor), this suggests that approximately 81% of the flora species potentially present within the study area were recorded during the quadrat-based component of the survey. A further 48 species were recorded opportunistically during transects, or 92% of the total number of species estimated to be present.

5.4 FLORA OF CONSERVATION SIGNIFICANCE

5.4.1 Flora Species Protected by Commonwealth and State Acts

5.4.1.1 Environment Protection and Biodiversity Conservation Act 1999

Flora species are protected at a national level under the Commonwealth *EPBC Act*. This Act protects species that are considered Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Extinct or Extinct in the Wild (refer to Table I.3, Appendix I for category definitions). One species listed under this Act as Endangered, *Conospermum toddii* (Approved Conservation Advice for *Conospermum toddii*, 2008), is known from two collections in the Murchison region.

Conospermum toddii was not recorded during the current survey.

5.4.1.2 Wildlife Conservation Act 1950

Under the Western Australian Wildlife Conservation (Rare Flora) Notice of the *WC Act*, the Minister for the Environment may declare species of protected flora to be declared rare flora (DRF) if they are

considered to be in danger of extinction, rare or otherwise in need of special protection. These taxa are legally protected and removal or impact to their surroundings cannot be conducted without ministerial approval obtained specifically on each occasion for each population.

Currently, two DRF taxa are protected by the *WC Act* and are listed as occurring in the Murchison, *Conospermum toddii* and *Eremophila rostrata* subsp. *rostrata* (Wildlife Conservation (Rare Flora) Notice 2008(2)).

Neither *Eremophila rostrata* subsp. *rostrata* nor *Conospermum toddii* were recorded during the current survey

5.4.2 Priority Flora

The DEC maintains a list of priority flora species, which may be rare or threatened but for which there are insufficient records to accurately determine the status, or which are regarded as rare but not currently threatened. These species are assigned to one of four priority categories (Atkins, 2010), as defined in Table I.4, Appendix I. Currently, 150 rare and priority flora taxa are listed as occurring in the Murchison (Western Australian Herbarium, June 2010).

To date, 27 flora taxa of conservation significance have been recorded during surveys carried out at the Weld Range by the DEC and *ecologia*, 25 of which were recorded during the current survey. Table 5-3 summarises the distribution of these taxa. Their morphology, habitat preferences and distribution at Weld Range are summarised in Table 5-4, their locations in Appendix K and details of Voucher specimens and Declared Rare Forms in Appendix L

Populations are defined as disjunct in Table 5-3 if separated by at least 100 km from all other known occurrences. A disjunct record may simply reflect a lack of available data, due to a low level of investigation in the region or a low number of lodgements at the WA Herbarium. However it may also indicate a population that is genuinely isolated as a result of habitat specificity for the BIF landform that is isolated within the landscape. On the basis of current records, eight of the Weld Range Priority taxa populations appear to be disjunct.

All Priority taxa currently recorded at Weld Range have distributions extending over at least 100 km, consistent with the observation by Markey and Dillon (2008) that there do not appear to be any species that are endemic to the Weld Ranges.

5.4.3 Taxa of Potential Conservation Significance

Two previously undescribed taxa were also recorded during the current survey. Given their status as undescribed taxa, there is insufficient information available to determine their conservation status. These taxa may be listed as Priority species in the future. Their morphology, habitat preferences and distribution at Weld Range are summarised in Table 5-5.

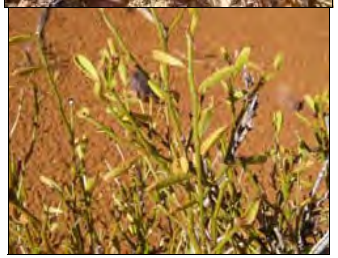
Table 5-3 – Taxa of Conservation Significance Recorded in the Study Area

Taxon	Conserv. Status	Origin of record(s) at Weld Range		Distribution	
		ecologia	DEC Database	Weld Range disjunct	range >100 km
Beyeria lapidicola (formerly sp. Murchison)	P1	✓	✓	✓	✓
Eremophila rhegos	P1		✓	✓	✓
Euphorbia sarcostemmoides	P1	✓		✓	✓
Goodenia lyrata	P1	✓		✓	✓
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	✓	✓	✓	✓
Stenanthemum patens	P1	✓	✓	✓	✓
Acacia ?burrowsiana	P3	✓	✓		✓
Acacia speckii	P3	✓	✓		✓
Calytrix erosipetala	P3	✓			✓
Dodonaea amplisemina	P3	✓	✓		✓
Eremophila arachnoides subsp. *arachnoides*	P3	✓			✓
Grevillea stenostachya	P3	✓	✓		✓
Hemigenia tysonii	P3	✓			✓
Homalocalyx echinulatus	P3	✓	✓		✓
Indigofera gilesii subsp. *gilesii* Peter G.Wilson & Rowe	P3	✓		✓	✓
Micromyrtus placoides	P3	✓	✓		✓
Mirbelia ?stipitata	P3	✓		✓	✓
Phyllanthus baeckeoides	P3		✓	✓	✓
Prostanthera ferricola	P3	✓	✓		✓
Prostanthera petrophila	P3	✓	✓		✓
Ptilotus beardii	P3	✓	✓		✓
Ptilotus luteolus	P3	✓			✓
Tecticornia cymbiformis	P3	✓		✓	✓
Verticordia jamiesonii	P3	✓	✓		✓
Baeckea sp. Melita Station (H. Pringle 2738)	P4	✓	✓		✓
Goodenia berringbinensis	P4	✓			✓
Grevillea inconspicua	P4	✓	✓		✓

Table 5-4 – Characteristics of Priority Taxa Recorded at Weld Range

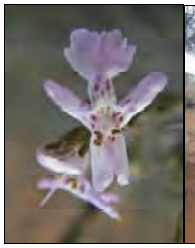
Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Beyeria lapidicola (EUPHORBIACEAE)	P1	Much branched shrub to 1.6 m. Stems and leaves resinous and sticky, branches pale, yellow-green becoming grey or black. Leaves narrow oblong, 5-20 mm x 1-3 mm, three ribs on under surface, hairy between the ribs, and a tip that is a blunt callus. Flowers are small and green.	Banded ironstone ridges and slopes	1&2, 3a, 3b, 3d, 4a	Scattered distribution bounded by Meekatharra, Wiluna, Menzies.	Ida Valley - Mt Forrest Cons. Park	2	
Eremophila rhegos (MYOPORACEAE)	P1	Erect shrub 1.5 m tall. Flowers deep lilac, tube white, purple spotted in tube below the upper and lower lips.	Skeletal brown stony loams over granite, dolerite	1&2	Three locations Weld Range, Coombarra, Waldburg Stn.	No	0	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Euphorbia sarcostemmoides **(EUPHORBIACEAE)**	P1	Upright, often leafless, semi-succulent herb 0.4 - 1 m (2). Stems light green, with blue-grey waxy light coating. Stems exude white sap. Rarely present leaves narrow, lanceolate, opposite, held horizontally. Flowers terminal, green.	Sandstone ridges, quartzite hills	5b	Robinson Ranges, Mt Augustus Station.	No	1	
Goodenia lyrata	P1	Prostrate herb to 0.5 m length. Basal leaves lyrate (triangular with one or two points at right angles to the leaf stalk), to 2.5 cm long; stem leaves always smaller than the basal leaves and similarly shaped. Yellow flowers occurring in August.	Mulga woodlands, red sandy loam	1&2, 3a, 3b, 5a, 5b, 7a	Newman, Laverton, West Angelas.	No	4	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94) **(EUPHORBIACEAE)**	P1	Low shrub 0.3 - 1 m high. Leaves obovate with a notched tip, light to medium green in colour, approx. 0.5-2 cm long and 0.2-0.8 cm wide. Tiny yellow flowers June	Slopes of Banded Ironstone outcrop	1&2, 4a, 4b	Weld Range, Woolgorong Hstd., Pinegrove Hstd.	No		 
Stenanthemum patens **(RHAMNACEAE)**	P1	Small, widely spreading shrub with spiny branchlets to 0.6 m. Leaves small, round to heart-shaped, hairs both surfaces. Flowers small, hairy tubular flowers primarily Aug. - Sept. Easily confused with the more common *S. petraeum*, which has hairs only on the under surface of the leaf.	Rocky hillsides	1&2, 4a, 4b	Weld Range, Marshall Pool, Mt. Clifford, Leinster			

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Acacia ?burrowsiana **(MIMOSACEAE)**	P3	Spreading shrub or tree to 5 m, main trunks and branches often slightly contorted. Phyllodes narrowly linear - linear oblanceolate - linear elliptic, narrowing towards base, 7-13 cm long, often held erect on the plant. Inflorescences simple, spikes interrupted 10 – 20 mm.	Red-brown loams, calcrete, laterite, quartz. Flats adj. to drainage, crests of low rises, breakaways.	3b, 5a	Lorna Glen Cons. Park, Cue, Sandstone, Mt. Magnet	Lorna Glen Cons. Park,	1	
Acacia speckii **(MIMOSACEAE)**	P3	Bushy, rounded shrub or gnarled tree, 1.5 m- 3.0 m. Bark igrey and fissured on the main branches. Phyllodes light green, rigid and erect, circular in cross-section, with a hardened, brown tip. Pod light brown, narrow and compressed between each seed.	Rocky soils over granite, basalt or dolerite. Rocky hills or rises	1&2, 3a, 3b, 4a, 5a	Weld Range, Mt. Magnet, Meekatharra, Yalgoo		26	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Calytrix erosipetala **(MYRTACEAE)**	P3	Low shrub 0.3 m - 0.7 m. Leaves erect to spreading, obovate in outline, club shaped). White or pink flowers Sept. - Oct.	Rocky sandstone or granite breakaways	6a, 6b	Yakabindie Station, Mt Mason, Booylgoo Range, Windimurra Hstd..	*	1	
Dodonaea amplisemina **(SAPINDACEAE)**	P3	Multi-stemmed open shrub, branchlets sometimes spiny. Leaves linear or narrow spear shaped, blunt tips, often clumped together. Flowers inconspicuous. Mature fruits pink-brown with four incurving horns, Aug. – Oct.	Red-brown sandy clay soils over basalt or banded ironstone	1&2, 3a, 3b, 4a, 4b, 5a, 7a, 7b	Scattered populations Robinson Ranges -south Paynes Find. Mt Magnet, Weld Range, Cue,Buddadoo Range.		17	
Eremophila arachnoides subsp. *Arachnoids* **(MYOPORACEAE)**	P3	Open shrub to 3.5 m. Stems and leaves whiteish-green appearance (due to a covering of microscopic white scales), stems pustulate. Lleaves linear, upright with hooked tip. Flowers white to mauve, the inside of the corella yellow or purple spotted.	Shallow loams over limestone	1&2, 3a, 3b, 4a	Jilyili Hills, Yarrabubba Hstd., Lake Mason Hstd.		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Grevillea stenostachya **(PROTEACEAE)**	P3	Dense, spiky shrub 0.6 m to 1.5 m. Leaves dissected into a number of segments, each segment terminating in a sharp tip. Flowers greenish/creamy yellow colour on a cylindrical inflorescence, July – Sept.	Red sand, sandy loam	3a, 3b, 3c, 4b, 6b	Toolonga N. R., Woolgorong Station, Carnarvon, Belele Station	Toolonga N. R.,	5	
Hemigenia tysonii **(LAMIACEAE)**	P3	Dense, finely-branched bush to 0.6 m. Leaves grey-green in colour, stiff, 4-7 mm long and 1-3 mm wide,arranged opposite one another or occasionally grouped on the stem. Flowers purple/light pink, with white spots inside, May to Dec.	Red sand, sandy clay and lateritic sand on flats, sand dunes and hills	1&2, 3a, 3b, 3d, 4a, 5, 6a	Mi Hale, Noonie Hills, Muggon Station, between Murchison Roadhouse and Meekatharra		8	 
Homalocalyx echinulatus **(MYRTACEAE)**	P3	Shrub 0.45 - 1.0 m. Bark old branches stringy, fibrous. Leaves closely spaced, covering surface branchlets, oblong - spoon shaped, 1-2.5 mm long, two rows of dark glands on the under surface. Flowers pink, terminal, surrounded by small papery bracts. Jun - Sept.	Laterite. Breakaways, sandstone hills	3a,3b, 4b, 5a	Weld Range, Wiluna West BIF Range, Jack Hills, Mt. Hale		2	 

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Indigofera gilesii subsp. *gilesii* **(FABACEAE)**	P3	Upright erect single stemmed shrub 1.5 m high. Bark dull, grey, fairly smooth. Leaflets grey-green above and below. Flowers purple/pink. Keel dull light red with white base and brown hairy tip. May-Aug.	Pebbly loams and hill slopes amongst boulders & outcrops	4a	Jinayri, Fortescue Botanical District, Hamersley Ranges, Mooloogool Homestead, Ophthalmia Range	Karinjini N. P., *	1	
Micromyrtus placoides **(MYRTACEAE)**	P3	Rounded shrub 0.5 m - 2.5 m. Leaves broad obovate to almost circular, usually concentrated at the tips of branches. Flowers white, often reflexed on stalks July-Sept.	Brown loam, dolerite, ironstone or granite, outcrops above breakaways and steep slopes	1&2, 3a, 3b, 4b, 5a, 7b	Weld Range, Tallering Peak, Mt. Narryer and Cue		7	
Mirbelia ?stipitata **(FABACEAE)**	P3	Spiny shrub 0.5 - 1 m. Leafless, small brown bracts at the bases of the spinescent branchlets. Pink pea flowers borne along these spiny branchlets Aug..	Red sandy loam	3b, 4a, 4b, 5a	Sandstone, Cue-Sandstone Road, Bandya Hstd.		5	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Phyllanthus baeckeoides **(EUPHORBIACEAE)**	P3	Shrub 1-1.7 m high. Flowers small, white to cream. March Fruit green	Red lateritic & sandy clay soils. Granite outcrops	DEC record	Sandstone, Laverton, Leinster, Windimurra Station		0	Not available
Prostanthera ferricola **(LAMIACEAE)**	P3	Erect, openly branched shrub 0.3 - 1 m in. Densely hairy branches, leaves flat, green to pale green, often whorled around stem, strongly aromatic when crushed. Flowers purple/mauve, hairy July - Sept.	Red-brown skeletal sandy loam on BIF, laterite, basalt or quartz.	4a	Jack Hills, Wiluna West Range, Moolagool Stn.	*	1	
Prostanthera petrophila **(LAMIACEAE)**	P3	Spreading shrub 0.6 - 2 m. Young stems covered in white-grey hairs. Leaves opposite and elliptic. Flowers white with purple to violet striations August.	Lateritic soils.	1&2, 3a, 3b, 4a, 4b, 5a, 5b, 7a, 7b	Weld Range, Woolgorong Hstd., Mt. Barloweerie, Cue		21	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Ptilotus beardii (AMARANTHACEAE)	P3	Many-branched, rigid shrub 0.15- 0.5 m . Leaves often clustered along the stem, small, linear, acute. Flowers pale pink/red. Inflorescences terminal, open,spherical to cylindrical. Aug. – Oc.	Clayey soils. Saline flats, low breakaways	1&2, 3a, 3b, 4b, 5a, 6a	Weld Range, Muggon Stn., Crystal Hill, Mt Narryer Hstd.		5	
Ptilotus luteolus (AMARANTHACEAE)	P3	Low, spreading shrub 0.15 - 0.7 m. Stems yellow, leaves grey-yellow, oblong. Flowers lemon to greenish-yellow, bract bases often purplish; Inflorescence ovate - shortly cylindrical, Mar. -Oct.	Gravelly slopes down from Banded Ironstone outcrop	1&2, 3a, 4a, 4b	Thomas River, Neds Creek, Wiluna, Wiluna Murchison Roadhouse Mt. Magnet, Meekatharra		5	
Tecticornia cymbiformis (CHENOPODIACEAE)	P3	Low, erect shrub to 0.5 m. Fleshy stem is cylindrical, oval or circular in cross-section, dull green, or dull to bright red. Terminal, fertile tips have broad, boat shaped bracts with tips that flare outwards.	Saline areas along floodplains or creeklines	5a, 5b, 7a	Lake Aneen, Yuin Hstd., Polelle Stn..		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Verticordia jamiesonii **(MYRTACEAE)**	P3	Small, irregularly branched, rounded shrub to 60 cm more commonly to 20 cm. Leaves very small, crowded on short, lateral branchlets. Flowers creamish-white turning to pink with maturity. Flower buds are shiny, pale to bright red. Sept- Oct.	Sandy clay soils. Lateritic breakaways	3b	Mt Hale, Noonie Hills, Cue, Yalgoo, Sth Warburton	* Class A Reserve 40787	1	
Baeckea sp. Melita Station (H. Pringle 2738) **(MYRTACEAE)**	P4	Upright shrub 2 - 2.5 m. Leaves terete, 3-5 mm, hooked at tip. Older stems retain persistent leaf bases creating a white corky-like scar. Flowers white/pale pink terminal; Sept. to Oct.	Dark red rocky soil over ironstone. Mulga shrubland	1&2, 3a, 3b, 4a, 4b	Scattered distribution bounded by Weld Range, Robinson Range, Wiluna and Leonora	Wanjarri N. R., Ida Valley – Mt Forrest Cons. Pk	6	
Goodenia berringbinensis **(GOODENIACEAE)**	P4	Prostrate to ascending herb to 0.3 m. Basal leaves spoon-shaped to 6 cm, stem leaves to 3 cm long. Flowers yellow; Oct.	Red sandy loam. Along watercourses	5b	Noonie Hills, Killara Stn., Nallan Lake and Belele Stn.		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
Grevillea inconspicua (PROTEAE)	P4	Intricately branched,untidy, spreading shrub 0.6 - 2 m. Leaves linear, deflexed, flat, silvery green with hardened tip. Flowers white to pink June- Aug.	Greenstonelo am gravel drainage lines, rocky outcrops, creeklines	3a, 3b, 4a, 5a	Weld Range, Sandstone, Cue, Wanjarie, Mt Magnet, Booylgoo Range	Wanjarri N. R.	9	

Table 5-5 – Characteristics of Taxa of Potential Conservation Significance Recorded at Weld Range

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Location During Current Survey	Photograph
Hemigenia sp. nov. (aff. exilis) **(LAMIACEAE)**	-	Open spreading shrub to 1m. Branches divaricate, leaves mainly at tips of branchlets. Leaves opposite, linear-elliptic. Flowers pale mauve/white with pale purple markings, singly below the current season's leaves; Sept.	Mid - lower slopes, surface layer of stones, small boulders& gravel. Granite and dolerite.		Weld Range. Related to *Hemigenia exilis* which occurs Agnew - Sandstone – Leonora		3	Not available.
Acacia sp. nov. (aff. kochii) **(MIMOSACEAE)**	-	Low, multi-stemmed shrub to 1.25 m, often >1 m wide. Main branches smooth, charcoal grey, branchlets red ending with a spine.Phyllodes elliptic, 1-6 mm long, usually steely blue with needle sharp apex off-set from the mid vein. Inflorescence globular, bright yellow; Sept. Pod sausage shaped, red-brown, faint waxy blue glaze.	Foot slopes of dolerite hills, undulating plains.		Sth Madoonga Hstd., Wilgie Mia Reserve.	Wilgie Mia Reserve	2	

* = Indicates species with records at the DEC owned Doolgunna, Mooloogool or Woolgorong Stations.

5.5 RANGE EXTENSIONS

Based on records lodged at the Western Australian Herbarium (2010), there are a seventeen range extensions of greater than 150 km of common and Priority taxa occurring within the Study Area, as detailed in Table 5-6. These range extensions are likely to be a reflection of two factors:

- the sporadic history of collection in the vicinity of the Study Area, resulting in an incomplete knowledge of the distributions of many taxa; and in at some instances; and
- specific requirements of some taxa for habitats which are genuinely restricted in the bioregion, resulting in restricted or disjunct distribution.

Table 5-6 –Taxa for which the Weld Range Records Represent an Extension of Known Distribution.

Taxon	Conserv. Status	Extent of Range Extension
Indigofera gilesii subsp. *gilesii*	P3	Approximately 150 km south west of the closest collection record at Glengarry Range (5 miles SE of Mooloogool Homestead).
Phyllanthus baeckeoides	P3	Approximately 170 km from the closest collection record to northwest at Windimurra Station and more than 400 km to the southeast at Laverton, Leinster.
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	Approximately 200 km east of the closest collection record at Woolgorong Station.
Beyeria lapidicola	P1	Approximately 200 km west of the closest collection record at Lakeway Station (30 km southwest of Wiluna)
Euphorbia sarcostemmoides	P1	Approximately 150 km south west from the closest collection record at Mt. Padbury Station, Robinson Range
Goodenia lyrata	P1	More than 400 km from the closest collections to northeast near Newman and to southeast near Laverton.
Stenanthemum patens	P1	Approximately 230 km from the closest collections to southeast at Windimurra Homestead. 80.7 km SE of Mount Magnet
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	Approximately 200 km from the closest collection record at Woolgorong
Trichodesma zeylanicum var. *zeylanicum*	None	Approximately 300 km north-east from the closest collection record at Jeffries Rocks (east of Galena) (Geraldton Sandplains region).
Amyema maidenii	None	Approximately 210 km south-east from the closest collection record at Gascoyne River (Gascoyne region).
Sclerolaena uniflora	None	Approximately 350 km north-east from the closest collection record at Three Springs (Avon Wheatbelt region).
Eucalyptus socialis subsp. *eucentrica*	None	Approximately 260 km south-west from the closest collection record at Gascoyne River (Gascoyne region).
Eriachne lanata	None	Approximately 430 km south-west from the closest collection record at Hamersley Ranges (Pilbara region).
Triodia schinzii	None	Approximately 170 km north north-west from the closest collection record at Cashmere Downs Station (Murchison region).

Taxon	Conserv. Status	Extent of Range Extension
Micromyrtus racemosa var. *racemosa*	None	Approximately 280 km from the closest collection record at White Well (Murchison region).
Drosera macrantha subsp. *eremaea*	None	Approximately 155 km north from the closest collection record at Mount Magnet (Murchison region).
Abutilon leucopetalum	None	Approximately 280 km south-west from the closest collection record at the Hamersley Ranges (Pilbara region).

5.6 INTRODUCED FLORA SPECIES

The Australian Weed Strategy (2007) 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 or assistance are also referred to as naturalized alien species.

5.6.1 Weeds of National Significance

At a national level there are twenty weed species listed as Weeds of National Significance (WONS). *The Commonwealth National Weeds Strategy: A Strategic Approach to Weed Problems of National Significance* describes broad goals and objectives to manage these species. There were no weed species listed as WONS recorded within the Study Area

5.6.2 Declared Plants

Weeds that are, or have the potential to become, a threat to agriculture may be formally declared under the *Agriculture and Related Resources Protection Act 1976* (*ARRP Act*). Declared Plants under this Act are listed with Standard Control Codes that outline the requirements for control. Five Priority groupings exist (P1, P2, P3, P4 or P5), and more than one Priority may be placed on a weed species. Weeds may also be prioritised differently in different agricultural regions. Eighty three Declared Plants are listed as occurring in the Murchison region of Western Australia under the ARRP Act. Landholders having declared weeds on their property are 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 M. Information regarding the current status of Declared Plants is listed at the Department of Agriculture and Food website:

http://agspsrv95.agric.wa.gov.au/dps/version02/01_plantsearch.asp.

No Declared Plants (weeds) were recorded during the Weld Range survey.

5.6.3 Environmental Weeds within the Study Area

Currently, 106 weed species are known to occur in the Murchison region of Western Australia (Western Australian Herbarium, October 2009). Six environmental weed species were recorded during the Weld Range survey: **Anagallis arvensis; *Cenchrus ciliaris; *Cuscuta epithymum; *Portulaca oleracea; *Solanum nigrum;* and **Sonchus oleraceus.*

These weed species have a scattered distribution on the plains within the Study Area, generally at low abundance, recorded either as "less than 10 plants" or as percentaage cover of 2-10%. Brief descriptions of each weed species are provided below.

**Anagallis arvensis* (PRIMULACEAE) (Pimpernell) is a decumbent annual herb growing to 40 cm in height. Flower colour varies from cream to scarlet and they are produced between February and December. This species is commonly recorded on disturbed areas from the Shark Bay to Esperance and inland areas between (Hussey et al, 2007; Western Australian Herbarium, 2009).

**Cenchrus ciliaris* (POACEAE) (Buffel grass) is a tufted, perennial grass growing to 1 m in height. It was widely planted in pastoral regions as a pasture grass, and has since become a widespread weed of roadsides, creeklines, river edges and most vegetation types from Shark Bay to the Pilbara and adjacent desert (Hussey et al, 2007; Western Australian Herbarium, 2009).

**Cuscuta epithymum* (CUSCUTACEAE) (Lesser Dodder) is a twining, annual, parasitic herb or climber (no image available). White flowers occur in small clusters and are produced from August to December. This species often occurs in sandy soils over limestone or granite, from Kalbarri to Busselton (Hussey et al., 2007; Western Australian Herbarium, 2009).

**Portulaca oleracea* (PORTULACACEAE) (Pigweed or Purslane) is a prostrate, succulent annual herb that grows up to 0.2 m in height. The leaves are shiny and spoon-shaped, and yellow flowers are produced from April to May. The entire plant becomes reddish in colour when subjected to water stress. This common and widespread species grows in clay loam and sand, often inhabiting disturbed sites. It is considered a native in the majority of Western Australia, however is probably introduced to the south-west (Hussey et al., 2007; Western Australian Herbarium, 2009).

**Solanum nigrum* (SOLANACEAE) (Black berry nightshade) is an erect perennial/annual herb or shrub reaching 1 m in height. It has broad, alternate concolorous leaves. It produces white flowers between April and October and dull black to purple globular berries. This species is thought to be native to central and southern Europe. It is recorded in all Australian states in disturbed woodlands, drainage areas and regions of high rainfall (Hussey et al., 2007; Western Australian Herbarium, 2009).

**Sonchus oleraceus* (ASTERACEAE) (Common Sowthistle) is an erect annual or short-lived perennial herb that grows up to 1.5 m in height. The generally flaccid leaves are slightly prickly or not prickly at all. Yellow flowers are produced from January to December. This species is native to Eurasia and North Africa, and is widespread on roadsides, gardens, market gardens and wasteland in all parts of Western Australia (Hussey et al., 2007; Western Australian Herbarium, 2009).

6 CONSERVATION SIGNIFICANCE

The significance of the flora of the project area has been assessed at four spatial scales; national, State, regional and local.

National significance refers to those features of the environment which are recognised under legislation as being of importance to the Australian community. Flora species and TECs listed under the *EPBC Act* are regarded as nationally significant.

State significance refers to those features of the environment that are recognised under State legislation as being of importance to the Western Australian community, in particular, species scheduled / listed as rare flora under the *WC Act*.

Regional significance addresses the representation of species and habitats at a biogeographic regional level. Species or habitat types that are endemic to the Murchison bioregion and whose distributions are limited or unknown are considered regionally significant.

Vegetation and flora species are of local significance when their presence is confined to a specialised habitat that is uncommon in the local area and whose disturbance or removal may lead to localised extinction.

6.1 CONSERVATION SIGNIFICANCE OF VEGETATION WITHIN THE STUDY AREA

6.1.1 Vegetation of National Significance

No vegetation communities recognised under the *EPBC Act* were recorded in the Study Area

6.1.2 Vegetation of State Significance

The Priority 1 State-listed PEC "Weld Range vegetation complexes (Banded Ironstone Formations)" occurs in the Study Area. Although not protected by current State legislation, the vegetation within these boundaries is potentially is of State significance. The criteria for a Priority 1 listing is;

"Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range."

The total area of each community type mapped by ecologia which lies within the PEC is detailed in Table 6.1. As not all of the area within the PEC lies within the study area, the total area of each community type within the PEC could not be accuratately determined. An estimate of the area has been made, based on the assumption that the proportion of each community type that occurs in the areas mapped by ecologia is identical in those areas outside the study area. This assumption is likely to be less correct for types more typical of the surrounding plains, since the majority of the PEC occurs on the BIF ridgeline. Eighty percent of the area within the Study Area of Community types 1 and 2 lies within the PEC and on this basis these community types are considered of conservation significance.

Some of the communities occurring within the PEC, particularly on the lower slopes and adjacent plains, are not uncommon within the broader area and hence may not meet the Priority 1 criteria.

Integration of vegetation mapping of the BIF ranges and surrounding plains throughout the Murchison region is required to further define and evaluate the regional significance of the ecological communities present within the PEC.

Table 6.1 – Proportion Of Each Vegetation Type Mapped By Ecologia Within The Study Area

Mapped Vegetation Community	Total Area Withn Study Area (ha)	Area Study Area Within PEC (ha)	Proportion of Study Area Within PEC (%)	*Estimated Area Within PEC (ha)
1 and 2: *Acacia aneura* low woodland over mixed open shrubs	1695	1360	**80.2**	1821
3a: +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	16779	462	2.8	4042
3b: +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.	8085	666	8.2	2947
3c: Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.	1624	0	0.0	24
3d: *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.	476	0	0.0	0
4a: *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.	8412	3225	38.3	8260
4b: *Acacia* sp. Weld Range and *A. speckii* (P3) shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* (P4) and *Dodonaea amplisemina* (P3) open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.	952	473	49.7	879
5a: *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.	9324	461	4.9	1894
5b: +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.	56	0	0.0	0
6a: Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.	1014	24	2.3	440
6b: Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.	2430	1	0.0	1
6c: *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.	37	0	0.0	0
7a: *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.	635	0	0.0	1
7b: *Eucalyptus carnei* and *E. trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.	14	0	0.0	0

6.1.2.1 Vegetation of Regional Significance

Regional conservation significance of the vegetation of the Weld Range has been assessed based upon three sources of information: land systems of the survey area, Beard's vegetation mapping of the Murchison and the DEC's surveys of BIF ranges of the Yilgarn Craton.

6.1.2.2 Land Systems Mapping Analysis

Sixteen land systems are represented within the Weld Range Study Area (Curry *et al,* 1994). The area of each land system in WA and the Murchison River Catchment Area are detailed (the Murchison) in Table 6-2. Eleven of the 16 land systems occur within two of SMC's infrastructure footprint options and 12 in the third.

Two land systems occurring within the Study Area are considered of potential conservation significance on the basis of being highly restricted in absolute area (<1% of the total Murchison) and either wholly or largely confined to the Murchison: the Breberle and Weld.

The Breberle land system (11,482 ha) is almost complety confined to the Murchison (97%) with a scattered distribution, the majority of which occurs much further to the west. It occurs in level saline drainage plains adjacent to ephermeral lakes, claypans and areas of swampy drainage with sandy margins. It supports tall acacia chrublands and other fringing shrublands gradating to perennial grasses and halophytes with increasing salinity. Only 4% of transects assessed in the Murchison Catchment Area Rangeland survey were in good condition, with 55% assessed as in poor condition.

This unit is not present within the footprint options for the Project.

The Weld land system (37,235 ha) is wholly confined to the Murchison, almost exclusively at Jack Hills and Weld Range. It occurs on rugged ranges and ridges and supports acacia shrublands. The majority of areas assessing the Murchison Rangeland survey were in good (59%) or fair (36%) condition, attributed to the lack of accessibility of the vegetation to stock.

Approximately 3% of the entire occurrence of the Weld land system occurs within the footprint options for the Project.

Table 6-2: Land Systems of the Weld Range Study Area.

Land System	Total Area in WA (ha)	Total Area in the Murchison* (ha)	% Total Area in WA Within Murchison*	% Total Area of Murchison*	% in Good Condition
Breberle	11,482	11,188	97	0.13	4
Cunyu	329,933	290,394	88	1.26	12
Gabanintha	251,455	165,109	66	1.12	22
Jundee	660,224	585,378	89	1.57	16
Kalli	1,115,901	853,590	76	7.10	40
Koonmarra	569,874	543,173	95	6.21	10
Mileura	261,223	206,496	79	1.17	31
Norie	211,177	157,182	74	1.54	31
Sherwood	1,579,691	1,505,851	95	5.63	25

Land System	Total Area in WA (ha)	Total Area in the Murchison* (ha)	% Total Area in WA Within Murchison*	% Total Area of Murchison*	% in Good Condition
Violet	584,096	546,126	93	1.26	25
Waguin	317,146	245,497	77	6	22
Weld	**37,235**	**37,235**	**100**	**0.41**	**59**
Wiluna	258,978	252,598	98	1.51	25
Yandil	494,525	465,955	94	3.96	8
Yanganoo	2,019,907	1,967,111	97	14.48	20
Yarrameedie	68,324	44,169	65	0.60	22

* Murchison defined as the Murchison River Catchment, and area of 88,360 km2 extending from the Innouendy and Mt Gould stations in the north, to Bullardoo and Wondinong in the south and to Pollele and Muggon in the east and west respectively (Curry *et al,* 1994)

Indicates land systems whitch occur with the proposed footprint options of the Project.

6.1.2.3 Beard Mapping Analysis

The survey area lies within the Austin Botanical District of Beard's Murchison Region. At a scale of 1:1000000 Beard (1976) mapped seven communities within the Weld Range project area (Figure 4.1). The total area of these units mapped in WA and within the Murchison bioregions is detailed in Table 6-3. Their level of significance based on total extent and degree of regional endemism is as follows:

- Unit; a_1^{17} Li, *Acacia aneura* and *Acacia grasby*i low woodland, is both highly restricted, with a total area in WA of only 3,255 ha, and wholly confined to the Murchison bioregion. It is considered of high regional conservation significance due to its restricted area and regional endemism. A single polygon of this unit has been mapped at the eastern boundary of the Study Area (Figure 4.1), outside the proposed areas of any of the proposed footprints.

  During the current survey, this area was mapped as Community 4; *Acacia* sp. Weld Range shrubland over mixed open shrubs. *Acacia grasbyi* did not occur as a dominant species in any community types described in the current survey howevr *Acacia aneura* is a dominant species in the upper strata of Community 4.

- Unit; a_1^9Li, *Acacia aneura, Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland is also relatively restricted (total area of occurrence 94,031 ha) but is not confined to the Murchison bioregion (54%). Due to the relatively small area, both within WA and the Murchison, this unit is regarded as of moderate regional significance. A single polygon of this unit occurs within the Study Area to the north of the Weld Range and portions of it are encompassed in each of the footprint options.

  Within the current survey Community 3: *Acacia* spp. shrubland over open mixed shrub species and tussock grasses was mapped in areas corresponding to this unit, predominantly as sub-communities 3a and 3b, both of which have Acacia *aneura* and *A. ramulosa* var. *linophylla* as dominants in the upper strata.

Two other Beard units present within the Study Area are largely confined to the Murchison bioregion but occur across larger areas. These units are considered of some regional significance given their high degree of endemism, but are likely to be less threatened given their broader occurrence:

- Unit $a_1^8Srk_1^2Ci$, *Acacia aneura* and *Acacia sclerosperma* lightly wooded succulent steppe, with *Atriplex* (saltbush) and *Maireana* (bluebush) species. A total of 199,534 ha is mapped across WA , 93% of which is broadly distributed across the Murchison bioregion. Two polygons of this unit are mapped within the Study Area however only a small proportion lies within the footprint options.

  The areas in which this unit occurs within the Study Area were primarily mapped as Community 6, Mixed open chenopod shrubland; and Community 7, Halophytic shrubland. *Acacia sclerosperma* was not dominant in either of these communities in the current survey, but is a widely distributed species in the Study Area. T

- Unit $a_1^{14}Si$, *Acacia aneura* and *Acacia quadrimarginea* scrub. A total of 448,700 ha is mapped across WA, 78% of which is widely distributed within the Murchison bioregion. The tendency of this unit to occur on stony ridges means that it is more likely to occur in area of mineral exploration. Two polygons of this unit occur along the stony ridges and footslopes to the south of the ridgline, partially overlapping with areas of proposed pits and dumps.

  The areas in which this unit occurs within the Study Area were primarily mapped as Community 1, *Acacia aneura* low woodland over mixed open shrubs; and Community 4, *Acacia* sp. Weld Range shrubland over mixed open shrubs. *Acacia quadrimarginea* was not identified from any of the specimens collected during the surveys. However, *Acacia* sp. Weld Range, a recently identified taxon that is morphologically similar to *A. quadrimarginea* is dominant within Community 4.

No other Beard units mapped within the Study Area are considered of regional conservation significance given the much larger areas they encompass and their broader distribution across multiple bioregions.

Table 6-3: Beard Vegetation Units Within the Weld Range Study Area.

Vegetation Unit Code	Vegetation Description	Total Area of Unit in WA (ha)	Area of Unit in the Murchison (ha)	% Within Murchison
a_1^{17} Li	*Acacia aneura* and *Acacia grasbyi* low woodland.	3255	3255	100
a_1^9 Li	*Acacia aneura, Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland.	**94,031**	50,965	54
a_1^8 Srk $_1^2$ Ci	*Acacia aneura* and *Acacia sclerosperma* lightly wooded succulent steppe, with *Atriplex* (saltbush) and *Maireana* (bluebush) species.	199,534	185,622	93
a_1^{14} Si	*Acacia aneura* and *Acacia quadrimarginea* scrub.	448,700	339,907	76
a_1 Li	*Acacia aneura* low woodland.	24,751,239	12,452,151	50
a_1 Si	*Acacia aneura* (mulga) scrub.	6,666,951	1,149,610	17

a_9 Si	*Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) scrub.	1,331,779	390,207	29

6.1.2.4 Vegetation of the BIF Ranges of the Yilgarn Craton

Since 2005 the DEC has conducted more than 20 botanical surveys of the BIF ranges of the Yilgarn Craton. The characteristics of vegetation described at 11 of the BIF ranges surveyed by the DEC are summarised in Table 6-4. These 11 ranges are located to the north of Mount Magnet. The vegetation described at ranges south of Mount Magnet tends to diverge increasingly and has been excluded from these comparisons.

When comparing the characteristics of communities, it is important to remember that the studies by the DEC were restricted to the BIF ranges themselves and unlike the current survey did not include significant areas of adjacent plains. Combined multivariate analysis of the 52 DEC Weld quadrats and the 259 ecologia Weld quadrats (the latter including surrounding plains) resulted in a shift in community groupings for the DEC data. Nevertheless the DEC data provides a means of comparing the composition of the BIF Range vegetation communities at a much finer scale regionally. The vegetation descriptions present at each point on the Ranges (e.g. crest, midslope, rocky outcrop, lower slope) are summarised in Appendix N. There are some limitations to this classification, as there is variation between the landforms present at each range, and some variation in the methods of describing vegetation communities in different surveys.

The DEC reported that the *Triodia melvillei* communities present at Jack Hills, Robinson Range and Mount Gould are restricted and of conservation significance. Communities including *T. melvillei* also occur at Joyners Find Hills (Community 2) and Lee Steere Range (Community 4) but have not been described as restricted communities. Isolated populations of *T. melvillei* have been located by *ecologia* at Weld Range – a very small population on a low hill of the Range and a few populations on the sandy flats to the north of the Range. There has been anecdotal evidence that more populations of this spinifex occur in the northern areas, however, *ecologia* has also collected *Triodia schinzii* from the flats to the north of the Range.

It appears that *T. melvillei* is at the southern boundary of its distribution on these more northern BIF ranges of the Yilgarn Craton. FloraBase records (October, 2009) indicate that *T. melvillei* has been recorded further south of these four ranges and further survey work might reveal more populations on other high ranges to the south of Weld Range. During a recent survey of SMC's tenements at Jack Hills (ecologia, 2010j) many large populations of *T. melvillei* were located in areas away from Mounts Hale and Matthew and on non-BIF hills. Small, isolated populations of *T. melvillei* were also located at Robinson Range in lower lying areas than the populations recorded on Mount Fraser. In summary it appears that there is further regional comparison of these communities necessary to determine the regional significance of the *T. melvillei* communities.

Three of the 11 ranges listed in the table (Weld Range, Jack Hills and Robinson Ranges with Mount Gould), are thought to have communities endemic to the range (Table 6-4). Two of these ranges; Jack Hills and Robinson Ranges / Mount Gould, have communities thought to be restricted within that range (Government of Western Australia, 2007).

Table 6-4 – Comparison of Vegetation Communities Described by DEC at BIF Ranges North of Mt. Magnet.

Banded Ironstone Formation (BIF)	Number of Communities	Community Endemic to Range?	Restricted Distribution within Range?	Source
Weld Range	8	Yes	No	Markey & Dillon, 2008
Jack Hills	6	Yes	Yes	Meissner & Caruso, DRAFT 2008
Robinson Ranges and Mount Gould	7	Yes	Yes	Meissner *et al*., DRAFT 2007
Western Narryer Terrane	4	No	No	Meissner & Owen, Draft 2008
Barloweerie and Twin Peaks Greenstone Belts	3	No?	No	Meissner & Wright, DRAFT 2008a
Montague Range Zone of Gum Creek Greenstone Belt	6	No	No	Thompson & Sheehy, Draft 2009a
Lake Mason Zone of Gum Creek Greenstone Belt	6	No	No	Thompson & Sheehy, Draft 2009b
Joyners Find Hills	6	No	No	Markey & Dillon, Draft 2007a
Lee Steere Range	5	No	No	Thompson & Sheehy, Draft 2009c
Perseverence Greenstone Belt	4	No	No	Meissner & Wright, Draft 2009b
Booylgoo Range	6	Possibly	No	Markey & Dillon, Draft 2007b

Jack Hills is approximately 100 km north, Robinson Range approximately 150 km north-east and Mount Gould approximately 130 km north-west of Weld Range. The vegetation communities described by the DEC at these ranges have some structural similarities with those described at Weld Range but tend to differ in species composition, as described below.

ecologia mapped the flat plains of Weld Range as dominated by Community 3, broadly described as *Acacia* spp. shrubland over mixed shrub species and tussock grasses. The dominant *Acacia* species was *Acacia ramulosa* var. *linophylla* and the dominant shrub species was *Eremophila forrestii* subsp. *forrestii.* At Jack Hills the DEC described a fairly species poor community of open woodlands of *A. aneura* cf. var. *aneura* over shrublands of *Eremophila* species dominated by *Eremophila macmillaniana* is described as occurring on outwash plains. No similar community is described by the DEC at Robinson Range/Mount Gould.

ecologia's Community 4 appears to be unique to Weld Range when compared with the vegetation of Jack Hills and Robinson Ranges and Mount Gould. The dominant species in this community are *Acacia* sp. Weld Range and *Acacia speckii* (Priority 3) over *Eremophila macmillaniana* shrubs. No similar community has been described on any other range surveyed. Community 4 was recorded predominantly on dolerite substrates across the Weld Range.

The communities occurring on the BIF ridges at Weld Range were dominated by *Acacia aneura* species woodlands and shrublands, along with *Acacia ramulosa* var. *linophylla*, *A. cockertoniana* and

Acacia sp. Weld Range tall shrubs and *Eremophila* spp. lower shrubs (Communities 1 and 2 and associated sub-communities). Similar ridges at Jack Hills were dominated by *Acacia* species not recorded at Weld Range such as *Acacia citrinoviridis* and *A*. sp. Jack Hills with *Eremophila margarethae* as the dominant lower shrub species.

The communities recorded by DEC on BIF ridges at Robinson Range and Mount Gould were also dominated by *Acacia aneura* varieties with *A. citrinoviridis* and resemble the vegetation communities recorded by the DEC at Jack Hills rather than those at Weld Range.

Those communities located on the flat saline plains of Weld Range (Communities 5, 6 and 7) were not recorded at Jack Hills or Robinson Range and Mount Gould. However, the majority of the DEC's survey sites at Jack Hills, Robinson Range and Mount Gould were located on BIF ridges and associated landforms. Similar communities may exist in these habitats at these ranges beyond the area of survey.

In summary the regional comparison suggests that Community Types 1, 2 and 4 described in the current survey, although locally widespread, may be endemic to the Weld Range and hence of regional significance.

6.1.3 Vegetation of Local Significance.

Table 6-5 details the total area of each community type mapped by *ecologia* within the Study Area. Several community types; 3d, 5b, 6c and 7b, each account for less the 1% of the total area. Community 1 and 2 is a composite of four subtypes which could not be discriminated in aerial photography and hence could not be individually mapped despite segregating as distinct subtypes during multivariate analysis. Since the total area of the composite is 3.29%, it is likely that at least some of the subtypes also encompass less than 1% of the Study Area. These community subtypes are potentially of local significance if species are confined to them and hence are likely to become locally scarce if they are destroyed. Communities 1 and 2, 4b, 6a, 7a and 7b are all locally restricted and support species that appear largely or wholly locally restricted in distribution. Communities 1 and 2 and 4b in particular support Priority taxa that are restricted to this habitat.

Table 6-5 – Area of Community Types Mapped in the Study Area

Vegetation Community	Area Mapped in Study Area (ha)	% of Study Area	Species with > 80% Records Locally Restricted To Community Type
1 and 2: *Acacia aneura* low woodland over mixed open shrubs	1695	3.29	*Acacia coolgardiensis subsp. effuse, Allocasuarina acutivalvis subsp. acutivalvis, Dodonaea pachyneura, Eremophila compacta subsp. fecunda, Hakea recurva subsp. arida,* ***Micromyrtus placoides****, Micromyrtus sulphurea, Olearia plucheacea, Olearia stuartii, Philotheca brucei subsp. brucei, Stenanthemum petraeum, Thryptomene decussata*
3a: +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	16779	32.56	No species
3b: +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.	8085	15.69	*Acacia cuthbertsonii subsp. cuthbertsonii, Sida fibulifera, Sida sp. Golden calyces pubescent (G.J. Leach 1966)*
3c: Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea, Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.	1624	3.15	*Corymbia lenziana, Eucalyptus socialis subsp. eucentrica*
3d: *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.	476	0.92	No species
4a: *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.	8412	16.32	***Ptilotus luteolus***
4b: *Acacia* sp. Weld Range and *A. speckii* **(P3)** shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* **(P4)** and *Dodonaea amplisemina* **(P3)** open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.	952	1.85	*Chorizema genistoides,* ***Stenanthemum patens***
5a: *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.	9324	18.09	*Eragrostis australasica, Eucalyptus lucasii, Eremophila latrobei subsp. filiformis, Eremophila galeata*

Vegetation Community	Area Mapped in Study Area (ha)	% of Study Area	Species with > 80% Records Locally Restricted To Community Type
5b: +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.	56	0.11	No species
6a: Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.	1014	1.97	*Maireana carnosa, Maireana thesioides*
6b: Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.	2430	4.72	*Eucalyptus striaticalyx subsp. striaticalyx, Exocarpos aphyllus*
6c: *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.	37	0.07	No species
7a: *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.	635	1.23	*Atriplex bunburyana, Atriplex nummularia, Atriplex vesicaria, Eremophila glabra subsp. glabra, Eremophila pantonii, Frankenia laxiflora, Halosarcia doleiformis, Halosarcia indica subsp. leiostachya, Muehlenbeckia florulenta*
7b: *Eucalyptus carnei* and *E. trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.	14	0.03	*Halosarcia indica subsp. leiostachya*
Total	**51533**	**100.0**	

Species in **bold** are Priority listed.

6.2 CONSERVATION SIGNIFICANCE OF FLORA WITHIN THE STUDY AREA

6.2.1 Flora of National Significance.

No taxa listed under the *EPBC Act* and hence of national significance have been recorded within the Study Area.

6.2.2 Flora of State Significance.

No taxa listed under the as Declared Rare Flora have been recorded within the Study Area. Twenty five Priority Flora taxa were recorded by *ecologia* during the current survey within the Study Area. An additional two Priority taxa were recorded in the Study Area by other sources as detailed in Table 5-3, making a total of 27 conservation significant flora taxa recorded in the Study Area.

The total abundance of each species was estimated by examining the collections notes of records from the DEC, combined with the data from surveys by *ecologia* for which accurate plant counts were available. DEC records vary considerably in the amount of detail available, ranging from accurate counts; to broad abundance descriptions; to no detail. Where multiple records at the same location were available, the highest numeric estimate was applied. Where descriptions of abundance only were available, numbers were inferred according to the assumptions detailed in Table 6-6. Where no estimate of abundance was available, it was assumed only one plant was present. The latter assumption is likely to be an underestimate in many instances, and hence the final estimates of total abundance of each species are likely to be very conservative.

The number of plants present at each location was counted during the ecologia transect-based surveys, however in most instances estimates of percentage cover only were available for collections from quadrats. The number of plants assumed from these cover estimates is detailed below.

Table 6-6 – Number of Plants Assumed for Records Where Only Descriptions or % Cover Available

Abundance Description or Percentage Cover	No. of Plants Assumed
no indication	1
very rare	1
several	3
infrequent, uncommon, scarce, one small group, a few scattered	5
occasional, moderately common, locally frequent, very localised	10
common here, locally common, locally frequent, locally abundant	20
frequent, common, plentiful, abundant, dominant	50
>2% cover	5
2-10% cover	10
10-30% cover	20

Table 6-7 summarises the known distribution and abundance of these species from all sources, including DEC records. The numbers of loci (clusters of plants separated by more than 500m from each other) are detailed. It can be seen that that the records within the Study Area represent more than 50% of all locations recorded to date for 8 species, and more than 50% of all known plants for 12 species. However it is likely that proportion of both locations and abundance within the Study Area is likely to have been significantly overestimated due to the much greater intensity of searching for these taxa which has occurred during threatened flora transects. The numbers of plants outside the survey area is also likely to have been underestimated because many previous records lack any detail of abundance, and hence a single plant has been recorded at these locations.

Table 6-7 – Conservation Significant Flora Recorded Within the Study Area (All Data Sources)

Rank	Species	Total No. ❖Loci	Estimate of Total No. Plants	No. ❖Loci Recorded Within the Study Area	% All ❖Loci Within Study Area	No Plants Recorded Within Study Area	% All Estimated Plants Within Study Area
P1	*Beyeria lapidicola*	12	80	8	66.7	53	66.3
P1	*Eremophila rhegos*	3	58	1	33.3	3	5.2
P1	*Euphorbia sarcostemmoides*	4	12	1	25.0	1	8.3
P1	*Goodenia lyrata*	10	35	3	30.0	20	57.1
P1	*Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94)	10	61	8	80.0	50	82.0
P1	*Stenanthemum patens*	8	186	3	37.5	34	18.3
P3	*Acacia burrowsiana*	14	4354	1	7.1	9	0.2
P3	*Acacia speckii*	97	1098	81	83.5	853	77.7
P3	*Calytrix erosipetala*	35	2053	1	2.9	20	1.0
P3	*Dodonaea amplisemina*	67	790	47	70.1	603	76.3
P3	*Eremophila arachnoides* Chinnock subsp. *arachnoides*	11	205	2	18.2	30	14.6
P3	*Grevillea stenostachya*	91	971	66	72.5	918	94.5
P3	*Hemigenia tysonii*	80	6616	67	83.8	6374	96.3
P3	*Homalocalyx echinulatus*	30	1050	12	40.0	845	80.5
P3	*Micromyrtus placoides*	45	2160	43	95.6	2126	98.4
P3	*Mirbelia ?stipitata*	4	7	1	25.0	5	71.4
P3	*Phyllanthus baeckeoides*	15	1309	1	6.7	5	0.4
P3	*Prostanthera ferricola*	14	672	1	7.1	14	2.1
P3	*Prostanthera petrophila*	95	2141	83	87.4	2084	97.3
P3	*Ptilotus beardii*	38	2804	11	28.9	1906	68.0

Rank	Species	Total No. ❖Loci	Estimate of Total No. Plants	No. ❖Loci Recorded Within the Study Area	% All ❖Loci Within Study Area	No Plants Recorded Within Study Area	% All Estimated Plants Within Study Area
P3	*Ptilotus luteolus*	15	533	5	33.3	68	12.8
P3	*Tecticornia cymbiformis*	7	69	1	14.3	14	20.3
P3	*Verticordia jamiesonii*	22	483	1	4.5	1	0.2
P4	*Baeckea sp. Melita Station*	57	2626	14	24.6	666	25.4
P4	*Goodenia berringbinensis*	18	33546	1	5.6	30	0.1
P4	*Grevillea inconspicua*	62	2320	16	25.8	264	11.4

Taxa with greate than 50% of loci within the study area

Taxa with greate than 50% of estimated plants within the study area

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7 ENVIRONMENTAL IMPACTS OF THE PROJECT

Impacts associated with construction may include:

- Clearing of vegetation leading to loss or fragmentation of habitats;
- Increased weed propagation;
- Direct loss of populations of plant taxa of conservation significance resulting in reduced viability of taxa regionally;
- Impact to the Weld Range PEC;
- Erosion;
- Changes to surface water flows with resultant deleterious effect on vegetation particularly adapted to surface water harvesting such as Mulga;
- Increased potential for fires;
- Alteration to groundwater levels, with resultant damage to phreatophytic vegetation;
- Increased dust levels, with resultant plant deaths;
- Increased salinity of soils if saline water is used for dust suppression.

7.1 DIRECT LOSS OF VEGETATION AND FLORA

The most substantial environmental impacts arising from the proposed works at Weld Range will result from the clearing of native vegetation. Approximately 3,533 ha, including a 100 m buffer will be cleared or disturbed during construction, as detailed in Table 7.1.

Table 7.1 – Proposed Infrastructure Clearance Areas

Weld Range Project	Approximate Area (ha)
Beebyn Pit and Waste Dumps	1097
Madoonga Pit and Waste Dumps	714.5
Central Processing Facility – Plant and Infrastructure	351
Evaporation Pond	600
Tailings Dam	46.5
Accommodation Village	20
Airstrip	55
Access Tracks and Haul Roads	549
Total	**3,533 ha**

Clearing of significant areas of vegetation is an unavoidable impact from the development of a mine and associated infrastructure. However the impact can be minimised by considering the distribution

of vegetation and flora species of conservation significance during the design stage and locating infrastructure to avoid areas of higher significance whenever possible.

7.1.1 Impact to Vegetation from Clearing

Tables 7.2, 7.3 and 7.4 show the areas of vegetation within each land system, Beard vegetation unit and ecologia community type respectively that would be cleared under each of three proposed infrastructure options.

At the land system level, the greatest impact, irrespective of the infrastructure option selected, is to the Weld land system (3.1%) and the next greatest impact is to the Yarrameedie land system (Table 7-2), with 2.4%, 1.0% and 1.6% of the total area within the Murchison from Base Case, Option 1 and 2 respectively. Impacts to the remaining land system are less than 0.5%. At this scale the impacts of clearing are not considered significant.

At the level of resolution (1:1,000,000) of Beard's vegetation mapping the greatest impact is to Beard's *Acacia aneura*, *Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla)* low woodland (a_1^9 Li) community (Table 7-3). This community is mapped over a relatively small area in Western Australia (94,031 ha), 54% of which is within the Murchison region, and hence could be considered relatively vulnerable. However the potential impacts predicted from each option are low. A loss of 1.4%, 1.1% or 1.7% of the total occurrence within the Murchison would result from the Base Case, Option 1 and Option 2 infrastructure options respectively.

With the exception of Unit a_1^{17} Li, which is not directly impacted by any of the infrastructure options, the remaining Beard units occurring in the project area occur over large areas of the Murchison and in some instances Western Australia, hence the impact from the proposed infrastructure clearing is minimal (less than 0.2%) irrespective of the footprint option selected.

At the finer scale of resolution of vegetation communities of the current survey, the greatest estimated potential impact to the vegetation communities is to Community 5b (77% by each option). The impact is results from clearing of the Madoonga waste dump which is common to all. Only one small area (56 ha) of this community type was identified elsewhere, close to Madoonga homestead. Much of this area is degraded sue to historical use as a dump for station refuse and grazing.

The estimated impact to the locally restricted Sub-community (7b) of the halophytic shrubland community 7 is also relatively high (39%) for all infrastructure footprint options. This community is considered locally significant, as it occurs on a seasonally inundated salt pan which provides a refuge to threatened fauna species. This community will be impacted by the proposed Madoonga waste dump. This community extends to the north beyond the boundaries of the Study Area however even allowing for this larger area, it remains locally restricted.

Potential impacts to Community 6a, which encompasses 1014 ha on the saline flats and drainage areas of the Study Area , are 34.2%, 30.3% and 28.9% from Option 2, Base Case and footprint Option 1 respectively. The Priority three species *Ptilotus beardii* was commonly within this community.

Communities 1 and 2 have been identified as of state conservation significance due to their restricted occurrence outside the area identified as a PEC and of local significance due to the high number of taxa which were locally restricted to them. These communities predominantly occur on BIF ridges and outcrops and cover approximately 1, 695 ha of the area mapped. The Priority 3 species *Prostanthera petrophila* commonly occurred in this community as did the geographically restricted

taxon *Acacia* sp. Weld Range. Approximately 13.8% would be impacted by all three of the potential infrastructure footprint options. This community will be impacted by the proposed Madoonga and Beebyn pits and associated infrastructure such as tracks and crushing facilities and by the central processing plant under the Base Case.

The impacts to Community 4, which is also considered to be locally and possibly regionally significant, due to the high numbers of conservation significant flora recorded within it, is low. Community 4a was mapped over a large area of the lease (8,412 ha) and the calculated impacts to the community from the three footprint options are 3.5% from the Base Case footprint and 3.3% from footprint Options 1 and 2. The Priority 3 taxa *Acacia speckii* and *Dodonaea amplisemina* along with the Priority 1 taxon *Ptilotus astrolasius* var. *luteolus* were commonly recorded within this sub-community. The undescribed taxa *Acacia* sp. nov. (aff. Kochii) and *Hemigenia* sp. nov. (aff exilis) were also recorded within this sub-community. Community 4b was mapped over a smaller area (952 ha) of which 3.1% will be impacted by the Base Case Option and 2.0% by footprint Options 1 and 2.

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Table 7-2 Estimated Impacts of Clearing to Land Systems within the Study Area

			BFS Base Case			BFS Option 1			BFS Option 2		
Land System	Total Area of Land System in WA (ha)	Total area in Murchison (ha)	Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)	Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)	Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)
Breberle	11,482	11,188	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Cunyu	329,933	290,394	16	0.005	0.006	16	0.005	0.005	16	0.005	0.005
Gabanintha	251, 455	165,109	165	0.066	0.100	29	0.012	0.018	29	0.012	0.018
Jundee	660,224	585,378	153	0.023	0.026	185	0.028	0.032	185	0.028	0.032
Kalli	1,115,901	853,590	605	0.054	0.071	1298	0.116	0.152	891	0.080	0.104
Koonmarra	569,874	543,173	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Mileura	261,223	206,496	141	0.054	0.068	141	0.054	0.068	141	0.054	0.068
Norie	211,177	157,182	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Sherwood	1,579,691	1,505,851	367	0.023	0.024	280	0.018	0.019	432	0.027	0.029
Violet	584,096	546,126	669	0.115	0.123	671	0.115	0.123	671	0.115	0.123
Waguin	317,146	245,497	0	0.000	0.000	0	0.000	0.000	163	0.052	0.067
Weld	37,235	37,235	1153	3.098	3.098	1160	3.116	3.116	1160	3.116	3.116
Wiluna	258,978	252,598	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Yandil	494,525	465,955	7	0.001	0.001	7	0.001	0.001	7	0.001	0.001
Yanganoo	2,019,907	1,967,111	165	0.008	0.008	165	0.008	0.008	165	0.008	0.008
Yarrameedie	68,324	44,169	1078	1.577	2.440	714	1.046	1.617	714	1.046	1.617

Table 7-3 Estimated Impacts to Beard Vegetation Communities of Infrastructure Footprint Options within the Study Area

				BFS Base Case			BFS Option 1			BFS Option 2		
Beard Unit	**Vegetation Description**	**Area in WA (ha)**	**Area in Murchison Bioregion (ha)**	**Area in BFS Base Case (ha)**	**Impact to Area Within WA (%)**	**Impact to Area Within Murch. (%)**	**Area in BFS Opt 1 (ha)**	**Impact to Area Within WA (%)**	**Impact to Area Within Murch. (%)**	**Area in BFS Opt 2 (ha)**	**Impact to Area Within WA (%)**	**Impact to Area Within Murch. (%)**
a_1^{14} Si	*Acacia aneura* and *Acacia quadrimarginea* scrub.	448,700	339,907	553	0.123	0.163	564	0.126	0.166	564	0.126	0.166
$a_1^8Srk_1^2$ Ci	*Acacia aneura* and *Acacia sclerosperma* lightly wooded succulent steppe, with *Atriplex* (saltbush) and *Maireana* (bluebush) species.	199,534	185,622	229	0.115	0.123	167	0.084	0.090	167	0.084	0.090
a_1^9 Li	*Acacia aneura, Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland.	94,031	50,965	729	0.775	1.430	582	0.619	1.141	881	0.937	1.729
a_1 Li	*Acacia aneura* low woodland.	24,751,239	12,452,151	2837	0.011	0.023	2856	0.012	0.023	2882	0.012	0.023
a_1 Si	*Acacia aneura* (mulga) scrub.	6,666,951	1,149,610	153	0.002	0.013	1	0.000	0.000	82	0.001	0.007
a_9 Si	*Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) scrub.	1,331,779	390,207	19	0.001	0.005	498	0.037	0.128	0	0	0
a_1^{17} Li	*Acacia aneura* and *Acacia grasbyi* low woodland.	3255	3255	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000

Table 7-4 Estimated Impacts to ecologia Community Types within the Study Area of Infrastructure Footprint Options.

		BFS Base Case		BFS Option 1		BFS Option 2	
Mapped Vegetation Community	**Total Area Within Study Area (ha)**	**Area Impacted (ha)**	**% Within Study Area**	**Area Impacted (ha)**	**% Within Study Area**	**Area Impacted (ha)**	**% Within Study Area**
1 and 2**:** *Acacia aneura* low woodland over mixed open shrubs	1695	236	13.93	234	13.82	234	13.82
3a: +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	16779	1278	7.62	1626	9.69	1362	8.12
3b: +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.	8085	1465	18.12	1185	14.66	1597	19.75
3c: Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea, Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.	1624	175	10.78	35	2.17	17	1.03
3d: *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.	476	91	19.14	0	0.00	0	0.00
4a: *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.	8412	297	3.53	277	3.29	277	3.29
4b: *Acacia* sp. Weld Range and *A. speckii* **(P3)** shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* **(P4)** and *Dodonaea amplisemina* **(P3)** open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.	952	32	3.33	19	1.99	19	1.99

Mapped Vegetation Community	Total Area Within Study Area (ha)	BFS Base Case		BFS Option 1		BFS Option 2	
		Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area
5a: *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.	9324	478	5.12	406	4.35	551	5.91
5b: *+/- Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.	56	43	**76.66**	43	**76.66**	43	**76.66**
6a: Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.	1014	307	**30.30**	293	**28.93**	347	**34.21**
6b: Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.	2430	35	1.42	466	19.20	45	1.85
6c: *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.	37	0	0.00	0	0.00	0	0.00
7a: *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.	635	41	6.41	41	6.41	41	6.41
7b: *Eucalyptus carnei* and *E. trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.	14	5	**38.82**	5	**38.82**	5	**38.82**

7.1.2 Clearing Impacts to the PEC

Using the DEC's currently defined PEC boundary the overall impact to the vegetation of the PEC (from each of the infrastructure options) has been estimated (Table 7.5).

Table 7.5 – Overall Impact to the Vegetation of the PEC

Area of PEC (ha)	Infrastructure Option	Area of PEC to be Impacted (ha)	Impact to PEC (%)
20,311	Base Case	1,660	8.17
	Option 1	1,623	7.99
	Option 2	1,623	7.99

The impact to the vegetation of the PEC as a whole is relatively low (less than 10%), as much of the proposed infrastructure occurs outside the PEC boundary (*ecologia*, 2009d).

The area of each community type mapped by ecologia within the PEC within each of the proposed infrastructure options is detailed in Table 7.6. Impact to Communities 1 and 2, identified as of conservation significance due to their restricted occurrence outside the Study Area, is 12.5% irrespective of which option is considered. This impact is considered the most significant by virtue of this restricted distribution.

A relatively high proportion (45%) of the area of Community sub-type 3c within the PEC will be impacted by all options. However this sub-type is much more abundant within the study area outside the PEC boundaries and is therefore not considered significant.

The second highest impact would be to Sub-community 6a where 20.5% would be affected by the Base Case option and 19.2% by Options 1 and 2. This community occurs on the seasonally inundated washout plains and saline drainage systems of the PEC. Again this percentage impact reflects the relatively small area of this community occurs within the current PEC boundary and a larger area has been mapped in the greater Project area.

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Table 7.6 – Estimated Impact from the Three Infrastructure Options to Vegetations Communities of the Weld Range PEC.

Mapped Vegetation Community	Total Area Within Study Area (ha)	*Estimated Area Within PEC (ha)	Area Within Base Case Footprint (ha)	% Area within PEC	Area within Option 1 Footprint (ha)	% Area within PEC	Area Within Option 2 Footprint (ha)	% Area within PEC
1 and 2: *Acacia aneura* low woodland over mixed open shrubs	1695	1821	227	12.5	228	12.5	228	12.5
3a: +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	16779	4042	512	12.7	507	12.5	507	12.5
3b: +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.	8085	2947	538	18.3	530	18.0	530	18.0
3c: Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.	1624	24	11	45.8	11	45.8	11	45.8
3d: *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.	476	0	0	0.0	0	0.0	0	0.0
4a: *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.	8412	8260	194	2.3	182	2.2	182	2.2
4b: *Acacia* sp. Weld Range and *A. speckii* (P3) shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* (P4) and *Dodonaea amplisemina* (P3) open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.	952	879	16	1.8	11	1.3	11	1.3
5a: *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.	9324	1894	71	3.7	71	3.7	71	3.7
5b: +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.	56	0	0	0.0	0	0.0	0	0.0

Mapped Vegetation Community	Total Area Within Study Area (ha)	*Estimated Area Within PEC (ha)	Area Within Base Case Footprint (ha)	% Area within PEC	Area within Option 1 Footprint (ha)	% Area within PEC	Area Within Option 2 Footprint (ha)	% Area within PEC
6a: Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.	1014	440	90	**20.5**	85	**19.3**	85	**19.3**
6b: Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.	2430	1	0	0.0	0	0.0	0	0.0
6c: *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.	37	0	0	0.0	0	0.0	0	0.0
7a: *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.	635	1	0	0.0	0	0.0	0	0.0
7b: *Eucalyptus carnei* and *E. trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.	14	0	0	0.0	0	0.0	0	0.0

Area mapped in PEC = area of each vegetation community mapped within the boundary of the PEC plus a fractional sum for the unmapped areas. The fractional sum equals the proportion of each mapped vegetation community in the mapped area multiplied by the area of the PEC that has not been mapped.

7.1.3 Impact to Priority Flora from Clearing

The estimated numbers of Priority taxa and the number of loci (defined to be the number of records of a taxon at least 500 metres distant from all other records) which are located within the clearance footprint for each option are detailed in Table 7.7. The distribution of each Priority and Species of Interest taxon relative to the infrastructure option is illustrated in Figures 7.1 to 7.29. Although a relatively high proportion of all records lie within the study area, the impact to most taxa due to the Option 1, the preferred option, is relatively low.

The taxon which would be most affected by Option 1, the preferred option, is *Micromyrtus placoides,* followed by *Beyeria lapidicola* which will have 44.4% and 41.7% respectively of all locations impacted. *Eremophila rhegos* and *Goodenia lyrata* will also be impacted by 33% and 30% respectively. The impacts of Option 2 are identical for these species, as all impacted locations lie within the pits and dumps which are common to both. The Base Case option would have significantly more impact, with 80% of all known locations of *Homalocalyx echinulatus* impacted, and *Beyeria lapidicola, Eremophila rhegos, Goodenia lyrata, Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94), *Hemigenia tysonii* and *Micromyrtus placoides* also impacted by between 30 and 41%.

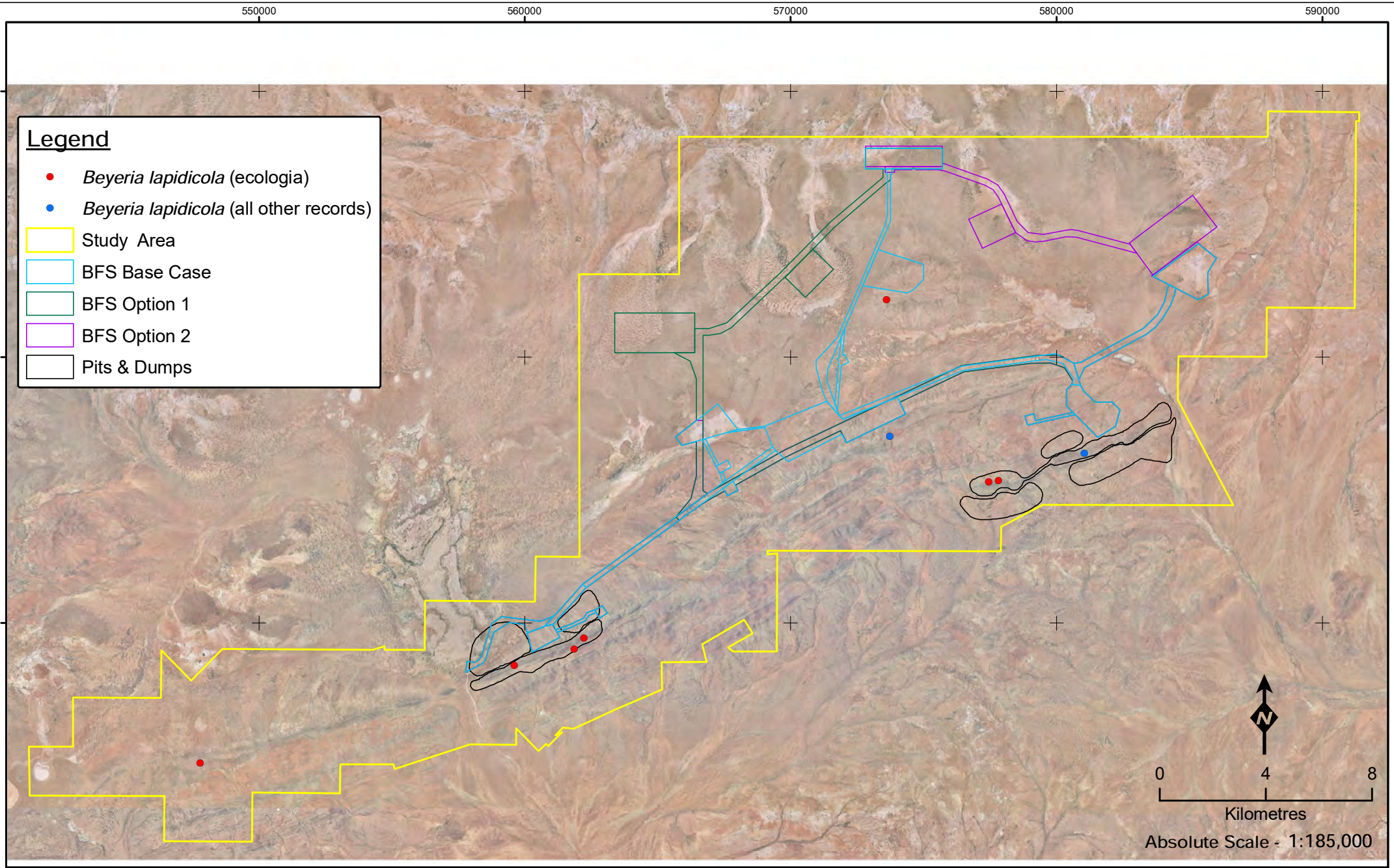
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Table 7.7 – Estimated Impacts to Priority Flora within the Study Area of Infrastructure Footprint Options

			BFS Base Case				BFS Option 1				BFS Option 2			
Taxon	Total No Locations separated by >500 m	Estimated Total No. Plants	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total
***Beyeria lapidicola* (P1)**	12	80	5	**41.7**	19	23.8	5	41.7	19	23.8	5	**41.7**	19	23.8
***Eremophila rhegos* (P1)**	3	58	1	**33.3**	3	5.2	1	**33.3**	3	5.2	1	**33.3**	3	5.2
***Euphorbia sarcostemmoides* (P1)**	4	12	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
***Goodenia lyrata* (P1)**	10	35	3	**30.0**	25	**71.4**	3	**30.0**	25	**71.4**	3	**30.0**	25	**71.4**
***Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)* (P1)**	10	61	4	**40.0**	30	**49.2**	1	10.0	1	1.6	1	10.0	1	1.6
Stenanthemum patens (P1)	8	186	1	12.5	20	10.8	1	12.5	20	10.8	1	12.5	20	10.8
Acacia burrowsiana (P3)	14	4354	0	0.0	0	0.0	1	7.1	9	0.2	1	7.1	9	0.2
Acacia speckii (P3)	97	1098	25	25.8	326	29.7	18	18.6	200	18.2	18	18.6	200	18.2
Calytrix erosipetala (P3)	35	2053	1	2.9	20	1.0	1	2.9	20	1.0	1	2.9	20	1.0
Dodonaea amplisemina	67	790	11	16.4	323	**40.9**	12	17.9	183	23.2	12	17.9	183	23.2
Eremophila arachnoides Chinnock subsp. Arachnoids (P3)	11	205	1	9.1	20	9.8	1	9.1	20	9.8	1	9.1	20	9.8
***Grevillea stenostachya* (P3)**	91	971	2	2.2	510	**52.5**	6	6.6	205	21.1	7	7.7	396	**40.8**
***Hemigenia tysonii* (P3)**	80	6616	32	**40.0**	2074	31.3	9	11.3	410	6.2	10	12.5	2783	**42.1**
***Homalocalyx echinulatus* (P3)**	30	1050	24	**80.0**	438	41.7	6	20.0	438	41.7	6	20.0	438	41.7
***Micromyrtus placoides* (P3)**	45	2160	16	35.6	545	25.2	20	44.4	532	24.6	20	**44.4**	532	24.6
Mirbelia stipitata (P3)	4	7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Phyllanthus baeckeoides (P3)	15	1309	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Prostanthera ferricola (P3)	14	672	1	7.1	14	2.1	1	7.1	14	2.1	1	7.1	14	2.1
Prostanthera petrophila (P3)	95	2141	25	26.3	556	26.0	25	26.3	435	20.3	25	26.3	491	22.9
***Ptilotus beardii* (P3)**	38	2804	9	23.7	1669	**59.5**	3	7.9	836	29.8	4	10.5	960	34.2
Ptilotus luteolus (P3)	15	533	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Tecticornia cymbiformis (P3)	7	69	0	0.0	14	20.3	1	14.3	14	20.3	1	14.3	14	20.3
Verticordia jamiesonii (P3)	22	483	1	4.5	1	0.2	1	4.5	1	0.2	1	4.5	1	0.2

			BFS Base Case				BFS Option 1				BFS Option 2			
Taxon	Total No Locations separated by >500 m	Estimated Total No. Plants	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total
Baeckea sp. Melita Station (P4)	57	2626	4	7.0	100	3.8	4	7.0	100	3.8	4	7.0	100	3.8
Goodenia berringbinensis (P4)	18	33546	5	27.8	40	0.1	2	11.1	40	0.1	2	11.1	40	0.1
Grevillea inconspicua (P4)	62	2320	6	9.7	110	4.7	6	9.7	82	3.5	6	9.7	82	3.5

Taxa for which > 50% total no of loci or plants are impacted by one or more options
Taxa for which > 30% total number of loci or plants are impacted by one or more options



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Location of ***Beyeria lapidicola*** (P1) within the Study Area

Figure: 7.1
Project ID: 722

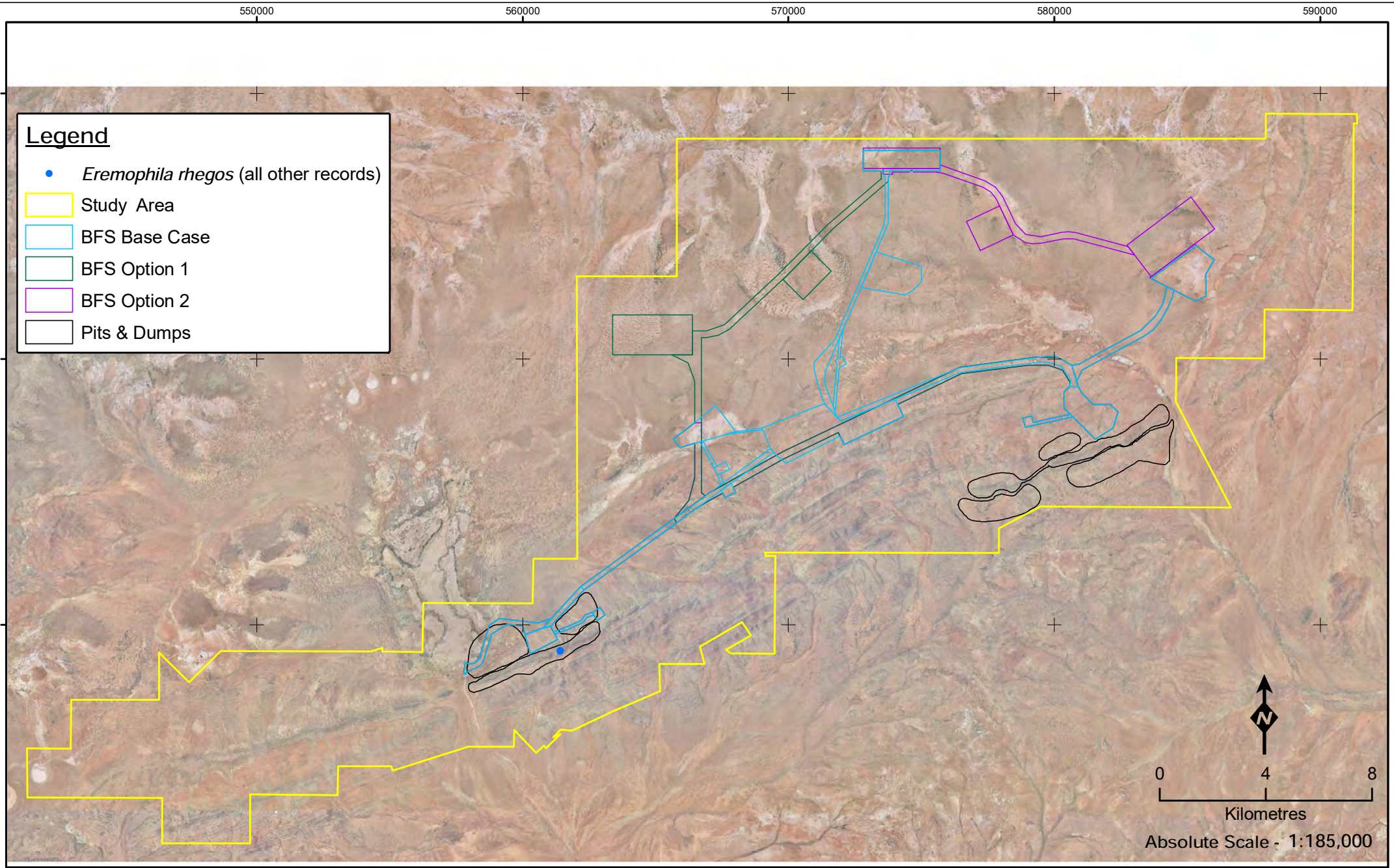
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Location of *Eremophila rhegos* (P1) within the Study Area

Figure: 7.2
Project ID: 722

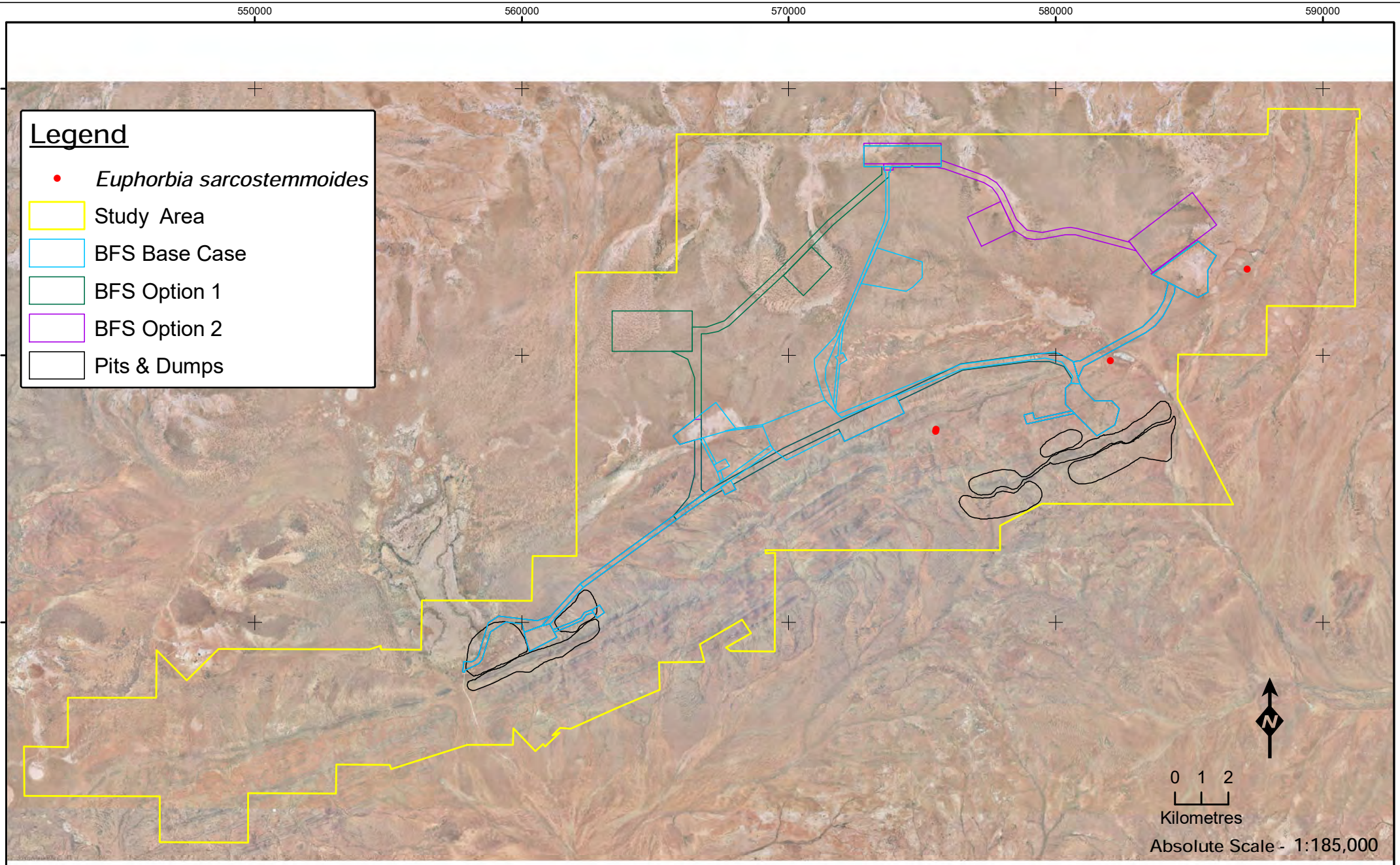
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Location of *Euphorbia sarcostemmoides* (P1) within the Study Area

Figure: 7.3
Project ID: 722

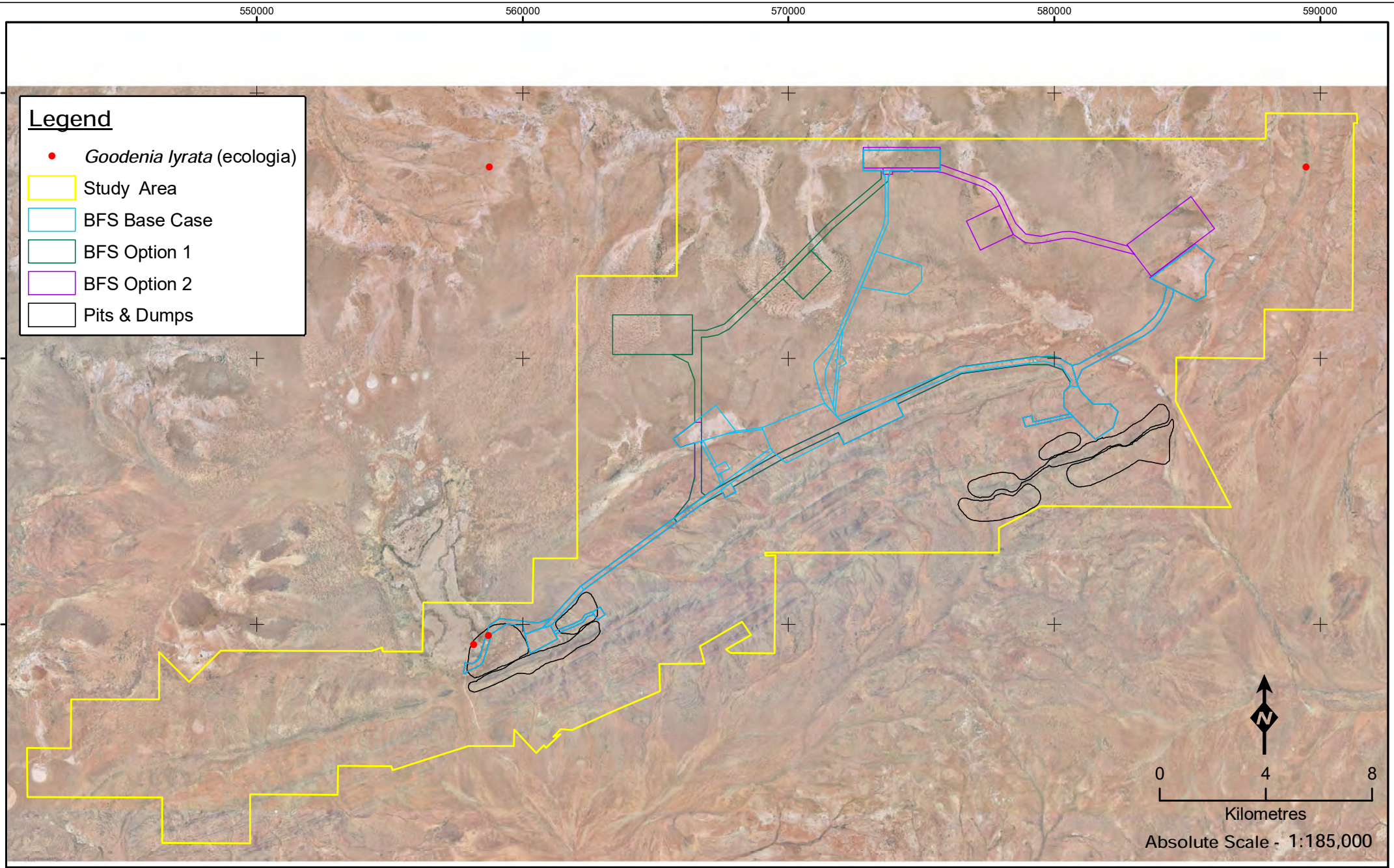
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Location of *Goodenia lyrata* (P1) within the Study Area

Figure: 7.4
Project ID: 722

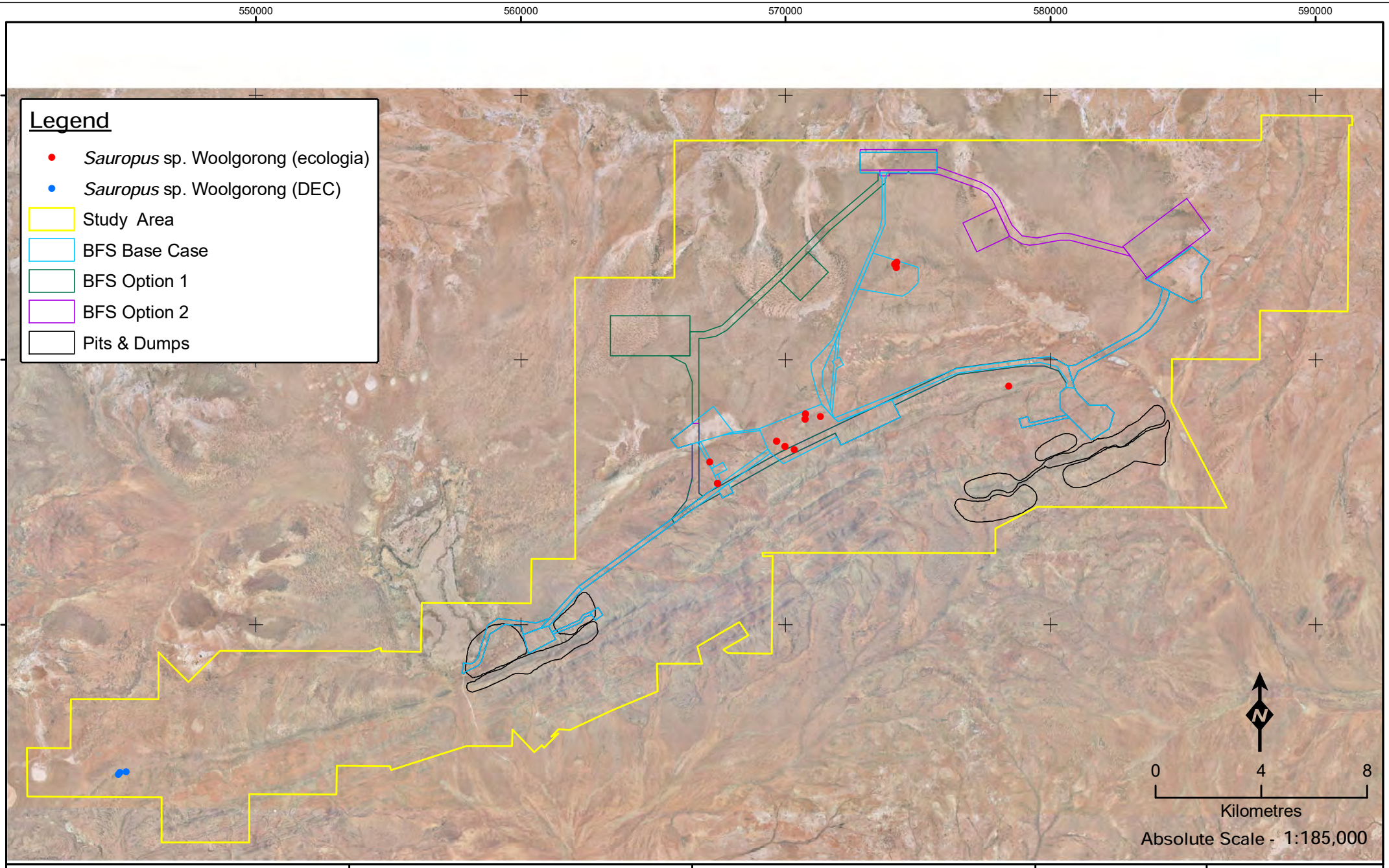
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Location of *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) (P3) within the Study Area

Figure: 7.5
Project ID: 722

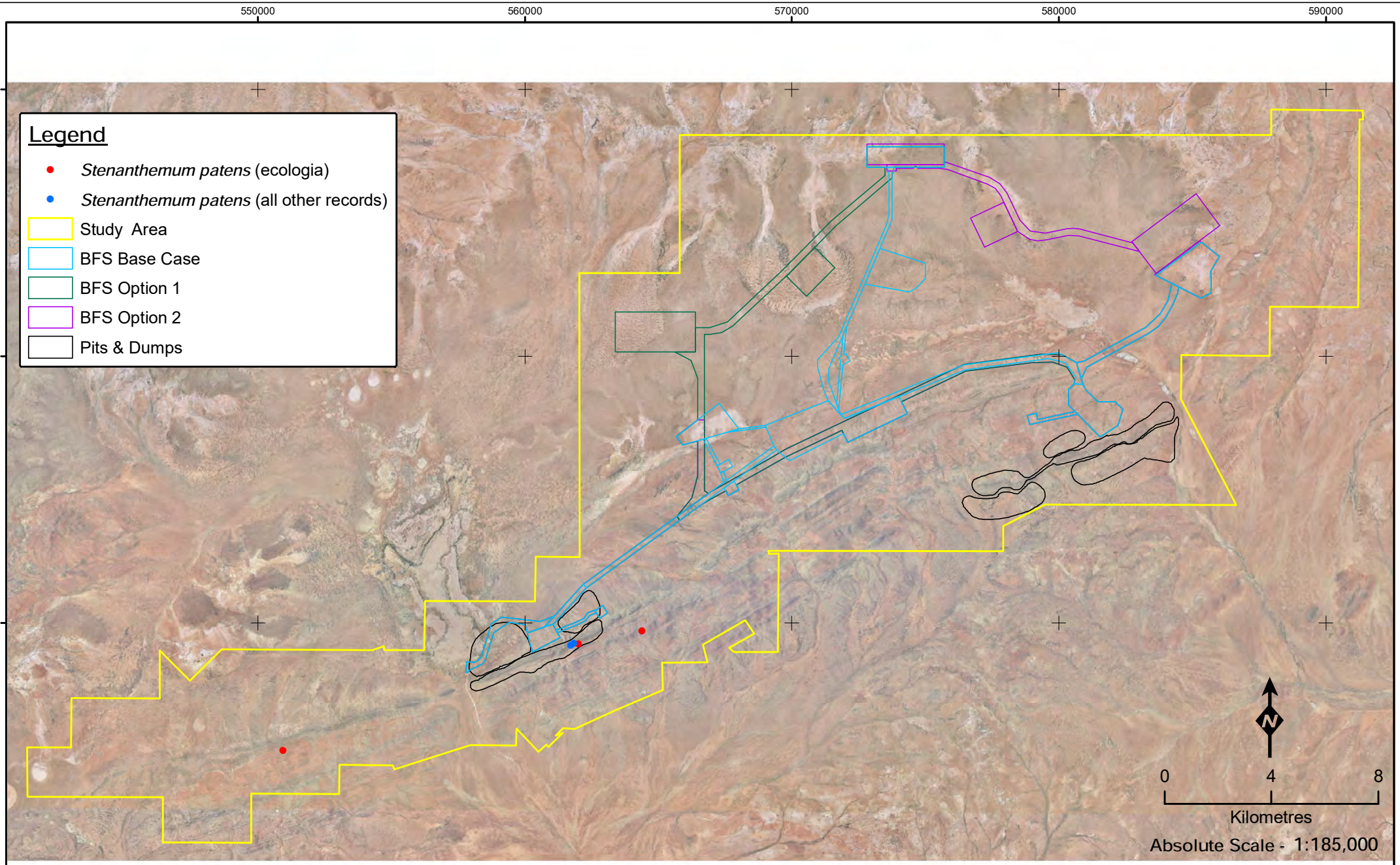
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Location of *Stenanthemum patens* (P1) within the Study Area

Figure: 7.6
Project ID: 722

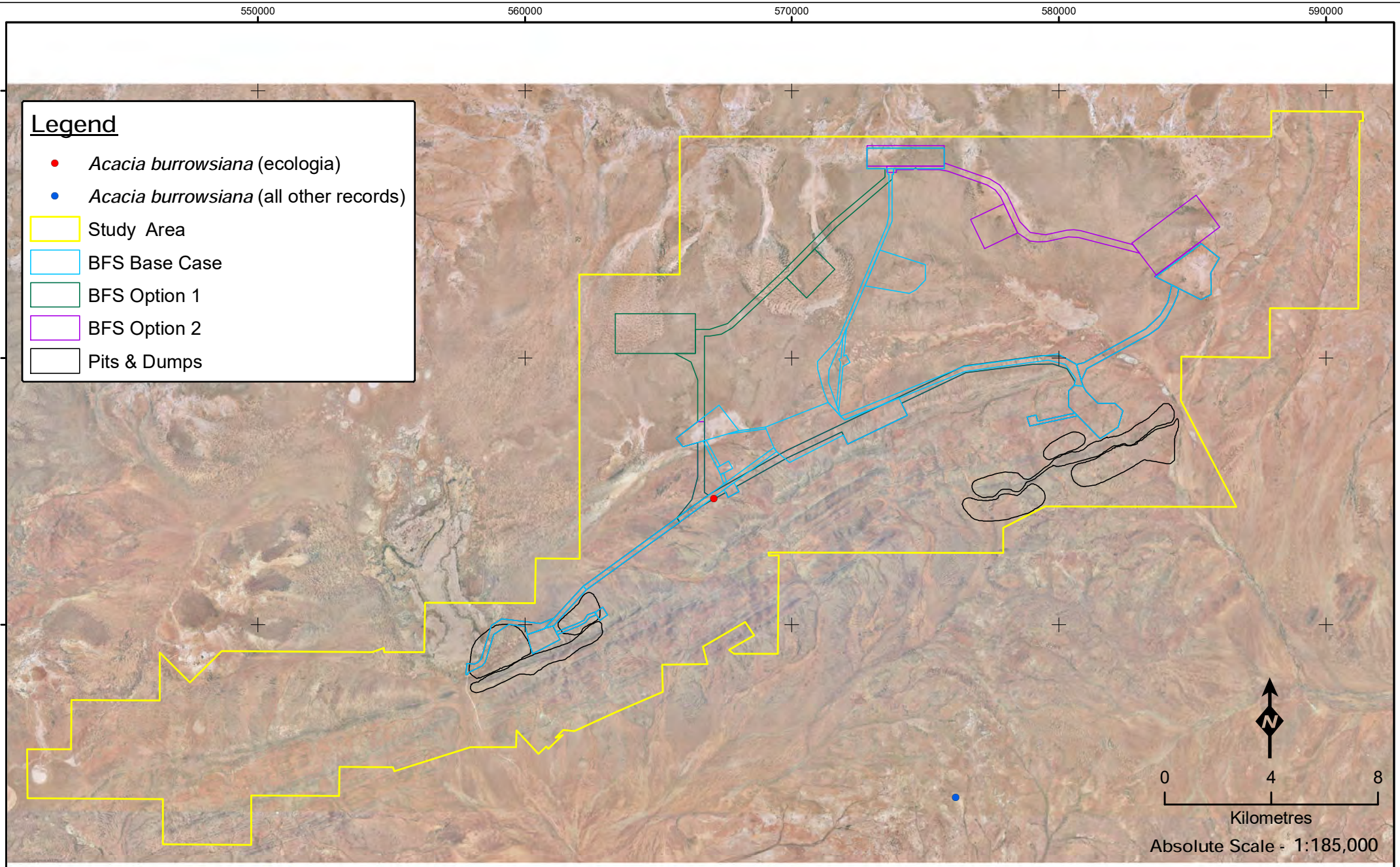
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Location of *Acacia burrowsiana* (P3) within the Study Area

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Project ID: 722

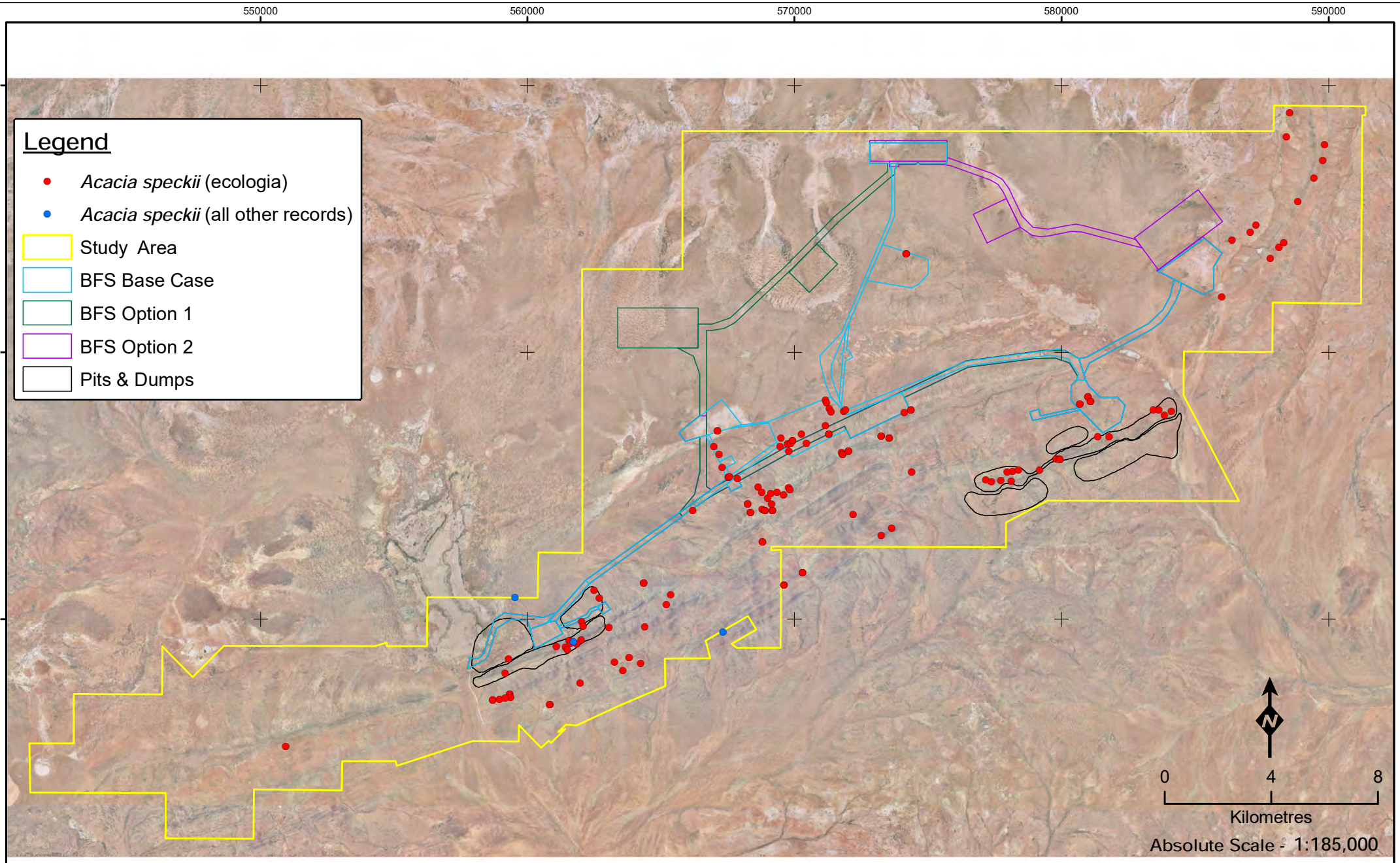
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Location of *Acacia speckii* (P3) within the Study Area

Figure: 7.8
Project ID: 722

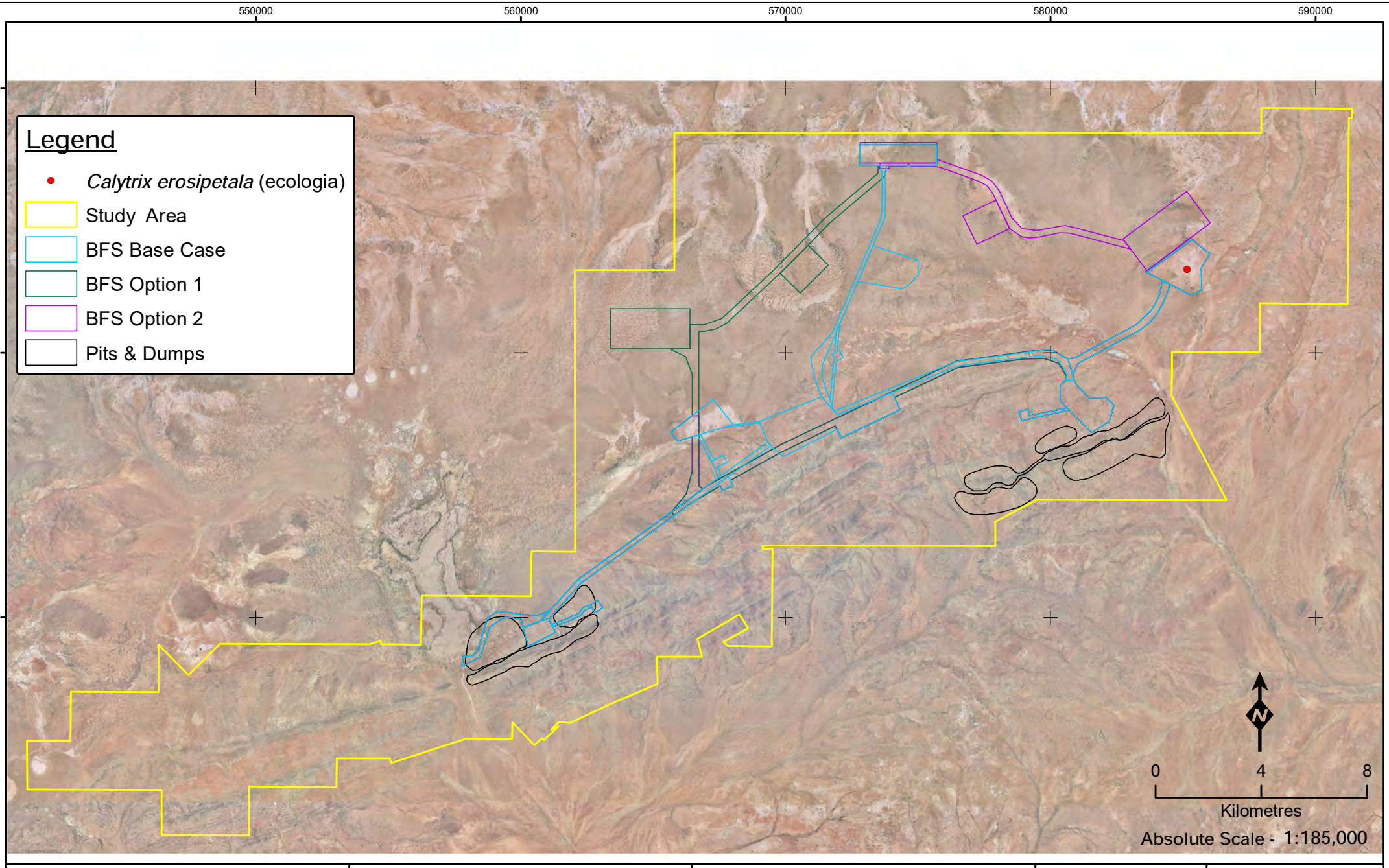
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Location of *Calytrix erosipetala* (P3) within the Study Area

Figure: 7.9
Project ID: 722

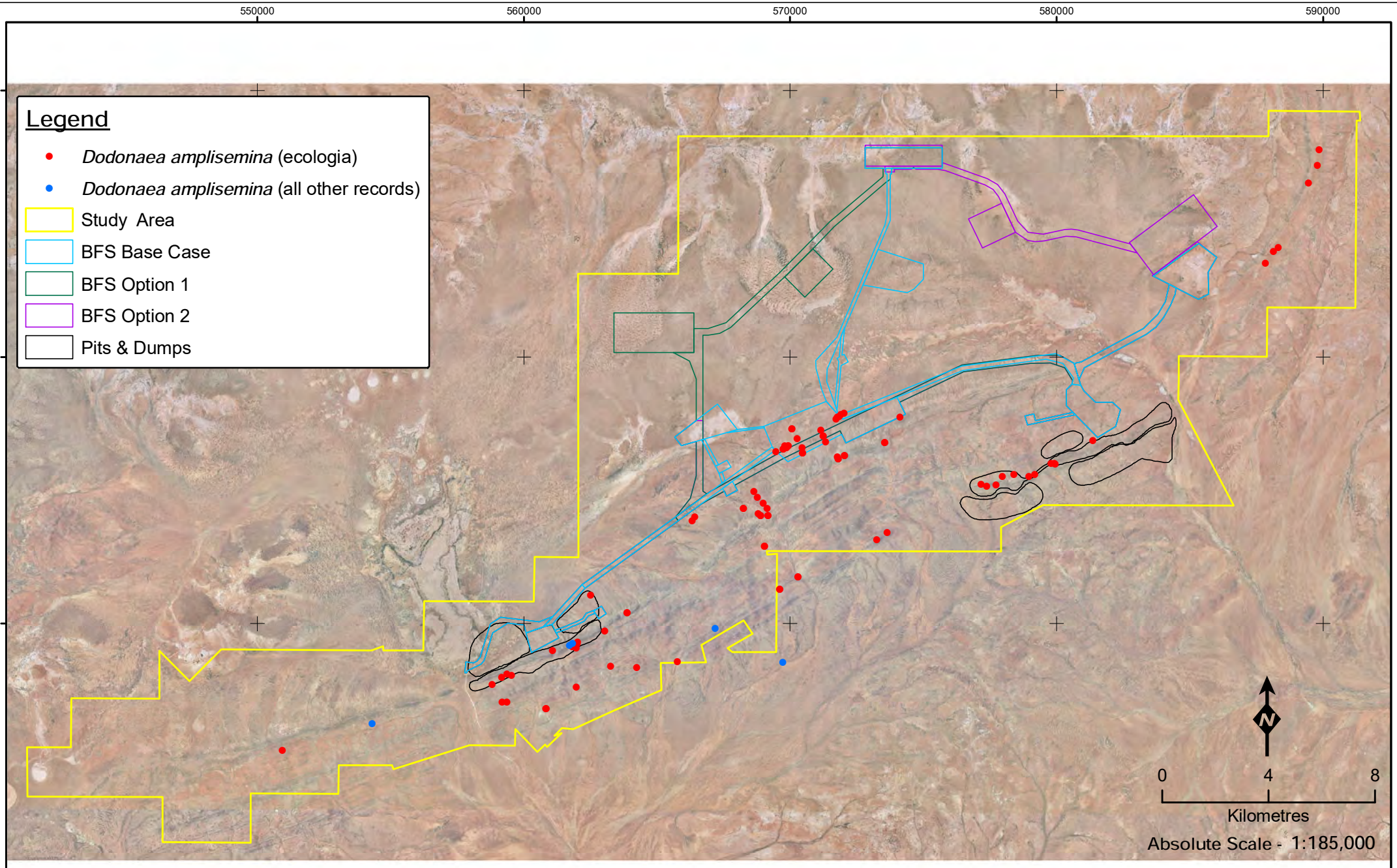
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Location of *Dodonaea amplisemina* (P3) within the Study Area

Figure: 7.10
Project ID: 722

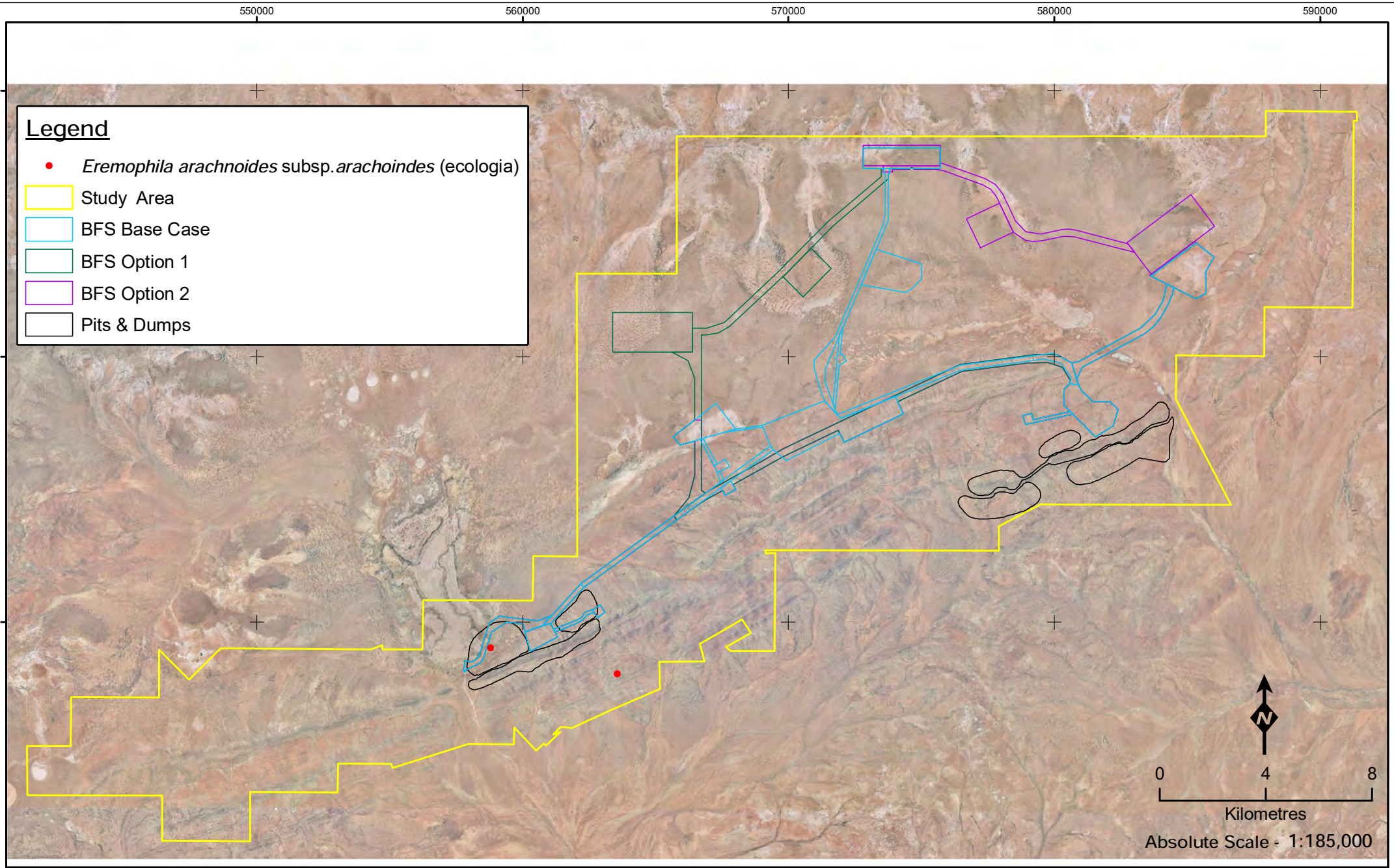
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Location of *Eremophila arachnoides* subsp. *arachnoides* (P3) within the Study Area

Figure: 7.11
Project ID: 722

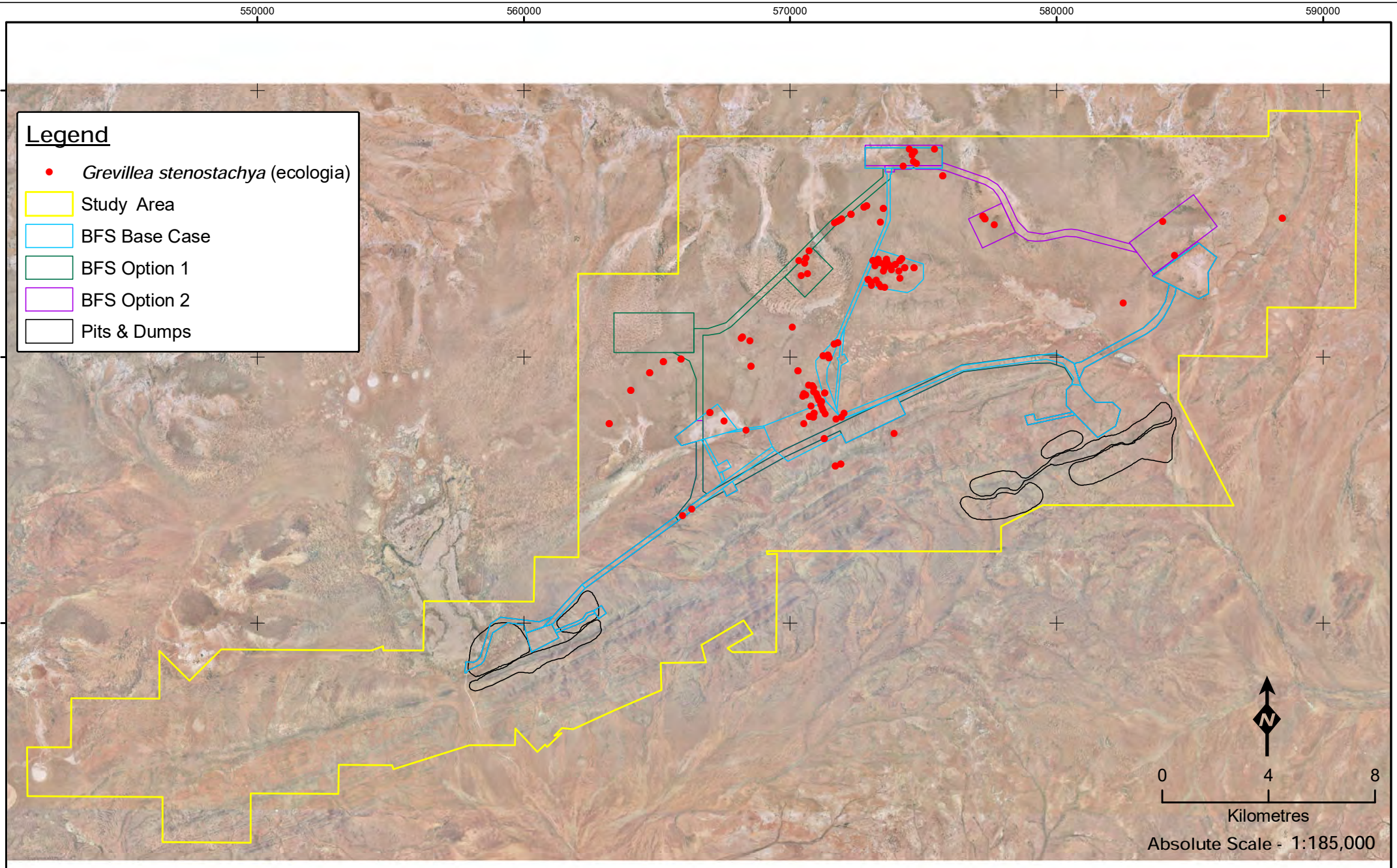
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Location of *Grevillea stenostachya* (P3) within the Study Area

Figure: 7.12
Project ID: 722

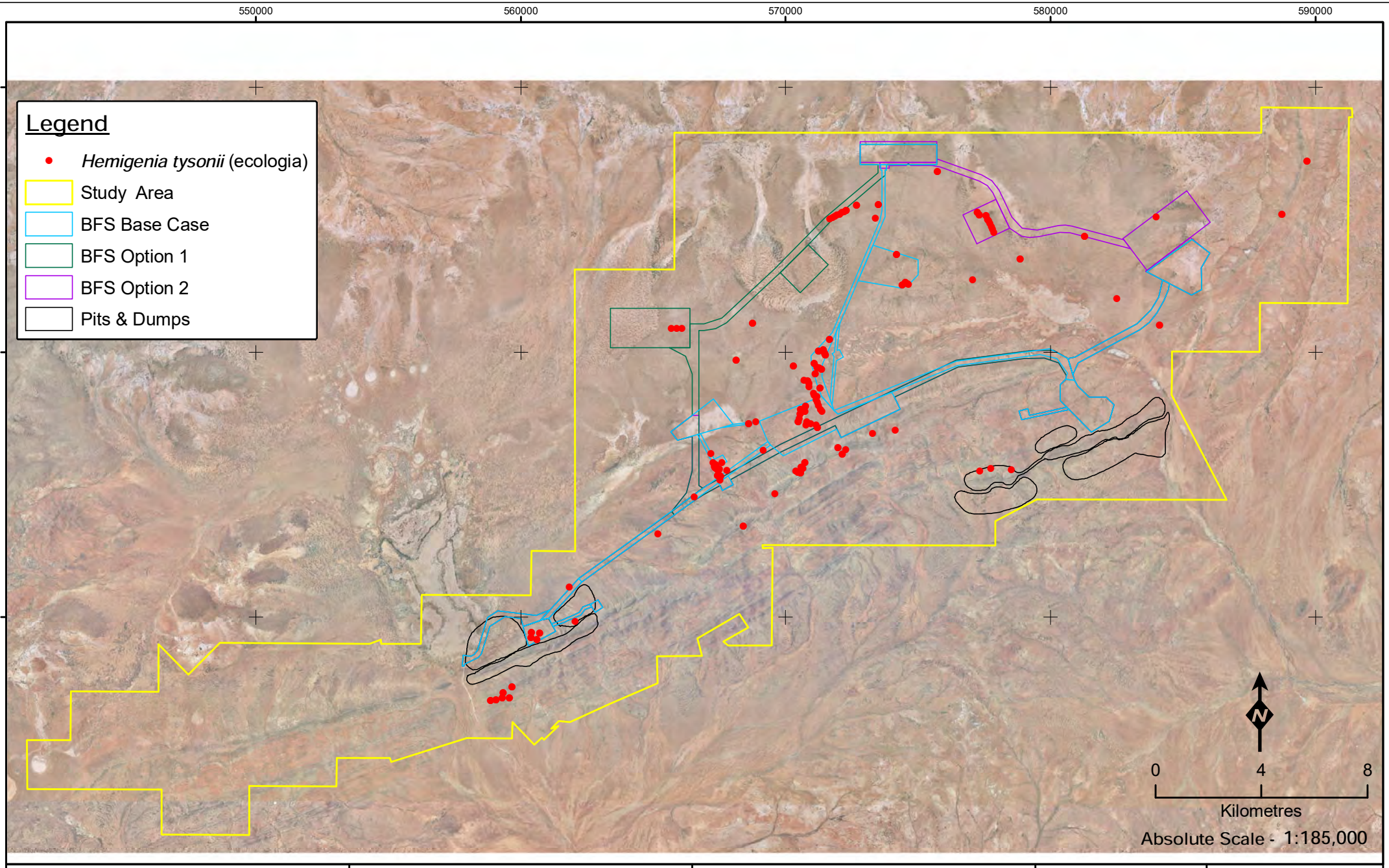
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Location of *Hemigenia tysonii* (P3) within the Study Area

Figure: 7.13
Project ID: 722

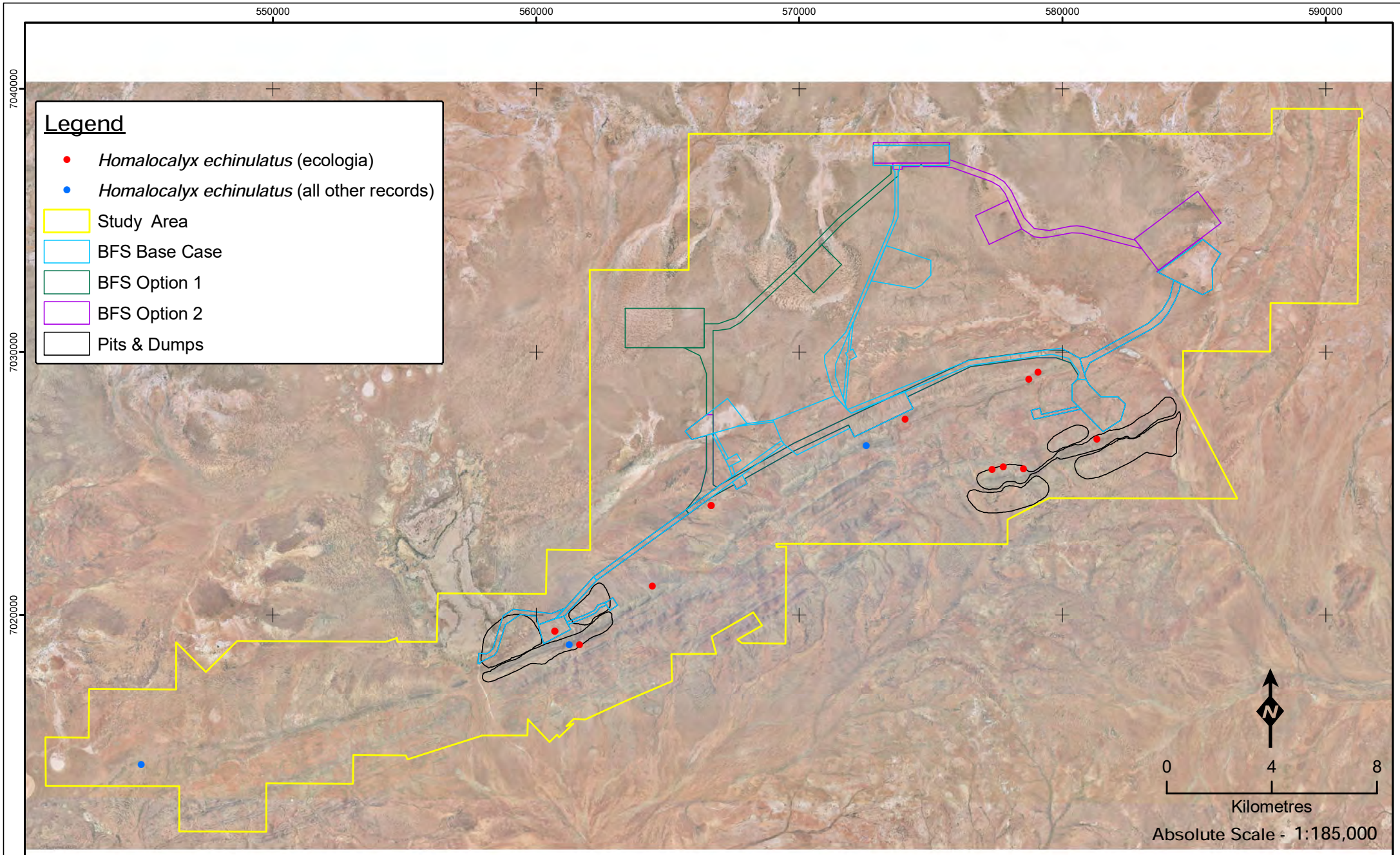
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Location of *Homalocalyx echinulatus* (P3) within the Study Area

Figure: 7.14
Project ID: 722

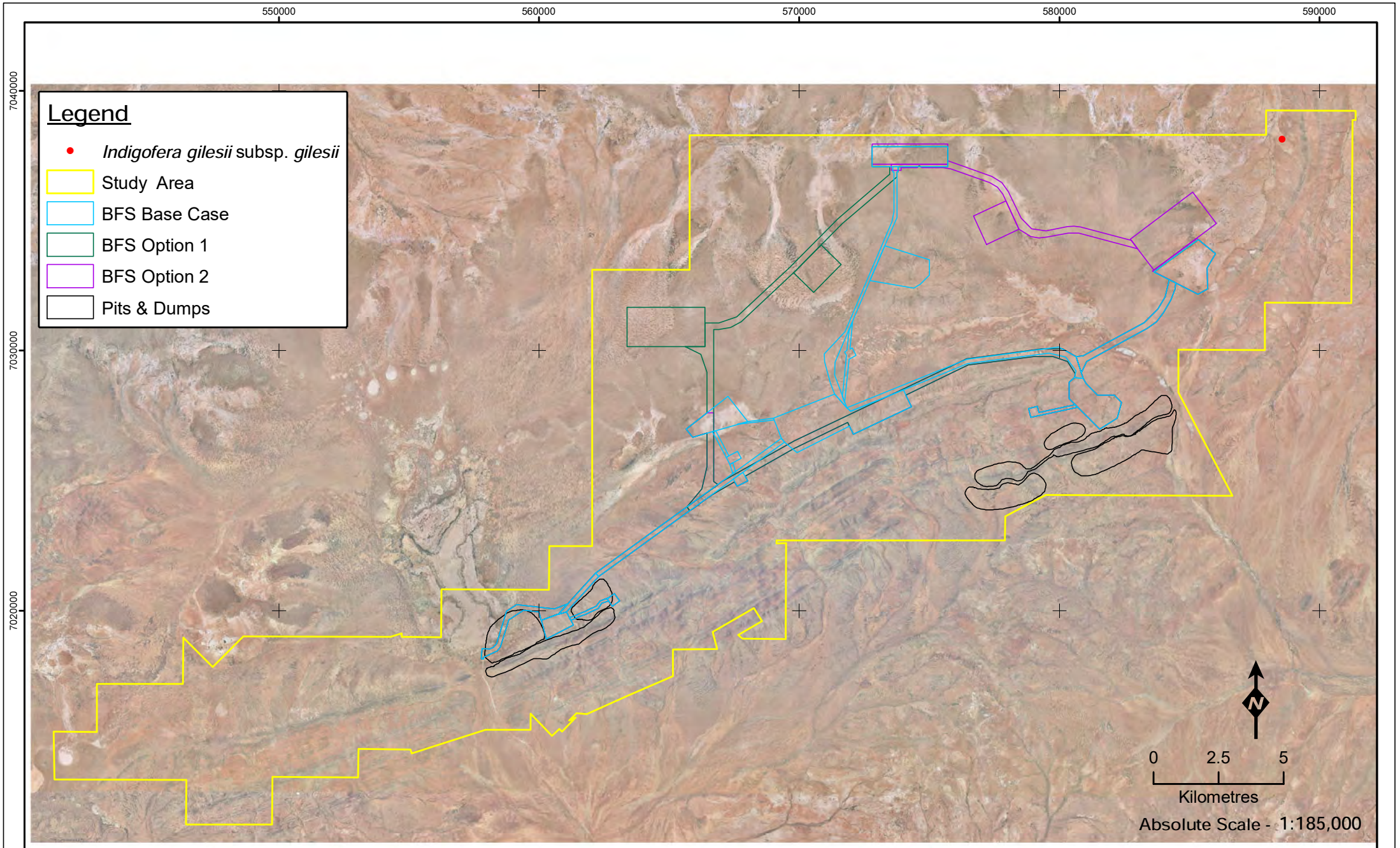
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Location of *Indigofera gilesii* subsp. *gilesii* (P3) within the Study Area

Figure: 7.15
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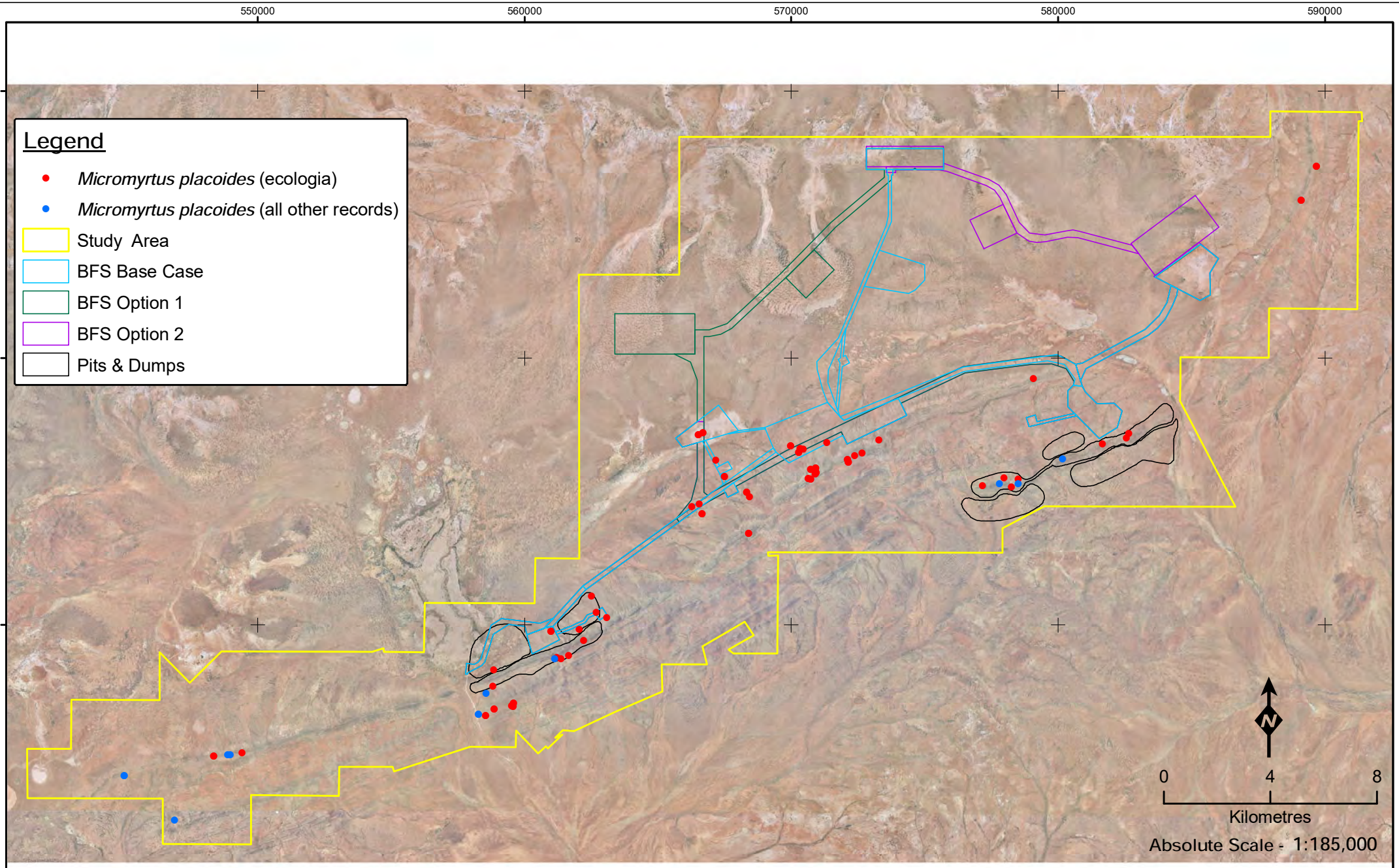
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Location of *Micrmyrtus placoides* (P3) within the Study Area

Figure: 7.16
Project ID: 722

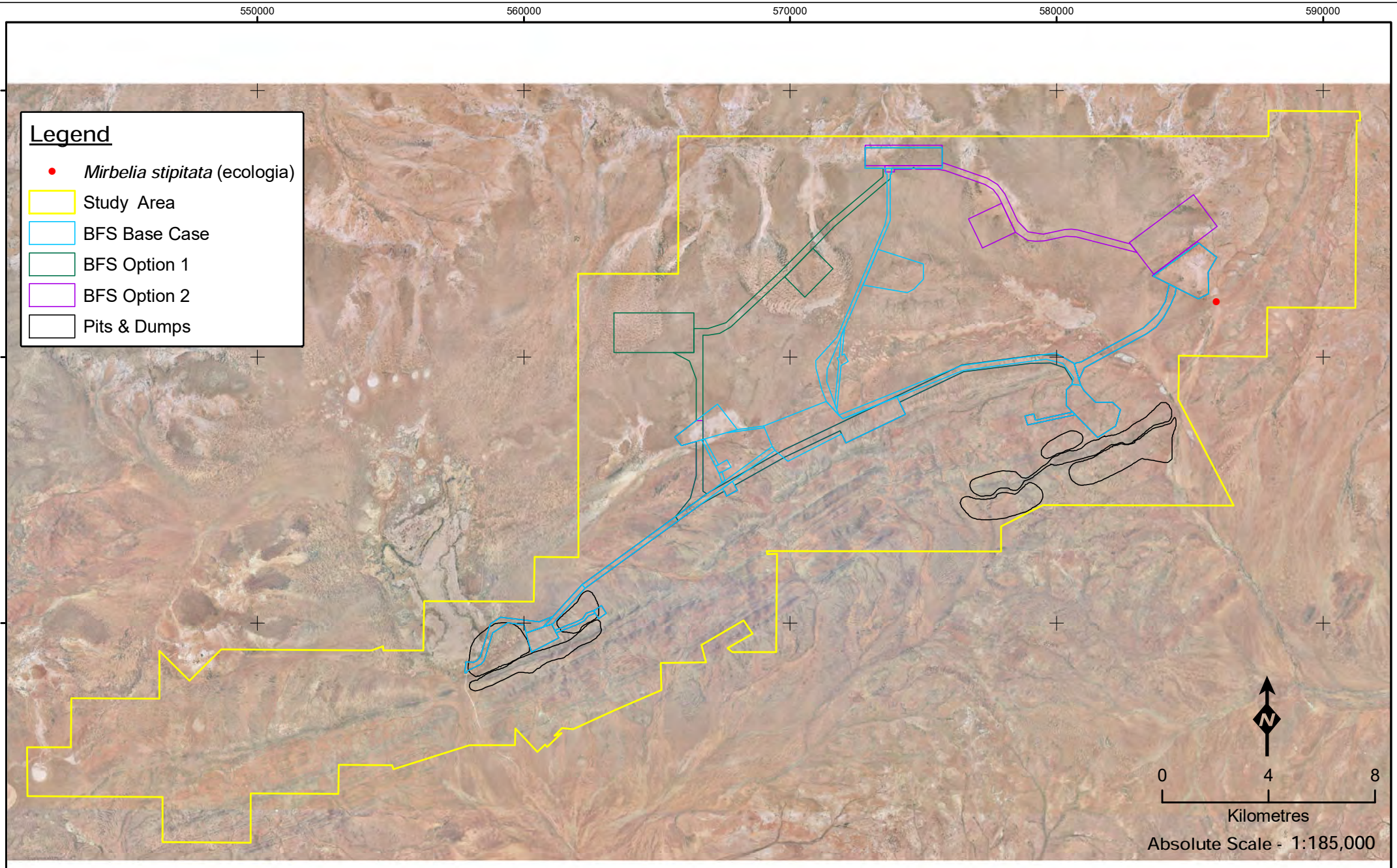
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Location of *Mirbelia ?stipitata* (P3) within the Study Area

Figure: 7.17
Project ID: 722

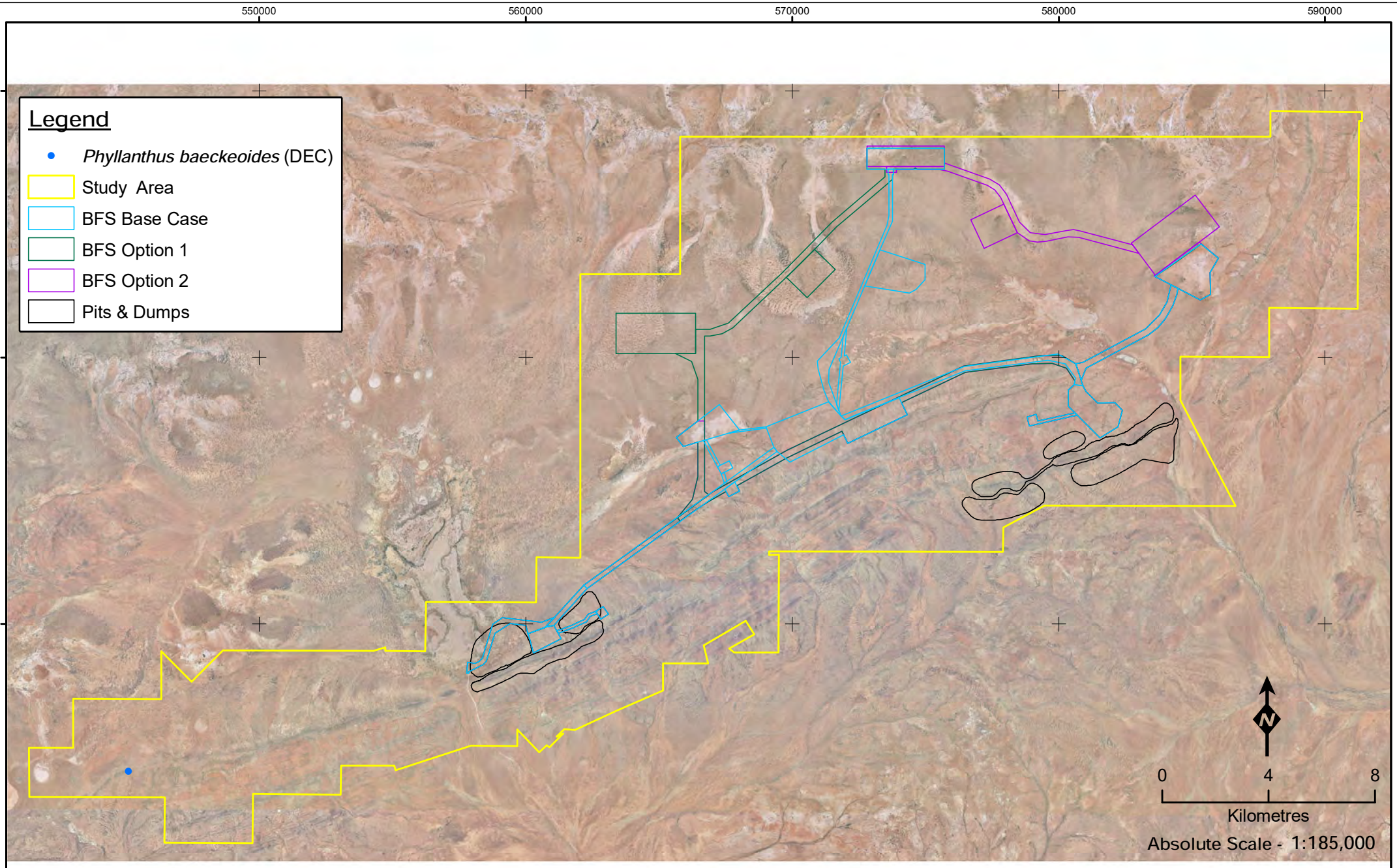
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Location of *Phyllanthus baeckeoides* (P3) within the Study Area

Figure: 7.18
Project ID: 722

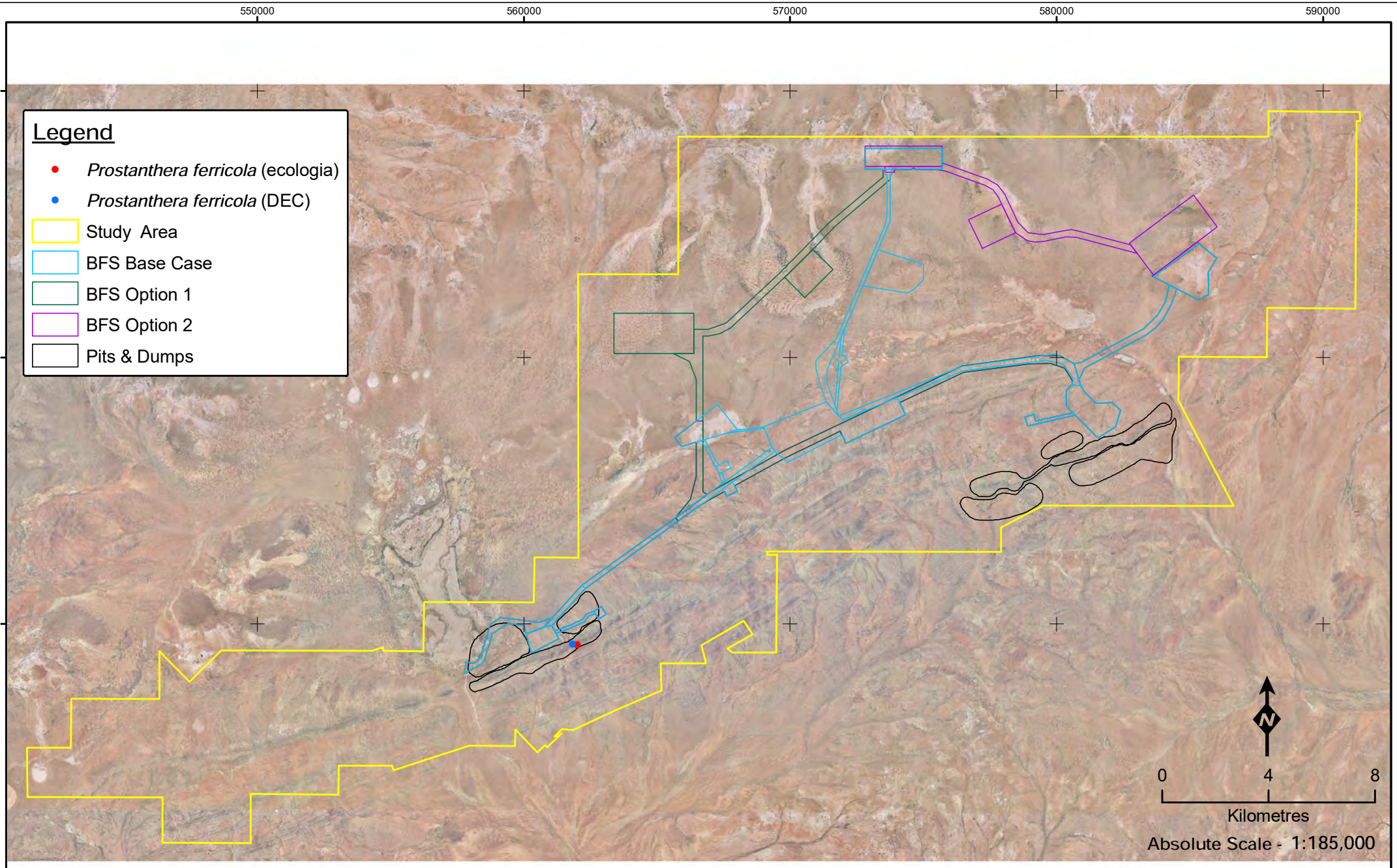
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Location of *Prostanthera ferricola* (P3) within the Study Area

Figure: 7.19
Project ID: 722

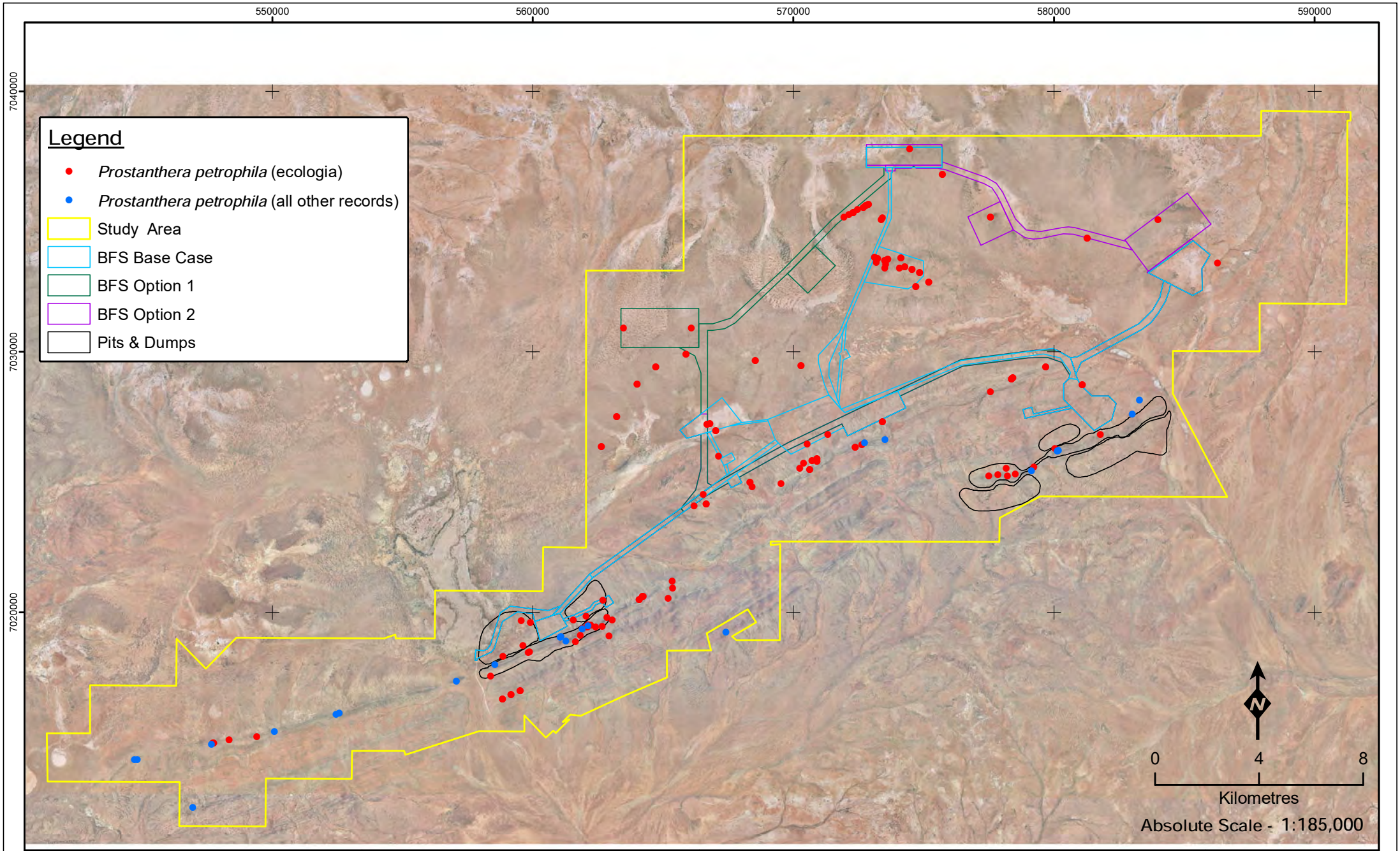
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Location of *Prostanthera petrophila* (P3) within the Study Area

Figure: 7.20
Project ID: 722

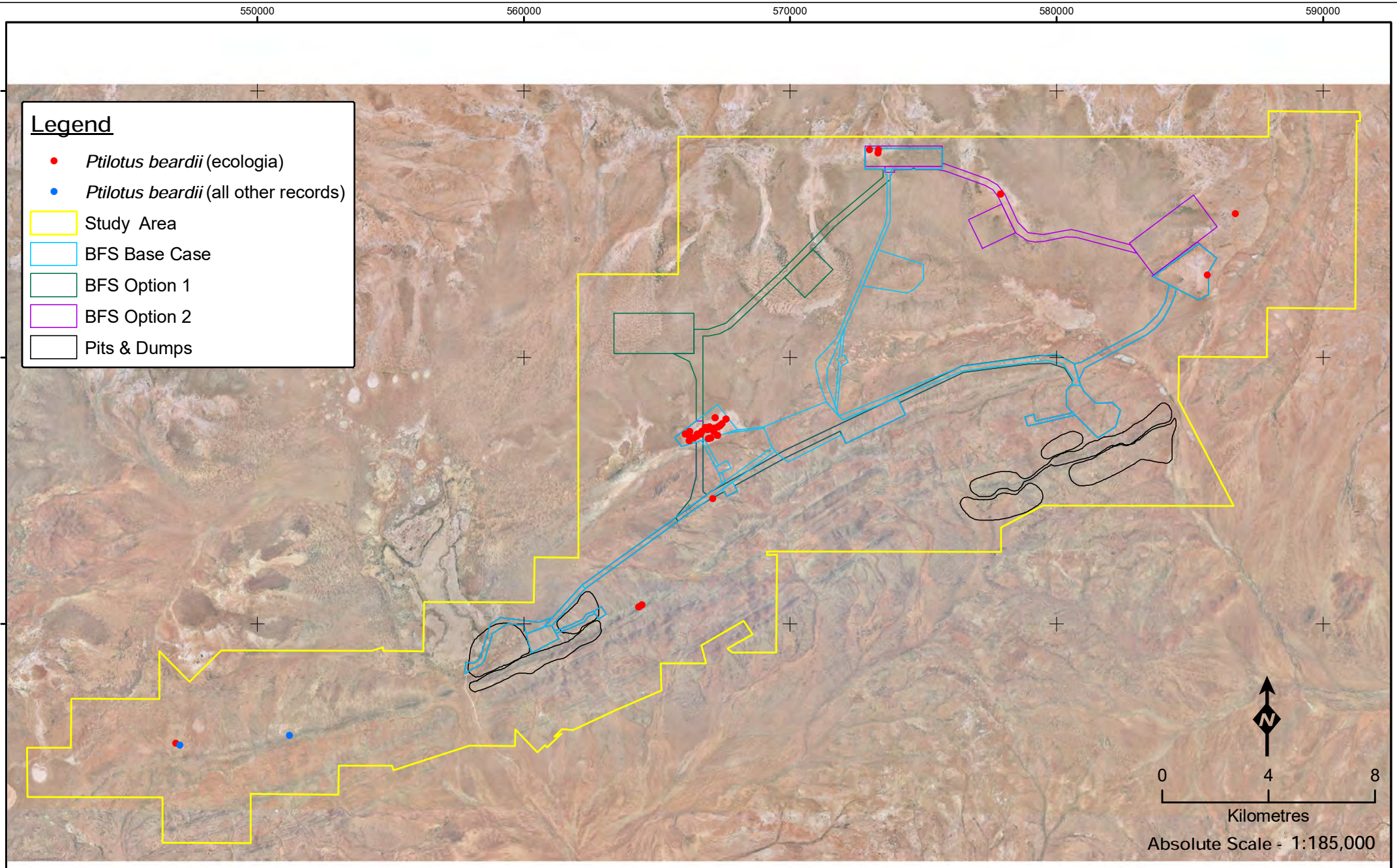
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Location of *Ptilotus beardii* (P3) within the Study Area

Figure: 7.21
Project ID: 722

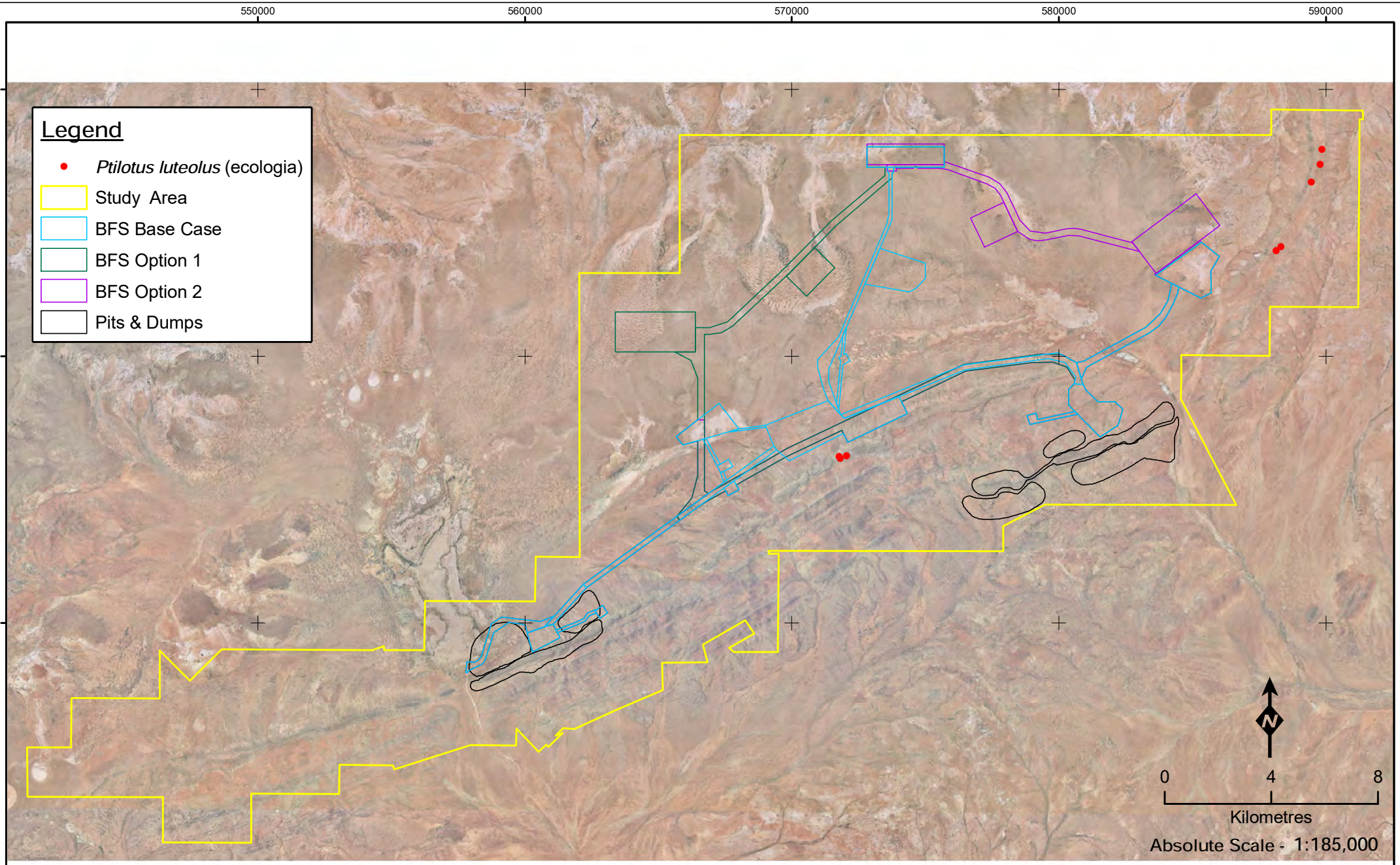
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Location of *Ptilotus luteolus* (P3) within the Study Area

Figure: 7.22
Project ID: 722

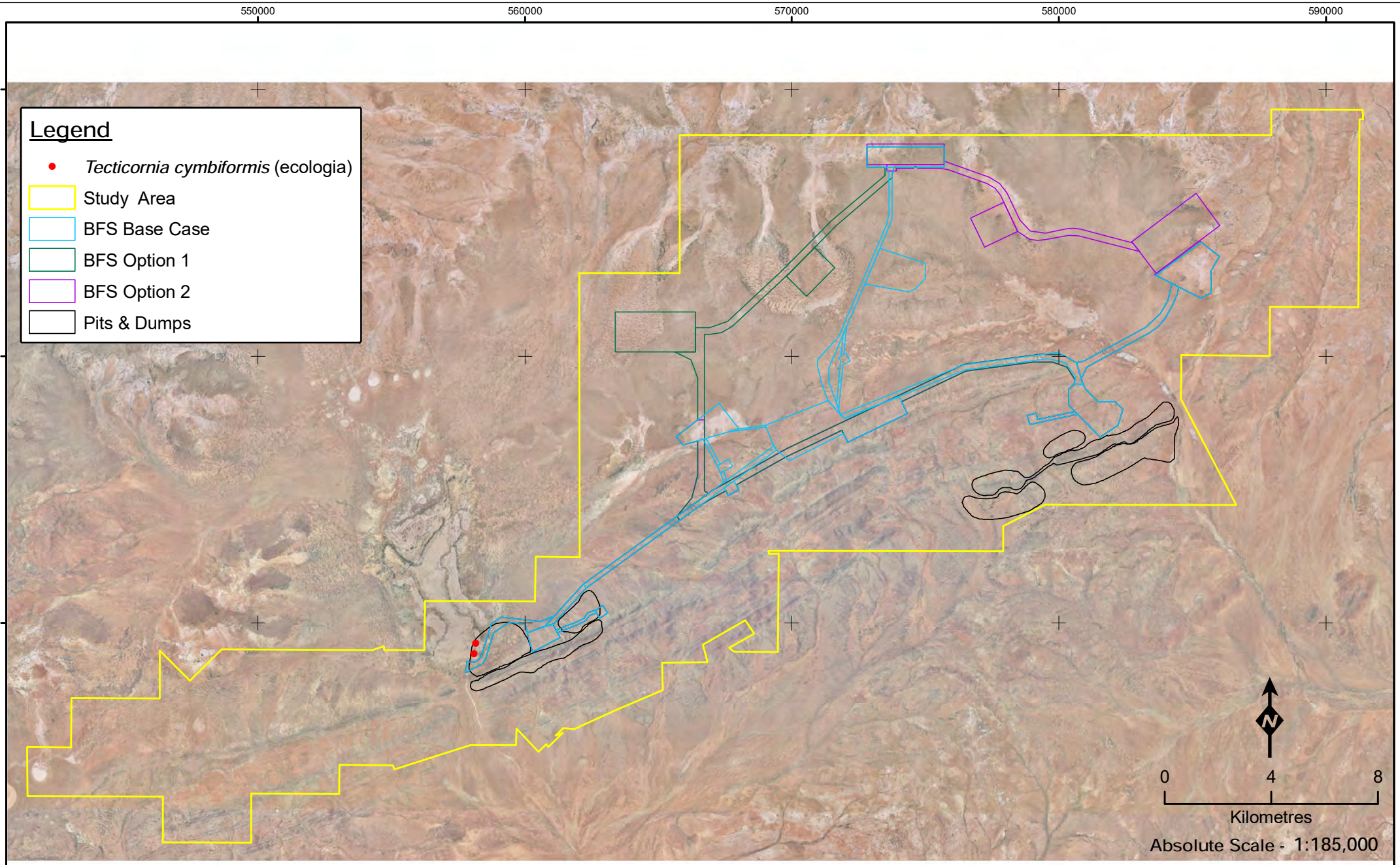
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Location of *Tecticornia cymbiformis* (P3) within the Study Area

Figure: 7.23
Project ID: 722

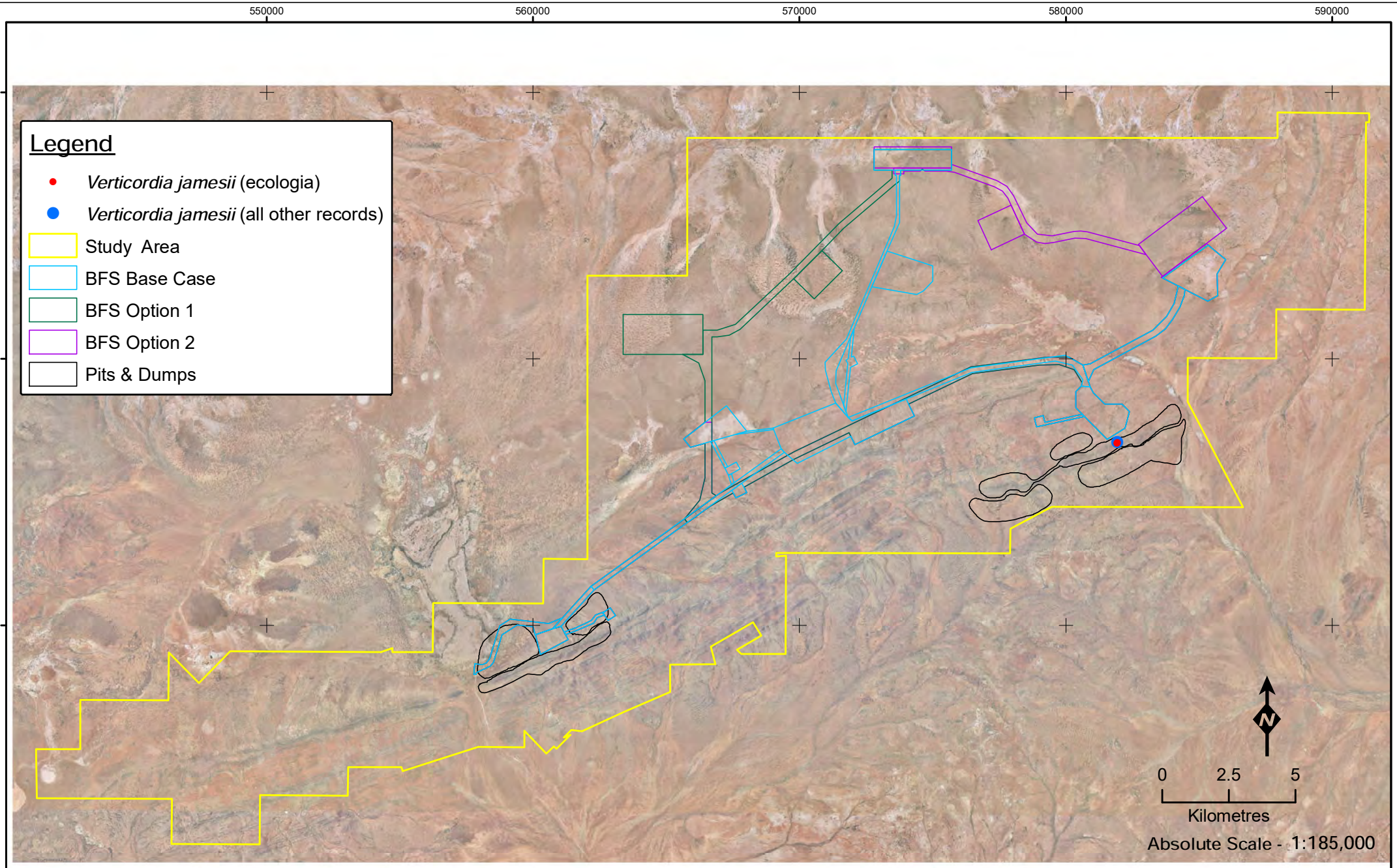
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Location of *Verticordia jamesii* (P3) within the Study Area

Figure: 7.24
Project ID: 722

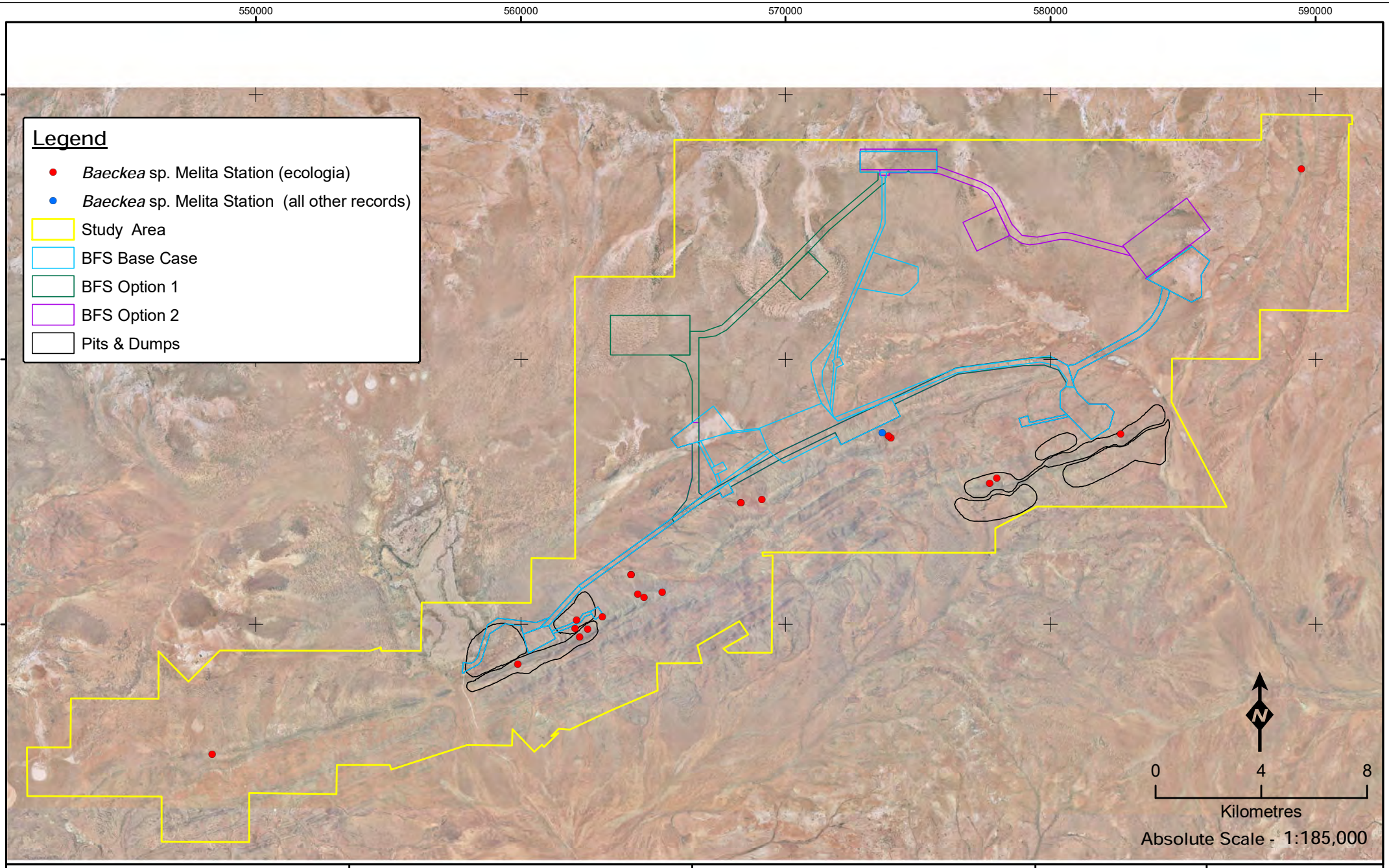
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Location of *Baeckea* sp. Melita Station (H. Pringle 2738) within the Study Area

Figure: 7.25
Project ID: 722

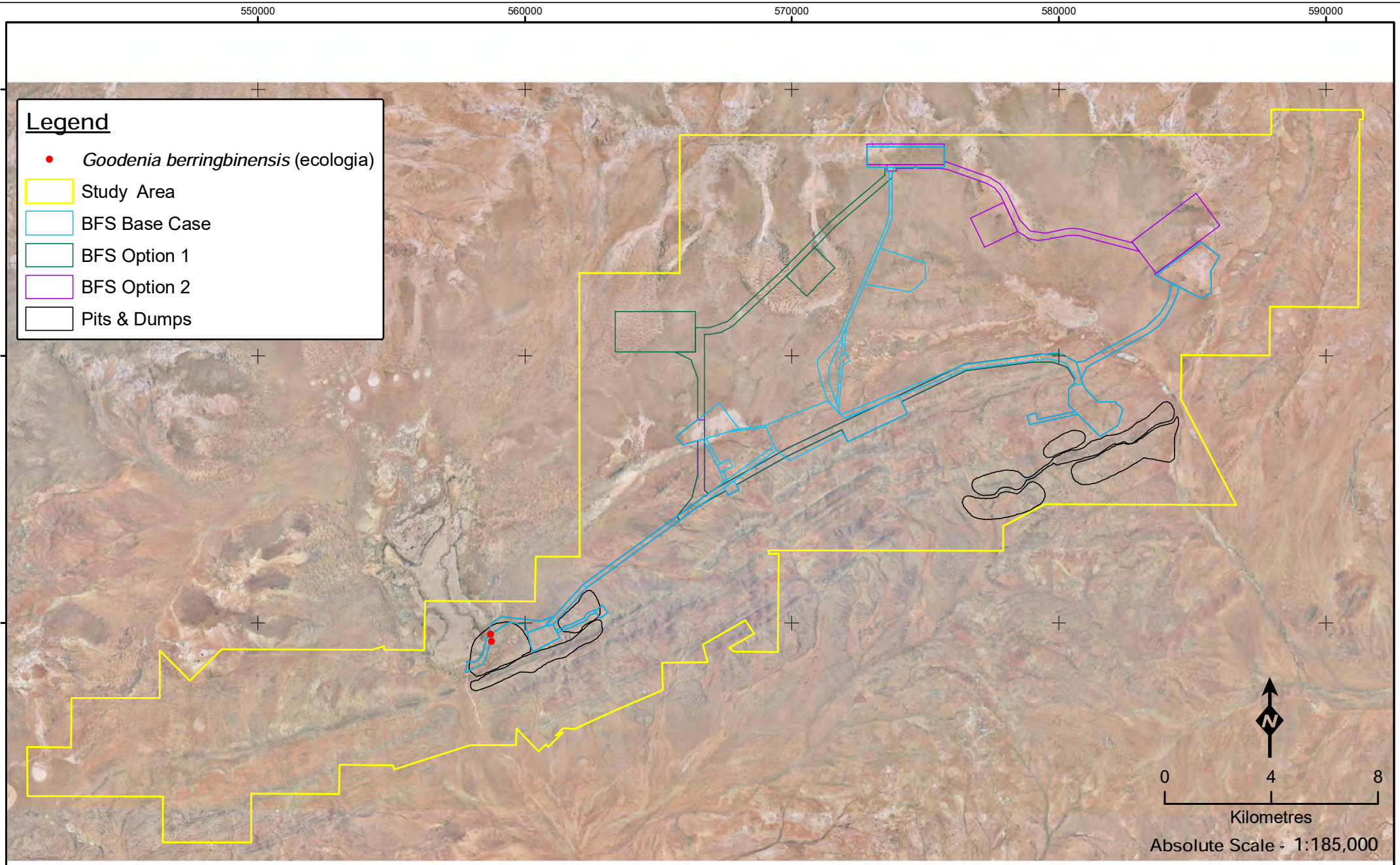
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Location of *Goodenia berringbinensis* (P4) within the Study Area

Figure: 7.26
Project ID: 722

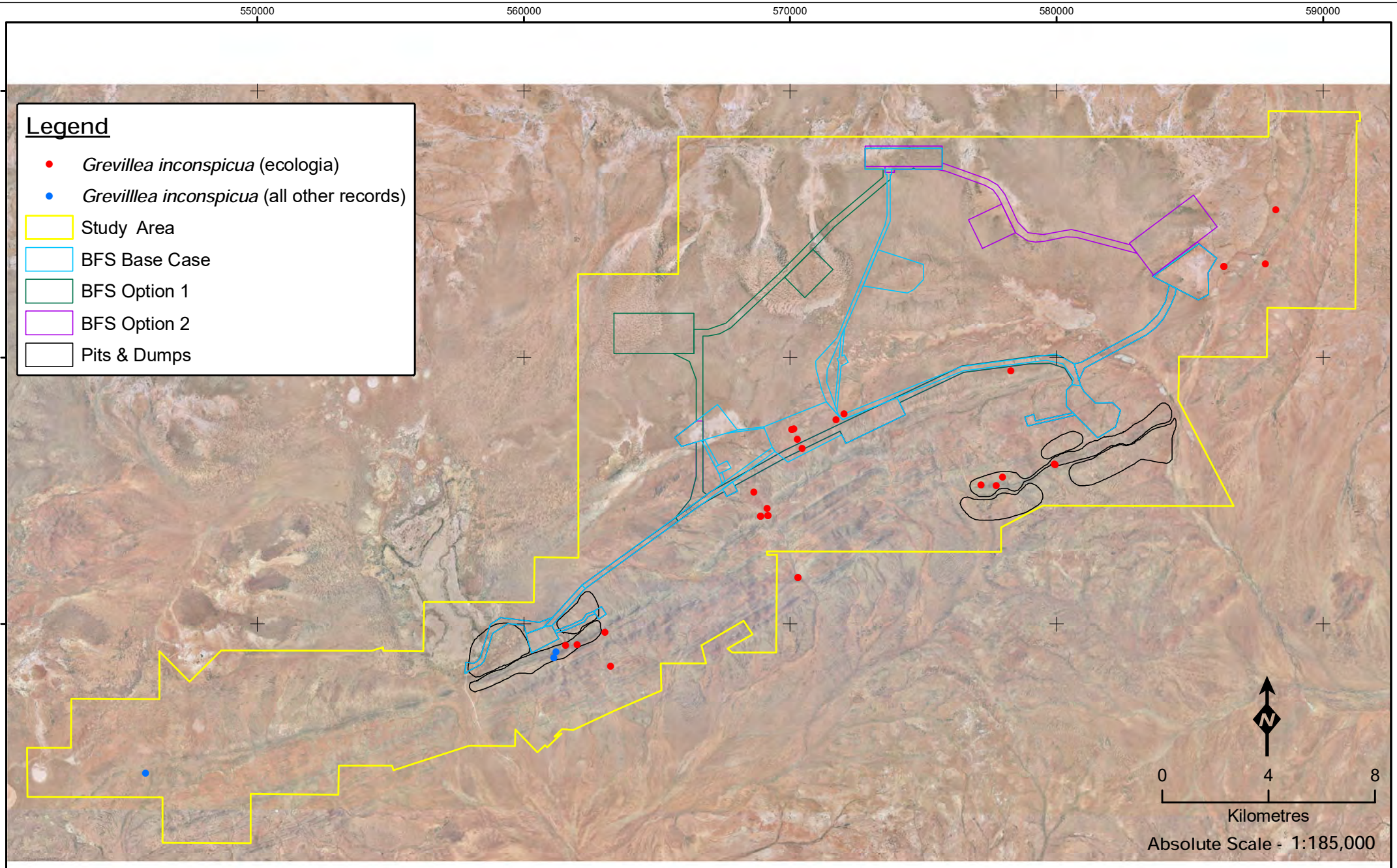
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Location of *Grevillea inconspicua* (P4) within the Study Area

Figure: 7.27
Project ID: 722

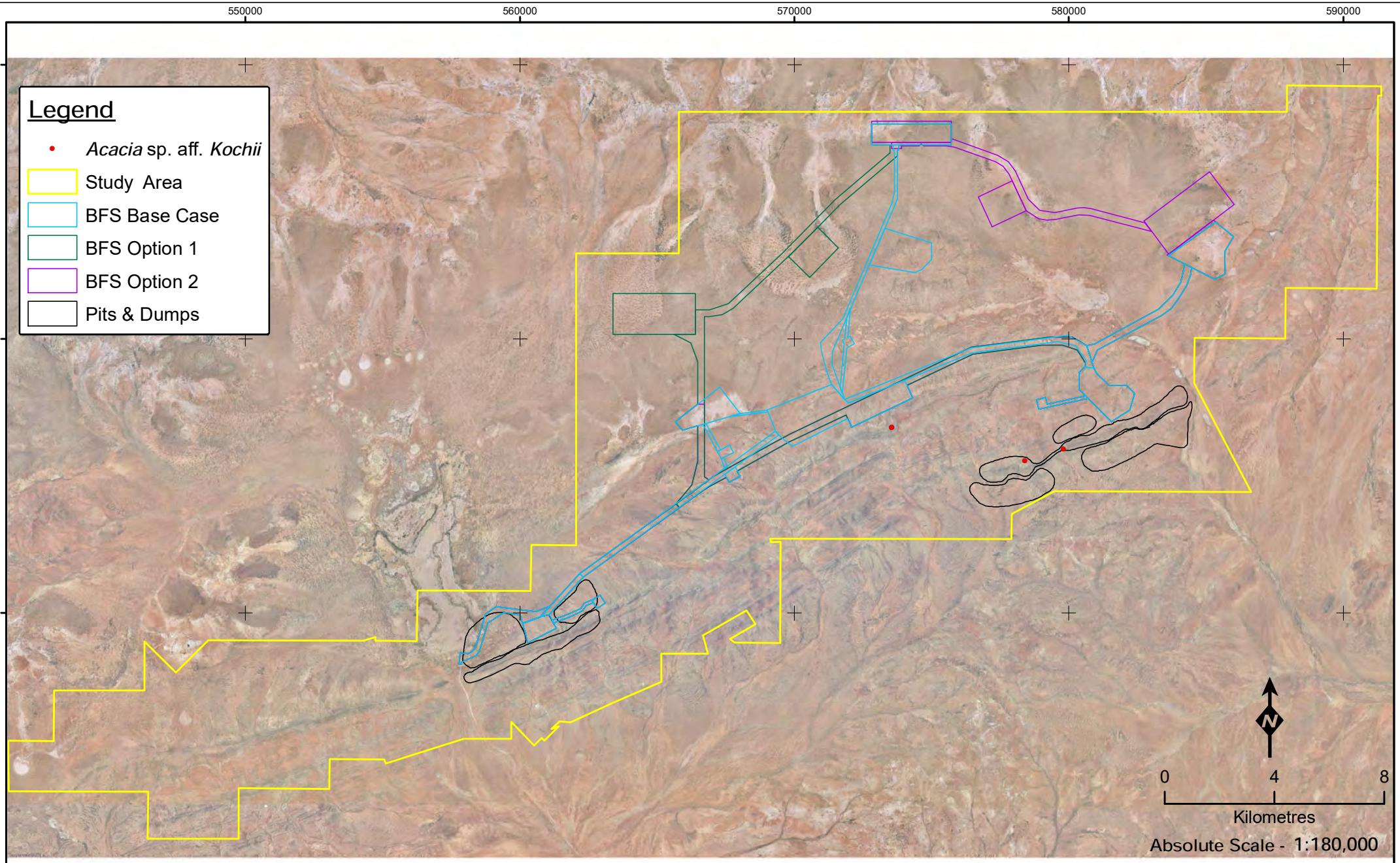
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Location of *Acacia* sp. aff. *kochii* (Species of Interest) within the Study Area

Figure: 7.28
Project ID: 722

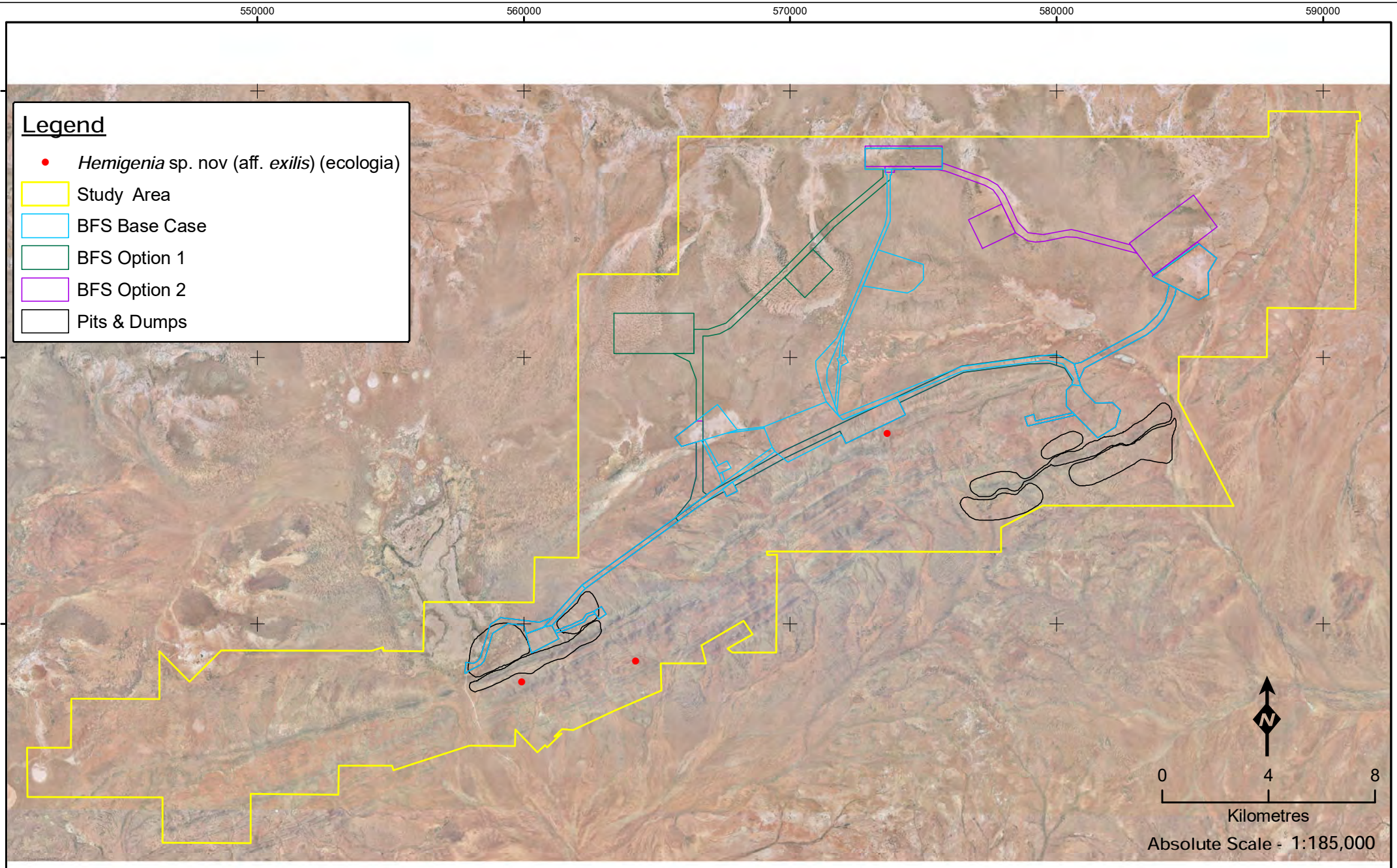
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Location of *Hemigenia* sp. nov. (aff.*exilis* (SOI) within the Study Area

Figure: 7.29
Project ID: 722

Drawn: CJM
Date: 19/06/10

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

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7.2 INDIRECT IMPACTS TO VEGETATION AND FLORA

7.2.1 Damage to Vegetation from Dust

Excessive dust can impact plants by clogging stomata. This can affect respiration and transpiration and lead to localised deaths. Excessive dust is most likely to occur at the edges of tracks and at the boundaries of pits and waste dumps. Dust suppression by watering tracks under dry conditions or periods of heavy traffic can reduce this impact, however the water used must not be excessively saline or incremental salinisation of the surrounding soil may occur.

7.2.2 Accidental Bushfires

Fires are a frequent occurrence in the arid zones of Australia. Ground truthing and examination of the aerial photography of the Weld Range area indicates that the area has not been frequently burnt in recent times. Spot fires are known to occur during the summer months predominantly through lightning strike.

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 as a result of mining activities can be minimised by implementing fire protocols such as; the appropriate isolation of flammable compounds such as hydrocarbons and explosives, localised clearing around working plant, and enforcement of appropriate smoking practices (e.g. no uncontrolled discarding of cigarette buts). Additional tracks in the area as a result of mining may act as a fire break and may help to prevent the spread of small fires once started.

7.2.3 Introduction of Weed Species

To date, few weeds have been recorded at Weld Range. The six weed species recorded during the surveys were all present in low numbers. Increased vehicle movements, combined with increased ground disturbance and disposal of water from drilling and dust suppression operations, will provide an opportunity for additional species to become established unless weed hygiene procedures are implemented.

7.2.4 Erosion and Compaction due to Off-Road Driving

Many of the landforms at Weld Range are susceptible to damage from off-road driving. The vegetation of the extensive sand plains and clay pans, which are flat and relatively sparsely vegetated, facilitate off-road driving. Soil compaction can make it difficult for plants to re-establish in these areas. The risk of damage to the vegetation can be avoided by implementing and maintaining a strict ban on off-road driving.

7.2.5 Effects of Saline Water used in Construction and Operation

The use of saline water in dust suppression along haul roads is common practice at mine sites across Western Australia (Bertuch *et al*, 2004). Salts in the water help to bind the soil and further reduce the dust particles released into the environment from vehicle movement.

Salts tend to accumulate on or near the soil surface in arid environments due to reduced annual rainfall regularly leeching the salts away (Bertuch *et al*, 2004). These concentrated salts can then be distributed into the environment during rainfall events and lead to localised impacts to vegetation adjacent to the haul road and access tracks. Drainage culverts and naturally occurring drainage lines along the access tracks distribute the saline water away and extend the range of the impact.

High concentrations of salts affect plants by reducing the amount of water taken up by the root system. This can lead to severe stress and eventually death. Localised plant deaths and changes in vegetation community structures could potentially occur with the use of saline water for dust suppression and salt tolerant and halophytic (salt loving) species could replace the less salt tolerant species.

Regional modelling of groundwater levels and sampling the water at a number of bores at and in the vicinity of Weld Range (SRK Consulting, 2010) suggest that regional groundwater is fresh (TDS<500 mg/L) to marginal (500 to 1,500 mg/L). However, the salinity at one borehole located in the proposed Madoonga pit area was very high, 46,000 mg/L (SRK, 2008). Discharge of water of this salinity into the surrounding environment would have detrimental effects on the vegetation.

Regular testing of the ground water extracted and used on the operational areas will reduce the potential for saline water to be released into the surrounding environment. As many plant species are damaged by saline water, the release of saline water into the environment 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 sufficient quantities.

7.2.6 Effects of Groundwater Discharge

Saline and fresh water produced by dewatering activities at Beebyn and Madoonga will be piped to an evaporation pond located in the west of the Study Area directly north of the range. Because the evaporation pond location was not determined during the period of survey, an additional survey to assess the distribution of Priority flora within the area of evaporation and the pipeline will be conducted.

7.2.7 Effects from Altered Surface Water Flow

Most of the vegetation of the project area utilises surface water for all of its water needs. Mulga (*Acacia aneura)* is particularly dependent on surface water harvesting and susceptible to alterations to flow regimes by infrastructure. As mulga is a common component of much of the vegetation within the Study Area, drainage and water flow will need to be managed to maintain surface water flow to minimise the effects.

7.2.8 Effects on Groundwater Dependent Ecosystems

Alterations to groundwater levels resulting from bore field pumping can affect phreatophytic vegetation that occurs in the zone of drawdown. The effects depend on the timing, magnitude and rate of drawdown. Pumping of water for the proposed works will need to be managed appropriately so that the phreatophytic vegetation of the project area is not irreversibly affected by changes in groundwater levels.

Current modelling indicates that decreases of between 5 m and 125 m to current groundwater levels could occur over the nine years modelled for the life of the mines at Madoonga and Beebyn. The drawdown contours indicate that decreases could occur in the vicinity of the saline claypans and seasonally inundated zones at Modoonga, the location at which potentially phreatophytic vegetation is present.

The vegetation in this area is dominated by Unit 7a, *Melaleuca stereophloia* and *Cratystylis subspinescens* shrubland over *Tecticornia* spp/*Frankenia laxiflora* low shrubland, with smaller areas of Unit 7b, *Eucalyptus carnei* and *E. trivalvis* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland and mixed tussock grasses. Within the study area these units are restricted to this location.

The degree to which the species present at this location are dependent upon groundwater is unclear; to establish the degree of dependence will require knowledge of the depth to which each species' roots extend and probably some measurement of seasonal variation in transpiration rates. However it is reasonable to assume that if a species is restricted to environments where groundwater is more readily accessible, there may be some dependence. Both *E. carnie* and *E. trivalvis* have been recorded regionally from a range of non-riparian habitats and do not appear to be obligate phreatophytes, although this does not preclude the fact that they may be seasonally phreatophytic at this location. *Melaleuca stereophloia* is much more consistently located on saline flats and lakes, although there are some records from hill slopes. This species may be more susceptible to a decreased water table, particularly if it occurs at a rapid rate such that it cannot adapt by developing a deeper root system. Other shrub species present are likely to have shallower root system and thus be dependent on surface fed water.

Another potential effect of a decreasing water table could be an increasing level of salinity in the soil in the capillary zone above the water table. Species which are accessing water from this zone may be adversely affected by the increasing salinity which inhibits effective water uptake. At present there is insufficient information available regarding the tolerance of the species present to changes in salinity, and the likelihood and extent of such changes.

Current modelling of drawdown cones indicates that the boundary of the drawdown cone, where decreases in the water table are likely to be range from 16 to 26 m, encompasses approximately 15-25% of the main zone of inundation of this unit. A further 5-15% lies between decreases of 26 and 36 m, and less than 5% between decreases of 36 and 46 m.

The risk to GDEs may be lowered considerably by avoiding periods of peak environmental demand and allowing adaptation of dependent biota to a lower water table. If the annual decline in groundwater level can be restricted to the maximum rate of downward growth of the roots of those plants dependent on groundwater, they may still be able to access the water in the capillary fringe above the water table as the water table drops.

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8 RECOMMENDATIONS

Detailed recommendations are listed under two categories; management level and design level. Recommendations at the design level present strategies that will mitigate impacts to the environment inherent in the design of proposed developments. The second level of recommendation is aimed at management strategies designed to minimise possible impacts to the functioning and quality of the biological environment by proposed developments, and to preserve existing conservation values. In order to reduce the impacts to vegetation and flora from mining activities at Weld Range, the following recommendations should be included in management plans for the project area.

8.1 DESIGN LEVEL

RECOMMENDATION 1

Vegetation clearing and earth works should be carried out at an appropriate time of year to minimise deterioration in surface water flow and / or, appropriate soil stabilisation methods should be used in areas where increased sedimentation could be expected. Drains and culverts should be incorporated into infrastructure crossing minor and major drainage lines to maintain seasonal flow regimes.

RECOMMENDATION 2

The preferred mine infrastructure footprint option should be selected to minimise impact to the conservation significant vegetation and flora species of the project area.

RECOMMENDATION 3

Access tracks leading to the Option 1 infrastructure area have not been surveyed for conservation significant flora. Targeted flora surveys of these tracks should be undertaken and every effort should be made to ensure that final alignments should minimise impacts to the priority flora of the area.

RECOMMENDATION 4

Vegetation clearing should be minimised and kept to that which is absolutely necessary. Whenever possible, areas with large populations of multiple priority flora species should be avoided. Environmental personnel should be present when vegetation is cleared in areas where priority flora species are known to occur, especially Priority 1 and 2 species, to ensure that impacts to priority flora are minimised.

RECOMMENDATION 5

The height of stockpiles of soil and cleared vegetation should be minimised. Multiple smaller stockpiles, dispersed at regular intervals along the edges of cleared areas, are preferable to a single, large stockpile. Lower stockpiles allow greater retention of biological activity within the soil (bacteria, fungi and lichens), which improves seed germination rates when the soil is reused.

RECOMMENDATION 6

Disturbance to vegetation associated with drainage lines and seasonally inundated low lying areas should be avoided or minimised whenever possible. Removing vegetation associated with drainage lines can lead to accelerated soil erosion or the alteration of surface water flow. Impacts to the vegetation of the halophytic shrubland (Community 7) to the west of Madoonga homestead should be avoided. This community has a restricted distribution within SMC's lease at Weld Range and is potentially a significant habitat for migratory fauna of the area.

RECOMMENDATION 7

Potentially groundwater dependent ecosystems should be identified in the project area. A baseline and long-term monitoring programme should be initiated to document any effects on groundwater dependent ecosystems resulting from groundwater extraction in the project area. Pumping of water for the proposed works will need to be managed appropriately so that any phreatophytic vegetation in the project area is not irreversibly affected by changes in groundwater levels.

8.2 MANAGEMENT LEVEL

RECOMMENDATION 8

Existing environmental procedures should be implemented for staff and contractors. These should include, but not be limited to, managing the risk of fire, the spread of weeds, and encouraging general environmental impact awareness.

RECOMMENDATION 9

A handbook containing photographs of conservation significant and weed species of Weld Range should be provided to all staff involved in vegetation clearing, prior to clearing. This will reduce the likelihood that these species are inadvertently cleared, or in the case of weed species, spread as a result of ground disturbance.

RECOMMENDATION 10

Topsoil stockpiles and areas of rehabilitation should be monitored periodically. Particular attention should be paid to weed species. If population densities or distribution of any weed species is seen to be increasing, eradication procedures should be implemented.

RECOMMENDATION 11

The minimum amount of topsoil possible should be removed when clearing vegetation for short-term structures. Minimal topsoil disturbance will encourage natural regeneration due to retention of the seed store and microbiological activity, which is largely confined to the topsoil. Achieving minimum disturbance will also discourage weeds and other species which proliferate following disturbance.

RECOMMENDATION 12

Areas that have been impacted by earthworks but are not needed for long-term infrastructure should be rehabilitated as soon as practicable after completion of works. This will promote soil stabilisation by plant roots and help to discourage weed proliferation in these areas. Stockpiled topsoil should be used in rehabilitation works as soon as after removal as possible as the seed stored in the soil will be viable.

RECOMMENDATION 13

Off road driving should be limited to reduce impact to vegetation in general and conservation significant flora in particular, and also to reduce areas of soil compaction.

RECOMMENDATION 14

Further surveys should be undertaken to determine the population extent, distribution and taxonomy of the two taxa of interest; *Acacia* sp. nov. (aff. *kochii*) and *Hemigenia* sp. nov. (aff. *exilis*). Currently the only records for these taxa are from Weld Range and additional reproductive material is required to assist in their taxonomic description.

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9 STUDY TEAM

The Weld Range vegetation and flora assessment described in this document was planned, coordinated and executed by:

ecologia ENVIRONMENT

1025 Wellington St

WEST PERTH WA 6005

Project Staff		
Carol Macpherson	BSc. (Hons)	Principal Botanist
Christina Cox	PhD	Manager Botany
Scott Hitchcock	BSc.	Senior Botanist
Zoe Benham	BSc. (Hons)	Botanist
Melissa Hay	BSc. (Hons)	Botanist
Rochelle Haycock	BSc.	Botanist
Jeremy Naaykens	BSc.	Botanist
Amy Capobianco	BSc. (Hons)	Botanist
Joshua Gilovitz	BSc. (Hons)	Botanist
Rebecca Graham	BSc. (Hons)	Botanist
Cate Tauss	BSc.	Plant Taxonomist
Peter Jobson	MSc.	Plant Taxonomist

Licences - "Licence to take flora for scientific purposes"		
The flora and vegetation surveys described in this report were conducted under the authorisation of the following licences issued by the Department of Environment and Conservation:		
	Permit Number	Valid Until
Scott Hitchcock	SL007531	10th May, 2007
	SL007816	30th April, 2008
	SL008095	30th April, 2009
Jeremy Naaykens	SL007508	2nd April, 2007
	SL007795	30th April, 2008

Licences - "Licence to take flora for scientific purposes"		
Amy Capobianco	SL007796	30th April, 2008
Joshua Gilovitz	SL008094	30th April 2009
Rochelle Haycock	SL008171	30th April, 2009
Melissa Hay	SL008100	30th April, 2009
Rebecca Graham	SL007797	30th April, 2009
Christina Cox	SL008096	30th April, 2009

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APPENDIX A SUMMARY OF TARGETED FLORA SURVEYS BY ECOLOGIA AT WELD RANGE

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Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
W40 to W36 polygon in Tenement E51/0907	July 2009	Targeted rare flora grid search survey of an approximately 1 km^2 area.	73	*Euphorbia sarcostemmoides* *Acacia speckii* *Dodonaea amplisemina* *Indigofera gilesii subsp. gilesii* *Micromyrtus placoides* *Baeckea sp. Melita Station (H. Pringle 2738)*	P1 P3 P3 P3 P3 P4	(ecologia, 2009,h)
W9,W10 and W11 deposits in Tenement TR70/3902	March & April 2009	Targeted rare flora grid search survey of an approximately 0.029 km^2 area.	85	*Prostanthera petrophila* *Acacia speckii*	P1 P3	(ecologia, 2009,h)
Campsite Extension in Tenement M 20/0402	March 2009	Targeted rare flora grid search survey of an approximately 0.559 km^2 area.	66	*Acacia speckii*	P3	(ecologia, 2009,h)
Gravel pits	March 2009	Targeted rare flora grid search survey of an approximately 0.559 km^2 area.		*Hemigenia tysonii* *Grevillea stenostachya*	P3 P3	(ecologia, 2009,h)
A polygon in the area between Beebyn and W45 to the east (Tenement E51/907).	November 2008	Targeted rare flora grid search survey of an approximately 2.5 km^2 area.	89	*Eremophila ?obliquisepala* *Ptilotus astrolasius* var. *luteolus* *Acacia speckii* *Dodonaea amplisemina* *Micromyrtus placoides* *Prostanthera petrophila* *Baeckea* sp. Melita Station	P1 P1 P3 P3 P3 P3 P4	(*ecologia*, 2009a)
Gravel Pit extension at the eastern end of the lease.	November 2008	Targeted rare flora survey of approximately 30-40 m width beyond two existing gravel pits.	0	*Hemigenia tysonii*	P3	(*ecologia,* 2009b)
W15 pad enlargements and additional new pads.	November 2008	Targeted rare flora survey of 10 m extensions to three existing drillpads and two new 30 m by 30 m drill pad areas (approximately 0.003 km^2 surveyed).	0	No DRF or priority flora recorded.		(*ecologia,* 2009c)
Polygon South of W12 at Beebyn at the eastern extent of the lease.	October 2008	Targeted rare flora grid search survey covering an area of 0.62 km^2.	70	*Acacia speckii* *Grevillea stenostachya*	P3 P3	(*ecologia,* 2009d)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Extension areas between W30 to W45 (Tenements E20/641 and E51/907).	October 2008	Targeted rare flora survey over an area of approximately 1.7 km².	93	*Sauropus* sp. Woolgorong *Beyeria lapidicola* *Acacia speckii* *Dodonaea amplisemina* *Grevillea stenostachya* *Hemigenia tysonii* *Homalocalyx echinulatus* *Micromyrtus placoides* *Prostanthera petrophila* *Baeckea* sp. Melita Station *Eremophila* aff. *gracillima*	P1 P2 P3 P3 P3 P3 P3 P3 P3 P4 SOI	(*ecologia*, 2009e)
Hydrological bores –HYM_202 - HYM_204.	September 2008	Targeted rare flora survey of three proposed drill pads and associated access tracks (approximately 0.05 km^2 surveyed).	47	*Hemigenia tysonii*	P3	(*ecologia,* 2009f)
Madoonga Infill.	September 2008	Targeted rare flora grid search survey of approximately 1.3 km^2.	96	*Acacia speckii* *Hemigenia tysonii* *Homalocalyx echinulatus* *Micromyrtus placoides* *Prostanthera petrophila*	P3 P3 P3 P3 P3	(*ecologia,* 2009g)
Lens W6 (tenement E20/641) extension of drill pads.	September 2008	Priority flora impacts survey associated with the enlargement of 10 existing drill pads by approximately 10 m.	0	*Micromyrtus placoides* *Prostanthera petrophila* *Baeckea* sp. Melita Station	P3 P3 P4	(*ecologia,* 2008a)
Lenses W6 and W20 (Tenement E20/641).	March 2008	Targeted rare flora grid search survey over approximately 1.4 km^2.	87	*Eremophila gracillima* *Acacia speckii* *Dodonaea amplisemina* *Grevillea stenostachya* *Homalocalyx echinulatus* *Micromyrtus placoides* *Prostanthera petrophila* *Grevillea inconspicua*	P1 P3 P3 P3 P3 P3 P3 P4	(*ecologia,* 2008b)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Weld Range Tenement E51/907 (W30 & 31, W33-W35, W38 & 39, W41-W43, W45 & Limestone Well).	March 2008	Targeted rare flora grid search survey with a combined approximate area of 4.6 km^2.	105	*Euphorbia sarcostemmoides* *Sauropus* sp. Woolgorong *Acacia speckii* *Dodonaea amplisemina* *Hemigenia tysonii* *Homalocalyx echinulatus* *Micromyrtus placoides* *Prostanthera petrophila* *Baeckea* sp. Melita Station	P1 P1 P3 P3 P3 P3 P3 P3 P4	(*ecologia*, 2008c)
Weld Range Tenement No. E51/907, Lens W41.	April 2007	Targeted rare flora survey of six proposed drill pads and associated access tracks (approximately 0.02 km^2 surveyed).	16	No DRF or Priority Flora recorded.		(*ecologia*, 2007a)
Weld Range E 51/907, (W33 &W42 north and south)	April 2007	Targeted rare flora survey of 35 proposed drill pads and associated access tracks (approximately 0.12 km^2 surveyed).	31	*Acacia speckii* *Baeckea* sp. Melita Station *Prostanthera petrophila*	P3 P4 P3	(*ecologia*, 2007b and 2007c)
Weld Range E51/907, Lenses W35 & W36.	April 2007	Targeted rare flora survey of 39 drill pads and associated access tracks (approximately 0.1 km^2 surveyed).	36	*Dodonaea amplisemina* *Baeckea* sp. Melita Station	P3 P4	(*ecologia*, 2007d)
Weld Range Tenement No. E51/907, Lens W43 (encompassing lenses W43, W43 North and W43 Far North) and a Channel Iron Deposit (CID) area (located between lenses W43 and W43 north.	April 2007	Targeted rare flora survey of 22 drill pads and associated access tracks (approximately 0.10 km^2 surveyed).	49	*Acacia speckii* *Dodonaea amplisemina* *Baeckea* sp. Melita Station *Grevillea inconspicua*	P3 P3 P4 P4	(*ecologia*, 2007e)
Weld Range E51/907, Lenses W38, W39 & W40.	March 2007	Targeted rare flora survey of 43 drill pads and associated access tracks (approximately 0.08 km^2 surveyed).	49	*Dodonaea amplisemina* *Baeckea* sp. Melita Station	P3 P4	(*ecologia*, 2007f)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Weld Range Tenement No. E51/907, Lens W34.	March 2007	Targeted rare flora survey of 19 drill pads and associated access tracks (approximately 0.08 km^2 surveyed).	49	*Acacia speckii* *Baeckea* sp. Melita Station	P3 P4	(*ecologia*, 2007g)
Second pass metallurgical exploration drilling programme at Beebyn and Madoonga (tenement number TR 70/3902) at Weld Range W9, W11 and W14.	February 2007	Targeted rare flora survey of 31 drill pads and associated access tracks (approximately 0.05 km^2 surveyed).	51	*Micromyrtus placoides*	P3	(*ecologia*, 2007h)
Weld Range Proposed Campsite Option B and G on tenement TR 70/3902 or M 20/0402.	October 2006	Targeted rare flora survey of a proposed exploration camp site (option B) and proposed access track (approximately 0.008 km^2 surveyed).	21	*Hemigenia tysonii* *Micromyrtus placoides*	P3 P3	(*ecologia*, 2006a)
		Targeted rare flora survey of a proposed exploration camp site (option G) and proposed access track (approximately 0.04 km^2 surveyed).	18	No DRF or Priority Flora recorded.		
Weld Range Proposed Campsite on tenement TR 70/3902.	September 2006	Targeted rare flora survey of a proposed exploration camp site (option A) and proposed access track (approximately 0.04 km^2 surveyed).	46	*Micromyrtus placoides*	P3	(*ecologia*, 2006b)
Hampton Hill Joint Venture tenements, infill drill pads between W15, W27, W16, W19, and W28.	September 2006	Targeted rare flora survey of 14 infill drill pads and associated access tracks (approximately 0.01 km^2 surveyed).	91	*Micromyrtus placoides* *Prostanthera petrophila*	P3 P3	(*ecologia*, 2006c)
Weld Range Rare and Priority Flora Survey – TR 70/3902, E 20/208 and M 20/31.	July 2006	Targeted rare flora survey of 57 drill pads and associated access tracks (approximately 0.07 km^2 surveyed).	154	*Beyeria lapidicola* *Micromyrtus placoides* *Prostanthera petrophila* *Verticordia jamiesonii*	P2 P3 P3 P3	(*ecologia*, 2006d)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
		Targeted rare flora survey of 16 drill pads and associated access tracks (approximately 0.03 km^2 surveyed).		*Micromyrtus placoides* *Prostanthera petrophila*	P3 P3	

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APPENDIX B 2010 DEC DATABASE SEARCH

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Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
Acacia burrowsiana	FABACEAE	P3	Along Beebyn-Karbar Road NW of Cue	Low stony rise with skeletal soils and quartz, ironstone and schistose rubble on surface, adjacent to Sapphire flats.	Recorded
Acacia speckii	FABACEAE	P3	Weld Range, on Madoonga Station and Telstra tower	Moderately inclined midslope of banded ironstone and basalt with red soils	Recorded
Baeckea sp. *Melita Station*	MYRTACEAE	P4	Weld Range, NW of Cue	Mid rocky slopes and ironstone breakaways. Red/brown soils over ironstone.	Recorded
Beyeria lapidicola	EUPHORBIACEAE	P1	Weld Range	Plain with a currently dry creek bed. Red-orange sandy clay, fine gravel. Ferrous. No evidence of fire. Good condition. Old track runs through centre of site.	Recorded
Calytrix erosipetala	MYRTACEAE	P3	East of Hillview Homestead	Breakaway weathered granite	Recorded
Dodonaea amplisemina	SAPINDACEAE	P3	Weld Range, on Madoonga Station.	Moderately inclined hillcrest of basalt and some banded ironstone. Slightly rocky basalt outcrop with red soils.	Recorded
Eremophila arachnoides subsp. Arachnoides	SCROPHULARIACEAE	P3	South of Yarrabubba State	On shallow brown loams over limestone	Recorded
Eremophila rhegos	SCROPHULARIACEAE	P1	Weld Range	High hill. Brown loam and rocks over dolerite, quartz and ironstone.	Recorded
Euphorbia sarcostemmoides	EUPHORBIACEAE	P1	Robinson Range, survey site ROBI28	Gently inclined lower slope of banded ironstone with red brown shallow sandy loam soils	Recorded
Goodenia berringbinensis	GOODENIACEAE	P4	Bed of Berringbine Creek, Belele Station	Red sandy loam.	Recorded

Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
Goodenia lyrata	GOODENIACEAE	P1	West of Laverton	Red sandy loam, near claypan.	Recorded
Grevillea inconspicua	PROTEACEAE	P4	Weld Range, SE of Madoonga Homestead	Red loam/clay soil. Population on greenstone outcrop.	Recorded
Grevillea stenostachya	PROTEACEAE	P3	Belele Station, near Lalgaroo paddock	Red sandy loam.	Recorded
Hemigenia tysonii	LAMIACEAE	P3	Near Government Well on Coodardy Station, Cue	Sand.	Recorded
Homalocalyx echinulatus	MYRTACEAE	P3	Weld Range	Brown loam and rock fragments, ironstone/dolerite.	Recorded
Indigofera gilesii subsp. *gilesii*	FABACEAE	P3	Glengarry Range, SE of Mooloogool Homestead		Recorded
Micromyrtus placoides	MYRTACEAE	P3	Weld Range slopes below Telecom tower	Brown loam over dolerite & ironstone.	Recorded
Mirbelia stipitata	FABACEAE	P3	Along Cue-Sandstone Road	Base of granite rock. Rangeland. Brown dry loam.	Recorded
Phyllanthus baeckeoides	PHYLLANTHACEAE	P3	Weld Range on Glen Station	Gently inclined lower hillslope to flat of banded ironstone. Very slightly rocky banded ironstone outcrop with red brown soils	Recorded
Prostanthera ferricola	LAMIACEAE	P3	Weld Range, on Madoonga Station.	Steep midslope of banded ironstone and basalt. Slightly rocky banded ironstone and basalt outcrop with red soils.	Recorded
Prostanthera petrophila	LAMIACEAE	P3	Weld Range	Brown loam with dolerite quartz and ironstone blocks.	Recorded
Ptilotus beardii	AMARANTHACEAE	P3	Weld Range	Red orange sandy clay.	Recorded
Ptilotus luteolus	AMARANTHACEAE	P3	South of Meekatharra on Gabanantha Road	Hillslope.	Recorded

Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
Sauropus sp. *Woolgorong*	PHYLLANTHACEAE	P1	Weld Range on Glen Station	Moderately inclined upper hillslope of banded ironstone, quartz and chert. Very rocky banded ironstone, quartz and chert outcrop with red brown soils.	Recorded
Stenanthemum patens	RHAMNACEAE	P1	North of Mount Clifford	Rocky hillside.	Recorded
Tecticornia cymbiformis	CHENOPODIACEAE	P3	Lake Anneen	Gently sloping dune before lake floodplain. Red-brown sandy clay.	Recorded
Verticordia jamiesonii	MYRTACEAE	P3	Along Kalli Road	Breakaway, dry red yellow sandy clay over pale red sandstone.	Not recorded

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APPENDIX C COORDINATES AND VEGETATION CONDITION ASSESSMENT OF QUADRATS

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Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
1	Phase 1&2	542005	7014892	Good
2	Phase 1&2	542124	7014740	Good
3	Phase 1	542684	7014676	Good
4	Phase 1	542975	7014538	Good
4a	Phase 2	547554	7014897	Good
5	Phase 1&2	545195	7016854	Good
6	Phase 1&2	544107	7016163	Good
7	Phase 1	547224	7014931	Poor
8	Phase 1	547559	7014896	Excellent
10	Phase 1	547755	7014970	Good
10a	Phase 2	547792	7014738	Good
11	Phase 1&2	547091	7015942	Poor
12	Phase 1	548350	7015087	Good
13	Phase 1	547503	7016136	Good
14	Phase 1	547824	7016428	Good
15	Phase 1&2	547381	7016821	Good
16	Phase 1	548863	7016361	Good
17	Phase 1&2	549879	7017173	Good
18	Phase 1	550527	7017872	Poor
19	Phase 1	551133	7018310	Good
22	Phase 1	569663	7027652	Excellent
23	Phase 1	572647	7026444	Poor
24	Phase 1	571858	7027290	Good
25	Phase 1	572027	7027663	Good
26	Phase 1	573297	7026981	Good
27	Phase 1	574151	7027062	Good
28	Phase 1	573935	7026087	Good
29	Phase 1	574397	7025516	Excellent
30	Phase 1	572381	7026342	Excellent
32	Phase 1	576110	7027945	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
33	Phase 1	576975	7027507	Good
34	Phase 1	577572	7028469	Good
35	Phase 1&2	578440	7028713	Good
36	Phase 1	578288	7029509	Good
37	Phase 1	578433	7029011	Good
38	Phase 1	579045	7028527	Good
39	Phase 1&2	580031	7028802	Good
40	Phase 1	580038	7029085	Good
41	Phase 1&2	580346	7028437	Good
42	Phase 1	581164	7028342	Poor
43	Phase 1&2	581737	7030291	Good
44	Phase 1	582477	7030165	Good
45	Phase 1	582532	7029890	Good
46	Phase 1	583721	7029312	Poor
47	Phase 1	584163	7028555	Good
48	Phase 1	581863	7027164	Excellent
49	Phase 1	580134	7025220	Good
50	Phase 1&2	579888	7025313	Good
51	Phase 1&2	578958	7025464	Poor
52	Phase 1	578405	7024722	Good
53	Phase 1&2	576712	7024043	Good
54	Phase 1&2	576285	7024058	Good
55	Phase 1	576512	7023213	Good
56	Phase 1&2	576624	7022957	Good
57	Phase 1	555361	7018447	Good
58	Phase 1&2	556310	7018553	Poor
59	Phase 1	555937	7016482	Good
60	Phase 1	556788	7016839	Poor
61	Phase 1&2	557351	7018302	Good
62	Phase 1&2	558160	7019242	Good
63	Phase 1	558753	7019308	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
64	Phase 1	558818	7019727	Poor
65	Phase 1	560117	7020303	Good
66	Phase 1	560739	7020177	Poor
67	Phase 1&2	560339	7018774	Good
68	Phase 1	561487	7019282	Excellent
69	Phase 1	562050	7019840	Good
70	Phase 1	563095	7019945	Excellent
71	Phase 1&2	564211	7020601	Good
72	Phase 1	565375	7021598	Good
75	Phase 1	558361	7016368	Good
76	Phase 1	558871	7016000	Excellent
77	Phase 1&2	560388	7016711	Poor
78	Phase 1&2	560836	7016798	Good
79	Phase 1&2	561440	7016893	Good
80	Phase 1	561967	7017599	Good
81	Phase 1&2	563937	7018085	Good
82	Phase 1	565129	7018605	Good
83	Phase 1	566032	7018945	Good
84	Phase 1&2	584124	7031028	Poor
85	Phase 1&2	584862	7031416	Excellent
86	Phase 1	585304	7031787	Good
87	Phase 1	585580	7030838	Good
88	Phase 1&2	585763	7031188	Good
88a	Phase 2	579048	7028520	Good
89	Phase 1	586478	7031056	Excellent
90	Phase 1	585997	7032081	Excellent
91	Phase 1	585672	7033112	Good
92	Phase 1&2	586292	7033420	Good
93	Phase 1	586714	7035414	Good
94	Phase 1&2	587032	7035055	Good
95	Phase 1&2	587295	7034769	Poor

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
96	Phase 1	588225	7035560	Good
97	Phase 1	588203	7035871	Poor
98	Phase 1&2	588797	7035953	Good
99	Phase 1&2	588798	7036525	Good
100	Phase 1&2	588158	7037131	Good
101	Phase 1&2	588450	7038104	Good
102	Phase 1&2	589312	7038142	Good
103	Phase 1	588444	7038690	Good
104	Phase 1	588554	7038981	Good
108	Phase 1&2	562128	7019503	Good
109	Phase 1	581786	7026819	Good
110	Phase 1	548351	7015088	Good
111	Phase 1	549405	7015196	Good
114	Phase 1	563731	7020476	Good
115	Phase 2	541455	7014385	Good
116	Phase 2	544412	7016905	Good
117	Phase 2	546935	7015506	Good
118	Phase 2	547723	7014961	Good
119	Phase 2	557394	7018295	Good
120	Phase 2	558093	7018841	Good
121	Phase 2	558037	7019505	Good
122	Phase 2	580322	7030811	Excellent
123	Phase 2	581695	7030171	Good
124	Phase 2	589437	7037259	Good
125	Phase 2	589791	7037197	Good
126	Phase 2	589471	7037203	Excellent
127	Phase 2	589282	7036626	Good
128	Phase 2	589342	7036616	Excellent
129	Phase 2	589461	7036537	Good
130	Phase 2	589858	7037769	Good
131	Phase 2	587069	7034505	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
132	Phase 2	587781	7034353	Good
133	Phase 2	587937	7034213	Excellent
134	Phase 2	588151	7033952	Good
135	Phase 2	588502	7033622	Poor
136	Phase 2	587841	7033527	Good
137	Phase 2	588342	7034114	Excellent
138	Phase 2	582918	7027232	Good
139	Phase 2	583009	7027197	Good
140	Phase 2	582941	7027205	Good
141	Phase 2	582035	7027062	Good
142	Phase 2	581892	7027044	Good
143	Phase 2	581922	7026918	Good
144	Phase 2	580319	7026328	Good
145	Phase 2	575112	7027432	Good
146	Phase 2	580290	7026302	Good
147	Phase 2	579052	7025125	Good
148	Phase 2	573853	7027002	Excellent
149	Phase 2	573904	7027138	Good
150	Phase 2	573767	7027087	Good
151	Phase 2	573424	7027308	Excellent
152	Phase 2	573471	7027246	Good
153	Phase 2	574031	7027464	Good
154	Phase 2	555848	7017032	Poor
156	Phase 2	555918	7016947	Good
156a	Phase 2	555945	7016882	Good
157	Phase 2	555667	7016771	Good
158	Phase 2	555416	7016811	Good
159	Phase 2	555419	7016931	Poor
160	Phase 2	563572	7018064	Good
161	Phase 2	564239	7018334	Good
162	Phase 2	563264	7018400	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
163	Phase 2	564463	7019090	Good
164	Phase 2	563797	7018544	Good
165	Phase 2	562938	7019075	Good
166	Phase 2	563695	7019052	Good
167	Phase 2	564390	7019704	Good
168	Phase 2	562094	7019416	Good
169	Phase 2	562005	7019220	Excellent
170	Phase 2	563054	7019695	Good
171	Phase 2	562929	7019904	Good
172	Phase 2	562971	7019839	Good
173	Phase 2	563088	7020263	Good
174	Phase 2	563915	7019886	Good
175	Phase 2	578375	7028962	Good
176	Phase 2	579697	7029433	Good
177	Phase 2	551827	7015815	Good
178	Phase 2	552257	7015792	Good
179	Phase 2	551354	7015776	Good
180	Phase 2	552434	7015962	Good
181	Phase 2	550940	7015223	Good
182	Phase 2	559931	7017810	Good
183	Phase 2	559418	7018409	Poor
BPC01	Phase 3	581233	7031767	Good
BPC02	Phase 3	581030	7031651	Good
BPC03	Phase 3	580844	7031891	Good
BPC04	Phase 3	579977	7031713	Good
BPC05	Phase 3	579814	7031869	Good
BPC06	Phase 3	578651	7032379	Poor
BPC07	Phase 3	577958	7032287	Good
BPC08	Phase 3	577662	7032721	Good
BPC09	Phase 3	579024	7032277	Poor
BPC10	Phase 3	579391	7031751	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
BPE01	Phase 3	586684	7034277	Good
BPE02	Phase 3	585309	7032299	Good
BPE03	Phase 3	585158	7033155	Good
BPE05	Phase 3	585487	7034280	Good
BPE06	Phase 3	585632	7033848	Poor
BPE07	Phase 3	586389	7034215	Good
BPE08	Phase 3	585343	7033633	Good
BPE09	Phase 3	585363	7033496	Good
BPE12	Phase 3	504022	7033223	Good
BPE14a	Phase 3	585451	7032503	Good
BPE14b	Phase 3	585471	7033373	Good
BPE15	Phase 3	585376	7032971	Good
BPE16	Phase 3	585521	7033373	Good
BPW01	Phase 3	577071	7032746	Good
BPW02	Phase 3	577059	7033032	Good
BPW03	Phase 3	576626	7032346	Good
BPW04	Phase 3	573114	7032129	Good
BPW05	Phase 3	573610	7032003	Good
BPW06	Phase 3	575851	7032724	Excellent
BPW07	Phase 3	575210	7032660	Good
BPW08	Phase 3	574389	7032529	Excellent
BPW09	Phase 3	574188	7032469	Excellent
BPW10	Phase 3	574714	7032500	Excellent
BPW13	Phase 3	573979	7032615	Good
HR01	Phase 3	563716	7022514	Excellent
HR02	Phase 3	504383	7022943	Excellent
HR03	Phase 3	565967	7024046	Excellent
HR04	Phase 3	571730	7027665	Excellent
HR05	Phase 3	571137	7027349	Excellent
HR06	Phase 3	567092	7024711	Excellent
HR07	Phase 3	566302	7024279	Excellent

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
HR09	Phase 3	574743	7028902	Good
HR10	Phase 3	575069	7029011	Good
HR11	Phase 3	561103	7020074	Good
HR12	Phase 3	561671	7020815	Good
HR13	Phase 3	562739	7021607	Good
HR14	Phase 3	571935	7027743	Good
HR15	Phase 3	572353	7027955	Good
HR16	Phase 3	576016	7029468	Good
HR17	Phase 3	576849	7029667	Good
HR18	Phase 3	577286	7029627	Excellent
HR19	Phase 3	577838	7029714	Good
HR20	Phase 3	578621	7029801	Good
HR21	Phase 3	579184	7029888	Excellent
HR23a	Phase 3	580496	7029551	Good
HR23b	Phase 3	580171	7029992	Excellent
HR25	Phase 3	580826	7029203	Good
HR26	Phase 3	570579	7027118	Good
HR27	Phase 3	570335	7026986	Good
HR28	Phase 3	570265	7026936	Good
HR29	Phase 3	569789	7026655	Excellent
HR30	Phase 3	569357	7026385	Good
MWD01	Phase 3	558832	7019504	Good
MWD02	Phase 3	558804	7019050	Good
R02	Rail	563317	7025414	Poor
R04	Rail	563415	7026464	Good
R05	Rail	563231	7030325	Good
R06	Rail	563479	7027637	Good
R07	Rail	565650	7026510	Good
R08	Rail	567491	7027591	Good
R09	Rail	565553	7028994	Good
R10	Rail	566320	7030900	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
R11	Rail	568802	7032751	Good
R12	Rail	571003	7034390	Excellent
R13	Rail	571424	7031721	Good
R14	Rail	575257	7031712	Good
R17	Rail	569879	7034562	Good
R18	Rail	569647	7034092	Good
R19	Rail	568182	7029128	Good
R20	Rail	575266	7030644	Good
R21	Rail	573856	7030371	Good
R22	Rail	578561	7031062	Good
R23	Rail	569438	7031261	Excellent

KEY: MWD = Madoonga Waste Dump;
HR = Haul Road;
BPW = Borrow Pit West;
BPC = Borrow Pit Centre;
BPE = Borrow Pit East;
R = Rail Corridor.

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APPENDIX D NATIONAL VEGETATION INVENTORY SYSTEM (NVIS) VEGETATION CLASSIFICATIONS

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Growth Form	Height (m)	Structural Formation Classes					
Foliage cover and rank*		70-100% (5)	30-70% (4)	10-30% (3)	<10% (2)	0-5% (1)	≈ 0% (N)
TREE	<10,10-30, >30	closed forest	open forest	woodland	isolated clumps of trees	isolated trees	isolated clumps of trees
TREE MALLEE	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	isolated clumps of mallee trees	isolated mallee trees	isolated clumps of mallee trees
SHRUB	<1,1-2,>2	closed shrubland	shrubland	open shrubland	isolated clumps of shrubs	isolated shrubs	isolated clumps of shrubs
MALLEE SHRUB	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	isolated clumps of mallee shrubs	isolated mallee shrubs	isolated clumps of mallee shrubs
HEATH SHRUB	<1,1-2,>2	closed heathland	heathland	open heathland	isolated clumps of heath shrubs	isolated heath shrubs	isolated clumps of heath shrubs
CHENOPOD SHRUB	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	isolated clumps of chenopod shrubs	isolated chenopod shrubs	isolated clumps of chenopod shrubs
SAMPHIRE SHRUB	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	isolated clumps of samphire shrubs	isolated samphire shrubs	isolated clumps of samphire shrubs
HUMMOCK GRASS	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	isolated clumps of hummock grasses	isolated hummock grasses	isolated clumps of hummock grasses
TUSSOCK GRASS	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	isolated clumps of tussock grasses	isolated tussock grasses	isolated clumps of tussock grasses
SEDGE	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	isolated clumps of sedges	isolated sedges	isolated clumps of sedges
RUSH	<0.5,>0.5	closed rushland	rushland	open rushland	isolated clumps of rushes	isolated rushes	isolated clumps of rushes

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APPENDIX E SITE DESCRIPTIONS FOR PHASES 1,2 AND 3

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Phase 1

722 WRE Site 01

Described by	JN	**Date:**	9/11/2006	**Type:**	Q	20x20
Location	Weld Range					
MGA Zone	50	542023	**mE**	7014919	**mN**	
Habitat	Lakeside vegetation on a gentle slope.					
Soil	Red-orange sandy clay with a hard surface crust and loose soil.					
Rock Type						
Vegetation	Acacia aneura var. aneura low open woodland over Acacia aneura var. aneura and Acacia ramulosa var. linophylla high shrubland over Acacia ramulosa var. linophylla open shrubland over Eremophila forrestii ssp. forrestii low open shrubland over Calocephalus multiflorus very open herbs over Aristida contorta tussock grassland. Lakeside vegetation on a gentle slope					
Veg Condition	Good, with grazing by hard hoofed.					
Fire Age	None evident					
Notes	Sparse leaf litter and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia ?cockertoniana, Acacia minyura, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila forrestii*
Shrubs < 1m	2 - 10%	*Chenopodium gaudichaudianum, Dianella revoluta* var. *divaricata, Eremophila granitica, Eremophila punicea, Senna glaucifolia, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Monachather paradoxus, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Aristida holathera* var. *holathera, Eragrostis cumingii, Eragrostis lanipes*
Herbs	2 - 10%	*Alternanthera denticulata, Calocephalus multiflorus, Euphorbia drummondii, Gnephosis tenuissima*

722 WRE Site 02

Described by	JN	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	542124	**mE**	7014727	**mN**	
Habitat	Lakeside vegetation on a gentle slope					
Soil	Red-orange sandy clay with a surface crust.					
Rock Type						
Vegetation	Acacia aneura var. aneura low open forest over Acacia tetragonophylla high open shrubland over Melaleuca stereophloia low shrubland to open shrubland over Calocephalus multiflorus open herbs over Aristida contorta open tussock grassland. Lakeside vegetation on a gentle slope.					
Veg Condition	Good with grazing by hard hoofed.					
Fire Age	>5 yrs					
Notes	Moderate to sparse leaf litter and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *major, Acacia minyura*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Melaleuca stereophloia*
Shrubs < 1m	2 - 10%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia tetragonophylla, Eremophila forrestii, Eremophila fraseri*
Shrubs < 0.5m	10 - 30%	*Maireana planifolia, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis dielsii, Eragrostis leptocarpa, Eriachne flaccida, Eriachne pulchella* subsp. *pulchella*
Climbers	< 2%	*Lysiana murrayi*
Herbs	10 - 30%	*Alternanthera denticulata, Calocephalus multiflorus*

722 WRE Site 03

Described by		Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	542684	**mE**	7014676	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sand with loose surface soil.					
Rock Type						
Vegetation	Acacia *pruinocarpa scattered* trees and Acacia aneura var. aneura scattered low trees over Acacia *ramulosa* var. *linophylla* and Acacia aneura *var aneura* high shrubland over *Eremophila forrestii* low open shrubland to shrubland and *Solanum lasiophyllum* low scattered shrubs over *Marsdenia australis* climbers over *Ptilotus polystachyus* very open herbs over *Monachather paradoxus* and *Eragrostis lanipes* tussock grassland.					
Veg Condition	Good with grazing by hard hoofed					
Fire Age	None evident					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa, Rhagodia eremaea*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Eremophila granitica*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Eragrostis lanipes, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	2 - 10%	*Ptilotus exaltatus* var. *exaltatus, Ptilotus polystachyus, Sida fibulifera*

722 WRE Site 04

Described by	SH	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	542975	**mE**	7014538	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose soil surface.					
Rock Type						
Vegetation	Acacia aneura var. aneura low open woodland over Acacia ramulosa var. linophylla and Acacia aneura var. aneura high shrubland over Eremophila forrestii open shrubland over Eremophila forrestii and Solanum lasiophyllum low scattered shrubs over Ptilotus polystachyus var. polystachyus open herbs over Monachather paradoxus tussock grassland. Flat plain.					
Veg Condition	Good with grazing by hard hoofed.					
Fire Age	None evident					
Notes	Sparse leaf litter and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Psydrax rigidula, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila forrestii, Eremophila georgei, Rhagodia eremaea, Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	< 2%	*Spartothamnella teucriiflora*
Shrubs < 0.5m	< 2%	*Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Eragrostis lanipes, Monachather paradoxus*
Herbs	10 - 30%	*Ptilotus polystachyus* var. *polystachyus, Sida fibulifera, Swainsona* sp.

722 WRE Site 05

Described by	JN	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	545193	**mE**	7016850	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy loam with a surface crust and fine to coarse gravel.					
Rock Type	Non-banded ferrous and quartz.					
Vegetation	Acacia aneura var. *fuliginea* low *woodl*and over Acacia aneura var. *fuliginea* and Acacia *ramulosa* var. *linophylla* high shrubland over Acacia *ramulosa* var. *linophylla* open shrubland over *Eremophila forrestii* low open shrubland over A*ristida* c*ontorta* open tussock *grassl*and. Flat plain.					
Veg Condition	Good with grazing by hard hoofed and tracks.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia quadrimarginea, Psydrax suaveolens, Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila forrestii, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Ptilotus obovatus* var. *obovatus, Sida ammophila, Spartothamnella teucriiflora*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Calandrinia ?translucens*

722 WRE Site 06

Described by	SH	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	544103	**mE**	7016171	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with a cracked clay, fine gravel and loose soil surface layer.					
Rock Type	Few, composed of non-banded ferrous, granite and quartz.					
Vegetation	*Acacia aneura* var. *aneura scattered* low trees over *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Acacia aneura* var. *intermedia* and *Eremophila forrestii* open shrubland over and *Acacia aneura* var. *intermedia, Eremophila forrestii* and *Ptilotus schwartzii* low open shrubland over *Marsdenia australis* climbers over *Calandrinia* sp. Scattered herbs over *Aristida contorta* open tussock grassland.					
Veg Condition	Good condition, grazed by hard hoofed.					
Fire Age	None evident.					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	*Acacia craspedocarpa, Eremophila georgei*
Shrubs < 1m	2 - 10%	*Acacia tetragonophylla, Eremophila forrestii, Spartothamnella teucriiflora*
Shrubs < 0.5m	< 2%	*Eremophila jucunda, Maireana* sp., *Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Calandrinia* sp. The Pink Hills (F. Obbens FO 19/06)

722 WRE Site 07

Described by	SH	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547224	**mE**	7014931	**mN**	
Habitat	Gentle hill slope.					
Soil	Red-orange sandy clay with continuous stones and plates/boulders at surface.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia ramulosa* var. *linophylla* *scattered* shrubs to high open shrubland over *Eremophila latrobei subsp. latrobei, Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low open *heath* over *Sida excedentifolia* open herbs over *Cymbopogon ambiguous*. Open tussock grassland.					
Veg Condition	Poor, grazed by hard hoof.					
Fire Age	None evident					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	30 - 70%	*Dodonaea pachyneura, Eremophila compacta, Olearia plucheacea, Psydrax suaveolens, Ptilotus obovatus* var. *obovatus, Sida* sp. *Excedentifolia* (J.L. Egan 1925), *Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus*
Herbs	10 - 30%	*Amaranthus* sp., *Phyllanthus erwinii*

722 WRE Site 08

Described by	JN	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547559	**mE**	7014896	**mN**	
Habitat	Steep to moderate hill crest.					
Soil	Red-orange sandy clay with surface crust and coarse gravel, and many stones,boulders and plates at surface					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia pruinocarpa scattered* low trees over *Acacia ramulosa* var. *ramulosa* high open shrubland over A*llocasuarina acutivalvis sub*sp. a*cutivalis* open shrubland over *Philotheca brucei sub*sp. *brucei* and *Eremophila glutinosa* low shrubland over *Goodenia tenuiloba* scattered herbs over *Eriachne mucronata* (desert form) very open tussock grassland. Steep to moderate hill crest.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	Non evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	< 2%	*Acacia pruinocarpa, Acacia ramulosa* var. *ramulosa*
Shrubs > 2m	2 - 10%	*Acacia sibirica, Allocasuarina acutivalvis* subsp. *acutivalvis*
Shrubs 1 - 2m	2 - 10%	*Micromyrtus sulphurea, Scaevola spinescens*
Shrubs < 1m	10 - 30%	*Acacia grasbyi, Dodonaea pachyneura, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Hibiscus sturtii* var. *forrestii, Philotheca brucei* subsp. *brucei, Ptilotus obovatus* var. *obovatus, Rhagodia eremaea*
Shrubs < 0.5m	10 - 30%	*Maireana* sp.*, Olearia stuartii, Ptilotus obovatus* var. *obovatus, Solanum ellipticum*
Tussock grasses	2 - 10%	*Austrostipa scabra, Cymbopogon ambiguus, Eriachne mucronata (desert form)*
Herbs	< 2%	*Goodenia tenuiloba, Olearia plucheacea*

722 WRE Site 10

Described by	JN	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547755	**mE**	7014970	**mN**	
Habitat	Ridge Crest with moderate slope.					
Soil	Red-orange sandy clay with surface crust, gravel/pebbles, continuous stones/boulders and rock					
Rock Type	BIF					
Vegetation	*Acacia minyura* high shrubland to scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Philotheca brucei subsp. brevifolia, Eremophila compacta subsp. fecunda* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Sida chrysocalyx* scattered herbs over *Thyridolepis multiculmis* very open tussock grassland. Ridge Crest with moderate slope.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia minyura, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia sibirica, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	*Eremophila georgei*
Shrubs < 1m	10 - 30%	*Dodonaea pachyneura, Eremophila ?georgei, Eremophila compacta* subsp. *fecunda, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brevifolia, Prostanthera petrophila*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ashbyae*
Tussock grasses	2 - 10%	*Thyridolepis multiculmis*

722 WRE Site 11

Described by	SH	Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547084	**mE**	7015943	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with surface crust and much coarse gravel/pebbles.					
Rock Type	Granite					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees to *scattered* trees over *Acacia aneura* var. *fuliginea* and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila latrobei subsp. latrobei* and *Solanum lasiophyllum* low *scattered* shrubs over *Goodenia tenuiloba* open herbs over *Aristida contorta* open tussock grassland.					
Veg Condition	Good, grazing by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia citrinoviridis*
Shrubs < 1m	< 2%	*Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	< 2%	*Eremophila georgei, Eremophila jucunda* subsp. *jucunda, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis* sp.
Herbs	10 - 30%	*Goodenia tenuiloba, Ptilotus obovatus* var. *obovatus*

722 WRE Site 12

Described by	SH	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	548350	**mE**	7015087	**mN**	
Habitat	Flat hill crest.					
Soil	Red-orange sandy slay with coarse gravel/pebbles and many stones/boulders and plates at surface.					
Rock Type	BIF, non-banderd ferrous, granite and quartz.					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *ramulosa* scattered low trees to scattered trees over *Acacia ramulosa* var. *ramulosa* and *Acacia ramulosa* var. *linophylla* high shrubland over *Thryptomene decussata* open shrubland over *Micromyrtus placoides* and *Eremophila latrobei subsp. latrobei* low shrubland over *Goodenia tenuiloba.* Open herbs over *Monachather paradoxus* very open tussock grassland.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf and moderate wood litter under shrubs. *Micromyrtus placoides* population of ~40 on BIF.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *ramulosa, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Psydrax rigidula*
Shrubs 1 - 2m	2 - 10%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa*
Shrubs < 0.5m	2 - 10%	*Aluta aspera* subsp. *hesperia, Eremophila latrobei* subsp. *latrobei, Micromyrtus placoides, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ashbyae*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	10 - 30%	*Goodenia tenuiloba*

722 WRE Site 13

Described by	SH	Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547503	**mE**	7016136	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay and clay, with loose surface soil.					
Rock Type						
Vegetation	*Acacia sibirica scattered* low trees over *Acacia sibirica* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila georgei* and *Eremophila forrestii* open shrubland over *Eremophila georgei, Eremophila forrestii*over and *Ptilotus obovatus* var. *obovatus* low *scattered* shrubs over *Calandrinia* ?*translucens* scattered herbs over *Aristida contorta* tussock grassland. Flat plain.					
Veg Condition	Good, grazing by hard hoofed.					
Fire Age	>5 yrs					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia sibirica, Psydrax suaveolens*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Acacia sibirica*
Shrubs 1 - 2m	2 - 10%	*Eremophila compacta*
Shrubs < 1m	< 2%	*Eremophila forrestii, Eremophila georgei, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Eremophila jucunda, Ptilotus obovatus* var. *obovatus, Sida* ? *calyxhymenia, Solanum ellipticum, Solanum lasiophyllum, Thryptomene decussata*
Tussock grasses	30 - 70%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*
Herbs	< 2%	*Calandrinia* ?*translucens*

722 WRE Site 14

Described by	JN	Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547824	**mE**	7016428	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay with surface crust.					
Rock Type						
Vegetation	*Acacia pruinocarp*a low open woodland over *Acacia ramulos*a var. *linophyll*a open scrub over *Acacia ramulos*a var. *linophyll*a and *Eremophil*a *forrestii* shrubland over *Eremophil*a *forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over A*ristid*a *contort*a closed tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Moderate leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia pruinocarpa, Acacia sibirica*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia tetragonophylla, Eremophila forrestii*
Shrubs < 1m	2 - 10%	*Eremophila* ?*georgei, Eremophila fraseri, Eremophila georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Senna* sp. Meekatharra (E. Bailey 1-26), *Sida calyxhymenia*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida fibulifera, Sida spodochroma, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	> 70%	*Aristida contorta, Eragrostis pergracilis*

722 WRE Site 15

Described by		Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	547370	**mE**	7016820	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with surface crust, gravel/pebbles and many stones/boulders.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia pruinocarp*a and *Acacia* a*neur*a var. a*neur*a low open woodland over *Acacia* a*neur*a var. a*neur*a high shrubland over *Acacia ramulos*a var. *linophyll*a open shrubland over *Scaevol*a *spinescens, Eremophil*a *forrestii* shrubs and *Acacia* a*neur*a var. a*neur*a low open shrubland over *Eriachne pulchell*a *sub*sp. *pulchell*a open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by goats, with tracks.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Chenopodium gaudichaudianum*
Shrubs < 1m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Eremophila forrestii, Eremophila georgei, Eremophila simulans* subsp. *simulans, Scaevola spinescens, Sida calyxhymenia, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Maireana georgei, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sclerolaena eriacantha, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Bulbostylis barbata*

722 WRE Site 16

Described by		Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	548863	**mE**	7016361	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay and clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia anuera var aneura* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* shrubland over *Eremophila forrestii* and *Ptilotus schwartzii* low open shrubland over *Ptilotus polystachyus* open herbs over *Monachather paradoxus* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse plant litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Eremophila spuria, Ptilotus polystachyus, Sida* sp. *Excedentifolia* (J.L. Egan 1925)
Shrubs < 0.5m	2 - 10%	*Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus, Ptilotus schwartzii*

722 WRE Site 17

Described by	JN	Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	549879	**mE**	7017184	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay with surface crust and loose surface soil.					
Rock Type	Few, non-banded ferrous rocks.					
Vegetation	*Acacia aneura* var. ?*intermedia* scattered low trees over *Acacia aneura* var. ?*intermedia* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila forrestii, Eremophila granitica, Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Aristida contorta* tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse wood and leaf litte under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. ?*intermedia, Acacia aneura* var. *aneura, Acacia cockertoniana, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila forrestii, Eremophila granitica, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	10 - 30%	*Eremophila forrestii, Eremophila simulans* subsp. *simulans, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Ptilotus obovatus* var. *obovatus, Sclerolaena densiflora, Sclerolaena uniflora, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Thyridolepis multiculmis*

722 WRE Site 18

Described by	SH	Date:	8/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	550527	**mE**	7017872	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose surface soil.					
Rock Type	Nil					
Vegetation	*Acacia aneura* var. *intermedia* and *Acacia craspedocarpa* low open woodland to open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* open shrubland over *Eremophila forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Ptilotus polystachyus* herbs over *Aristida contorta* open hummock grassland. Flat plain.					
Veg Condition	Poor, grazed by goats.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia craspedocarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Chenopodium gaudichaudianum, Eremophila forrestii*
Shrubs < 1m	2 - 10%	*Acacia tetragonophylla, Solanum ashbyae*
Shrubs < 0.5m	2 - 10%	*Maireana* ?*villosa, Ptilotus obovatus* var. *obovatus, Sida fibulifera*
Tussock grasses	10 - 30%	*Aristida contorta*
Herbs	30 - 70%	*Ptilotus polystachyus*

722 WRE Site 19

Described by	JN	Date:	8/11/2006	Type:	Q	20x20	
Location	Weld Range						
MGA Zone	50	551133	**mE**	7018310	**mN**		
Habitat	Flat plain.						
Soil	Red-orange clay, with cracked clay and crust at surface, and continuous surface plates/boulders.						
Rock Type	BIF, non-banded iron.						
Vegetation	*Acacia anuera* var. *fuliginea scattered* low trees over *Acacia anuera* var. *fuliginea* and *Acacia craspedocarpa* high shrubland over *Acacia anuera* var. *fuliginea* and *Eremophila fraseri* open shrubland over *Eremophila fraseri* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Aristida contorta* open tussock grassland. Flat plain.						
Veg Condition	Good, grazed by hard hoofed, with tracks.						
Fire Age	None evident.						
Notes	Leaf and wood litter mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *fuliginea, Acacia sibirica*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia craspedocarpa, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Acacia tetragonophylla, Eremophila fraseri, Eremophila georgei, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila glutinosa, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Eremophila mackinlayi* subsp. *spathulata, Maireana triptera, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus*
Climbers	< 2%	*Rhyncharrhena linearis*

722 WRE Site 22

Described by	JN	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	569663	**mE**	7027652	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with surface crust, fine gravel and few coarse gravel/pebbles.					
Rock Type	BIF					
Vegetation	*Acacia aneura* var. *intermedia* low open woodland to *scattered* trees over *Acacia aneura* var. *aneura* high shrubland over *Eremophila forrestii* shrubland over *Eremophila forrestii* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Marsdenia australis* climbers over *Aristida contorta* very open tussock grassland. Flat plain.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Psydrax latifolia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila clarkei, Eremophila forrestii, Eremophila georgei*
Shrubs < 1m	10 - 30%	*Chenopodium gaudichaudianum, Senna glaucifolia, Senna stricta, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Ptilotus exaltatus* var. *exaltatus*

722 WRE Site 23

Described by	SH	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	572647	**mE**	7026444	**mN**	
Habitat	Gentle hill slope.					
Soil	Red-orange sandy clay, with many stones/boulders at surface.					
Rock Type	BIF, non-banded ferrous					
Vegetation	*Acacia aneura* var. *aneura* low open *woodland* over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* high open shrubland over *Prostanthera petrophila* open shrubland over *Micromyrtus placoides* and *Aluta aspera* subsp. *hesperia* low open *heath* over *Cheilanthes sieberi subsp. sieberi* very open herbs over *Austrostipa scabra* scattered tussock *grasses.* Gentle hill slope.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila latrobei* subsp. *latrobei* ms (glaucous variant), *Thryptomene decussata*
Shrubs < 1m	30 - 70%	*Aluta aspera* subsp. *hesperia, Eremophila georgei, Prostanthera petrophila, Solanum ashbyae*
Shrubs < 0.5m	10 - 30%	*Micromyrtus placoides*
Tussock grasses	< 2%	*Austrostipa scabra, Eriachne pulchella* subsp. *pulchella*
Herbs	2 - 10%	*Cheilanthes sieberi* subsp. *sieberi, Erymophyllum ramosum, Goodenia tenuiloba, Podolepis lessonii*

722 WRE Site 24

Described by	JN	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	571858	**mE**	7027290	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay, with surface crust and common coarse gravel and stones.					
Rock Type	BIF non-banded ferrous.					
Vegetation	*Acacia pruinocarpa scattered* trees over *Acacia aneura* low open woodland over *Acacia aneura* var. *aneura* high shrubland over *Eremophila forrestii* and *Acacia aneura* shrubland over *Eremophila forrestii* low shrubland over *Sida chrysocalyx* very open herbs over *Eragrostis eriopoda* scattered tussock grasses. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Moderate to sparse leaf and wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia aneura, Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Psydrax latifolia, Psydrax rigidula*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *ramulosa, Eremophila forrestii, Eremophila simulans* subsp. *simulans, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Eremophila ?jucunda, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	< 2%	*Eragrostis eriopoda*

722 WRE Site 25

Described by	SH	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	572027	**mE**	7027663	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose soil at surface.					
Rock Type	Nil					
Vegetation	*Acacia pruinocarp*a scattered low trees to *scattered* trees over *Acacia aneur*a var. *fuligine*a and *Acacia ramulos*a var. *linophyll*a open *scrub* over *Senn*a a*rtemisioides* subsp. *helmsii* open shrubland over *Eremophil*a *granitic*a and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Ptilotus polystachyus* open herbs over *Eriachne helmsii* very open tussock *grassl*and.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *fuliginea, Acacia pruinocarpa, Psydrax rigidula, Santalum acuminatum*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia rhodophloia*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila granitica, Senna stricta*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. x *sturtii*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Eriachne helmsii*
Herbs	10 - 30%	*Ptilotus polystachyus*

722 WRE Site 26

Described by	SH	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	573297	**mE**	7026981	**mN**	
Habitat	Gentle hill slope.					
Soil	Red-orange sandy clay, with continuous coarse gravel/pebbles and rocks/boulders at surface.					
Rock Type	BIF, non-banded ferrous, granite.					
Vegetation	*Acacia aneura* var. *aneura scattered* low trees over *Acacia aneura* var. *aneura* and *Acacia cockertoniana* high shrubland over *Eremophila latrobei subsp. latrobei* open shrubland over *Micromyrtus sulphurea* and *Dodonaea pachyneura* low *scattered* shrubs over *Goodenia tenuiloba* open herbs over *Eriachne pulchella subsp. pulchella* scattered tussock grasses. Gentle hill slope, BIF, non-banded ferrous, granite.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Moderate wood and sparse leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia cockertoniana*
Shrubs < 1m	2 - 10%	*Acacia exocarpoides, Eremophila georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Micromyrtus sulphurea, Senna* sp. Meekatharra(E. Bailey 1-26)*, Solanum ashbyae, Thryptomene decussata*
Shrubs < 0.5m	< 2%	*Aluta aspera* subsp. *hesperia, Dodonaea pachyneura, Philotheca brucei* subsp. *brucei, Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Stenanthemum petraeum*
Tussock grasses	< 2%	*Eriachne pulchella* subsp. *pulchella*
Herbs	10 - 30%	*Goodenia tenuiloba, Ptilotus obovatus* var. *obovatus*

722 WRE Site 27

Described by	SH	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	574151	**mE**	7027062	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with continuous surface plates/boulders					
Rock Type	BIF, ?calcrite and ?granite					
Vegetation	*Acacia pruinocarpa* scattered trees over *Acacia aneura* var. *aneura* low open woodland over *Acacia cockertoniana* and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia cockertoniana* and *Thryptomene decussata* shrubland over *Thryptomene decussata* and *Eremophila latrobei subsp. latrobei* shrubs low open shrubland over *Ptilotus schwartzii* very open herbs over *Grass* sp. scattered tussock grasses.					
Veg Condition	Good, with grazing by hard hoofed.					
Fire Age	None Evident					
Notes	Sparse leaf litter and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia cockertoniana, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia exocarpoides, Eremophila forrestii, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	< 2%	*Dodonaea pachyneura, Dodonaea rigida, Eremophila jucunda* subsp. *jucunda, Hemigenia tysonii, Ptilotus schwartzii, Sida calyxhymenia, Stenanthemum petraeum*
Tussock grasses	< 2%	POACEAE sp., *Ptilotus obovatus* var. *obovatus*

722 WRE Site 28

Described by	JN	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	573935	**mE**	7026087	**mN**	
Habitat	Small, gentle to moderate hill slope.					
Soil	Red-orange sandy clay, with fine gravel and few surface stones/boulders at surface.					
Rock Type	Non-banded ferrous, ferrous laterite					
Vegetation	*Acacia* a*neur*a var. a*neur*a low woodland to *woodl*and over *Acacia* a*neur*a var. a*neur*a and *Acacia ramulos*a var. *linophyll*a high shrubland over *Eremophil*a *georgei* low open heath to shrubland. Small, gentle to moderate hill slope.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Moderate wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Acacia aneura* var. *aneura*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Psydrax latifolia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia* ?*cockertoniana, Acacia grasbyi, Acacia pruinocarpa, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia pruinocarpa, Acacia tetragonophylla, Chenopodium gaudichaudianum, Eremophila georgei, Eremophila* sp.
Shrubs < 1m	30 - 70%	*Eremophila forrestii, Eremophila latrobei* subsp. *latrobei, Eremophila simulans* subsp. *Simulans, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Maireana* sp., *Ptilotus obovatus* var. *obovatus, Sclerolaena eriacantha, Sida* ? *Calyxhymenia, Solanum lasiophyllum*
Tussock grasses	< 2%	*Eragrostis eriopoda*
Climbers	< 2%	*Marsdenia australis, Marsdenia australis*

722 WRE Site 29

Described by	JN	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	574397	**mE**	7025516	**mN**	
Habitat	Hill slope/crest with moderate slope.					
Soil	Red orange sandy clay/clay, with surface crust and continuous surface-level plates/stones/boulders.					
Rock Type	BIF, non-banded ferrous, granite.					
Vegetation	*Acacia aneura* var. *aneura scattered* low trees over *Acacia aneura* var. *aneura* and *Acacia* sp. *Weld Range* high shrubland over *Acacia* sp. *Weld Range* and *Acacia speckii* open heath over *Senna glaucifolia, Eremophila georgei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Marsdenia australis* climbers over *Austrostipa scabra* very open tussock grassland. Hill slope/crest with moderate slope, BIF, non-banded ferrous, granite.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Sparse leaf and moderate to sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	30 - 70%	*Acacia speckii, Eremophila georgei, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Eremophila latrobei* subsp. *Latrobei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Austrostipa scabra*
Climbers	< 2%	*Marsdenia australis*

722 WRE Site 30

Described by	JN	Date:	7/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	572381	**mE**	7026342	**mN**	
Habitat	Moderate to steep hill slope.					
Soil	Red-orange sandy clay/clay, with surface crust, continuous stones/boulders and surface-level plates.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	A*cacia* a*neura* var. a*neura* high open shrubland to low open woodland over A*cacia* a*neura* var. a*neura* and *Prostanthera petrophila* shrubland over A*luta* a*spera* subsp. *hesperia* low open heath. Moderate to steep hill slope.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Sparse leaf and moderate to sparse wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia pruinocarpa, Grevillea berryana*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia exocarpoides, Acacia rhodophloia, Dodonaea pachyneura, Eremophila georgei, Prostanthera petrophila, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila* ?*margarethae, Eremophila latrobei* subsp. *latrobei, Micromyrtus placoides, Philotheca brucei* subsp. *brucei, Ptilotus obovatus* var. *obovatus, Psydrax rigidula, Senna glaucifolia*
Shrubs < 0.5m	30 - 70%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*

722 WRE Site 32

Described by	SH	Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	576110	**mE**	7027945	**mN**	
Habitat	Flat plain, with wash-out.					
Soil	Red-orange sandy clay/clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* and *Acacia aneura* var *argentea* woodland over *Acacia ramulosa* var. *ramulosa* low open woodland over *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila clarkei* and *Eremophila forrestii* low open shrubland to shrubland over *Sida chrysocalyx* very open herbs over *Monachather paradoxus* scattered tussock grasses. Flat plain, with wash-out.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Moderate leaf and plentiful wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *argentea, Acacia ramulosa* var. *ramulosa*
Shrubs > 2m	30 - 70%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila simulans* subsp. *simulans*
Shrubs < 1m	2 - 10%	*Eremophila clarkei, Eremophila forrestii*
Shrubs < 0.5m	< 2%	*Maireana* sp., *Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*
Tussock grasses	< 2%	*Monachather paradoxus*
Herbs	2 - 10%	*Myriocephalus guerinae, Ptilotus polystachyus*

722 WRE Site 33

Described by		Date: 6/11/2006	Type: Q		20x20
Location	Weld Range				
MGA Zone	50	576975 **mE**		7027507 **mN**	
Habitat	Undulating plain with gentle slope.				
Soil	Red-orange sandy clay, with surface crust, fine to coarse gravel, common stones/boulders.				
Rock Type	BIF, non-banded ferrous.				
Vegetation	*Acacia pruinocarp*a scattered trees over *Acacia* a*neur*a var. a*neur*a and *Acacia pruinocarp*a scattered low trees over *Acacia* a*neur*a var. a*neur*a and *Acacia* a*neur*a var. *intermedi*a open shrubland to open scrub over *Eremophil*a forest*ii* low open shrubland over *M*ona*chather paradoxus* very open tussock grassland. Undulating plain with gentle slope.				
Veg Condition	Good, grazed by hard hoofed, with tracks.				
Fire Age	>5 yrs				
Notes	Sparse wood and leaf litter under shrubs.				

Species List:

Trees 10 - 30m	< 2%	*Acacia pruinocarpa, Corymbia lenziana*
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Psydrax latifolia*
Shrubs > 2m	30 - 70%	*Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila clarkei*
Shrubs < 1m	2 - 10%	*Eremophila ?georgei, Eremophila forrestii, Eremophila simulans* subsp. *Simulans, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*

722 WRE Site 34

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	577572	**mE**	7028469	**mN**	
Habitat	Flat plain with wash out.					
Soil	Red-orange sandy clay, with loose surface soil.					
Rock Type						
Vegetation	*Acacia cuthbertsonii* and *Acacia pruinocarpa* woodland over *Acacia cuthbertsonii* and *Acacia aneura* var. *intermedia* low open forest over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Abutilon macrum* very open herbs over *Austrostipa scabra* open tussock grassland.					
Veg Condition	Good.					
Fire Age	None evident					
Notes	Moderate leaf and wood litter has been washed and deposited against shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia cuthbertsonii, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	< 2%	*Chenopodium gaudichaudianum, Eremophila clarkei*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila foliosissima, Eremophila forrestii, Senna artemisioides* subsp. *helmsii, Senna stricta, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Maireana* sp., *Prostanthera petrophila, Ptilotus obovatus* var. *obovatus, Sida fibulifera, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Austrostipa scabra, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	2 - 10%	*Euphorbia boophthona*

722 WRE Site 35

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	578426	**mE**	7028712	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay with surface crust.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland to open woodland over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* open shrubland to high shrubland over *Eremophila granitica* and *Eremophila foliosissima* low shrubland over *Ptilotus polystachyus* very open herbs over *Monachather paradoxus.* Open tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Moderate to sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia pruinocarpa, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Grevillea nematophylla* subsp. *supraplana*
Shrubs 1 - 2m	2 - 10%	*Eremophila granitica*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Chenopodium gaudichaudianum, Eremophila foliosissima, Eremophila forrestii, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	10 - 30%	*Maireana villosa, Ptilotus exaltatus* var. *exaltatus, Ptilotus obovatus* var. *obovatus, Sida fibulifera, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Monachather paradoxus*
Herbs	10 - 30%	*Ptilotus polystachyus*

722 WRE Site 36

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	578288	**mE**	7029509	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *intermedia* scattered low trees to scattered trees over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* open shrubland over *Eremophila forrestii* and *Solanum lasiophyllum* low scattered shrubs over *Ptilotus polystachyus* and *Sida fibulifera* very open herbs over *Monachather paradoxus* very open tussock grassland.					
Veg Condition						
Fire Age	None evident					
Notes	Sparse wood and lead litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *intermedia, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	2 - 10%	*Chenopodium gaudichaudianum, Eremophila forrestii, Eremophila spuria*
Shrubs < 0.5m	< 2%	*Aristida holathera* var. *holathera, Grevillea inconspicua, Sida fibulifera, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Climbers	< 2%	*Rhyncharrhena linearis*
Herbs	2 - 10%	*Cuscuta epithymum, Ptilotus obovatus* var. *obovatus, Ptilotus polystachyus*

722 WRE Site 37

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	578433	**mE**	7029011	**mN**	
Habitat	Gentle hill slope/crest.					
Soil	Red-orange sandy clay with continuous surface-level plates/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia* aff. quadrimarginea low open woodland over *Acacia aneura* var. *aneura* and *Thryptomene decussata* scattered tall shrubs over *Eremophila latrobei* subsp. *latrobei* and *Philotheca brucei* subsp. *brucei* open shrubland over *Eremophila latrobei* subsp. *latrobei*, *Philotheca brucei* subsp. *brucei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia tenuiloba* very open herbs over *Eriachne mucronata* (desert form) open tussock grassland. Gentle hill slope/crest.					
Veg Condition	Good.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs. 6 *Prostanthera petrophila* plants found on BIF.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aff. quadrimarginea, Acacia aneura* var. *aneura*
Shrubs 1 - 2m	< 2%	*Philotheca brucei* subsp. *brucei, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Dodonaea petiolaris, Eremophila latrobei* subsp. *latrobei, Solanum ashbyae*
Shrubs < 0.5m	10 - 30%	*Grevillea berryana, Prostanthera petrophila, Ptilotus obovatus* var. *obovatus, Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94), *Sida fibulifera, Sida* sp. golden calyces glabrous (H.N. Foote 32)
Tussock grasses	10 - 30%	*Eriachne mucronata* (desert form), *Eriachne pulchella*
Herbs	2 - 10%	*Goodenia tenuiloba*

722 WRE Site 38

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	579045	**mE**	7028527	**mN**	
Habitat	Drainage area with gentle slope and no distinct channels.					
Soil	Red-orange sandy clay/clay, with surface crust and loose soil.					
Rock Type						
Vegetation	*Acacia pruinocarp*a scattered tall trees over *Acacia* a*neur*a var. a*neur*a low woodland to open forest over *Acacia linophyll*a high shrubland over *Eremophil*a *georgei* shrubland over *Eremophil*a forestii and *Ptilotus obovatus* var. *obovatus* low shrubland over *Glycine canescens* climbers and *Sid*a *fibulifer*a open herbs over *Thyridolepis multiculmis* very open tussock grassland. Drainage area with gentle slope and no distinct channels.					
Veg Condition	Good.					
Fire Age	>5 yrs					
Notes	Moderate leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Trees < 10m	30 - 70%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia craspedocarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla, Chenopodium gaudichaudianum, Eremophila clarkei, Eremophila clarkei, Eremophila georgei, Eremophila glutinosa*
Shrubs < 1m	10 - 30%	*Abutilon macrum, Eremophila forrestii, Eremophila mackinlayi* subsp. *spathulata, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Hibiscus burtonii, Ptilotus obovatus* var. *obovatus, Senna* sp. Meekatharra(E. Bailey 1-26), *Sida fibulifera, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Thyridolepis multiculmis*
Climbers	< 2%	*Glycine canescens*
Herbs	< 2%	*Oxalis perennans*

722 WRE Site 39

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	580021	**mE**	7028822	**mN**	
Habitat	Undulating plain.					
Soil	Red-orange sandy clay, with surface crust, and common coarse gravel/pebbles and stones/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia pruinocarp*a open woodland over *Acacia* a*neur*a var. a*neur*a low open woodland over *Acacia* a*neur*a var. a*neur*a high shrubland over *Acacia* a*neur*a var. a*neur*a and *Acacia ramulos*a var. *linophyll*a open shrubland over *Acacia* a*neur*a var. a*neur*a low open shrubland and *Maireana* sp. low shrubland over *Sid*a *fibulifer*a very open herbs over *Aristida contorta* very open tussock grassland. Undulating plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila clarkei*
Shrubs < 1m	2 - 10%	*Chenopodium gaudichaudianum, Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Maireana* sp., *Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida fibulifera, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis eriopoda, Monachather paradoxus*
Climbers	2 - 10%	*Duperreya commixta*

722 WRE Site 40

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	580038	**mE**	7029085	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with surface crust and scattered fine gravel.					
Rock Type	BIF.					
Vegetation	*Acacia pruinocarp*a scattered trees over *Acacia pruinocarp*a and *Acacia* a*neur*a var. *intermedi*a low woodland over *Acacia* a*neur*a var. a*neur*a high shrubland over *Acacia ramulos*a var. *linophyll*a open shrubland over *Eremophil*a *forrestii* and *Ptilotus obovatus* var. *obovatus* low shrubland over A*ristid*a c*ontort*a open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Chenopodium gaudichaudianum, Eremophila clarkei, Eremophila forrestii, Eremophila latrobei* subsp. *latrobei*
Shrubs < 1m	10 - 30%	*Abutilon macrum, Ptilotus obovatus* var. *obovatus, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Eremophila georgei, Hibiscus burtonii, Maireana georgei, Maireana tomentosa, Maireana triptera, Maireana villosa, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus*
Herbs	2 - 10%	*Ptilotus exaltatus* var. *exaltatus*

722 WRE Site 41

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	580335	**mE**	7028443	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with much fine gravel, loose soil and coarse gravel/pebbles at surface.					
Rock Type	BIF, non-banded ferrous, granite, quartz.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila forrestii* low open shrubland to shrubland over *Ptilotus schwartzii* very open herbs over *Monachather paradoxus* open tussock grassland. Flat plain, BIF, non-banded ferrous, granite, quartz.					
Veg Condition	Good.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Grevillea berryana*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii*
Shrubs < 1m	2 - 10%	*Eremophila georgei*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Monachather paradoxus*
Herbs	2 - 10%	*Ptilotus polystachyus*

722 WRE Site 42

Described by		Date:	6/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	581164	**mE**	7028342	**mN**	
Habitat	Flat plain and creek bank.					
Soil	Red-orange sandy clay/clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland to woodland over *Acacia sibirica* and *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila forrestii* shrubs and *Acacia ramulosa* var. *linophylla* open heath over *Eremophila forrestii* and *Ptilotus obovatus* var *obovatus* low shrubland over *Abutilon otocarpum* open herbs over *Eragrostis dielsii* and *Aristida contorta* closed tussock grassland.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Brachychiton gregorii*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Brachychiton gregorii*
Shrubs > 2m	30 - 70%	*Acacia* ?*cockertoniana, Acacia ramulosa* var. *linophylla, Acacia sibirica*
Shrubs 1 - 2m	30 - 70%	*Eremophila forrestii*
Shrubs < 1m	10 - 30%	*Abutilon otocarpum, Eremophila* ?*georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Grevillea deflexa*
Shrubs < 0.5m	2 - 10%	*Abutilon* sp., *Eremophila georgei, Eremophila mackinlayi* subsp. *spathulata, Sida fibulifera, Solanum lasiophyllum*
Tussock grasses	> 70%	*Aristida contorta, Austrostipa scabra, Cymbopogon ambiguus, Eragrostis dielsii*
Herbs	10 - 30%	*Calandrinia* ?*translucens, Lobelia heterophylla, Ptilotus obovatus* var. *obovatus*

722 WRE Site 43

Described by		Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	581723	**mE**	7030241	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Brown loam/clay loam with hummus and loose soil at surface. Few rocks.					
Rock Type	Sparse calcrete.					
Vegetation	*Eucalyptus lucasii* low open forest to woodland over *Senn*a a*rtemisioides* subsp. *filifoli*a low shrubland to open shrubland over *Ptilotus obov*a*tus* var. *obov*a*tus* low shrubland over *Ptilotus exaltatus* var. *exaltatus* herbs over A*ustrostip*a *scabr*a open tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Widespread and plentiful leaf and wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Eucalyptus lucasii*
Shrubs > 2m	< 2%	*Eremophila longifolia*
Shrubs 1 - 2m	2 - 10%	*Pimelea microcephala* subsp. *microcephala, Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	10 - 30%	*Abutilon macrum, Chenopodium gaudichaudianum, Hibiscus* sp.*, Maireana* sp.*, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	10 - 30%	*Dissocarpus paradoxus, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Austrostipa scabra, Enneapogon caerulescens*
Climbers	< 2%	*Marsdenia australis*
Herbs	30 - 70%	*Ptilotus exaltatus* var. *exaltatus, Zygophyllum eremaeum*

722 WRE Site 44

Described by		Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	582477	**mE**	7030165	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with cracked clay surface and loose soil.					
Rock Type						
Vegetation	Acacia aneura var. aneura scattered low trees over Acacia tetragonophylla and Eremophila galeata high open shrubland over Eremophila galeata open shrubland over Ptilotus obovatus var. obovatus low scattered shrubs over Ptilotus aervoides open herbs over Eragrostis pergracilis and Aristida contorta tussock grassland.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia craspedocarpa, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila galeata*
Shrubs < 1m	< 2%	*Chenopodium gaudichaudianum*
Shrubs < 0.5m	< 2%	*Eremophila oldfieldii* subsp. *angustifolia, Ptilotus divaricatus* var. *divaricatus, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Enneapogon caerulescens, Eragrostis pergracilis*
Herbs	10 - 30%	*Euphorbia* sp., *Ptilotus aervoides*

722 WRE Site 45

Described by		Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	582532	**mE**	7029890	**mN**	
Habitat	Crest of a small gently sloped hill (mound).					
Soil	Yellow/orange sandy clay/cloay loam, with surface crust, fine gravel and common coarse					
Rock Type	gravel/pebbles and small rocks.					
Vegetation	BIF, calcrete, granite.					
Veg Condition	Acacia *burkittii* high shrubland over *Eremophila falcata* and Acacia *burkittii* shrubland over *Senna artemisioides* subsp. *filifolia* low open shrubland over *Austrostipa scabra* tussock grassland. Crest of a small gently sloped hill (mound), BIF, calcrete, granite.					
Fire Age	Good, grazed by hard hoofed, with tracks.					
Notes	None evident.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia burkittii*
Shrubs 1 - 2m	10 - 30%	*Eremophila falcata, Senna artemisioides* subsp. *filifolia, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 1m	2 - 10%	*Eremophila fraseri, Eremophila subfloccosa* subsp. *lanata, Pimelea microcephala* subsp. *microcephala, Ptilotus obovatus* var. *obovatus, Scaevola tomentosa, Senna artemisioides* subsp. x *sturtii, Solanum lasiophyllum*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Austrostipa scabra*

722 WRE Site 46

Described by		Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	583721	**mE**	7029312	**mN**	
Habitat	Flat plain with minor channel.					
Soil	Red-orange sandy clay, with cracked clay surface and loose soil.					
Rock Type						
Vegetation	*Acacia sibirica* scattered low trees over *Acacia tetragonophylla* and *Eremophila galeata* open to high open shrubland over *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Ptilotus aervoides* very open herbs over *Aristida contorta* tussock grassland.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Negligable leaf and sparse wood litter under shubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia sibirica, Acacia sibirica*
Shrubs > 2m	2 - 10%	*Acacia craspedocarpa, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila galeata, Rhagodia eremaea*
Shrubs < 1m	< 2%	*Abutilon macrum*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Eragrostis leptocarpa*
Herbs	2 - 10%	*Ptilotus aervoides, Streptoglossa cylindriceps*
Epiphytes	< 2%	*Amyema fitzgeraldii*

722 WRE Site 47

Described by		Date: 5/11/2006	Type: Q		20x20
Location	Weld Range				
MGA Zone	50	584163 **mE**		7028555 **mN**	
Habitat	Undulating plain with complex minor channels on a gentle slope.				
Soil	Red-orange sand/sandy clay, with a surface crust, fine gravel, loose soil and coarse pebbles/gravel.				
Rock Type	Non-banded ferrous. Few.				
Vegetation	*Acacia aneura* var. *aneura* low woodland to woodland over *Acacia tetragonophylla* open shrubland to high shrubland over *Eremophila fraseri* and *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Duperreya sericea* climbers over *Abutilon macrum* very open herbs over *Aristida contorta* open tussock grassland. Undulating plain with complex minor channels on a gentle slope.				
Veg Condition	Good, grazed by hard hoofed.				
Fire Age	None evident.				
Notes	Moderate leaf and wood litter under shrubs.				

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Acacia aneura* var. *aneura*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Eremophila longifolia*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia ramulosa* var. *ramulosa, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Leptomeria preissiana*
Shrubs < 1m	< 2%	*Abutilon macrum, Alternanthera denticulata, Eremophila fraseri, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Maireana* sp., *Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Eragrostis australasica*
Climbers	2 - 10%	*Amyema fitzgeraldii, Duperreya sericea, Glycine canescens, Glycine* sp.
Herbs	2 - 10%	*Parietaria cardiostegia*

722 WRE Site 48

Described by		Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	581863	**mE**	7027164	**mN**	
Habitat	Small hill crest.					
Soil	Red-orange sandy clay, with surface crust, and continuous coarse gravel/pebbles, stones and surface					
Rock Type	plates/boulders at surface.					
Vegetation	Non-banded ferrous.					
Veg Condition	A*cacia* a*neura* var. a*neura* shrubland to high shrubland over *Thrypt*o*mene decussat*a low shrubland over *Goodeni*a *tenuiloba* scattered herbs over *Eriachne pulchell*a subsp. *pulchell*a very open tussock grassland. Small hill crest.					
Fire Age	Excellent, grazed by hard hoofed.					
Notes	>5 yrs					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia rhodophloia*
Shrubs 1 - 2m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Dodonaea pachyneura, Eremophila georgei, Micromyrtus sulphurea, Philotheca brucei* subsp. *brucei, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum ashbyae, Stenanthemum petraeum, Thryptomene decussata*
Tussock grasses	2 - 10%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Herbs	< 2%	*Goodenia tenuiloba*

722 WRE Site 49

Described by		Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	580134	**mE**	7025220	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* open woodland over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* scattered low trees over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* shrubland over *Eremophila forrestii* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Rhyncharrhena linearis* climbers over *Sida fibulifera* very open herbs over *Monachather paradoxus* very open tussock grassland. Flat plain.					
Veg Condition	Good.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Eremophila clarkei*
Shrubs < 1m	10 - 30%	*Abutilon oxycarpum* subsp. *prostratum, Eremophila exilifolia, Eremophila forrestii, Eremophila forrestii, Eremophila simulans* subsp. *simulans*
Shrubs < 0.5m	10 - 30%	*Eremophila mackinlayi* subsp. *spathulata, Maireana* sp., *Ptilotus obovatus* var. *obovatus, Sclerolaena convexula, Sida fibulifera, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Enneapogon caerulescens, Monachather paradoxus*
Climbers	< 2%	*Rhyncharrhena linearis*

722 WRE Site 50

Described by		Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	579893	**mE**	7025318	**mN**	
Habitat	Lower gentle hill slope.					
Soil	Orange sandy clay with surface crust and common fine to coarse gravel/pebbles.					
Rock Type	BIF.					
Vegetation	*Grevillea berryana* scattered trees over Acacia aneura var. *intermedia* low open woodland over *Acacia aneura* var. *intermedia* open scrub over *Acacia ramulosa* var. *linophylla* and *Grevillea berryana* shrubland over *Eremophila forrestii* low shrubland over *Sida chrysocalyx* very open herbs over *Monachather paradoxus* scattered tussock grasses. Lower gentle hill slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla, Grevillea berryana*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Eremophila simulans* subsp. *simulans*
Shrubs < 1m	10 - 30%	*Eremophila forrestii, Eremophila jucunda, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	< 2%	*Eragrostis eriopoda, Monachather paradoxus*

722 WRE Site 51

Described by		Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	578949	**mE**	7025479	**mN**	
Habitat	Tall ridge crest with steep slope.					
Soil	Red-orange sandy clay, with continuous coarse gravel, rocks/boulders and surface level plates.					
Rock Type	BIF					
Vegetation	*Acacia aneura* var. *aneura* high shrubland to scattered low trees over *Thryptomene decussata* shrubland over *Ptilotus obovatus* var. *obovatus* and *Thryptomene decussata* low open heath over *Austrostipa scabra* very open tussock grassland. Tall ridge crest with steep slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Allocasuarina acutivalvis* subsp. *acutivalvis*
Shrubs 1 - 2m	10 - 30%	*Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Acacia pruinocarpa, Cymbopogon ambiguus, Eremophila forrestii, Eremophila latrobei* subsp. *latrobei, Harnieria kempeana* subsp. *muelleri, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	30 - 70%	*Dodonaea pachyneura, Ptilotus obovatus* var. *obovatus, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Austrostipa scabra, Eriachne helmsii*

722 WRE Site 52

Described by	SH	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	578405	**mE**	7024722	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with cracked clay surface and many surface stones/boulders.					
Rock Type	BIF, non-banded ferrous					
Vegetation	*Acacia cockertoniana* and *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila latrobei* subsp. *latrobei* and *Eremophila georgei* low scattered shrubs to scattered shrubs over *Eremophila* jucunda low scattered shrubs over *Ptilotus schwartzii* scattered herbs over *Aristida contorta* very open tussock grassland. Flat plain.					
Veg Condition	Good.					
Fire Age	None evident					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia cockertoniana, Grevillea berryana*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	< 2%	*Acacia cockertoniana, Eremophila forrestii, Eremophila latrobei* subsp. *latrobei, Eremophila latrobei* subsp. *latrobei*
Shrubs < 1m	< 2%	*Eremophila georgei*
Shrubs < 0.5m	< 2%	*Eremophila jucunda, Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Aristida contorta*
Herbs	< 2%	*Calandrinia* ?*translucens, Myriocephalus guerinae*

722 WRE Site 53

Described by	JN	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	576712	**mE**	7024044	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy plain, with surface crust and loose soil. Common coarse gravel and boulders are found at surface.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland to scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Acacia aneura* var. *aneura* low open shrubland over *Aristida contorta* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Eremophila georgei, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	< 2%	*Eremophila jucunda, Maireana georgei, Maireana* sp., *Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Myriocephalus guerinae*

722 WRE Site 54

Described by	JN	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	576288	**mE**	7024069	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with surface crust.					
Rock Type						
Vegetation	*Acacia aneura* var. fuliginea open forest over *Acacia aneura* var. *aneura* low woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* open heath over *Eremophila forrestii* and *Eremophila foliosissima* low shrubland over *Marsdenia australis* climbers and *Sida fibulifera* open herbs over *Monachather paradoxus* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Moderate wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	30 - 70%	*Acacia aneura* var. *fuliginea, Acacia pruinocarpa*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia minyura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Eremophila clarkei, Eremophila clarkei, Eremophila forrestii, Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	10 - 30%	*Eremophila foliosissima, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Shrubs < 0.5m	2 - 10%	*Eremophila georgei, Maireana* sp., *Ptilotus obovatus* var. *obovatus, Sida fibulifera, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Monachather paradoxus, Thyridolepis multiculmis*
Climbers	2 - 10%	*Marsdenia australis*
Herbs	10 - 30%	*Lobelia heterophylla, Ptilotus polystachyus* var. *polystachyus*

722 WRE Site 55

Described by	SH	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	576512	**mE**	7023213	**mN**	
Habitat	Flat plain					
Soil						
Rock Type						
Vegetation	*Grevillea berryana* scattered trees over *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia aneura* var. *fuliginea* high shrubland over *Eremophila forrestii* scattered shrubs over *Eremophila forrestii* , *Eremophila* foliosissima, *Eremophila jucunda* subsp. *jucunda* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Monachather paradoxus* very open tussock grassland.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Grevillea berryana, Psydrax rigidula, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Eremophila jucunda* subsp. *jucunda*
Shrubs < 0.5m	2 - 10%	*Eremophila foliosissima, Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	< 2%	*Ptilotus obovatus* var. *obovatus*

722 WRE Site 56

Described by	SH	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	576631	**mE**	7022957	**mN**	
Habitat	Minor channel surrounded by relatively bare clay pan.					
Soil	Red-orange sandy clay, with surface crust and loose soil..					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* and *Grevillea berryana* scattered low trees to scattered trees over *Acacia ramulosa* var. *linophylla* and *Acacia ramulosa* var. *ramulosa* open scrub over *Eremophila forrestii* shrubland over *Eremophila foliosissima* low shrubland over *Ptilotus schwartzii* very open herbs over *Thyridolepis multiculmis* very open tussock grassland. Minor channel surrounded by relatively bare clay pan.					
Veg Condition	Good					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *ramulosa, Grevillea berryana, Psydrax suaveolens*
Shrubs > 2m	30 - 70%	*Acacia minyura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila clarkei, Eremophila forrestii*
Shrubs < 1m	10 - 30%	*Eremophila foliosissima*
Shrubs < 0.5m	< 2%	*Eremophila ?jucunda, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)
Tussock grasses	2 - 10%	*Aristida contorta, Thyridolepis multiculmis*
Herbs	2 - 10%	*Waitzia acuminata* var. *acuminata*

722 WRE Site 57

Described by	JN	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	555361	**mE**	7018447	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with surface crust, fine gravel and loose soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland to scattered trees over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* open scrub over *Acacia ramulosa* var. *linophylla* and *Acacia craspedocarpa* open shrubland over *Eremophila punicea* low shrubland over *Ptilotus exaltatus* var. *exaltatus* scattered herbs over *Eragrostis pergracilis* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia aneura* var. *aneura*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Rhagodia eremaea*
Shrubs < 1m	10 - 30%	*Eremophila georgei, Eremophila punicea, Maireana lobiflora, Senna stricta, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Eremophila falcata, Eremophila latrobei* subsp. *filiformis, Ptilotus gaudichaudii* var. *gaudichaudii, Ptilotus obovatus* var. *obovatus, Sclerolaena densiflora, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis pergracilis*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Calandrinia translucens, Ptilotus exaltatus* var. *exaltatus*

722 WRE Site 58

Described by	SH	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	556308	**mE**	7018551	**mN**	
Habitat	Salt pan					
Soil	Red-orange sandy clay with loose soil at surface.					
Rock Type						
Vegetation	*Cratystylis subspinescens* high shrubland over *Melaleuca stereophloia* and *Cratystylis subspinescens* low open shrubland to shrubland over *Halosarcia indica* subsp. *leiostachya* and *Frankenia laxiflora* low shrubland over *Podolepis capillaris* very open herbs over *Eragrostis pergracilis* open tussock grassland. Salt pan.					
Veg Condition	Good.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Leptomeria preissiana, Melaleuca stereophloia*
Shrubs 1 - 2m	10 - 30%	*Cratystylis subspinescens, Eremophila glabra* subsp. *glabra, Eremophila glabra* subsp. *tomentosa, Eremophila maculata* subsp. *brevifolia, Muehlenbeckia florulenta*
Shrubs < 1m	2 - 10%	*Atriplex* sp., *Atriplex vesicaria, Eremophila georgei*
Shrubs < 0.5m	10 - 30%	*Frankenia laxiflora, Podolepis capillaris, Pterocaulon sphacelatum, Ptilotus divaricatus* var. *divaricatus, Tecticornia doleiformis, Tecticornia indica* subsp. *leiostachya*
Tussock grasses	10 - 30%	*Eragrostis pergracilis*

722 WRE Site 59

Described by		Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	555937	**mE**	7016482	**mN**	
Habitat	Creek bank and bed with gentle slope.					
Soil	Red-orange sand/sandy clay with surface crust and loose soil. Continuous coarse gravel/pebbles, stones and surface level plates/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low woodland to woodland over *Acacia sibirica* low woodland over *Acacia sibirica* and *Acacia* sp. Weld Range high open shrubland over *Senna* sp. Meekatharra and *Eremophila georgei* open shrubland over *Senna* sp. Meekatharra, *Eremophila forrestii* and *Calytrix desolata* low open shrubland over *Pluchea dentex* scattered herbs over *Cymbopogon ambiguus* very open tussock grassland. Creek bank and bed with gentle slope.					
Veg Condition	Good, grazed by hard hoofed					
Fire Age	?					
Notes	Sparse leaf and moderate wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Acacia aneura* var. *aneura, Grevillea berryana*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia sibirica, Acacia* sp. Weld Range (A. Markey & S. Di 2994), *Grevillea berryana*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila exilifolia, Eremophila forrestii, Eremophila georgei, Eremophila glutin Eremophila macmillaniana, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharr Bailey 1-26)
Shrubs < 1m	2 - 10%	*Calytrix desolata, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *filif Senna artemisioides* subsp. x *artemisioides, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Austrostipa scabra, Cymbopogon ambiguus, Monachather paradoxu*
Climbers	< 2%	*Duperreya sericea, Marsdenia australis*
Herbs	< 2%	*Pluchea dentex*

722 WRE Site 60

Described by	JN	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	556788	**mE**	7016839	**mN**	
Habitat	Flat plain, approximately 30m to the south-west of a creek bed.					
Soil	Red-orange sandy clay/clay, with loose soil at surface.					
Rock Type						
Vegetation	*Acacia aneura* and *Hakea lorea* subsp. *lorea* scattered trees over *Hakea lorea* subsp. *lorea* low open woodland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii* high shrubland over *Eremophila forrestii*, *Senna* sp. Meekatharra and *Senna artemisioides* subsp. *sturtii* open heath over *Senna artemisioides* subsp. *sturtii*, *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Glycine canescens* climbers over *Abutilon oxycarpum* subsp. *prostratum* very open herbs over *Aristida contorta* tussock grassland. Flat plain, approximately 30m to the south-west of a creek bed.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Hakea lorea* subsp. *lorea*
Trees < 10m	2 - 10%	*Acacia aneura, Acacia craspedocarpa, Hakea lorea* subsp. *Lorea*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Eremophila forrestii, Eremophila macmillaniana, Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	10 - 30%	*Acacia tetragonophylla, Eremophila georgei, Eremophila glutinosa, Eremophila granitica, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. x *sturtii, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	2 - 10%	*Abutilon oxycarpum* subsp. *prostratum, Ptilotus obovatus* var. *obovatus, Senna* sp. Meekatharrax *artemisiodes* subsp. x *sturtii, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus, Eragrostis lanipes*
Climbers	< 2%	*Glycine canescens*

722 WRE Site 61

Described by	JN	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	557395	**mE**	7018295	**mN**	
Habitat	Flat flood plain.					
Soil	Orange sandy clay with surface crust, loose soil and coarse gravel.					
Rock Type	Non-banded ferrous, calcrete.					
Vegetation	*Pittosporum angustifolium* scattered low trees to scattered trees over *Melaleuca stereophloia* scattered tall shrubs over *Cratystylis subspinescens* and *Melaleuca stereophloia* shrubland over *Melaleuca stereophloia*, *Cratystylis subspinescens*, *Halosarcia indica* subsp. *leiostachya* and *Frankenia laxiflora* low open heath over *Sonchus oleraceus* scattered herbs over *Aristida contorta* very open tussock grassland. Flat flood plain.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Pittosporum angustifolium*
Shrubs 1 - 2m	10 - 30%	*Cratystylis subspinescens, Eremophila glabra* subsp. *glabra, Leptomeria preissiana, Melaleuca stereophloia, Muehlenbeckia florulenta*
Shrubs < 1m	30 - 70%	*Atriplex nummularia, Frankenia laxiflora, Maireana* sp.*3, Tecticornia indica* subsp. *leiostachya*
Shrubs < 0.5m	10 - 30%	*Atriplex bunburyana, Frankenia laxiflora, Lawrencia chrysoderma, Ptilotus obovatus* var. *obovatus, Sclerolaena patenticuspis, Sida fibulifera*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis dielsii*
Herbs	< 2%	*Brachyscome ciliaris* var. *ciliaris, Centaurium clementii, Cullen cinereum, Sonchus oleraceus, Swainsona laciniata*

722 WRE Site 62

Described by	SH	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	558162	**mE**	7019250	**mN**	
Habitat	Flat plain. ?Seep samphire flat.					
Soil	Red-orange and white sandy clays and clays. Cracked clay and loose soil at surface.					
Rock Type						
Vegetation	*Eucalyptus gypsophil*a low woodland to woodland over *Cratystylis subspinescens* shrubland to scattered tall shrubs over *Lawrencia chrysoderma*, *Cratystylis subspinescens* and A*triplex bunburyan*a low shrubland over A*ngianthus tomentosus* open herbs over *Eragrostis dielsii* tussock grassland. Flat plain. ?Seep samphire flat.					
Veg Condition	Good.					
Fire Age	>5 yrs					
Notes	Sparse leaf and wood litter under trees.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Eucalyptus carnei*
Trees < 10m	10 - 30%	*Eucalyptus carnei*
Shrubs 1 - 2m	10 - 30%	*Cratystylis subspinescens, Eremophila pantonii, Leptomeria preissiana, Scaevola spinescens,Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	10 - 30%	*Eremophila glabra* subsp. *tomentosa, Pittosporum angustifolium*
Shrubs < 0.5m	2 - 10%	*Atriplex bunburyana, Atriplex vesicaria, Frankenia laxiflora, Lawrencia chrysoderma, Pittosporum angustifolium, Tecticornia doleiformis, Zygophyllum aurantiacum*
Tussock grasses	30 - 70%	*Eragrostis dielsii*
Herbs	10 - 30%	*Angianthus tomentosus, Goodenia lyrata, Minuria cunninghamii, Rhodanthe humboldtiana*

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Described by	JN	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	558753	**mE**	7019308	**mN**	
Habitat	Flat flood plain area, seasonally inundated.					
Soil	Red-orange sandy clay, with surface crust.					
Rock Type						
Vegetation	*Acacia aneura* var. *fuliginea* and *Grevillea striata* low open woodland to open woodland over *Acacia craspedocarpa* and *Acacia tetragonophylla* high shrubland over *Melaleuca stereophloia* shrubland over *Melaleuca stereophloia* and *Scaevola spinescens* low open shrubland over *Goodenia* sp. Weld Range open herbs over *Eragrostis pergracilis* very open tussock grassland. Flat flood plain area, seasonally inundated.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Moderate wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Grevillea striata*
Trees < 10m	2 - 10%	*Grevillea striata*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia tetragonophylla, Eremophila longifolia, Grevillea nematophylla* subsp. *supraplana, Melaleuca stereophloia*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Ptilotus divaricatus* var. *divaricatus, Senna stricta*
Shrubs < 1m	2 - 10%	*Eremophila maculata* subsp. *brevifolia, Scaevola spinescens*
Shrubs < 0.5m	2 - 10%	*Alternanthera denticulata*
Tussock grasses	2 - 10%	*Eragrostis pergracilis, Eriachne flaccida*
Climbers	< 2%	*Lysiana murrayi*
Herbs	10 - 30%	*Bergia perennis* subsp. *exigua, Calocephalus multiflorus, Goodenia berringbinensis, Goodenia tenuiloba, Marsilea* sp.

722 WRE Site 64

Described by	SH	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	558818	**mE**	7019727	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay.					
Rock Type						
Vegetation	*Grevillea striata* and *Acacia ramulosa* var. *ramulosa* low open woodland to scattered trees over *Grevillea nematophylla* subsp. *supraplana* and *Acacia tetragonophylla* high open shrubland over *Scaevola* spinescens open shrubland over *Ptilotus divaricatus* var. *divaricatus* low shrubland over *Calocephalus multiflorus* herbs over *Eriachne flaccida* open tussock grassland.					
Veg Condition	Poor, grazed by hard hoofed, with tracks. Large quantities of litter scattered around due to proximity to dump.					
Fire Age	?					
Notes	Plentiful leaf litter and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Grevillea striata*
Trees < 10m	2 - 10%	*Acacia craspedocarpa, Acacia ramulosa* var. *ramulosa, Eremophila longifolia, Grevillea striata*
Shrubs > 2m	2 - 10%	*Acacia victoriae, Grevillea nematophylla* subsp. *supraplana, Senna artemisioides* subsp. *filifolia*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Scaevola spinescens*
Shrubs < 1m	10 - 30%	*Ptilotus divaricatus* var. *divaricatus*
Tussock grasses	10 - 30%	*Austrostipa elegantissima, Eriachne flaccida*
Climbers	< 2%	*Amyema fitzgeraldii*
Herbs	< 2%	*Alternanthera denticulata, Calocephalus multiflorus*

722 WRE Site 65

Described by	JN	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	560117	**mE**	7020303	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with surface crust, fine gravel and loose soil.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low woodland to scattered trees over *Acacia craspedocarpa* and *Acacia aneura* var. *aneura* open shrubland to high shrubland over *Eremophila oppositifolia* subsp. angustifolia low shrubland over *Eriachne pulchella* subsp. *pulchella* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None-evident.					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia craspedocarpa, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Chenopodium gaudichaudianum*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Eremophila latrobei* subsp. *filiformis, Eremophila oppositifolia* subsp. *angustifolia, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	10 - 30%	*Maireana melanocoma, Maireana* sp.*2, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*
Climbers	< 2%	*Lysiana murrayi*
Herbs	< 2%	*Bergia perennis* subsp. *exigua, Goodenia tenuiloba, Schoenia cassiniana*

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Described by	SH	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	560739	**mE**	7020177	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay, with loose surface soil and animal excrement.					
Rock Type						
Vegetation	*Acacia aneura* var. *intermedia* low open woodland to open woodland over *Acacia ramulosa* var. *linophylla* scattered shrubs to open scrub over *Eremophila* glutinosa and *Senna artemisioides* subsp. *helmsii* low open shrubland over *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low scattered shrubs over *Marsdenia australis* climbers over *Ptilotus polystachyus* var. *polystachyus* open herbs over *Aristida contorta* and *Monachather paradoxus* open tussock grassland.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and moderate wood litter mainly under shrubs. The area has been heavily grazed by goats, which were not disturbed by human proximity.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *intermedia*
Shrubs > 2m	30 - 70%	*Acacia murrayana, Acacia ramulosa* var. *linophylla, Rhagodia eremaea*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Ptilotus polystachyus* var. *polystachyus, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	< 2%	*Eremophila glutinosa, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus*
Climbers	< 2%	*Lysiana murrayi, Marsdenia australis*
Herbs	10 - 30%	*Ptilotus obovatus* var. *obovatus*

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Described by	SH	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	560339	**mE**	7018774	**mN**	
Habitat	Moderate hill slope.					
Soil	Red-orange sandy clay, with continuous stones and surface level plates/boulders.					
Rock Type	Non-banded ferrous					
Vegetation	*Acacia aneura* var. *aneura* low woodland over *Thryptomene decussata* and *Acacia aneura* var. *aneura* high open shrubland over *Eremophila latrobei* subsp. *latrobei* and *Eremophila compacta* open shrubland over *Eremophila latrobei* subsp. *latrobei* and *Solanum lasiophyllum* low open shrubland over *Sida chrysocalyx* very open herbs over *Eriachne pulchella* subsp. *pulchella* very open tussock grassland. Moderate hill slope.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila compacta*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)*, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Eriachne pulchella* subsp. *pulchella*
Herbs	2 - 10%	*Cheilanthes lasiophylla*

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Described by	JN	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	561487	**mE**	7019282	**mN**	
Habitat	Steep hill slope.					
Soil	Red-orange sandy clay with surface crust, and continuous coarse gravel, surface level plates and					
Rock Type	boulders.					
Vegetation	BIF.					
Veg Condition	*Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* high shrubland to scattered low trees over *Thryptomene decussata* and *Acacia sibirica* shrubland over *Thryptomene decussata* and *Eremophila* compacta low shrubland over *Sida* sp. *Excedentifolia* very open herbs over *Eriachne helmsii* scattered tussock grasses. Steep hill slope.					
Fire Age	Excellent, grazed by hard hoofed.					
Notes	None evident.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia*
Shrubs > 2m	10 - 30%	*Acacia rhodophloia, Acacia sibirica*
Shrubs 1 - 2m	10 - 30%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila compacta, Eremophila glutinosa*
Shrubs < 0.5m	10 - 30%	*Dodonaea pachyneura, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Eriachne helmsii, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Herbs	2 - 10%	*Sida* sp. *Excedentifolia* (J.L. Egan 1925)

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Described by	SH	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	562050	**mE**	7019840	**mN**	
Habitat	Minor channel, washout from hill.					
Soil	Red-orange sandy clay with fine to coarse gravel and continuous surface boulders.					
Rock Type	Non-banded ferrous, ?calcrete and granite.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia rhodophloia* and *Thryptomene decussata* scattered tall shrubs over *Baeckea* sp. Melita Station and *Acacia rhodophloia* scattered shrubs over *Micromyrtus placoides*, *Baeckea* sp. Melita Station and *Aluta aspera* subsp. *hesperia* low shrubland over *Goodenia tenuiloba* scattered herbs over Grass sp. scattered tussock grasses.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs 1 - 2m	< 2%	*Acacia rhodophloia, Acacia sibirica, Thryptomene decussata*
Shrubs < 1m	< 2%	*Aluta aspera* subsp. *hesperia, Baeckea* sp. Melita Station (H. Pringle 2738), *Eremophila latrobei* subsp. *latrobei, Micromyrtus placoides, Philotheca brucei* subsp. *brevifolia, Prostanthera petrophila*
Shrubs < 0.5m	10 - 30%	*Aluta aspera* subsp. *hesperia, Hemigenia tysonii, Stenanthemum petraeum*
Tussock grasses	< 2%	POACEAE sp.
Herbs	< 2%	*Goodenia tenuiloba*

722 WRE Site 70

Described by	JN	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	563095	**mE**	7019945	**mN**	
Habitat	Hills lope and crest with a moderate slope.					
Soil	Red-orange sandy clay with surface crust, and continuous coarse gravel, stones/boulders and					
Rock Type	surface level plates.					
Vegetation	BIF, non-banded ferrous.					
Veg Condition	Acacia aneura var. aneura low open woodland over Acacia aneura high shrubland over Acacia aneura and *Thryptomene decussata* shrubland over *Thryptomene decussata*, *Eremophila latrobei* subsp. *latrobei* and Philotheca brucei subsp. brucei low shrubland over *Sida* sp. *Excedentifolia* scattered herbs over *Monochathe* sp very open tussock grassland.					
Fire Age	Excellent, grazed by hard hoofed.					
Notes	None evident.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Psydrax rigidula, Santalum spicatum*
Shrubs 1 - 2m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Acacia aneura, Dodonaea pachyneura, Eremophila glutinosa, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. *Excedentifolia* (J.L. Egan 1925), *Solanum ashbyae*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Herbs	< 2%	*Goodenia tenuiloba, Monachather paradoxus*

722 WRE Site 71

Described by	SH	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	564237	**mE**	7020615	**mN**	
Habitat	Moderate hill slope.					
Soil	Red-orange sandy clay with stones and continuous surface-level plates/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low woodland over *Thryptomene decussata* high open shrubland over *Eremophila glutinosa* open heath over *Eremophila latrobei* subsp. *latrobei* and *Sida excedentifolia* low open shrubland over *Goodenia tenuiloba* open herbs over *Eragrostis eriopoda* scattered tussock grasses.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	SE face 140°. Approximately 80 Prostanthera petrophila on SE face, around 40 of those inside the quadrat. Numbers reduce after the BIF outcrop.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia minyura, Grevillea berryana, Psydrax suaveolens*
Shrubs 1 - 2m	30 - 70%	*Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila glutinosa, Prostanthera petrophila*
Shrubs < 0.5m	2 - 10%	*Cheilanthes sieberi* subsp. *sieberi, Eremophila latrobei* subsp. *latrobei, Sida* sp. *Excedentifolia* (J.L. Egan 1925)
Tussock grasses	< 2%	*Eragrostis eriopoda*
Climbers	< 2%	*Marsdenia australis*
Herbs	10 - 30%	*Goodenia tenuiloba*

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Described by	JN	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	565375	**mE**	7021598	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay with surface crust and fine gravel.					
Rock Type	Non-banded ferrous.					
Vegetation	*Grevillea berryana* scattered trees over Acacia aneura var. aneura low open woodland over Acacia ramulosa var. linophylla and Acacia aneura var. aneura high shrubland over Acacia ramulosa var. linophylla and *Eremophila forrestii* shrubland over *Eremophila forrestii*, *Solanum lasiophyllum* and *Eremophila* margarethae low shrubland over *Sida chrysocalyx* very open herbs over *Monachather paradoxus* very open tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, tracks.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Grevillea berryana*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Eremophila granitica*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Mirbelia rhagodioides*
Shrubs < 0.5m	2 - 10%	*Eremophila margarethae, Hibiscus burtonii, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)*, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis eriopoda, Monachather paradoxus*

722 WRE Site 75

Described by	SH	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	558361	**mE**	7016368	**mN**	
Habitat	Flat plain, including culvert drain.					
Soil	Red-orange sandy clay, with loose soil and common coarse gravel/pebbles.					
Rock Type	BIF, non-banded ferrous and quartz.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia ramulosa* var. *linophylla* and *Senna glaucifolia* high open shrubland over *Eremophila forrestii* and *Senna glaucifolia* open shrubland over *Eremophila forrestii*, *Senna glaucifolia* and *Ptilotus schwartzii* low scattered shrubs over *Ptilotus polystachyus* very open herbs over *Aristida contorta* very open tussock grassland. Flat plain, including culvert drain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Eremophila forrestii, Senna glaucifolia*
Shrubs < 1m	< 2%	*Maireana* sp., *Solanum ashbyae, Tribulus suberosus*
Shrubs < 0.5m	< 2%	*Eremophila margarethae, Maireana georgei, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida spodochroma*
Tussock grasses	2 - 10%	*Aristida contorta*
Herbs	2 - 10%	*Ptilotus polystachyus*

722 WRE Site 76

Described by	JN	Date:	10/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	558871	**mE**	7016000	**mN**	
Habitat	Moderate hill slope.					
Soil	Red-orange sandy clay, with surface crust, and continuous srones/boulders and surface-level plates.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland to open scrub over *Eremophila macmillaniana* low shrubland to shrubland over *Sida atrovirens* scattered herbs over *Aristida contorta* tussock grassland. Moderate hill slope.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	None-evident.					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Psydrax latifolia*
Shrubs > 2m	30 - 70%	*Acacia craspedocarpa*
Shrubs 1 - 2m	10 - 30%	*Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Calytrix desolata, Eremophila glutinosa, Senna* sp. Meekatharra(E. Bailey 1-26)*, Tribulus suberosus*
Shrubs < 0.5m	< 2%	*Abutilon macrum, Abutilon otocarpum, Ptilotus helipteroides* var. *helipteroides, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta*

722 WRE Site 77

Described by	SH	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	560383	**mE**	7016704	**mN**	
Habitat	Flat plain, creek bed and bank.					
Soil	Red-orange sandy clay, with loose soil and coarse gravel/pebbles continuous at surface.					
Rock Type	Non-banded ferrous, granite, quartz.					
Vegetation	*Acacia aneura* var. a*neur*a and *Acacia aneura* var. *intermedi*a woodland to low open forest over *Acacia ramulosa* var. *linophyll*a high shrubland over *Senn*a a*rtemisioides* subsp. *helmsii* and *Senn*a sp. Meekatharra low open shrubland to shrubland over *Ptilotus obovatus* var. *obovatus* low open shrubland over *Marsdeni*a a*ustralis* climbers over A*butil*on *macrum* and *Sid*a *fibulifer*a open herbs over A*ristid*a *c*onto*r*ta and A*ustrostip*a *scabr*a open tussock grassland.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Psydra*x *latifolia*
Shrubs > 2m	10 - 30%	*Acacia pruinocarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Chenopodium gaudichaudianum, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila georgei, Senna artemisioides* subsp. *oligophylla* x *helmsii, Senna artemisioides* subsp. x *sturtii*
Shrubs < 0.5m	2 - 10%	*Acacia exocarpoides, Eremophila forrestii, Eremophila* sp., *Ptilotus obovatus* var. *obovatus, Sida fibulifera, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Austrostipa scabra, Cymbopogon ambiguus, Enneapogon* sp.
Climbers	2 - 10%	*Marsdenia australis*
Herbs	10 - 30%	*Trichodesma zeylanicum* var. *zeylanicum*

722 WRE Site 78

Described by	JN	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	560839	**mE**	7016798	**mN**	
Habitat	Hill slope and crest with moderate to gentle slope.					
Soil	Red-orange sandy clay with surface crust, and continuous stones/boulders and surface-level plates.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila glutinosa* shrubland over *Eremophila* glutinosa and *Eremophila exilifolia* low shrubland over *Aristida contorta* open tussock grassland. Hill slope and crest with moderate to gentle slope.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	*Acacia speckii, Eremophila exilifolia, Eremophila glutinosa, Philotheca brucei* subsp. *brucei*
Shrubs < 1m	10 - 30%	*Dodonaea amplisemina, Eremophila forrestii, Eremophila georgei, Eremophila glutinosa, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Heliotropium ovalifolium, Hibiscus sturtii* var. *forrestii, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 79

Described by	SH	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	561459	**mE**	7016891	**mN**	
Habitat	Hill slope/crest facing north.					
Soil	Red-orange sandy clay with continuous surface stones/boulders and surface-level plates.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low woodland over *Acacia* sp. Weld Range and *Acacia longispinea* high shrubland over *Eremophila glutinosa* and *Eremophila macmillaniana* open shrubland over *Eremophila glutinosa* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Ptilotus helipteroides* var. *helipteroides* and *Goodenia tenuiloba* open herbs over *Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* very open tussock grassland. Hill slope/crest facing north.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf litter and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Psydrax rigidula*
Shrubs > 2m	10 - 30%	*Acacia longispinea*
Shrubs 1 - 2m	2 - 10%	*Eremophila macmillaniana*
Shrubs < 1m	2 - 10%	*Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	< 2%	*Ptilotus helipteroides* var. *helipteroides, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Sida spodochroma, Solanum lasiophyllum, Tribulus suberosus*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon* sp., *Eriachne pulchella* subsp. *pulchella*
Herbs	10 - 30%	*Goodenia tenuiloba*

722 WRE Site 80

Described by	JN	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	561967	**mE**	7017599	**mN**	
Habitat	Moderate hill slope.					
Soil	Red-orange sandy clay with surface crust, amd continuous stones/boulders and surface-level plates.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia aneura* var. *aneura* high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Dodonaea* sp. Ninghan low shrubland over *Sida atrovirens* scattered herbs over *Aristida contorta* open tussock grassland. Moderate hill slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	*Acacia speckii, Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Cymbopogon ambiguus, Eremophila forrestii, Eremophila glutinosa, Eremophila mackinlayi* subsp. *spathulata, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Halgania cyanea* var. Allambi Stn (B.W. Strong 676), *Heliotropium ovalifolium, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260)*, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 81

Described by	SH	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	563953	**mE**	7018088	**mN**	
Habitat	Lower gentle hill slope and gully sides.					
Soil	Red-orange sandy clay/clay, with coarse gravel/pebbles and stones/boulders at surface.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland to scattered trees over *Acacia* sp. Weld Range high shrubland over *Senna artemisioides* subsp. *helmsii* open heath over *Senna artemisioides* subsp. *helmsii*, *Eremophila glutinosa* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Ptilotus helipteroides* var. *helipteroides* open herbs over *Aristida contorta* open tussock grassland.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Brachychiton gregorii*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	30 - 70%	*Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Eremophila glutinosa, Eremophila glutinosa, Senna* sp. Meekatharra(E. Bailey 1-26), *Solanum ashbyae, Tribulus suberosus*
Shrubs < 0.5m	2 - 10%	*Abutilon otocarpum, Abutilon oxycarpum* subsp. *prostratum, Heliotropium ovalifolium, Indigofera monophylla, Maireana georgei, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon* sp.
Climbers	< 2%	*Glycine canescens, Marsdenia australis*
Herbs	10 - 30%	*Ptilotus helipteroides* var. *helipteroides, Ptilotus obovatus* var. *obovatus*

722 WRE Site 82

Described by	JN	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	565129	**mE**	7018605	**mN**	
Habitat	Creek bed and bank with gentle slope.					
Soil	Red-orange sandy clay with loose soil, and continuous coarse gravel and stones/boulders.					
Rock Type	BIF, non-banded ferrous					
Vegetation	*Acacia aneura* var. *aneura* and *Grevillea berryana* low woodland over *Acacia aneura* var. *aneura* and *Acacia* sp. Weld Range high shrubland over *Acacia ramulosa* var. *linophylla* and *Acacia* sp. Weld Range shrubland over *Eremophila mackinlayi* subsp. *spathulata* and *Senna artemisioides* subsp. *sturtii* low shrubland over *Marsdenia australis* climbers over *Abutilon* sp. scattered herbs over *Cymbopogon ambiguus* open tussock grassland. Creek bed and bank with gentle slope.				
Veg Condition	Good, grazed by goats, with tracks.					
Fire Age	None evident.					
Notes	Moderate to sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Gre berryana, Psydrax latifolia, Psydrax rigidula, Psydrax suaveolens, Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia tetragonophylla, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila phyllopoda, Rhagodia eremaea, Senna artemis* subsp. *filifolia, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	10 - 30%	*Eremophila forrestii, Eremophila georgei, Eremophila mackinlayi* subsp. *spathulata, artemisioides* subsp. x *sturtii, Sida* ? *calyxhymenia*
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum* subsp. *prostratum, Abutilon* sp., *Ptilotus obovatus* var. *obovatus* sp. dark green fruits (S. van Leeuwen 2260), *Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Austrostipa scabra, Cymbopogon ambiguus, Digitaria br Enneapogon caerulescens*
Climbers	< 2%	*Glycine canescens, Marsdenia australis*
Herbs	< 2%	*Duperreya sericea, Trichodesma zeylanicum*

722 WRE Site 83

Described by	SH	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	566032	**mE**	7018945	**mN**	
Habitat	Lower hill slope.					
Soil	Red-orange sandy clay, with common coarse gravel and rocks/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia* a*neur*a var. a*neur*a low woodland over *Acacia ramulos*a var. *linophyll*a high shrubland over *Eremophil*a *glutinos*a and *Eremophil*a *forrestii* scattered shrubs and low scattered shrubs over *Sid*a *excedentifoli*a low open heath over *Goodeni*a *tenuilob*a open herbs over *M*ona*chather paradoxus* scattered tussock grasses. Lower hill slope.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	< 2%	*Eremophila forrestii, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Eremophila simulans* subsp. *simulans, Maireana villosa*
Shrubs < 0.5m	30 - 70%	*Cheilanthes sieberi* subsp. *sieberi, Hibiscus burtonii, Ptilotus schwartzii, Sida* sp. *Excedentifolia* (J.L. Egan 1925), *Solanum lasiophyllum, Tribulus suberosus*
Tussock grasses	< 2%	*Aristida contorta, Monachather paradoxus*
Herbs	10 - 30%	*Goodenia tenuiloba*

722 WRE Site 84

Described by	SH	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	584122	**mE**	7031020	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose soil at surface.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura*, *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* low open shrubland to shrubland over *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Marsdenia australis* climbers over *Rhodanthe citrina* and *Ptilotus polystachyus* scattered herbs over *Monachather paradoxus* and *Eragrostis lanicaulis* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila granitica*
Shrubs < 1m	2 - 10%	*Eremophila forrestii*
Shrubs < 0.5m	< 2%	*Abutilon macrum, Hemigenia tysonii, Ptilotus obovatus* var. *obovatus, Solanum centrale, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis lanipes, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Ptilotus polystachyus, Rhodanthe citrina*

722 WRE Site 85

Described by	SH	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	584851	**mE**	7031422	**mN**	
Habitat	Flat plain and ?sump.					
Soil	Red-orange/brown sandy clay, with loose soil at surface.					
Rock Type						
Vegetation	*Corymbia lenziana* scattered tall trees over *Acacia ramulosa* var. *ramulosa* scattered low trees over *Acacia* minyura and *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila granitica* and *Senna artemisioides* subsp. x *artemisioides* shrubland over *Eremophila forrestii* low open shrubland and *Ptilotus obovatus* var. *obovatus* low shrubland over *Marsdenia australis* climbers over *Abutilon macrum* open herbs over *Eragrostis lanicaulis* open tussock grassland. Flat plain and ?sump.					
Veg Condition	Good.					
Fire Age	None evident.					
Notes	Plentiful leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia minyura, Acacia ramulosa* var. *ramulosa, Corymbia lenziana, Psydrax rigidula*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa, Senna artemisioides* subsp. *filifolia, Solanum ashbyae*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila forrestii, Eremophila granitica, Rhagodia eremaea, Senna artemisioides* subsp. x *artemisioides*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Sclerolaena densiflora, Solanum centrale, Spartothamnella teucriiflora*
Tussock grasses	10 - 30%	*Eragrostis lanipes, Thyridolepis multiculmis*
Climbers	< 2%	*Marsdenia australis*
Herbs	10 - 30%	*Rhodanthe citrina*

722 WRE Site 86

Described by	SH	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	585304	**mE**	7031787	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose surface soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* scattered low trees and scattered trees over *Acacia minyura* and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila granitica* shrubland over *Eremophila granitica* low open shrubland over *Aristida holathera* var. *holathera* and *Thyridolepis multiculmis* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia minyura*
Shrubs > 2m	< 2%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila granitica, Solanum ashbyae*
Shrubs < 1m	2 - 10%	*Eremophila ?georgei*
Shrubs < 0.5m	< 2%	*Eremophila simulans* subsp. *simulans, Sida fibulifera*
Tussock grasses	10 - 30%	*Aristida holathera* var. *holathera, Eriachne helmsii, Iseilema membranaceum, Thyridolepis multiculmis*
Herbs	< 2%	*Myriocephalus guerinae*

722 WRE Site 87

Described by	SH	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	585580	**mE**	7030838	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose soil at surface.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* and *Acacia sibirica* low open woodland to woodland over *Acacia craspedocarpa* and *Acacia tetragonophylla* high open shrubland over *Acacia ramulosa* var. *linophylla* scattered shrubs over *Ptilotus obovatus* var. *obovatus* low open shrubland over *Glycine canescens* climbers over *Abutilon macrum* open herbs over *Aristida contorta* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Moderate leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia sibirica*
Shrubs > 2m	2 - 10%	*Acacia burkittii, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	< 2%	*Eremophila forrestii*
Shrubs < 1m	< 2%	*Abutilon macrum, Eremophila ?forrestii, Eremophila exilifolia, Eremophila georgei, Grevillea deflexa*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*
Climbers	2 - 10%	*Glycine canescens*
Herbs	10 - 30%	*Lobelia heterophylla, Vittadinia ?sulcata*

722 WRE Site 88

Described by	JN	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	585763	**mE**	7031188	**mN**	
Habitat	Gently sloped undulating plain, adjacent to a drainage complex.					
Soil	Red-orange sandy clay with surface crust, loose soil and fine gravel.					
Rock Type	Granite. Few.					
Vegetation	*Acacia sibirica* open woodland over *Acacia sibirica* and *Acacia craspedocarpa* low woodland over *Acacia sibirica* and *Acacia tetragonophylla* open shrubland to high open shrubland over *Acacia sibirica*, *Acacia tetragonophylla* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Aristida contorta* tussock grassland. Gently sloped undulating plain, adjacent to a drainage complex, Granite.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Acacia sibirica*
Trees < 10m	10 - 30%	*Acacia burkittii*
Shrubs > 2m	2 - 10%	*Acacia craspedocarpa, Acacia ramulosa* var. *ramulosa, Acacia sibirica*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *fuliginea, Eremophila exilifolia, Eremophila forrestii, Eremophila platycalyx* subsp. *platycalyx*
Shrubs < 1m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Senna artemisioides* subsp. x *artemisioides*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Enneapogon caerulescens*

722 WRE Site 89

Described by	JN	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	586478	**mE**	7031056	**mN**	
Habitat	Hill crest with gentle slope.					
Soil	Red-orange sandy clay/clay, with surface crust and continuous coarse gravel/pebbles,					
Rock Type	stones/boulders and surface-level plates.					
Vegetation	BIF					
Veg Condition	Acacia aneura var. aneura scattered low trees over Acacia aneura var. aneura high shrubland over *Thryptomene decussata* low shrubland to shrubland over *Sida excedentifolia* scattered herbs. Hill crest with gentle slope.					
Fire Age	*Thryptomene decussata* low shrubland to shrubland over *Sida* excedentifolia scattered herbs.					
Notes	Hill crest with gentle slope.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Psydrax rigidula*
Shrubs 1 - 2m	10 - 30%	*Acacia rhodophloia, Eremophila latrobei* subsp. *latrobei, Grevillea berryana, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila forrestii, Eremophila jucunda, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	10 - 30%	*Ptilotus schwartzii, Sida* sp. *Excedentifolia* (J.L. Egan 1925), *Solanum lasiophyllum*

722 WRE Site 90

Described by	JN	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	585997	**mE**	7032081	**mN**	
Habitat	Wide flat drainage complex with gentle slope.					
Soil	Red-orange sand/sandy clay with surface crust, loose soil and many stones/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* scattered trees over *Acacia aneura* var. *aneura* and *Acacia burkittii* low woodland over *Acacia aneura* var. *aneura* and *Acacia tetragonophylla* high shrubland over *Acacia jamesiana* open shrubland over *Calytrix desolata* and *Grevillea deflexa* low open shrubland over *Aristida contorta* open tussock grassland. Wide flat drainage complex with gentle slope.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and sparse to moderate wood litter under trees.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia aneura* var. *aneura*
Trees < 10m	10 - 30%	*Acacia burkittii*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *ramulosa, Acacia sibirica, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia speckii, Acacia tetragonophylla, Calytrix desolata*
Shrubs < 1m	2 - 10%	*Acacia sibirica, Eremophila exilifolia, Eremophila forrestii, Grevillea deflexa, Senna artemisioides* subsp. *helmsii, Sida calyxhymenia*
Shrubs < 0.5m	2 - 10%	*Eremophila fraseri, Mirbelia* ?*stipitata, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*

722 WRE Site 91

Described by	SH	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	585672	**mE**	7033112	**mN**	
Habitat	Flat plain.					
Soil	Red-orange clay, with cracked surface and loose soil.					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia tetragonophylla* and *Acacia craspedocarpa* scattered shrubs to scattered tall shrubs over *Senna* sp. Meekatharra, *Ptilotus obovatus* var. *obovatus* and *Ptilotus beardii* low shrubland over *Maireana georgei* open herbs over *Aristida contorta* open tussock grassland. Flat plain.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	< 2%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	< 2%	*Acacia craspedocarpa, Acacia tetragonophylla, Eremophila georgei*
Shrubs < 1m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Maireana villosa, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Maireana* sp., *Ptilotus beardii, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*
Herbs	10 - 30%	*Pogonolepis stricta, Pogonolepis stricta, Portulaca oleracea, Ptilotus aervoides*

722 WRE Site 92

Described by	JN	Date:	4/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	586292	**mE**	7033420	**mN**	
Habitat	Creek bed and bank with gentle slope.					
Soil	Red-orange sand/sandy clay, with surface crust and loose soil.					
Rock Type	Claystone. Few.					
Vegetation	*Acacia sibirica* low woodland to open woodland over *Acacia tetragonophylla* and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia tetragonophylla* open shrubland over *Prostanthera althoferi* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Duperreya sericea* climbers over *Abutilon macrum* very open herbs over *Aristida contorta* open tussock grassland. Creek bed and bank with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse to moderate leaf and wood litter spread on banks. No vegetation growth on creek bed.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Acacia sibirica*
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *ramulosa, Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Acacia tetragonophylla, Eremophila fraseri, Ere georgei, Eremophila platycalyx* subsp. *platycalyx, Prostanthera albiflora, Rhagodia er*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila fraseri, Eremophila forrestii, Eremophila mackinlay spathulata, Eremophila macmillaniana, Grevillea inconspicua, Prostanthera a Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna* sp. Meek (E. Bailey 1-26)*, Sida calyxhymenia*
Shrubs < 0.5m	2 - 10%	*Abutilon macrum, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Eremophila exilifolia*
Climbers	2 - 10%	*Duperreya sericea*
Herbs	2 - 10%	*Pluchea dentex, Podolepis capillaris*

722 WRE Site 93

Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	586714	**mE**	7035414	**mN**	
Habitat	Undulating plain, with minor channel and gentle slope.					
Soil	Red-orange sand/sandy clay with loose soil and many surface-level plates/boulders.					
Rock Type	Granite					
Vegetation	*Acacia aneura* var. *aneura* high shrubland to low open woodland over *Acacia craspedocarpa* shrubland over *Senna* sp. Meekatharra, *Eremophila platycalyx* subsp. *platycalyx*, *Sida calyxhymenia* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Aristida contorta* very open tussock grassland. Undulating plain, with minor channel and gentle slope, Granite.					
Veg Condition	Good, grazed by hard hoofed, with tracks					
Fire Age	1-5 yrs					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila platycalyx* subsp. *platycalyx, Scaevola spinescens, Senna artemisioides* subsp. *petiolaris*
Shrubs < 1m	10 - 30%	*Eremophila fraseri, Eremophila latrobei* subsp. *latrobei, Scaevola spinescens, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra (E. Bailey 1-26), *Sida calyxhymenia, Solanum lasiophyllum*
Shrubs < 0.5m	10 - 30%	*Frankenia setosa, Maireana carnosa, Maireana glomerifolia, Maireana trichoptera, Ptilotus beardii, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Austrostipa elegantissima, Enneapogon caerulescens*

722 WRE Site 94

Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	587028	**mE**	7035053	**mN**	
Habitat	Small granite hill crest with gentle slope.					
Soil	Red-orange sandy clay with surface crust, fine gravel and common surface-level plates/boulders.					
Rock Type	Granite					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range open shrubland to high open shrubland over *Senna artemisioides* subsp. *helmsii*, *Ptilotus obovatus* var. *obovatus* and *Indigofera monophylla* low shrubland over *Aristida contorta* tussock grassland. Small granite hill crest with gentle slope, Granite.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	>5 yrs					
Notes	Moderate wood and sparse leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs > 2m	2 - 10%	*Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila platycalyx* subsp. *platycalyx, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	10 - 30%	*Eremophila forrestii, Senna glaucifolia, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum* subsp. *prostratum, Indigofera monophylla, Ptilotus obovatus* var. *obovatus, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Herbs	< 2%	*Cheilanthes lasiophylla*

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Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	587291	**mE**	7034764	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sand, with fine to coarse gravel and many surface level plates/boulders					
Rock Type	Granite, quartz.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia rhodophloia* high open shrubland over *Senna glaucifolia* open shrubland over *Eremophila exilifolia* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Aristida contorta* open tussock grassland. Flat plain, Granite, quartz.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia rhodophloia, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila exilifolia, Eremophila forrestii, Indigofera monophylla, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Abutilon macrum, Abutilon oxycarpum* subsp. *prostratum, Hibiscus sturtii* var. *forrestii, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Herbs	< 2%	*Cheilanthes lasiophylla, Goodenia tenuiloba*

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Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588225	**mE**	7035560	**mN**	
Habitat	Creek bed and bank.					
Soil	Red-orange sandy clay/clay, with continuous coarse gravel and stones/boulders.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia pruinocarpa* and *Acacia ramulosa* var. *ramulosa* open woodland over *Acacia aneura* var. *aneura* low open woodland over *Acacia quadrimarginea* and *Acacia aneura* var. *aneura* high shrubland over *Senna artemisioides* subsp. sturtii low open shrubland to open shrubland over *Ptilotus obovatus* var. *obovatus* and *Grevillea inconspicua* low shrubland over *Abutilon macrum* herbs over *Cymbopogon ambiguus* very open tussock grassland. Creek bed and bank.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Plentiful wood and leaf litter widespread.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa, Acacia ramulosa* var. *ramulosa, Eremophila longifolia, Psy rigidula, Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia quadrimarginea*
Shrubs 1 - 2m	2 - 10%	*Acacia rhodophloia, Acacia tetragonophylla, Senna artemisioides* subsp. x *stu Solanum ashbyae*
Shrubs < 1m	2 - 10%	*Abutilon macrum, Eremophila macmillaniana, Eremophila spathulata, Grev inconspicua, Senna artemisioides* subsp. x *artemisioides, Senna glaucifolia, S calyxhymenia*
Shrubs < 0.5m	10 - 30%	*Eremophila exilifolia, Euphorbia boophthona, Hibiscus burtonii, Ptilotus obovatus obovatus, Ptilotus rotundifolius, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus, Eriachne pulchella*
Climbers	30 - 70%	*Glycine canescens, Marsdenia australis*
Herbs	30 - 70%	*Cheilanthes lasiophylla, Pluchea dentex, Trichodesma zeylanicum* var. *zeylanicum*

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Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588203	**mE**	7035871	**mN**	
Habitat	Flat plain.					
Soil	Red-orange sandy clay with loose soil and common coarse gravel at surface.					
Rock Type	Non-banded ferrous					
Vegetation	*Acacia aneura* var. *aneura* scattered tall shrubs over *Ptilotus rotundifolius* scattered shrubs over *Eremophila spathulata*, *Sclerolaena uniflora* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Calandrinia transluscens* scattered herbs over *Aristida contorta* very open tussock grassland. Flat plain.					
Veg Condition	Poor, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Psydrax suaveolens*
Shrubs > 2m	< 2%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	< 2%	*Acacia tetragonophylla, Ptilotus rotundifolius, Solanum ashbyae*
Shrubs < 1m	< 2%	*Eremophila spathulata*
Shrubs < 0.5m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Hibiscus sturtii* var. *forrestii, Maireana georgei, Ptilotus obovatus* var. *obovatus, Sclerolaena uniflora*
Tussock grasses	2 - 10%	*Aristida contorta*
Herbs	< 2%	*Calandrinia translucens*

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Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588807	**mE**	7035944	**mN**	
Habitat	Lower hill slope.					
Soil	Red-orange sandy clay with common surface stones/boulders.					
Rock Type	NIF, non-banded ferrous.					
Vegetation	*Acacia pruinocarp*a scattered trees over *Acacia ramulos*a var. *ramulos*a high shrubland to low woodland over *Senn*a a*rtemisioides* subsp. *helmsii* and *Senn*a *glaucifoli*a open shrubland over *Eremophil*a *forrestii*, *Dod*onae*a petiolaris* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Goodeni*a *tenuiloba* herbs over *Enneapog*on *caerulescens* scattered tussock grasses. Lower hill slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	Non-evident					
Notes	Sparse wood and leaf litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia pruinocarpa, Acacia ramulosa* var. *ramulosa*
Shrubs 1 - 2m	2 - 10%	*Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Solanum ashbyae, Thryptomene decussata*
Shrubs < 1m	< 2%	*Aluta aspera* subsp. *hesperia, Eremophila forrestii*
Shrubs < 0.5m	2 - 10%	*Dodonaea petiolaris, Maireana georgei, Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32)
Tussock grasses	< 2%	*Enneapogon caerulescens*
Herbs	30 - 70%	*Goodenia tenuiloba, Hibiscus* sp.*, Ptilotus roei, Sida* sp. dark green fruits (S. van Leeuwen 2260)

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Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588795	**mE**	7036524	**mN**	
Habitat	Small gently sloped hill crest/slope.					
Soil	Red-orange sandy clay/clay with surface crust, coarse gravel and continuous stones/boulders at					
Rock Type	surface.					
Vegetation	BIF, non-banded ferrous.					
Veg Condition	*Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia tetragonophylla* open shrubland over *Senna* sp. Meekatharra and *Maireana triptera* low shrubland over *Ptilotus exaltatus* var. *exaltatus* very open herbs over *Aristida contorta* very open tussock grassland. Small gently sloped hill crest/slope.					
Fire Age	Excellent, grazed by hard hoofed.					
Notes	>5 yrs					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Senna stricta*
Shrubs < 1m	10 - 30%	*Acacia aneura* var. *aneura, Eremophila phyllopoda* subsp. *phyllopoda, Eremophila spathulata, Maireana melanocoma, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Maireana triptera, Ptilotus obovatus* var. *obovatus, Sclerolaena eriacantha, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon caerulescens*
Herbs	2 - 10%	*Ptilotus exaltatus* var. *exaltatus*

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Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588177	**mE**	7037086	**mN**	
Habitat	Creek bed and banks on a moderate to gentle slope.					
Soil	Red-orange sand/sandy clay with loose surface soil.					
Rock Type	Non-banded ferrous, granite. Few.					
Vegetation	*Acacia ramulos*a var. *ramulos*a and *Acacia burkittii* low woodland to open forest over *Acacia burkittii* high shrubland over *Eremophil*a *forrestii* subsp. *forrestii* open shrubland over *Eremophil*a *margarethae*, *Sid*a *calyxhymeni*a and *Ptilotus obovatus* var. *obovatus* low shrubland over *Duperrey*a *commixt*a climbers over A*butil*on *macrum* open herbs over *Eragrostis kennedyae* open tussock grassland. Creek bed and banks on a moderate to gentle slope, Non-banded ferrous, granite.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Moderate leaf and wood litter widespread.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	30 - 70%	*Acacia burkittii*
Trees < 10m	10 - 30%	*Acacia burkittii, Psydrax latifolia, Psydrax rigidula*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *ramulosa, Acacia tetragonop*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila exilifolia, Eremophila forrestii* subsp. *fo Eremophila latrobei* subsp. *latrobei, Eremophila platycalyx* subsp. *platycalyx, artemisioides* subsp. *filifolia, Senna artemisioides* subsp. x *sturtii*
Shrubs < 1m	10 - 30%	*Abutilon macrum, Eremophila margarethae, Maireana* ?*villosa, Prosta albiflora, Ptilotus obovatus* var. *obovatus, Sida calyxhymenia*
Shrubs < 0.5m	10 - 30%	*Enneapogon caerulescens, Ptilotus obovatus* var. *obovatus, Solanum ellip Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Cymbopogon ambiguus, Eragrostis australasica, Eragrostis kennedyae*
Climbers	< 2%	*Duperreya commixta*
Herbs	10 - 30%	*Cheilanthes lasiophylla, Cheilanthes sieberi* subsp. *sieberi, Lobelia heterophylla*

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Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588431	**mE**	7038080	**mN**	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay with surface crust, loose soil, coarse gravel and many surface-level plates.					
Rock Type	Granite.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia* sp. Weld Range open shrubland over *Eremophila* spathulata and *Senna artemisioides* subsp. *helmsii* low shrubland over *Aristida contorta* tussock grassland. Undulating plain with gentle slope, Granite.					
Veg Condition	Excellent, with tracks,					
Fire Age	>5 yrs					
Notes	Sparse leaf and wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia tetragonophylla, Eremophila spathulata*
Shrubs < 1m	10 - 30%	*Acacia speckii, Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Indigofera brevidens, Maireana melanocoma, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Shrubs < 0.5m	2 - 10%	*Abutilon oxycarpum* subsp. *prostratum, Euphorbia boophthona, Grevillea deflexa, Hibiscus coatesii, Ptilotus obovatus* var. *obovatusSolanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus,*

722 WRE Site 102

Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	589305	**mE**	7038158	**mN**	
Habitat	Foot slope.					
Soil	Red-orange sandy clay with much coarse gravel/pebbles..					
Rock Type	BIF, non-banded ferrous, granite.					
Vegetation	*Acacia pruinocarp*a scattered tall trees and *Acacia aneur*a var. a*neur*a scattered trees over *Acacia aneur*a var. a*neur*a and *Acacia minyur*a low open woodland over *Acacia aneur*a var. a*neur*a, *Acacia minyur*a and *Acacia ramulos*a var. *linophyll*a open scrub over *Acacia ramulos*a var. *linophyll*a open shrubland over *Senn*a *glaucifoli*a and *Sid*a *chrysocaly*x low scattered shrubs over *Goodeni*a *tenuilob*a herbs over A*ristid*a *contort*a scattered tussock grasses. Footslope, BIF, non-banded ferrous, granite.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	None evident.					
Notes	Moderate leaf and sparse wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia pruinocarpa, Psydrax suaveolens*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *intermedia, Acacia minyura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Senna glaucifolia*
Shrubs < 1m	< 2%	*Eremophila glutinosa*
Shrubs < 0.5m	< 2%	*Eremophila simulans* subsp. *simulans, Euphorbia boophthona, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)*, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta*
Herbs	30 - 70%	*Goodenia tenuiloba*

722 WRE Site 103

Described by	SH	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588444	**mE**	7038690	**mN**	
Habitat	Undulating plain.					
Soil	Red-orange sandy clay, with much coarse gravel at surface.					
Rock Type	BIF, granite, quartz.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees to scattered trees over *Acacia sclerosperma* subsp. *sclerosperma* scattered tall shrubs over *Eremophila fraseri* and *Senna artemisioides* subsp. *helmsii* open shrubland over *Eremophila exilifolia* and *Ptilotus obovatus* var. *obovatus* low open shrubland over Maireana triptera very open herbs over *Aristida contorta* open tussock grassland. Undulating plain, BIF, granite, quartz.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	< 2%	*Acacia sclerosperma* subsp. *sclerosperma*
Shrubs 1 - 2m	2 - 10%	*Eremophila fraseri, Eremophila latrobei* subsp. *latrobei, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra (E. Bailey 1-26), *Solanum ashbyae*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Maidenia* sp., *Maireana georgei*
Shrubs < 0.5m	2 - 10%	*Eremophila phyllopoda* subsp. *phyllopoda, Eremophila spathulata, Maireana triptera, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens*

722 WRE Site 104

Described by	JN	Date:	3/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	588554	mE	7038981	mN	
Habitat	Undulating plain with gentle slope.					
Soil	Red-orange sandy clay, with loose surface soil, and continuous coarse gravel and stones/boulders.					
Rock Type	Non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* open shrubland to high open shrubland over *Acacia jamesiana* open shrubland over *Senna glaucifolia* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Aristida contorta* tussock grassland. Undulating plain with gentle slope.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	>5 yrs					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura*
Shrubs > 2m	2 - 10%	*Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *fuliginea, Acacia speckii, Acacia tetragonophylla*
Shrubs < 1m	2 - 10%	*Acacia tetragonophylla, Eremophila fraseri, Eremophila spathulata, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Eremophila exilifolia, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta*

722 WRE Site 108

Described by	JN	Date:	11/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	562128	**mE**	7019499	**mN**	
Habitat	Moderate to steep sloped hill crest.					
Soil	Red-orange sandy clay, with surface crust and continuous stones/boulders and surface-level plates.					
Rock Type	BIF.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* and *Acacia ramulosa* var. *linophylla* shrubland over *Thryptomene decussata* and *Eremophila glutinosa* low shrubland over *Sida excedentifolia* very open herbs. Moderate to steep sloped hill crest.					
Veg Condition	Excellent, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia rhodophloia, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Dodonaea petiolaris, Eremophila compacta* subsp. *fecunda, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Prostanthera petrophila*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Sida* sp. *Excedentifolia* (J.L. Egan 1925)
Tussock grasses	< 2%	*Monachather paradoxus*

722 WRE Site 109

Described by	SH	Date:	5/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	581786	**mE**	7026819	**mN**	
Habitat	Gentle hill slope					
Soil	Red-orange sandy clay with continuous stones/boulders and surface-level plates.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia* a*neur*a var. a*neur*a low open woodland to scattered trees over *Acacia* a*neur*a var. a*neur*a, *Acacia sibiric*a and *Acacia rhodophloi*a high open shrubland over *Eremophil*a glutinosa and *Eremophil*a *l*a*trobei* subsp. *l*a*trobei* low shrubland to open heath over *Ptilotus obov*a*tus* var. *obov*a*tus* low scattered shrubs over *Sid*a sp. and *Cheilanthes sieberi* subsp. *sieberi* scattered herbs over *Cymbopog*on a*mbiguus* and *Eriachne pulchell*a subsp. *dominii* scattered tussock grasses.					
Veg Condition	Good, grazed by hard hoofed, with tracks.					
Fire Age	?					
Notes	Sparse wood and leaf litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Santalum spicatum*
Shrubs > 2m	2 - 10%	*Acacia rhodophloia, Acacia sibirica*
Shrubs 1 - 2m	30 - 70%	*Acacia speckii, Eremophila glutinosa, Scaevola spinescens, Solanum ashbyae*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brevifolia, Thryptomene decussata*
Shrubs < 0.5m	< 2%	*Dodonaea pachyneura, Harnieria kempeana* subsp. *muelleri, Prostanthera petrophila, Sida calyxhymenia, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	< 2%	*Cymbopogon ambiguus, Eriachne mucronata, Eriachne pulchella* subsp. *dominii*
Herbs	< 2%	*Cheilanthes sieberi* subsp. *sieberi, Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site 110

Described by	SH	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	548351	**mE**	7015088	**mN**	
Habitat	Gentle hill slope and crest					
Soil	Red-orange sandy clay, with continuous coarse gravel, stones/boulders and surface level plates.					
Rock Type	BIF, non-banded ferrous.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia sibirica* high open shrubland over *Thryptomene decussata* shrubland over *Calytrix desolata* and *Micromyrtus sulphurea* low shrubland over *Goodenia tenuiloba* herbs over *Monachather paradoxus* scattered tussock grasses. Gentle hill slope and crest.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse wood and leaf litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia*
Shrubs 1 - 2m	10 - 30%	*Acacia sibirica, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Baeckea* sp. Melita Station (H. Pringle 2738), *Dodonaea pachyneura, Eremophila georgei, Micromyrtus sulphurea, Prostanthera petrophila*
Shrubs < 0.5m	10 - 30%	*Calytrix desolata, Eremophila latrobei* subsp. *latrobei, Micromyrtus placoides, Monachather paradoxus, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	< 2%	*Aristida contorta, Eriachne helmsii, Eriachne pulchella* subsp. *pulchella*
Herbs	30 - 70%	*Goodenia tenuiloba, Sida* sp. *Excedentifolia* (J.L. Egan 1925)

722 WRE Site 111

Described by	JN	Date:	9/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	549405	**mE**	7015196	**mN**	
Habitat	Moderate hill slope.					
Soil	Red-orange sandy clay, with surface crust, and continuous coarse gravel, stones/boulders and					
Rock Type	surface-level plates.					
Vegetation	BIF					
Veg Condition	*Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* and *Eremophila georgei* shrubland over *Philotheca brucei* subsp. *brucei*, *Micromyrtus sulphurae* and *Eremophila georgei* low shrubland over *Austrostipa scabra* scattered tussock grasses. Moderate hill slope.					
Fire Age	Good, grazed by hard hoofed, with tracks.					
Notes	None evident.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia rhodophloia*
Shrubs 1 - 2m	10 - 30%	*Allocasuarina acutivalvis* subsp. *acutivalvis, Eremophila georgei, Eremophila glutinosa, Hakea recurva* subsp. *arida, Micromyrtus sulphurea, Philotheca brucei* subsp. *brucei, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Calytrix desolata, Dodonaea pachyneura, Eremophila latrobei* subsp. *latrobei, Harnieria kempeana* subsp. *muelleri, Micromyrtus placoides, Scaevola spinescens*
Shrubs < 0.5m	10 - 30%	*Prostanthera petrophila, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	< 2%	*Austrostipa scabra, Monachather paradoxus*
Herbs	< 2%	*Olearia humilis*

722 WRE Site 114

Described by	SH	Date:	12/11/2006	Type:	Q	20x20
Location	Weld Range					
MGA Zone	50	563731	**mE**	7020476	**mN**	
Habitat	Gully sides with minor channel.					
Soil	Red-orange sandy clay, with fine gravel and continuous coarse gravel and stones/boulders at surface.					
Rock Type	BIF, non-banded ferrous, granite, quartz					
Vegetation	*Acacia aneura* var. *aneura* low open woodland to open woodland over *Acacia aneura* var. *aneura* high shrubland over *Eremophila macmillaniana* and *Scaevola spinescens* shrubland over *Eremophila exilifolia*, *Senna glaucifolia* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia tenuiloba* very open herbs over Grass sp. Scattered tussock grasses.					
Veg Condition	Good, grazed by hard hoofed.					
Fire Age	None evident.					
Notes	Sparse leaf and moderate wood litter under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Acacia ?ligulata, Acacia sibirica, Acacia tetragonophylla, Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Micromyrtus sulphurea, Philotheca brucei* subsp. *brevifolia, Scaevola spinescens, Tribulus suberosus*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Senna glaucifolia, Sida* sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	< 2%	*Cymbopogon ambiguus*
Herbs	2 - 10%	*Goodenia tenuiloba*

Phase 2

722 WRE Site 01

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	542005	mE	7014892	mN	
Habitat	Flat/plain, negligible slope, next to dry lake					
Soil	Red-orange sand, loose soil					
Rock Type	Few quartz rocks					
Vegetation	*Acacia aneura* and *Acacia ramulosa* var. *ramulosa* high shrubland over *Eremophila forrestii* scattered shrubs over *Aristida holathera* and *Monachather paradoxus* tussock grassland.					
Veg Condition	Good; animals tracks					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Negligible wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa*
Shrubs 1 - 2m	< 2%	*Acacia tetragonophylla, Eremophila forrestii, Melaleuca stereophloia*
Shrubs < 1m	< 2%	*Ptilotus polystachyus*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Aristida holathera* var. *holathera, Monachather paradoxus,* POACEAE sp.
Climbers	< 2%	*Cuscuta epithymum*
Herbs	< 2%	*Dianella revoluta* var. *divaricata, Gnephosis tenuissima, Wahlenbergia* sp.

722 WRE Site 02

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV, Lake					
MGA Zone	50	542124	mE	7014740	50	
Habitat	Flat/plain, lakeside, negligible slope					
Soil	Yellow-orange sandy clay, with a surface crust, fine gravel, and loose soil					
Rock Type	Nil					
Vegetation	*Acacia aneura* var. *aneura* low woodland over *Acacia tetragonophylla* high open shrubland over *Melaleuca stereophloia* low open shrubland *to* open shrubland over *Aristida contorta* open tussock grassland. Flat/plain, lakeside.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia craspedocarpa*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *fuliginea, Acacia tetragonophylla, Eremophila forrestii* subsp. *forrestii, Melaleuca stereophloia*
Shrubs < 1m	2 - 10%	*Chenopodium gaudichaudianum, Rhagodia eremaea*
Shrubs < 0.5m	2 - 10%	*Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis dielsii*
Climbers	< 2%	*Lysiana* ? *murrayi*

722 WRE Site 4a

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	547554	mE	7014897	mN	
Habitat	Midslope to ridgetop, moderate slope					
Soil	Red-orange sandy clay, with a surface crust.					
Rock Type	Many BIF coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var ?*microcarpa* high open shrubland over *Philotheca brucei subsp. brucei*, *Ptilotus obovatus* var. *obovatus*, *Olearia stuartii* and *Eremophila* ?*glut* low shrubland.					
Veg Condition	Good, grazing by hard-hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var ? *microcarpa, Acacia pruinocarpa, Allocasuarina acutivalvis* subsp. *acutivalvis*
Shrubs < 1m	10 - 30%	*Acacia sibirica, Eremophila glutinosa, Micromyrtus sulphurea, Philotheca brucei* subsp. *brucei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Acacia grasbyi, Dodonaea pachyneura, Olearia stuartii, Solanum lasiophyllum*
Tussock grasses	< 2%	*Cymbopogon ambiguus, Eriachne mucronata* (typical form), *Monachather paradoxus*
Herbs	< 2%	*Cheilanthes sieberi* subsp. *sieberi*

722 WRE Site 05

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	545195	mE	7016854	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sand and sandy clay, with fine gravel and loose soil					
Rock Type	Common ferrous, granite, and quartz fine gravel.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii subsp. forrestii* low open shrubland *to* open shrubland over *Aristida contorta* open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Psydrax suaveolens, Santalum lanceolatum*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	*Acacia craspedocarpa, Eremophila forrestii* subsp. *forrestii, Rhagodia eremaea, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila georgei*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 06

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV, near road to lake					
MGA Zone	50	544107	mE	7016163	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, with a surface crust and fine gravel					
Rock Type	Few to common ferrous and quartz coarse gravel/pebbles and stones/boulders					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland *to* low open woodland over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* shrubland over *Eremophila forrestii sub*sp. *forrestii* and *Eremophila jucunda sub*sp. *jucunda* low open shrubland over *Aristida contorta* open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	Old (>5 yrs)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia craspedocarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Eremophila jucunda* subsp. *jucunda, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus*

722 WRE Site 10a

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	547792	mE	7014738	mN	
Habitat	Flat/plain and footslope, negligible slope					
Soil	Red-orange sandy clay, with loose soil.					
Rock Type	Common ferrous and granite stones.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii sub*sp. *forrestii* low open shrubland *to* shrubland over *Aristida contorta* very open tussock grassland. Flat/plain and footslope, granite stones.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia grasbyi*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Beyeria* sp. Murchison (B. Jeanes s.n. 7/7/2005), *Eremophila forrestii* subsp. *forrestii, Eremophila simulans*
Shrubs < 0.5m	2 - 10%	*Eremophila glutinosa, Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei, Maireana georgei, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum, Thryptomene decussata*
Tussock grasses	2 - 10%	*Aristida contorta*
Herbs	< 2%	*Cheilanthes sieberi* subsp. *sieberi*

722 WRE Site 11

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	547091	mE	7015942	mN	
Habitat	Flat/plain to footslope.					
Soil	Red-orange sand to sandy clay					
Rock Type	Many granite and quartz coarse gravel/pebbles and stones/boulders					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* open shrubland *to* high open shrubland over *Aristida contorta* very open tussock grassland. Flat/plain to footslope.					
Veg Condition	Poor; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs < 1m	< 2%	*Eremophila glutinosa*
Shrubs < 0.5m	< 2%	*Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum centrale, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 15

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	547381	mE	7016821	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, surface crust					
Rock Type	Many ferrous and quartz coarse gravel/pebbles					
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var. *aneura* high shrubland. Flat/plain.					
Veg Condition	Good, signs of grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs 1 - 2m	< 2%	*Acacia ramulosa* var. *linophylla, Eremophila georgei, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	< 2%	*Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Acacia ?quadrimarginea, Maireana ? tomentosa, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	< 2%	*Monachather paradoxus*

722 WRE Site 17

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	549879	mE	7017173	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* high open shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii sub*sp. *forrestii* shrubland over *Ptilotus obovatus* var. *obovatus* low open shrubland. Flat/plain.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	none evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia sibirica*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	2 - 10%	*Eremophila hughesii* subsp. *hughesii, Eremophila simulans, Ptilotus obovatus* var. *obovatus, Senna glaucifolia, Solanum lasiophyllum*

722 WRE Site 35

Described by	SH	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	578440	mE	7028713	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange clay loam, with a surface crust					
Rock Type	Nil					
Vegetation	*Acacia ramulosa* var. *ramulosa* high shrubland over *Acacia ramulosa* var. *ramulosa* and *Acacia quadrimarginea* shrubland over *Monachather paradoxus* tussock grassland. Flat/plain.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *ramulosa*
Shrubs 1 - 2m	10 - 30%	*Acacia quadrimarginea, Acacia ramulosa* var. *linophylla*
Shrubs < 1m	< 2%	*Eremophila ?clarkei, Ptilotus obovatus* var. *obovatus, Rhagodia eremaea*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Monachather paradoxus*

722 WRE Site 39

Described by	SH	**Date:**	21/04/07	**Type:**	Q	20x20
Location						
MGA Zone	50	580031	mE	7028802	mN	
Habitat	Plain/flat, negligible slope					
Soil	Red-orange sandy clay, with loose soil					
Rock Type	Common non-banded ferrous and granite coarse gravel/pebbles					
Vegetation	*Acacia pruinocarpa* scattered low trees over *Acacia aneura* var. *aneura* high open shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Ptilotus schwartzii* very open herbs over *Aristida contorta* scattered tussock *grasses.* Plain/Flat.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Negligble wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Psydrax latifolia*
Shrubs < 1m	< 2%	*Eremophila clarkei, Eremophila georgei*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Enneapogon caerulescens*
Herbs	10 - 30%	*Ptilotus schwartzii*

722 WRE Site 41

Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Plain behind Beebyn					
MGA Zone	50	580346	mE	7028437	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, with a surface crust and fine gravel.					
Rock Type	Common ferrous coarse gravel/pebbles					
Vegetation	*Acacia pruinocarpa* scattered trees over *Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* open shrubland to high shrubland over *Eremophila forrestii sub*sp. *forrestii* low shrubland over *Monachather paradoxus* very open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla, Grevillea berryana*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	10 - 30%	*Eremophila georgei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Monachather paradoxus*

722 WRE Site 43

Described by	AC	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	581737	mE	7030291	mN	
Habitat	Flat/plain, negligible slope.					
Soil	Red-orange sandy clay, with a surface crust.					
Rock Type	Few calcrete					
Vegetation	*Eucalyptus lucasii* woodland over *Senna artemisioides sub*sp. *filifolia* and *Eucalyptus lucasii* high open shrubland over *Eucalyptus lucasii (emergent)* scattered shrubs over *Ptilotus obovatus* var. *obovatus* and *Ptilotus polystachyus* low shrubland and *Salsola australis* low scattered shrubs. Flat/plain.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Eucalyptus lucasii*
Trees < 10m	< 2%	*Eucalyptus lucasii*
Shrubs > 2m	2 - 10%	*Senna artemisioides* subsp. *filifolia*
Shrubs 1 - 2m	< 2%	*Acacia tetragonophylla, Eremophila longifolia, Pimelea microcephala* subsp. *microcephala*
Shrubs < 1m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus polystachyus, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 0.5m	< 2%	*Salsola australis, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Eragrostis australasica*
Herbs	< 2%	*Maireana* sp.

722 WRE Site 50

Described by	JN	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn, southern side, lower footslopes					
MGA Zone	50	579888	mE	7025313	mN	
Habitat	Footslope, gentle slope					
Soil	Red-orange sandy clay with a surface crust					
Rock Type	Common BIF and ferrous coarse gravel and pebbles.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii* subsp. *forrestii* shrubland over *Eremophila forrestii sub*sp. *forrestii* low shrubland over *Monachather paradoxus* very open tussock grassland. Footslope, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla, Grevillea berryana*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei*
Shrubs < 1m	10 - 30%	*Eremophila jucunda* subsp. *jucunda, Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Monachather paradoxus*

722 WRE Site 51

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	578958	mE	7025464	mN	
Habitat	Moderate slope, midslope.					
Soil	Red-orange sandy clay					
Rock Type	Continuous BIF and ferrous stones and boulders					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* open heath over *Ptilotus obovatus* var. *obovatus* low open heath over *Aristida holathera* var. *holathera* open tussock grassland. Moderate slope, midslope.					
Veg Condition	Poor; track and proposed drillpad					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Allocasuarina acutivalvis* subsp. *acutivalvis*
Shrubs 1 - 2m	30 - 70%	*Eremophila latrobei* subsp. *latrobei, Thryptomene decussata*
Shrubs < 1m	< 2%	*Eremophila glutinosa, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	30 - 70%	*Dodonaea pachyneura, Harnieria kempeana* subsp. *muelleri, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Aristida holathera* var. *holathera*
Herbs	< 2%	*Sida* sp. dark green fruits (S. van Leeuwen 2260), *Stylidium longibracteatum*

722 WRE Site 53

Described by	JN	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Western Beebyn					
MGA Zone	50	576712	mE	7024043	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, with a surface crust and some fine gravel					
Rock Type	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland *to* low open woodland over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* shrubland over *Acacia aneura* var. *aneura* low open shrubland over *Monachather paradoxus* very open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	Old (>5 yrs)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Solanum lasiophyllum*
Shrubs < 0.5m	< 2%	*Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon caerulescens, Eragrostis eriopoda, Monachather paradoxus*

722 WRE Site 54

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	576285	mE	7024058	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange clay, with a surface crust					
Rock Type	Common ferrous coarse gravel/pebbles.					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia craspedocarpa* open *scrub* over *Eremophila forrestii subs*p. *forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila foliosissima* low open shrubland over *Monachather paradoxus* and *Aristida contorta* very open tussock grassland. Flat/plain.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Plentiful widespread leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia craspedocarpa, Acacia pruinocarpa, Psydrax latifolia*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila ?clarkei, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	10 - 30%	*Eremophila foliosissima, Eremophila georgei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*

722 WRE Site 56

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn South					
MGA Zone	50	576624	mE	7022957	mN	
Habitat	Flat/plain, negligble slope					
Soil	Red-orange sandy clay, with loose soil					
Rock Type	Common BIF, ferrous and quartz coarse gravel and pebbles.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila forrestii sub*sp. *forrestii* and *Eremophila foliosissima* low open heath over *Marsdenia australis* climbers over *Eragrostis eriopoda* very open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Grevillea berryana*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila* ?*clarkei*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii*
Shrubs < 0.5m	30 - 70%	*Eremophila foliosissima, Psydrax rigidula, Psydrax suaveolens, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Eragrostis eriopoda*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 58

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	556310	mE	7018553	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sand to sandy clay, clay, with a surface crust and loose soil					
Rock Type	Few granite and BIF rocks					
Vegetation	*Melaleuca stereophloia* scattered tall shrubs over *Cratystylis subspinescens* shrubland over *Melaleuca stereophloia*, *Cratystylis subspinescens* and *Halosarcia indica* subsp. *bidens* low open heath. Flat/plain.					
Veg Condition	Degraded; heavy grazing					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly undre shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	< 2%	*Melaleuca stereophloia*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Cratystylis subspinescens, Eremophila* sp., *Leptomeria preissiana*
Shrubs < 1m	30 - 70%	*Frankenia* sp., *Muehlenbeckia florulenta*
Shrubs < 0.5m	10 - 30%	*Atriplex* ?*vesicaria, Atriplex bunburyana, Dissocarpus paradoxus, Maireana georgei, Maireana melanocoma, Melaleuca stereophloia, Sclerolaena fusiformis, Tecticornia indica* subsp. *bidens*

722 WRE Site 61

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	557351	mE	7018302	mN	
Habitat	Flat/plain, floodplain, negligible slope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Nil					
Vegetation	*Melaleuca stereophloia* and *Cratystylis subspinescens* shrubland over *Halosarcia indica* subsp. *bidens* low shrubland. Flat/plain, floodplain.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs 1 - 2m	10 - 30%	*Cratystylis subspinescens, Melaleuca stereophloia, Muehlenbeckia florulenta, Pittosporum angustifolium*
Shrubs < 0.5m	10 - 30%	*Atriplex bunburyana, Frankenia laxiflora, Maireana* sp.*, Tecticornia indica* subsp. *bidens, Tecticornia indica* subsp. *bidens*
Tussock grasses	< 2%	*Aristida contorta, Eragrostis pergracilis*
Herbs	< 2%	*Hibiscus burtonii*

722 WRE Site 62

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Madoonga					
MGA Zone	50	558160	mE	7019242	mN	
Habitat	Flat/plain, negligible slope.					
Soil	Red-orange and white sandy clay, with a surface crust					
Rock Type	Few calcrete					
Vegetation	*Eucalyptus gypsophila* low open woodland *to* open woodland over *Cratystylis subspinescens* shrubland over *Lawrencia chrysoderma* and *Frankenia* ?*laxiflora* low shrubland over *Eragrostis pergracilis* open tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Eucalyptus carnei, Eucalyptus gypsophila, Eucalyptus trivalva*
Trees < 10m	2 - 10%	*Eucalyptus carnei, Eucalyptus gypsophila, Eucalyptus trivalva*
Shrubs 1 - 2m	10 - 30%	*Cratystylis subspinescens, Eremophila forrestii* subsp. *forrestii, Eremophila pantonii, Leptomeria preissiana, Pittosporum angustifolium, Scaevola spinescens, Senna artemisioides* subsp. *filifolia, Zygophyllum eremaeum*
Shrubs < 1m	10 - 30%	*Acacia tetragonophylla, Atriplex nummularia, Frankenia laxiflora, Tecticornia cymbiformis*
Shrubs < 0.5m	2 - 10%	*Frankenia* ?*laxiflora, Lawrencia chrysoderma, Tecticornia indica* subsp. *bidens*
Tussock grasses	10 - 30%	*Eragrostis pergracilis*

722 WRE Site 67

Described by	AC	**Date:**	21/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	560374	mE	7018601	mN	
Habitat	North-east facing midslope, moderate slope.					
Soil	Orange to brown clay loam.					
Rock Type	Common BIF stones/boulders					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Solanum lasiophyllum* and *Eremophila latrobei* low open shrubland over *Sida excedentifolia* open herbs. North-east facing midslope, moderate slope.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Plentiful leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m		*Acacia aneura* var. *aneura*
Shrubs < 1m		*Eremophila latrobei, Solanum lasiophyllum*
Shrubs < 0.5m		*Ptilotus schwartzii*
Tussock grasses		*Cymbopogon ambiguus, Monachather paradoxus*
Herbs		*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 71

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location						
MGA Zone	50	564211	mE	7020601	mN	
Habitat	Ridgetop, gentle to negligible slope					
Soil	Red-orange sandy clay					
Rock Type	Continuous to many BIF and granite stones and boulders					
Vegetation	*Grevillea berryana* low open woodland over *Acacia aneura* var. *aneura* and *Grevillea berryana* open *scrub* over *Thryptomene decussata* open shrubland over *Eremophila glutinosa* and *Eremophila latrobei* subsp. *latrobei* low shrubland over *Sida excedentifolia* very open herbs. Ridgetop, gentle to negligible slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia minyura, Grevillea berryana*
Shrubs 1 - 2m	2 - 10%	*Acacia sibirica, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Prostanthera petrophila*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Eremophila margarethae, Ptilotus schwartzii*
Tussock grasses	< 2%	*Aristida contorta*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 77

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	East of camp					
MGA Zone	50	560388	mE	7016711	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sandy clay, with some loose soil					
Rock Type	Common ferrous and quartz coarse gravel and pebbles.					
Vegetation	*Acacia aneura* var. *aneura* low woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Senna glaucifolia* and *Senna artemisioides* subsp. *helmsii* open shrubland over *Senna glaucifolia*, *Senna artemisioides sub*sp. *helmsii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Marsdenia australis* climbers over *Aristida contorta* and *Cymbopogon ambiguus* open tussock grassland. Flat/plain.					
Veg Condition	Poor, evidence of goats					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura, Acacia aneura* var. *aneura, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Rhagodia eremaea, Scaevola spinescens, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. x *sturtii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Eremophila mackinlayi* subsp. *spathulata, Maireana* sp.*, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Climbers	< 2%	*Marsdenia australis*

722 WRE Site 78

Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Ridge behind camp					
MGA Zone	50	560836	mE	7016798	mN	
Habitat	Gentle to moderate slope, ridgetop					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous stones/boulders and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range shrubland to high shrubland over *Eremophila glutinosa* low shrubland over *Aristida contorta* open tussock grassland. Gentle to moderate slope, ridgetop.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Eremophila glutinosa, Mirbelia* ?*stipitata, Philotheca brucei* subsp. *brucei, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Tribulus suberosus*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Heliotropium* sp., *Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 79

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	561440	mE	7016893	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange clay, with a surface crust					
Rock Type	Many BIF stones and boulders					
Vegetation	*Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* high shrubland over *Eremophila macmillaniana* open shrubland over *Eremophila glutinosa* and *Senna artemisioides* subsp. *helmsii* low shrubland and *Solanum lasiophyllum* low scattered shrubs over *Aristida contorta* tussock grassland. Ridgetop, gentle slope.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Eremophila macmillaniana, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	< 2%	*Eremophila latrobei, Solanum lasiophyllum, Tribulus suberosus*
Tussock grasses	30 - 70%	*Aristida contorta, Monachather paradoxus*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 81

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	563937	mE	7018085	mN	
Habitat	Moderate slope, midslope					
Soil	Red clay					
Rock Type	Mnay BIF coarse gravel/pebbles and stones					
Vegetation	*Acacia* sp. Weld Range and *Acacia aneura* var. *aneura* high open shrubland over *Senna artemisioides* subsp. *helmsii* and *Ptilotus obovatus* var. *obovatus* low open heath over *Aristida contorta* very open tussock grassland. Moderate slope, midslope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs < 1m	30 - 70%	*Eremophila exilifolia, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Ptilotus obovatus* var. *obovatus, Senna glaucifolia, Solanum lasiophyllum, Tribulus suberosus*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus*

722 WRE Site 84

Described by	SH	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	584124	mE	7031028	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red-orange sand to sandy clay, with loose soil					
Rock Type	Nil					
Vegetation	*Acacia pruinocarpa* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia aneura* var. *fuliginea* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila forrestii* subsp. *forrestii* low shrubland over *Aristida* sp. open tussock grassland. Flat/plain.					
Veg Condition	SH, Flat/plain.					
Fire Age	Poor					
Notes	None evident					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii*
Shrubs < 0.5m	< 2%	*Eremophila jucunda, Hemigenia tysonii, Solanum ferocissimum, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida* sp., *Eragrostis lanipes*

722 WRE Site 85

Described by	JN	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld North					
MGA Zone	50	584862	mE	7031416	mN	
Habitat	Flat/plain, negligible slope.					
Soil	Red-orange sand to sandy clay, with loose soil.					
Rock Type	Nil					
Vegetation	*Corymbia lenziana* open woodland to scattered tall trees over *Acacia aneura* var. *intermedia* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila hughesii* subsp. *hughesii* and *Eremophila forrestii* subsp. *forrestii* low shrubland to shrubland over *Eremophila hughesii* subsp. *hughesii* and *Ptilotus obovatus* var. *obovatus* low open shrubland. Flat/plain.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs and trees - plentiful under Corymbia sp.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Corymbia lenziana*
Trees < 10m	2 - 10%	*Acacia pruinocarpa,Corymbia lenziana, Psydrax rigidula*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *intermedia, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila hughesii* subsp. *hughesii, Senna artemisioides* subsp. *filifolia, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. x *artemisioides*
Shrubs < 1m	10 - 30%	*Senna ?glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*

722 WRE Site 88

Described by	SH	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Beebyn North					
MGA Zone	50	579048	mE	7028520	mN	
Habitat	Flat/plain, negligible slope, possible soak					
Soil	Red-orange sandy clay to clay, with loose soil and no rocks					
Rock Type						
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var. *aneura* open woodland over *Acacia aneura* var. *aneura* and *Psydrax latifolia* low woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* subsp. *forrestii* open shrubland over *Eremophila forrestii* subsp. *forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Marsdenia australis* climbers over *Abutilon* sp. and *Sida fibulifera* very open herbs. Flat/plain, possible soak.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate widespread leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Acacia aneura* var. *aneura, Acacia craspedocarpa, Acacia pruinocarpa*
Trees < 10m	30 - 70%	*Acacia aneura* var. *aneura, Acacia craspedocarpa, Acacia pruinocarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila* ?*clarkei, Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila gilesii* subsp. *variabilis, Rhagodia eremaea*
Shrubs < 1m	< 2%	*Eremophila glutinosa*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Aristida holathera* var. *holathera*
Climbers	< 2%	*Marsdenia australis*
Herbs	2 - 10%	*Abutilon* sp., *Sida fibulifera*

722 WRE Site 88a

Described by	AC	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	585765	mE	7031197	mN	
Habitat	Flat/plain, creek bed and bank, gentle slope.					
Soil	Red-orange sand with a surface crust and some loose soil					
Rock Type	Few ferrous and quartz stones.					
Vegetation	*Acacia aneura* var. *aneura*, *Acacia sibirica* and *Acacia ramulosa* var. *linophylla* high shrubland over *Solanum lasiophyllum* low scattered shrubs over *Aristida contorta* tussock grassland. Flat/plain, creek bed and bank, gentle slope.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia sibirica*
Shrubs 1 - 2m	< 2%	*Acacia burkittii, Acacia tetragonophylla*
Shrubs < 1m	< 2%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila platycalyx*
Shrubs < 0.5m	< 2%	*Hakea preissii, Ptilotus obovatus* var. *obovatus, Ptilotus polystachyus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Climbers	< 2%	*Duperreya commixta*

722 WRE Site 92

Described by	AC	**Date:**	16/04/07	**Type:**	Q	20x20

Location	Weld Range North
MGA Zone	
Habitat	Flat/plain, creek bed.
Soil	Red-orange sand, with loose soil and some fine gravel.
Rock Type	
Vegetation	*Acacia ramulosa* var. *linophylla*, *Acacia tetragonophylla* and *Acacia aneura* open scrub over *Eremophila forrestii* subsp. *forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Enneapogon caerulescens* and *Aristida contorta* open tussock grassland. Flat/plain, creek bed.
Veg Condition	
Fire Age	
Notes	

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura, Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia tetragonophylla, Santalum spicatum*
Shrubs 1 - 2m	< 2%	*Eremophila* aff. *georgei, Eremophila platycalyx, Prostanthera althoferi* subsp. *althoferi, Senna artemisioides* subsp. x *sturtii*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Eremophila forrestii* subsp. *forrestii, Grevillea inconspicua, Prostanthera petrophila, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Mirbelia ?stipitata, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens, Eragrostis* sp.
Herbs	< 2%	*Sida* sp.

722 WRE Site 94

Described by	AC	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	587032	mE	7035055	mN	
Habitat	Flat/plain, gentle slope					
Soil	Orange sandy clay					
Rock Type	Common granite stones/boulders and surface level plates					
Vegetation	*Acacia* sp. Weld Range high shrubland over *Senna artemisioides sub*sp. *helmsii* and *Senna glaucifolia* shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland and *Eremophila platycaly*x low scattered shrubs over *Cymbopogon ambiguus* and *Enneapogon caerulescens* open tussock grassland. Flat/plain, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 1m	< 2%	*Acacia minyura, Eremophila platycaly*x
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*

722 WRE Site 95

Described by	SH	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	587295	mE	7034769	mN	
Habitat	Flat/plain, with a minor channel and possible granite soak. Negligible slope					
Soil	Red-orange sand					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia rhodophloia* high open shrubland over *Eremophila exilifolia* scattered shrubs over *Eremophila exilifolia* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Cymbopogon ambiguus* very open tussock grassland. Flat/plain, with a minor channel and possible granite soak.					
Veg Condition	Good					
Fire Age	None evident					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia rhodophloia, Acacia sibirica, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia speckii*
Shrubs < 1m	< 2%	*Eremophila exilifolia, Hakea lorea, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Eremophila forrestii* subsp. *forrestii, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Enneapogon caerulescens*

722 WRE Site 98

Described by	SH	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	588797	mE	7035953	mN	
Habitat	Footslope, negligible slope					
Soil	Red-orange sandy clay					
Rock Type	Many ferrous pieces of fine gravel and coarse gravel/pebbles.					
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *aneura* high shrubland over *Senna artemisioides sub*sp. *helmsii* and *Senna glaucifolia* open shrubland over *Eremophila forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland. Footslope.					
Veg Condition						
Fire Age						
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 1m	2 - 10%	*Chenopodium gaudichaudianum, Dodonaea petiolaris, Eremophila forrestii, Eremophila spathulata, Solanum lasiophyllum*
Shrubs < 0.5m	2 - 10%	*Maireana georgei, Maireana triptera, Ptilotus obovatus* var. *obovatus*

722 WRE Site 99

Described by	JN	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld North					
MGA Zone	50	588798	mE	7036525	mN	
Habitat	Footslope, gentle slope					
Soil	Red-orange sandy clay, with a surface crust.					
Rock Type	Continuous ferrous and quartz coarse gravel/pebbles, stones/boulders, and surface level plates.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura* and *Acacia tetragonophylla* high open shrubland over *Acacia tetragonophylla* scattered shrubs over *Senna* sp. Meekatharra and *Maireana georgei* low shrubland. Footslope, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter (mainly under shrubs). Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia tetragonophylla*
Shrubs < 1m	< 2%	*Eremophila spathulata, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 0.5m	10 - 30%	*Maireana georgei, Maireana triptera, Ptilotus obovatus* var. *obovatus*

722 WRE Site 100

Described by	AC	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	588158	mE	7037131	mN	
Habitat	Flat/plain, gentle slope.					
Soil	Orange to brown clay loam, with a surface crust and some fine gravel.					
Rock Type	Common ferrous and quartz fine gravel.					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* low woodland over *Acacia tetragonophylla* and *Acacia sclerosperma* subsp. *sclerosperma* high open shrubland over *Ptilotus obovatus* var. *obovatus* and *Senna* sp. 1 shrubland over *Aristida contorta* open tussock grassland.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia*
Shrubs > 2m	2 - 10%	*Acacia craspedocarpa, Acacia sclerosperma* subsp. *sclerosperma, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila compacta* subsp. *compacta, Eremophila exilifolia, Eremophila forrestii, Eremophila galeata, Eremophila platycalyx, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 1m	< 2%	*Ptilotus obovatus* var. *obovatus, Ptilotus polystachyus, Senna artemisioides* subsp. *filifolia, Sida ectogama*
Shrubs < 0.5m	< 2%	*Maireana triptera, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 101

Described by	AC	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	588450	mE	7038104	mN	
Habitat	Flat/plain, negligible slope.					
Soil	Red-orange sandy clay, with fine gravel and loose soil					
Rock Type	Many ferrous, granite, and quartz coarse gravel and pebbles.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland over *Eremophila spathulata* open shrubland over *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low scattered shrubs over *Aristida contorta* tussock grassland. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Eremophila spathulata, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	< 2%	*Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Acacia tetragonophylla, Grevillea extorris, Harnieria kempeana* subsp. *muelleri, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus*

722 WRE Site 102

Described by	SH	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	589312	mE	7038142	mN	
Habitat	Footslope, negligible slope					
Soil	Red-orange sandy clay, with fine gravel					
Rock Type	Many ferrous and granite coarse gravel/pebbles					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia minyura* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila simulans* subsp. *simulans* and *Ptilotus schwartzii* low open shrubland over *Sida excedentifolia* very open herbs, Footslope.					
Veg Condition	Good; track at edge of quadrat					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa, Psydrax latifolia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea, Acacia minyura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Grevillea berryana, Senna glaucifolia*
Shrubs < 1m	< 2%	*Eremophila simulans* subsp. *simulans*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*

722 WRE Site 108

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	562128	mE	7019503	mN	
Habitat	Ridgetop, moderate slope					
Soil	Red-orange sandy clay					
Rock Type	Common BIF stones and boulders					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Aluta aspera* subsp. *hesperia* and *Thryptomene decussata* open heath *Sida excedentifolia* and *Ptilotus schwartzii* scattered herbs over *Monachather paradoxus* very open tussock grassland. Ridgetop, moderate slope.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	30 - 70%	*Acacia ramulosa* var. *linophylla, Acacia rhodophloia, Aluta aspera* subsp. *hesperia, Grevillea berryana, Thryptomene decussata*
Shrubs < 1m	< 2%	*Eremophila glutinosa, Eremophila latrobei, Prostanthera petrophila*
Shrubs < 0.5m	< 2%	*Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	< 2%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 115

Described by	SH	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Lakeside					
MGA Zone	50	541455	mE	7014385	mN	
Habitat	Flat/plain, lake bank					
Soil	Red-orange sand to sandy clay, with loose soil.					
Rock Type	Nil					
Vegetation	*Acacia aneura* low open woodland over *Melaleuca stereophloia* high open shrubland over *Eremophila forrestii* shrubland over *Eremophila forrestii* and *Solanum lasiophyllum* low open shrubland over *Eragrostis lanipes* and *Aristida contorta* tussock grassland. Flat/plain, lake bank.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura*
Shrubs > 2m	2 - 10%	*Acacia murrayana, Acacia sibirica*
Shrubs 1 - 2m	10 - 30%	*Acacia craspedocarpa, Acacia tetragonophylla, Eremophila compacta* subsp. *compacta, Eremophila forrestii, Melaleuca stereophloia*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Aristida contorta, Cymbopogon ambiguus, Eragrostis lanipes, Monachather paradoxus,* POACEAE sp.

722 WRE Site 116

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	544412	mE	7016905	mN	
Habitat	Flat plain, negligible slope					
Soil	Red-orange sandy clay, with loose soil					
Rock Type	Common quartz stones					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland over *Eremophila galeata* and *Acacia tetragonophylla* scattered shrubs over *Eriachne helmsii* tussock grassland.					
Veg Condition	Good, kangaroo track through site					
Fire Age	None evident					
Notes	Negligible leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	< 2%	*Acacia aneura* var. *conifera, Acacia tetragonophylla, Eremophila galeata*
Shrubs < 1m	< 2%	*Sida ectogama*
Shrubs < 0.5m	< 2%	*Acacia craspedocarpa, Eremophila latrobei* subsp. *latrobei, Eremophila punicea, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida holathera, Eriachne pulchella, Monachather paradoxus*
Herbs	< 2%	*Dianella revoluta* var. *divaricata*

722 WRE Site 117

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Near W17					
MGA Zone	50	546935	mE	7015506	mN	
Habitat	Midslope, minor crest, gentle slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland *to* scattered low trees over *Acacia grasbyi* open shrubland over *Acacia grasbyi* and *Ptilotus beardii* low shrubland over *Aristida contorta* very open tussock grassland. Midslope, minor crest, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mianly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Hakea recurva*
Shrubs 1 - 2m	2 - 10%	*Acacia grasbyi*
Shrubs < 1m	2 - 10%	*Dodonaea adenophora, Eremophila glutinosa, Senna* sp. Austin (A. Strid 20210)*, Thryptomene decussata*
Shrubs < 0.5m	10 - 30%	*Maireana glomerifolia, Ptilotus beardii*
Tussock grasses	2 - 10%	*Aristida contorta, Eriachne mucronata*

722 WRE Site 118

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	547723	mE	7014961	mN	
Habitat	Ridgetop, moderate slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous coarse gravel/pebbles, stones/boulders, and surface level plates					
Vegetation	*Acacia pruinocarpa* low open woodland *to* scattered trees over *Acacia craspedocarpa* and *Acacia aneura* var. *fuliginea* high shrubland over *Thryptomene decussata* shrubland over *Philotheca brucei* subsp. *brucei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Aristida contorta* very open tussock grassland. Ridgetop, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *fuliginea, Acacia craspedocarpa, Acacia sibirica*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Solanum ashbyae, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Dodonaea pachyneura, Eremophila glutinosa, Eremophila latrobei, Eremophila platycalyx* subsp. *platycalyx, Micromyrtus sulphurea, Olearia plucheacea, Philotheca brucei* subsp. *brucei, Prostanthera petrophila*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Aristida contorta*
Climbers	< 2%	*Duperreya commixta*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 119

Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Samphire plain					
MGA Zone	50	557394	mE	7018295	mN	
Habitat	Undulating plain; isolated patch of woodland in a samphire plain.					
Soil	Red-orange sandy clay, with loose soil					
Rock Type						
Vegetation	*Pittosporum angustifolium* low open woodland *to* scattered trees over *Leptomeria preissiana* high open shrubland over *Cratystylis subspinescens* and *Senna artemisioides sub*sp. *filifolia* shrubland over *Atriplex cephalantha*, *Scaevola spinescens*, *Halosarcia indica* subsp. *bidens* and *Frankenia laxiflora* low shrubland over *Aristida contorta* very open tussock grassland. Undulating plain; isolated patch of woodland in a samphire plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Pittosporum angustifolium, Santalum spicatum*
Shrubs > 2m	2 - 10%	*Acacia victoriae, Leptomeria preissiana, Senna artemisioides* subsp. *filifolia*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Atriplex cephalantha, Cratystylis subspinescens, Eremophila subfloccosa* subsp. *lanata, Melaleuca stereophloia, Scaevola spinescens*
Shrubs < 1m	10 - 30%	*Eremophila glabra* subsp. *glabra, Tecticornia indica* subsp. *bidens*
Shrubs < 0.5m	10 - 30%	*Frankenia laxiflora, Podolepis capillaris*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon caerulescens*

722 WRE Site 120

Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Madoonga					
MGA Zone	50	558093	mE	7018841	mN	
Habitat	Flat/plain, negligible slope					
Soil	Orange clay with a surface crust.					
Rock Type	Nil					
Vegetation	*Eucalyptus carnei* woodland over *Eremophila pantonii* scattered shrubs over *Atriplex* sp. and *Tecticornia cymbiformis* low open shrubland over *Eragrostis pergracilis* open tussock grassland. Flat/plain.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate widespread leaf litter. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Eucalyptus carnei, Eucalyptus carnei*
Trees < 10m	< 2%	*Eucalyptus carnei, Eucalyptus carnei*
Mallee tree	< 2%	*Eucalyptus trivalva*
Shrubs 1 - 2m	< 2%	*Acacia victoriae, Eremophila pantonii*
Shrubs < 1m	2 - 10%	*Acacia exocarpoides, Acacia tetragonophylla, Atriplex* sp., *Cratystylis subspinescens, Eremophila glabra* subsp. *glabra, Eremophila subfloccosa* subsp. *lanata, Scaevola spinescens*
Shrubs < 0.5m	< 2%	*Frankenia laxiflora, Melaleuca stereophloia, Senna artemisioides* subsp. *filifolia, Solanum lasiophyllum, Tecticornia cymbiformis, Tecticornia indica* subsp. *bidens*
Tussock grasses	10 - 30%	*Eragrostis pergracilis, Monachather paradoxus*
Herbs	< 2%	*Calocephalus multiflorus, Centaurium* sp.

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Described by	JN	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Ex's near samphire					
MGA Zone	50	558037	mE	7019505	mN	
Habitat	Flat/plain, edges of samphire plain, negligible slope					
Soil	Red-orange to brown sandy clay, with a surface crust and some loose soil					
Rock Type	Nil					
Vegetation	*Eucalyptus trivalva* low open woodland to woodland over *Eucalyptus trivalva* low open mallee forest over *Exocarpos aphyllus* scattered tall shrubs over *Acacia victoriae* open shrubland over *Eremophila glabra* subsp. *glabra*, *Scaevola spinescens* and *Frankenia laxiflora* low shrubland over *Aristida contorta* open tussock grassland. Flat/plain, edges of samphire plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs and trees. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	10 - 30%	*Eucalyptus carnei, Eucalyptus trivalva*
Trees < 10m	2 - 10%	*Eucalyptus carnei, Eucalyptus trivalva*
Shrubs > 2m	< 2%	*Acacia murrayana, Acacia victoriae, Exocarpos aphyllus*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla, Eremophila glabra* subsp. *glabra, Eremophila subfloccosa* subsp. *lanata, Scaevola spinescens, Senna artemisioides* subsp. *filifolia*
Shrubs < 1m	10 - 30%	*Atriplex nummularia, Cratystylis subspinescens, Lawrencia chrysoderma, Melaleuca stereophloia, Muehlenbeckia florulenta, Tecticornia* sp.
Shrubs < 0.5m	2 - 10%	*Frankenia laxiflora*
Tussock grasses	10 - 30%	*Aristida contorta*

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Described by	JN	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	580322	mE	7030811	mN	
Habitat	Flat/plain to undulating plain, with a negligible slope.					
Soil	Brown loam, with loose soil					
Rock Type	Nil					
Vegetation	*Eucalyptus lucasii* low woodland *to* open forest over *Eucalyptus lucasii (saplings)* low open mallee woodland over *Acacia tetragonophylla* high open shrubland over *Senna artemisioides* subsp. *filifolia* open shrubland over *Pimelea microcephala* subsp. *microcephala*, *Abutilon oxycarpum* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Duperreya commixta* climbers. Flat/plain to undulating plain.					
Veg Condition	Excellent					
Fire Age	Old (>5 yrs)					
Notes	Plentiful, widespread leaf litter. Plentiful wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	30 - 70%	*Eucalyptus lucasii*
Trees < 10m	10 - 30%	*Eucalyptus lucasii*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Chenopodium gaudichaudianum, Eremophila longifolia, Pimelea microcephala* subsp. *microcephala, Pittosporum angustifolium, Santalum lanceolatum, Senna artemisioides* subsp. *filifolia, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	2 - 10%	*Abutilon oxycarpum, Eremophila georgei, Eremophila subfloccosa* subsp. *lanata, Solanum lasiophyllum*
Shrubs < 0.5m	2 - 10%	*Abutilon oxycarpum, Ptilotus obovatus* var. *obovatus*
Tussock grasses	< 2%	*Enneapogon caerulescens, Eragrostis australasica, POACEAE* sp.
Climbers	10 - 30%	*Duperreya commixta*

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Described by	SH	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld North					
MGA Zone	50	581695	mE	7030171	mN	
Habitat	Flat/plain, negligible slope					
Soil	Brown sand to sandy clay, with loose soil					
Rock Type	Few granite and quartz stones.					
Vegetation	*Acacia aneura* low open woodland over *Eucalyptus lucasii* low mallee woodland over *Sida calyxhymenia* open shrubland over *Ptilotus obovatus* var. *obovatus* and *Ptilotus divaricatus* var. *divaricatus* low open heath over *Ptilotus polystachyus* open herbs. Flat/plain.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Plentiful widespread leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Psydrax latifolia*
Mallee tree	10 - 30%	*Eucalyptus lucasii*
Shrubs > 2m	< 2%	*Acacia aneura*
Shrubs 1 - 2m	2 - 10%	*Acacia craspedocarpa, Acacia pruinocarpa, Acacia tetragonophylla*
Shrubs < 1m	30 - 70%	*Eremophila galeata, Ptilotus divaricatus* var. *divaricatus, Ptilotus obovatus* var. *obovatus, Rhagodia eremaea, Sida calyxhymenia, Solanum lasiophyllum*
Shrubs < 0.5m	30 - 70%	*Eremophila foliosissima, Maireana ?georgei, Spartothamnella teucriiflora*
Herbs	10 - 30%	*Abutilon ?oxycarpum, Ptilotus polystachyus*

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Described by	SH	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	589437	mE	7037259	mN	
Habitat	Midslope, north west facing, gentle slope.					
Soil	Red-orange sandy clay					
Rock Type	Continuous BIF, grantie, quartz, and ferrous stones/boulders and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Thryptomene decussata* high open shrubland over *Eremophila margarethae* low scattered shrubs and *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia tenuiloba* open herbs over *Eriachne pulchella* very open tussock grassland. Midslope, north west facing, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Grevillea berryana*
Shrubs > 2m	< 2%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Thryptomene decussata*
Shrubs < 1m	< 2%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	10 - 30%	*Psydrax rigidula, Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Aristida contorta, Eriachne pulchella*
Herbs	10 - 30%	*Cheilanthes sieberi* subsp. *sieberi, Goodenia tenuiloba*

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Described by	JN	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld North					
MGA Zone	50	589791	mE	7037197	mN	
Habitat	Midslope, hill crest on side of range, south east facing gentle slope.					
Soil	Red-orange sandy clay, with a surface crust and fine gravel					
Rock Type	Continuous to many ferrous coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range and *Acacia aneura* var. *aneura* high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana*, *Senna artemisioides* subsp *helmsii* and *Ptilotus astrolasius* var. *luteolus* low open shrubland.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia tetragonophylla, Eremophila macmillaniana*
Shrubs 1 - 2m	10 - 30%	*Acacia speckii, Acacia tetragonophylla, Calytrix desolata, Eremophila macmillaniana, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 1m	2 - 10%	*Acacia speckii, Eremophila exilifolia, Eremophila latrobei* subsp. *latrobei, Eremophila macmillaniana, Ptilotus obovatus* var. *obovatus, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	2 - 10%	*Dodonaea amplisemina, Eremophila latrobei* subsp. *latrobei, Mirbelia ?stipitata, Ptilotus astrolasius* var. *luteolus, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii*

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Described by	AC	**Date:**	15/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	589471	mE	7037203	mN	
Habitat	Ridgetop, gentle slope (slopes down, south to north).					
Soil	Red-orange sandy clay					
Rock Type	Many BIF coarse gravel/pebbles, stones/boulders and surface level plates.					
Vegetation	*Acacia aneura* var. *aneura* and *Thryptomene decussata* high open shrubland over *Thryptomene decussata* and *Baeckea* sp. Melita Station open shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia* sp. very open herbs over *Eriachne helmsii* scattered tussock grasses. Ridgetop, gentle slope *(*slopes down, south to north).					
Veg Condition	Excellent					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Negligible wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Baeckea* sp. Melita Station (H. Pringle 2738), *Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Eremophila exilifolia, Eremophila glutinosa, Solanum ashbyae*
Tussock grasses	< 2%	*Eriachne helmsii*
Herbs	2 - 10%	*Goodenia* sp., *Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)

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Described by	SH	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	589282	mE	7036626	mN	
Habitat	Midslope, north-west facing, moderate slope.					
Soil	Red-orange sandy clay					
Rock Type	Continuous BIF and ferrous stones/boulders and surface-level plates.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland over *Eremophila margarethae* scattered shrubs over *Eremophila margarethae* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Marsdenia australis* climbers. Midslope, north-west facing, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Cheilanthes lasiophylla*

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Described by	AC	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	589342	mE	7036616	mN	
Habitat	Midslope, east south east facing, steep slope.					
Soil	Red-orange clay					
Rock Type	Continuous stones/boulders and surface-level plates, BIF.					
Vegetation	*Acacia aneura* var. *aneura* and *Thryptomene decussata* high shrubland over *Ptilotus obovatus* var. *obovatus* low open heath and *Solanum ashbyae* low scattered shrubs over *Goodenia* sp. and *Sida* ?*chrysocaly*x very open herbs. Midslope, east south east facing, steep slope.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Thryptomene decussata*
Shrubs 1 - 2m	< 2%	*Psydrax latifolia, Psydrax suaveolens*
Shrubs < 1m	30 - 70%	*Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Hibiscus* ?*burtonii, Solanum ashbyae, Tribulus suberosus*
Herbs	2 - 10%	*Cheilanthes sieberi, Goodenia* sp., *Sida* sp. golden calyces glabrous (H.N. Foote 32)

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Described by	JN	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld North, south-east face of range					
MGA Zone	50	589461	mE	7036537	mN	
Habitat	Midslope, moderate south-east facing slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Conintuous BIF and ferrous coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range shrubland *to* high shrubland over *Eremophila macmillaniana*, *Dodonaea* sp. *Ninghan* and *Eremophila exilifolia* low shrubland. Midslope, moderate south-east facing slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Eremophila macmillaniana*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Ptilotus astrolasius* var. *luteolus*

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Described by	JN	**Date:**	16/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	589858	mE	7037769	mN	
Habitat	Midslope to ridgetop, gentle slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous coarse gravel/pebbles, stones/boulders, and surface level plates.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range high open shrubland over *Acacia* sp. Weld Range and *Acacia speckii* shrubland over *Eremophila macmillaniana*, *Eremophila exilifolia* and *Ptilotus astrolasius* var. *luteolus* low open shrubland over *Aristida contorta* very open tussock grassland. Midslope *to* ridgetop, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii, Grevillea berryana*
Shrubs 1 - 2m	10 - 30%	*Eremophila macmillaniana*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	2 - 10%	*Dodonaea amplisemina, Ptilotus astrolasius* var. *luteolus*
Tussock grasses	2 - 10%	*Aristida contorta*

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Described by	JN	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	587069	mE	7034505	mN	
Habitat	Undulating plain, small granite dome crest. Gentle slope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Many granite pieces of fine gravel and stones/boulders.					
Vegetation	*Acacia aneura* low open woodland over *Acacia* sp. Weld Range open shrubland *to* high shrubland over *Eremophila platycalyx subsp. platycalyx*, *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Cymbopogon ambiguus* very open tussock grassland. Undulating plain, small granite dome crest. Gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate to sparse wood litter. Sparse leaf litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii, Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Eremophila exilifolia*
Shrubs < 1m	2 - 10%	*Eremophila platycalyx* subsp. *platycalyx*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*

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Described by	AC	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	587781	mE	7034353	mN	
Habitat	Rocky scree footslope, north-west side of ridge, gentle slope.					
Soil	Red-orange clay, with a surface crust					
Rock Type	Many BIF, and a few quartz, coarse gravel and pebbles.					
Vegetation	*Acacia ramulosa* var. *linophylla* and *Acacia aneura* high shrubland over *Acacia aneura* (emergent), *Eremophila spathulata* and *Ptilotus rotundifolius* shrubland over *Eremophila latrobei* subsp. *latrobei* and *Solanum lasiophyllum* low scattered shrubs over *Sida excedentifolia* scattered herbs over *Aristida contorta* scattered tussock grasses. Rocky scree footslope, north-west side of ridge, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Negligible wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila spathulata, Psydrax suaveolens, Ptilotus rotundifolius*
Shrubs < 1m	< 2%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	< 2%	*Senna glaucifolia, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Cymbopogon ambiguus*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

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Described by	JN	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	587937	mE	7034213	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange sandy clay with a surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel, pebbles, stones, and boulders.					
Vegetation	*Acacia pruinocarpa* scattered trees over *Acacia aneura* var. *aneura* low woodland over *Acacia aneura* var. *aneura* open shrubland *to* high shrubland over *Eremophila spathulata* low shrubland over *Goodenia tenuiloba* very open herbs. Ridgetop, gentle slope.					
Veg Condition	Excellent					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia pruinocarpa, Psydrax latifolia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	*Eremophila spathulata*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Ptilotus rotundifolius, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Herbs	2 - 10%	*Goodenia tenuiloba*

722 WRE Site 134

Described by	SH	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North-East					
MGA Zone	50	588151	mE	7033952	mN	
Habitat	Midslope, south-west facing, minor drainage channel just below site, gully sides with a gentle slope.					
Soil	Red-orange clay					
Rock Type	Continuous ferrous coarse gravel/pebbles, and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range high shrubland over *Eremophila macmillaniana* open shrubland over *Eremophila exilifolia* and *Dodonaea* sp. *Ninghan* low shrubland over *Enneapogon caerulescens* and *Aristida contorta* very open tussock grassland. *Mid*slope, *south-west facing*, *minor drainage channel just be*low *site*, *gully sides with a* gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs 1 - 2m	2 - 10%	*Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Dodonaea amplisemina, Ptilotus astrolasius* var. *luteolus, Ptilotus obovatus* var. *obovatus, Sida ectogama*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon caerulescens*
Herbs	< 2%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site 135

Described by	SH	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North East					
MGA Zone	50	588502	mE	7033622	mN	
Habitat	Midslope, gentle slope, noth-west facing.					
Soil	Red-orange sandy clay					
Rock Type	Continuous, ferrous, granite, and quartz					
Vegetation	*Acacia aneura* and *Acacia aneura* var. *aneura* low open woodland over *Eremophila macmillaniana* low scattered shrubs *to* scattered tall shrubs over *Euphorbia boophthona* scattered herbs over *Aristida contorta* open tussock grassland. Midslope, gentle slope, *noth-west facing.*					
Veg Condition	Poor; heavily grazed by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, minaly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura, Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	< 2%	*Eremophila macmillaniana*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Senna glaucifolia*
Shrubs < 0.5m	< 2%	*Prostanthera althoferi* subsp. *althoferi, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*
Herbs	< 2%	*Euphorbia boophthona, Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site 136

Described by	JN	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	587841	mE	7033527	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange sandy clay with a surface crust					
Rock Type	Continuous to many ferrous coarse gravel, pebbles, stones, and boulders					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range shrubland to high open shrubland over *Eremophila macmillaniana*, *Eremophila exilifolia*, *Ptilotus rotundifolius* and *Dodonaea* sp. *Ninghan* low shrubland over *Aristida contorta* open tussock grassland. Ridgetop, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. *oligophylla*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Grevillea inconspicua, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta*

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Described by	AC	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Weld Range North					
MGA Zone	50	588342	mE	7034114	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange clay, with a surface crust					
Rock Type	Many BIF coarse gravel, pebbles, and stones.					
Vegetation	*Acacia* sp. Weld Range and *Acacia speckii* shrubland over *Eremophila macmillaniana* and *Ptilotus astrolasius* var. *luteolus* low open shrubland over *Aristida contorta* very open tussock grassland. Ridgetop, gentle slope.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Shrubs 1 - 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs < 1m	2 - 10%	*Eremophila exilifolia, Eremophila macmillaniana*
Shrubs < 0.5m	< 2%	*Dodonaea amplisemina, Eremophila forrestii* subsp. *forrestii, Ptilotus astrolasius* var. *luteolus, Senna artemisioides* subsp. *helmsii, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus*

722 WRE Site 138

Described by	SH	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Beebyn North East					
MGA Zone	50	582918	mE	7027232	mN	
Habitat	Midslope, north face. Moderate slope.					
Soil	Red-orange sandy clay					
Rock Type	Continuous ferrous stones/boulders and surface-level plates.					
Vegetation	*Acacia aneura* var. *aneura* scattered tall shrubs *to* scattered low trees over *Eremophila latrobei* subsp. *latrobei* shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Cymbopogon ambiguus* and *Enneapogon caerulescens* very open tussock grassland. Midslope, north face. Moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	< 2%	*Acacia pruinocarpa*
Shrubs < 1m	10 - 30%	*Eremophila galeata, Eremophila latrobei* subsp. *latrobei, Senna* sp. Meekatharra (E. Bailey 1-26), *Solanum lasiophyllum*
Shrubs < 0.5m	2 - 10%	*Eremophila macmillaniana, Hibiscus burtonii, Ptilotus obovatus* var. *obovatus, Tribulus suberosus*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*

722 WRE Site 139

Described by	JN	**Date:**	17/04/07	**Type:**	Q	20x20
Location	South-facing slope, Beebyn east					
MGA Zone	50	583009	mE	7027197	mN	
Habitat	Midslope, moderate slope.					
Soil	Red-orange sandy clay with a surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia pruinocarpa* scattered trees over *Acacia aneura* var. *aneura* high open shrubland *to* low woodland over *Eremophila latrobei* subsp. *latrobei* and *Thryptomene decussata* open heath over *Eremophila latrobei* subsp. *latrobei* and *Ptilotus obovatus* var. *obovatus* low open heath. Midslope, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Acacia pruinocarpa*
Trees < 10m	10 - 30%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	30 - 70%	*Dodonaea petiolaris, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	30 - 70%	*Harnieria kempeana* subsp. *muelleri, Olearia stuartii, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*

722 WRE Site 140

Described by	AC	**Date:**	17/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	582941	mE	7027205	mN	
Habitat	Ridgetop, moderate to gentle slope.					
Soil	Red-orange sandy clay, with a surface crust.					
Rock Type	Many BIF coarse gravel/pebbles and stones/boulders					
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *aneura* scattered tall shrubs over *Ptilotus obovatus* var. *obovatus* low open heath. Ridgetop, moderate *to* gentle slope.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	< 2%	*Acacia aneura* var. *aneura*
Shrubs < 1m	30 - 70%	*Eremophila ?georgei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Dodonaea ?pachyneura, Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brucei, Senna glaucifolia, Solanum lasiophyllum*
Tussock grasses	< 2%	*Cymbopogon ambiguus*

722 WRE Site 141

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	582035	mE	7027062	mN	
Habitat	Flat/plain, negligible slope					
Soil	Red orange hard clay pan					
Rock Type	Few ferrous pebbles					
Vegetation	*Grevillea berryana* low open woodland over *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *aneura* high open shrubland over *Acacia ramulosa* var. *linophylla* scattered shrubs over *Eremophila forrestii* subsp. *forrestii* and *Eremophila georgei* low shrubland over *Maireana georgeii* very open herbs over *Monachather paradoxus* very open tussock grassland.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Grevillea berryana, Psydrax latifolia*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Psydrax suaveolens*
Shrubs 1 - 2m	< 2%	*Acacia ramulosa* var. *linophylla, Acacia tetragonophylla, Chenopodium gaudichaudianum, Eremophila georgei, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *latrobei, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	2 - 10%	*Hibiscus burtonii, Maireana georgei*

722 WRE Site 142

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	581892	mE	7027044	mN	
Habitat	Flat/plain to footslope, gentle slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Many BIF coarse gravel, pebbles and stones					
Vegetation	*Grevillea berryana* and *Acacia aneura* var. *aneura* high shrubland over *Eremophila georgei* and *Ptilotus obovatus* var. *obovatus* low shrubland and *Solanum lasiophyllum* low scattered shrubs over *Ptilotus schwartzii* scattered herbs over *Aristida contorta* very open tussock grassland. Flat/plain *to* footslope, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs 1 - 2m	< 2%	*Acacia ramulosa* var. *linophylla, Psydrax latifolia*
Shrubs < 1m	10 - 30%	*Eremophila georgei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Eremophila forrestii* subsp. *forrestii, Maireana georgei, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Monachather paradoxus*
Herbs	< 2%	*Cheilanthes sieberi, Ptilotus schwartzii*

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Described by	JN	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	581922	mE	7026918	mN	
Habitat	Ridgetop, gentle slope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous and BIF stones, boulders, and surface-level plates					
Vegetation	*Acacia aneura* var. *aneura* high shrubland to scattered low trees over *Thryptomene decussata* shrubland over *Eremophila latrobei* subsp. *latrobei*, *Thryptomene decussata* and *Ptilotus obovatus* var. *obovatus* low shrubland. Ridgetop, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse to negligible leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia pruinocarpa, Acacia ramulosa* var. *linophylla, Acacia rhodophloia*
Shrubs 1 - 2m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Philotheca brucei* subsp. *brucei, Solanum lasiophyllum*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus*
Tussock grasses	< 2%	*Monachather paradoxus*

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Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	580319	mE	7026328	mN	
Habitat	Moderate slope, north facing midslope.					
Soil	Red-orange sandy clay					
Rock Type	Continuous BIF and ferrous stones, boulders, and surface-level plates.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Eremophila margarethae* low shrubland and *Ptilotus obovatus* var. *obovatus* low scattered shrubs. Moderate slope, north facing midslope.					
Veg Condition	Good					
Fire Age	none evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura, Acacia aneura* var. *aneura*
Shrubs 1 - 2m	< 2%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila margarethae*
Shrubs < 0.5m	< 2%	*Dodonaea pachyneura, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum ellipticum, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta*

722 WRE Site 145

Described by	JN	**Date:**	18/04/07	**Type:** Q	20x20

Location	Beebyn centre - footslope northern face
MGA Zone	
Habitat	Moderate to gentle slope, footslope
Soil	Red-orange sandy clay, with a surface crust
Rock Type	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders
Vegetation	*Acacia aneura* var. *aneura* high shrubland to low open woodland over *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila forest ssp forest* low shrubland over *Monachather paradoxus* very open tussock grassland.
Veg Condition	Good
Fire Age	Old (>5 yrs)
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Grevillea berryana*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *Forrestii, Eremophila glutinosa, Eremophila jucunda* subsp. *jucunda, Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	10 - 30%	*Eremophila forrestii* subsp. *Forrestii, Ptilotus schwartzii, Senna glaucifolia, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum ashbyae, Solanum ellipticum*
Tussock grasses	2 - 10%	*Monachather paradoxus*

722 WRE Site 146

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	580290	mE	7026302	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange clay					
Rock Type	Many BIF stones/boulders and surface-level plates					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* high shrubland over *Thryptomene decussata* open shrubland over *Eremophila latrobei* subsp. *latrobei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Solanum lasiophyllum* and *Tribulus suberosus* low scattered shrubs over *Monachather paradoxus* scattered tussock grasses. Ridgetop, gentle slope.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Dodonaea* ?*petiolaris, Maireana georgei, Philotheca brucei* subsp. *brucei, Senna* sp. Meekatharra (E. Bailey 1-26)*, Solanum lasiophyllum, Tribulus suberosus*
Tussock grasses	< 2%	*Cymbopogon ambiguus, Monachather paradoxus*

722 WRE Site 147

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn					
MGA Zone	50	579052	mE	7025125	mN	
Habitat	Flat/plain, gentle slope					
Soil	Red-orange clay loam, with a surface crust					
Rock Type	Common BIF coarse gravel and pebbles					
Vegetation	*Grevillea berryana* scattered low trees over *Acacia aneura* var. *aneura* high shrubland over *Acacia ramulosa* var. *linophylla*, *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *sturtii* and *Eremophila* ?*clarkei* open heath over *Acacia aneura* var. *aneura* (emergent) low open shrubland. Flat/plain, gentle slope.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Psydrax latifolia*
Shrubs 1 - 2m	30 - 70%	*Acacia ramulosa* var. *linophylla, Eremophila* ?*clarkei, Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. x *sturtii*
Shrubs < 1m	< 2%	*Acacia pruinocarpa, Eremophila latrobei, Psydrax suaveolens*
Shrubs < 0.5m	2 - 10%	*Eremophila glutinosa, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*

722 WRE Site 148

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn northwest					
MGA Zone	50	573853	mE	7027002	mN	
Habitat	Flat/plain, with a minor drainage channel and a gentle slope.					
Soil	Red clay, with a surface crust and fine gravel					
Rock Type	Many, ferrous					
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var. *aneura* high shrubland over *Acacia exocarpoides* open shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland and *Solanum lasiophyllum* low scattered shrubs. Flat/plain, with a minor drainage channel and a gentle slope.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia pruinocarpa, Santalum acuminatum*
Shrubs 1 - 2m	2 - 10%	*Acacia exocarpoides, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs < 1m	10 - 30%	*Ptilotus obovatus, Ptilotus obovatus* var. *obovatus, Scaevola spinescens*
Shrubs < 0.5m	< 2%	*Maireana* ? *tomentosa, Solanum lasiophyllum*
Climbers	< 2%	*Lysiana* ? *murrayi*

722 WRE Site 149

Described by	JN	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Down on flats, below breakaway behind Beebyn					
MGA Zone	50	573904	mE	7027138	mN	
Habitat	Drainage basin below breakaway					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous to many ferrous coarse gravel and pebbles, stones and boulders.					
Vegetation	*Acacia pruinocarpa* low woodland over *Acacia aneura* var. *aneura* high shrubland over *Acacia sibirica* shrubland over *Acacia exocarpoides* and *Ptilotus obovatus* var. *obovatus* low shrubland.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea*
Shrubs 1 - 2m	10 - 30%	*Acacia sibirica, Acacia tetragonophylla*
Shrubs < 1m	10 - 30%	*Acacia exocarpoides, Dodonaea viscosa, Eremophila simulans* subsp. *simulans, Grevillea stenostachya*
Shrubs < 0.5m	2 - 10%	*Dodonaea viscosa, Eremophila jucunda* subsp. *jucunda, Maireana georgei, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Stenanthemum petraeum*

722 WRE Site 150

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn North					
MGA Zone	50	573767	mE	7027087	mN	
Habitat	Flat/plain, breakaway drainage area, negligible slope					
Soil	Red-orange sand, with fine gravel					
Rock Type	Many granite and quartz coarse gravel, pebbles, and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia coolgardiensis* subsp. *effusa* high open shrubland over *Acacia exocarpoides* shrubland over *Philotheca brucei* subsp. *brucei* and *Hibiscus sturtii* var. *forrestii* low shrubland. Flat/plain, breakaway drainage area.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Psydrax latifolia*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia effusifolia, Acacia minyura, Grevillea berryana, Hakea recurva* subsp. *arida*
Shrubs 1 - 2m	10 - 30%	*Acacia exocarpoides, Acacia ramulosa* var. *linophylla, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Acacia pruinocarpa, Eremophila forrestii, Eremophila georgei, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	2 - 10%	*Dodonaea viscosa* subsp. *angustissima, Eremophila latrobei* subsp. *latrobei, Hibiscus sturtii* var. *forrestii, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*

722 WRE Site 151

Described by	AC	**Date:**	18/04/07	**Type:**	Q	20x20
Location	North West of Beebyn					
MGA Zone	50	573424	mE	7027308	mN	
Habitat	Ridgetop, gentle slope.					
Soil						
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* and *Eremophila glutinosa* shrubland over *Eremophila latrobei* and *Stenanthemum petraeum* low shrubland over *Sida excedentifolia* and *Ptilotus schwartzii* scattered herbs over *Monachather paradoxus* scattered tussock grasses. Ridgetop, gentle slope.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia pruinocarpa, Psydrax latifolia*
Shrubs 1 - 2m	10 - 30%	*Eremophila glutinosa, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Acacia exocarpoides, Eremophila latrobei*
Shrubs < 0.5m	10 - 30%	*Prostanthera petrophila, Stenanthemum petraeum*
Tussock grasses	< 2%	*Monachather paradoxus*
Herbs	< 2%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 152

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Beebyn North					
MGA Zone	50	573471	mE	7027246	mN	
Habitat	Midslope, minor channel, with a gentle slope					
Soil	Red-orange sandy clay					
Rock Type	Many BIF coarse gravel/pebbles and stones/boulders					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Acacia coolgardiensis* subsp. *effusa* open shrubland over *Eremophila latrobei* subsp. *latrobei* low open heath over *Senna glaucifolia* low open shrubland over *Sida* ?*chrysocaly*x very open herbs. Midslope, minor channel, with a gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Grevillea berryana, Psydrax latifolia*
Shrubs 1 - 2m	2 - 10%	*Acacia effusifolia, Acacia exocarpoides, Eremophila* ?*georgei, Thryptomene decussata*
Shrubs < 1m	30 - 70%	*Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	2 - 10%	*Dodonaea viscosa* subsp. *angustissima, Ptilotus schwartzii, Senna glaucifolia*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 153

Described by	SH	**Date:**	18/04/07	**Type:**	Q	20x20
Location	Footslopes of range near breakaway behind Beebyn					
MGA Zone	50	574031	mE	7027464	mN	
Habitat	Moderate to gentle slope, midslope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland *to* scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Aluta aspera sub*sp. *hesperia* low open heath. Moderate to gentle slope, midslope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia rhodophloia*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *latrobei, Homalocalyx echinulatus*

722 WRE Site 154

Described by	SH	**Date:**	19/04/07	**Type:**	Q	20x20
Location	HHJV East					
MGA Zone	50	555848	mE	7017032	mN	
Habitat	Ridgetop, negligible slope					
Soil	Red-orange sandy clay					
Rock Type	Many BIF and jasperlite stones and boulders					
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *aneura* high shrubland over *Acacia sibirica* open shrubland over *Ptilotus obovatus* var. *obovatus* low open heath and *Solanum lasiophyllum* low open shrubland over *Sida excedentifolia* very open herbs. Ridgetop.					
Veg Condition	Poor; grazing by hard hooved animals and adjacent clearing					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Acacia sibirica*
Shrubs < 1m	30 - 70%	*Eremophila margarethae, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	2 - 10%	*Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 156

Described by	JN	**Date:**	19/04/07	**Type:**	Q	20x20
Location	Midslope west of W14 range					
MGA Zone	50	555918	mE	7016947	mN	
Habitat	Steep to moderate slope, midslope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders, and surface level plates.					
Vegetation	*Acacia aneura* var. *aneura* low woodland to scattered trees over *Acacia aneura* var. *aneura* shrubland to high shrubland over *Eremophila* ?*georgei* and *Ptilotus schwartzii* low shrubland. Steep to moderate slope, midslope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila* ?*georgei, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Dodonaea pachyneura, Eremophila latrobei* subsp. *latrobei, Grevillea berryana*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*

722 WRE Site 156a

Described by	AC	**Date:**	19/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	555945	mE	7016882	mN	
Habitat	Footslope, moderate slope					
Soil	Red-orange sandy clay					
Rock Type	Many BIF and ferrous coarse gravel and pebbles.					
Vegetation	*Acacia aneura* var. *aneura* open scrub *Aluta aspera* subsp. *hesperia* low shrubland over *Monachather paradoxus* and *Aristida contorta* very open tussock grassland. Footslope, moderate slope.					
Veg Condition	Good; goat tracks through site					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	< 2%	*Psydrax suaveolens*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila forrestii* subsp. *forrestii*
Shrubs < 0.5m	< 2%	*Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta, Monachather paradoxus*

722 WRE Site 157

Described by	AC	**Date:**	19/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	555667	mE	7016771	mN	
Habitat	Footslope, moderate slope					
Soil	Red-orange clay					
Rock Type	Common BIF coarse gravel and pebbles					
Vegetation	*Acacia aneura* var. *aneura* and *Grevillea berryana* low shrubland *to* high shrubland over *Sida excedentifolia* scattered herbs. Footslope, moderate slope.					
Veg Condition	Good; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Acacia aneura* var. *aneura, Grevillea berryana, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	< 2%	*Eremophila georgei, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 158

Described by	JN	**Date:**	19/04/07	**Type:**	Q	20x20
Location	Midslope of range west of W14					
MGA Zone	50	555416	mE	7016811	50	
Habitat	Midslope, moderate slope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders and surface-level plates					
Vegetation	*Acacia pruinocarpa* open woodland over *Acacia aneura* var. *aneura* high shrubland *to* low open woodland over *Acacia aneura* var. *aneura* and *Thryptomene decussata* shrubland over *Acacia aneura* var. *aneura* and *Eremophila* ?*georgei* low shrubland. Midslope, moderate slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Acacia pruinocarpa*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia minyura* x *ayersiana*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Eremophila forrestii* subsp. *Forrestii, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila forrestii* subsp. *Forrestii, Eremophila* ?*georgei, Eremophila latrobei* subsp. *latrobei, Eremophila simulans*
Shrubs < 0.5m	2 - 10%	*Eremophila forrestii* subsp. *Forrestii, Harnieria kempeana* subsp. *muelleri, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*

722 WRE Site 159

Described by	SH	**Date:**	19/04/07	**Type:**	Q	20x20
Location	HHJV East					
MGA Zone	50	555419	mE	7016931	mN	
Habitat	Ridgetop, negligible slope					
Soil	Red-orange sandy clay					
Rock Type	Continuous to many BIF stones and boulders.					
Vegetation	*Acacia pruinocarpa* scattered low trees over *Acacia minyura* x *ayersiana* high shrubland over *Acacia sibirica* open shrubland over *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Sida excedentifolia* very open herbs. Ridgetop.					
Veg Condition	Poor; grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia minyura* x *ayersiana*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia sibirica, Thryptomene decussata*
Shrubs < 1m	< 2%	*Eremophila margarethae*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 160

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	West of Site 81					
MGA Zone	50	563572	mE	7018064	mN	
Habitat	South-east facing midslope, gentle slope.					
Soil	Red-orange sandy clay, with loose soil					
Rock Type	Many ferrous coarse gravel, pebbles, stones, and boulders.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia speckii* high shrubland over *Senna glaucifolia* low open shrubland to shrubland over *Maireana georgei* low open heath over *Aristida contorta* open tussock grassland. South-east facing midslope, gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Acacia grasbyi, Acacia ramulosa* var. *linophylla, Eremophila arachnoides* subsp. *arachnoides, Eremophila glutinosa, Hakea preissii, Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 1m	2 - 10%	*Solanum lasiophyllum*
Shrubs < 0.5m	30 - 70%	*Maireana georgei, Psydrax rigidula, Ptilotus obovatus* var. *obovatus, Sclerolaena* sp.*, Tribulus suberosus*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens*
Herbs	< 2%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site 161

Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Ridge crest behind 10 point turn gully					
MGA Zone	50	564239	mE	7018334	mN	
Habitat	Ridgetop/hill crest, gentle slope					
Soil	Red-orange sandy clay, surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel/pebbles and stones/boulders					
Vegetation	*Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila mackinlayi* subsp. *spathulata* low shrubland over *Aristida contorta* open tussock grassland. Ridgetop/hill crest, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia speckii*
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Eremophila glutinosa, Eremophila mackinlayi* subsp. *spathulata, Eremophila phyllopoda* subsp. *phyllopoda, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Tribulus suberosus*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Maireana georgei, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens*

722 WRE Site 162

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Midslope, negligible slope					
MGA Zone	50	563264	mE	7018400	mN	
Habitat	Midslope, negligible slope					
Soil	Red-orange sand to sandy clay, with loose soil					
Rock Type	Common granite and quartz coarse gravel, pebbles, stones, and boulders.					
Vegetation	*Acacia aneura* var. *aneura* scattered low trees over *Acacia* sp. Weld Range high shrubland over *Senna glaucifolia* shrubland over *Grevillea inconspicua*, *Dodonaea* sp. *Ninghan* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Aristida contorta* open tussock grassland. Midslope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Grevillea inconspicua, Senna artemisioides* subsp. x *artemisioides, Senna glaucifolia*
Shrubs < 1m	2 - 10%	*Eremophila glutinosa, Senna artemisioides* subsp. *helmsii, Tribulus suberosus*
Shrubs < 0.5m	30 - 70%	*Dodonaea amplisemina, Eremophila mackinlayi* subsp. *spathulata, Ptilotus obovatus* var. *obovatus*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus*
Herbs	< 2%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site 163

Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Hill behind 10 point turn gully					
MGA Zone	50	564463	mE	7019090	mN	
Habitat	Midslope on small hill before main range, moderate to gentle slope.					
Soil	Red-orange to yellow sandy clay, with a surface crust and some fine gravel.					
Rock Type	Common ferrous and laterite like coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura* and *Acacia grasbyi* high shrubland over *Acacia grasbyi* and *Acacia tetragonophylla* shrubland over *Philotheca brucei* subsp. *brucei*, *Eremophila glutinosa* and *Sida* ? *Calyxhymenia* low shrubland. Midslope on small hill before main range, moderate *to* gentle slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse to negligible leaf litter, mainly under shrubs. Moderate to sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia grasbyi, Acacia tetragonophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila glutinosa, Grevillea berryana*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brucei, Ptilotus obovatus* var. *obovatus, Sida ectogama, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Solanum lasiophyllum*

722 WRE Site 164

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	563797	mE	7018544	mN	
Habitat	Upper slope, almost ridgetop, moderate slope.					
Soil	Red clay, with a surface crust					
Rock Type	Continuous ferrous stones and boulders					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Eremophila macmillaniana* and *Acacia speckii* shrubland over *Aristida contorta* tussock grassland. Upper slope, almost ridgetop, moderate slope.					
Veg Condition	Good, grazing by hard hooved animals.					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Acacia speckii, Eremophila macmillaniana, Senna glaucifolia*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Herbs	< 2%	*Cheilanthes lasiophylla, Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 165

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	West of Telstra tower					
MGA Zone	50	562938	mE	7019075	mN	
Habitat	Ridgetop, negligible slope					
Soil	Red-orange sandy clay, with fine gravel					
Rock Type	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* open shrubland over *Eremophila glutinosa* and *Eremophila latrobei subs*p. *latrobei* low shrubland over *Sida excedentifolia* and *Ptilotus schwartzii* very open herbs. Ridgetop.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia exocarpoides, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Prostanthera petrophila*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Ptilotus schwartzii, Solanum lasiophyllum*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 166

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	563695	mE	7019052	mN	
Habitat	Footslope, moderate slope					
Soil	Red clay					
Rock Type	Many BIF stones, boulders, and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Eremophila forrestii subsp. forrestii* shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland and *Tribulus suberosus* low scattered shrubs over *Aristida contorta* open tussock grassland. Footslope, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	< 2%	*Eremophila latrobei, Senna artemisioides* subsp. *helmsii, Tribulus suberosus*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens*
Climbers	< 2%	*Marsdenia australis*
Herbs	< 2%	*Cheilanthes lasiophylla*

722 WRE Site 167

Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location						
MGA Zone	50	564390	mE	7019704	mN	
Habitat	Midslope, steep to moderate slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous coarse gravel/pebbles, stones/boulders and surface-level plates					
Vegetation	*Acacia* sp. Weld Range shrubland *to* high shrubland over *Eremophila mackinlayi* subsp. *spathulata* low shrubland over *Aristida contorta* open tussock grassland. Midslope, steep to moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Eremophila georgei*
Shrubs < 1m	10 - 30%	*Abutilon otocarpum, Eremophila mackinlayi* subsp. *spathulata, Hibiscus sturtii* var. *forrestii, Mirbelia* ?*stipitata, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	10 - 30%	*Heliotropium* sp., *Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Stenanthemum patens*
Tussock grasses	10 - 30%	*Aristida contorta*

722 WRE Site 168

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	562094	mE	7019416	mN	
Habitat	Midslope, moderate slope					
Soil	Red-orange sandy clay					
Rock Type	Continuous BIF, ferrous and granite stones, boulders, and surface-level plates.					
Vegetation	*Acacia aneura* var. *aneura* open *scrub* over *Eremophila glutinosa* shrubland over *Dodonaea pachyneura* and *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Aristida holathera* scattered tussock grasses. Midslope, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia aneura* var. *fuliginea*
Shrubs 1 - 2m	10 - 30%	*Acacia exocarpoides, Dodonaea pachyneura, Eremophila glutinosa, Philotheca brucei* subsp. *brucei, Prostanthera petrophila, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Eremophila margarethae*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	< 2%	*Aristida contorta, Aristida holathera*

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Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	North face of ridge opposite W14					
MGA Zone	50	562005	mE	7019220	mN	
Habitat	Steep to moderate midslope.					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders and surface level plates.					
Vegetation	*Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Calytrix desolata* low shrubland over *Aristida contorta* very open tussock grassland. Steep to moderate midslope.					
Veg Condition	Excellent					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Calytrix desolata*
Shrubs < 1m	10 - 30%	*Acacia quadrimarginea, Dodonaea petiolaris, Eremophila macmillaniana, Grevillea inconspicua, Ptilotus rotundifolius, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Stenanthemum patens*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Heliotropium* sp., *Prostanthera ferricola, Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Aristida contorta*

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Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Gully between W14 ridgeline and Ridge behind camp					
MGA Zone	50	563054	mE	7019695	mN	
Habitat	Creek bank and creek bed, gentle slope					
Soil	Red-orange sandy clay, with loose soil					
Rock Type	Many BIF and ferrous coarse gravel, pebbles, stones, boulders, and surface level plates.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia* sp. Weld Range shrubland over *Eremophila exilifolia* and *Eremophila mackinlayi sub*sp. *spathulata* low shrubland over *Cymbopogon ambiguus* open tussock grassland. Creek bank and creek bed, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 years)					
Notes	Moderate to sparse leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Acacia speckii*
Shrubs 1 - 2m	10 - 30%	*Eremophila exilifolia, Eremophila georgei, Grevillea inconspicua*
Shrubs < 1m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Eremophila mackinlayi* subsp. *spathulata, Eremophila macmillaniana, Philotheca brucei* subsp. *brucei, Prostanthera petrophila, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. *oligophylla, Sida calyxhymenia*
Shrubs < 0.5m	10 - 30%	*Dodonaea amplisemina, Heliotropium* sp.*, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	10 - 30%	*Cymbopogon ambiguus*

722 WRE Site 171

Described by	SH	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14 East					
MGA Zone	50	562929	mE	7019904	mN	
Habitat	Footslope, negligible slope (scree)					
Soil	Red-orange sandy clay					
Rock Type	Many BIF coarse gravel, pebbles, and stones and boulders.					
Vegetation	*Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* open shrubland over *Aluta aspera subsp. hesperia* low shrubland over *Sida excedentifolia* very open herbs. Footslope, negligible slope (scree).					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Thryptomene decussata*
Shrubs < 1m	30 - 70%	*Aluta aspera* subsp. *hesperia, Dodonaea petiolaris*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Solanum lasiophyllum*
Herbs	2 - 10%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 172

Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	562971	mE	7019839	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange clay, with a surface crust					
Rock Type	Stones/boulders					
Vegetation	Many BIF and ferrous stones / boulders					
Veg Condition	*Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* shrubland over *Eremophila latrobei* low shrubland. Ridgetop, gentle slope.					
Fire Age	Good, grazing by hard hooved animals					
Notes	None evident					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Acacia grasbyi, Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Aluta aspera* subsp. *hesperia, Eremophila latrobei*
Shrubs < 0.5m	< 2%	*Solanum lasiophyllum*
Tussock grasses	< 2%	*Eriachne helmsii, Monachather paradoxus*
Herbs	< 2%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)

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Described by	AC	**Date:**	20/04/07	**Type:**	Q	20x20
Location						
MGA Zone	50	563088	mE	7020263	mN	
Habitat	Moderate slope, footslope					
Soil	Red-orange clay					
Rock Type	Many ferrous coarse gravel / pebbles.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland. Moderate slope, footslope.					
Veg Condition	Good, goat track through site					
Fire Age	none evident					
Notes	Negligible leaf litter. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Baeckea* sp. Melita Station (H. Pringle 2738), *Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Micromyrtus placoides*
Shrubs < 0.5m	< 2%	*Psydrax latifolia, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Eriachne helmsii*

722 WRE Site 174

Described by	JN	**Date:**	20/04/07	**Type:**	Q	20x20
Location	Midslope on ridge beside W14 ridge					
MGA Zone	50	563915	mE	7019886	mN	
Habitat	Moderate to gentle slope on foot to midslope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous ferrous and BIF coarse gravel, pebbles, stones, and boulders					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* low open shrubland over *Aristida contorta* very open tussock grassland. Moderate *to* gentle slope on foot to midslope.					
Veg Condition						
Fire Age						
Notes						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	*Eremophila macmillaniana*
Shrubs < 1m	2 - 10%	*Acacia sibirica, Hibiscus sturtii* var. *forrestii, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	2 - 10%	*Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta*

722 WRE Site 175

Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Ridge behind Beebyn					
MGA Zone	50	578375	mE	7028962	mN	
Habitat	Ridgetop, gentle slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous patches of BIF coarse gravel/pebbles, stones/boulders, and surface-level plates.					
Vegetation	*Acacia aneura* var. *aneura* high open shrubland *to* low open woodland over *Thryptomene decussata* and *Acacia aneura* var. *aneura* shrubland over *Eremophila glutinosa* and *Eremophila latrobei* subsp. *latrobei* low shrubland. Ridgetop, gentle slope.					
Veg Condition	Good					
Fire Age	Old (>5 yrs)					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Thryptomene decussata*
Shrubs 1 - 2m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Prostanthera petrophila*
Shrubs < 1m	10 - 30%	*Acacia grasbyi, Acacia minyura, Eremophila glutinosa*
Shrubs < 0.5m	10 - 30%	*Ptilotus* ?*schwartzii, Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32)*, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Eragrostis eriopoda, Eriachne mucronata*

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Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	North of Beebyn					
MGA Zone	50	579697	mE	7029433	mN	
Habitat	Ridgetop and upper slope, moderate slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Common BIF stones/boulders					
Vegetation	*Thryptomene decussata* shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Eriachne helmsii* very open tussock grassland. Ridgetop and upper slope, moderate slope.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs 1 - 2m	10 - 30%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Dodonaea viscosa* subsp. *angustissima, Philotheca brucei* subsp. *brucei, Prostanthera petrophila, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Eremophila latrobei, Micromyrtus sulphurea*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Eriachne helmsii*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

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Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Range towards W17					
MGA Zone	50	551827	mE	7015815	mN	
Habitat	Midslope to ridgetop, moderate to gentle slopes					
Soil	Yellow sandy clay, with a surface crust					
Rock Type	Continuous to many BIF and ferrous coarse gravel/pebbles, stones/boulders.					
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* shrubland *to* high shrubland over *Acacia aneura* var. *aneura*, *Eremophila glutinosa* and *Aluta aspera* subsp. *hesperia* low open shrubland. Midslope *to* ridgetop, moderate to gentle slopes.					
Veg Condition	Good, heavily grazed					
Fire Age	Old (>5 years)					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla*
Shrubs < 1m	2 - 10%	*Acacia aneura* var. *major, Aluta aspera* subsp. *hesperia, Eremophila forrestii* subsp. *forrestii, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	2 - 10%	*Eremophila jucunda* subsp. *jucunda, Sida* sp. golden calyces glabrous (H.N. Foote 32), *Solanum lasiophyllum*

722 WRE Site 178

Described by	AC	**Date:**	21/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	552257	mE	7015792	mN	
Habitat	Creekbed, footslope and minor drainage channel. Gentle slope.					
Soil	Orange sandy clay					
Rock Type						
Vegetation	*Acacia aneura* var. *aneura* and *Acacia grasbyi* high shrubland over *Eremophila georgei* shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Eriachne helmsii* very open tussock grassland. Creekbed, footslope and minor drainage channel. Gentle slope.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Moderate leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia grasbyi*
Shrubs 1 - 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia tetragonophylla, Eremophila georgei, Philotheca brucei* subsp. *brucei, Thryptomene decussata*
Shrubs < 0.5m	10 - 30%	*Eremophila glutinosa, Harnieria kempeana* subsp. *muelleri, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus, Eriachne helmsii*

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Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	551354	mE	7015776	mN	
Habitat	Steep to moderate midslope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF stones/boulders and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* high shrubland *to* scattered low trees over *Acacia aneura* var. *aneura* and *Thryptomene decussata* shrubland over *Thryptomene decussata* and *Ptilotus obovatus* var. *obovatus* low shrubland. Steep to moderate midslope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, minaly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs < 1m	10 - 30%	*Thryptomene decussata*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus, Sida* sp. golden calyces glabrous (H.N. Foote 32)*, Solanum lasiophyllum*

722 WRE Site 180

Described by	AC	**Date:**	21/04/07	**Type:**	Q	20x20
Location	HHJV					
MGA Zone	50	552434	mE	7015962	mN	
Habitat	Midslope, moderate slope					
Soil	Red-orange clay, surface crust					
Rock Type	Many ferrous coarse gravel/pebbles and stones.					
Vegetation	*Acacia aneura* var. *aneura* and *Acacia* sp. Weld Range high shrubland over *Dodonaea pachyneura*, *Eremophila glutinosa* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Sida excedentifolia* very open herbs. Midslope, moderate slope.					
Veg Condition	Good, grazing by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	< 2%	*Thryptomene decussata*
Shrubs < 1m	10 - 30%	*Dodonaea pachyneura, Eremophila glutinosa, Philotheca brucei* subsp. *brucei*
Shrubs < 0.5m	2 - 10%	*Eremophila georgei, Ptilotus obovatus* var. *obovatus, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta, Cymbopogon ambiguus*
Herbs	2 - 10%	*Ptilotus schwartzii, Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 181

Described by	SH	**Date:**	21/04/07	**Type:**	Q	20x20
Location	W17 (track up)					
MGA Zone	50	550940	mE	7015223	mN	
Habitat	Footslope, negligible slope					
Soil	Red-orange sand, with loose soil					
Rock Type	Many granite and quartz coarse gravel/pebbles and stones/boulders.					
Vegetation	*Acacia* sp. Weld Range high open shrubland over *Senna artemisioides* subsp. *sturtii* shrubland over *Eremophila mackinlayi* subsp. *spathulata* and *Dodonaea* sp. Ninghan low shrubland over *Aristida contorta* tussock grassland. Footslope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	*Acacia speckii*
Shrubs < 1m	10 - 30%	*Eremophila glutinosa, Senna artemisioides* subsp. x *sturtii*
Shrubs < 0.5m	2 - 10%	*Dodonaea amplisemina, Eremophila mackinlayi* subsp. *spathulata, Maireana georgei, Ptilotus obovatus* var. *obovatus, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Stenanthemum patens*
Tussock grasses	30 - 70%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*

722 WRE Site 182

Described by	JN	**Date:**	21/04/07	**Type:**	Q	20x20
Location	Midslope ridge opposite W14 towards main road					
MGA Zone	50	559931	mE	7017810	mN	
Habitat	Midslope, moderate slope					
Soil	Red-orange sandy clay, with a surface crust					
Rock Type	Continuous BIF as coarse gravel/pebbles, stones/boulder, and surface level plates					
Vegetation	*Acacia aneura* var. *aneura* high shrubland *to* low open woodland over *Acacia* sp. Weld Range shrubland over *Senna glaucifolia* low shrubland over *Aristida contorta* very open tussock grassland. Midslope, moderate slope.					
Veg Condition	Good					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Moderate wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs < 1m	10 - 30%	*Eremophila exilifolia, Eremophila macmillaniana, Hemigenia* sp. nov (aff. *exilis), Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Aristida contorta*

722 WRE Site 183

Described by	SH	**Date:**	21/04/07	**Type:**	Q	20x20
Location	W14					
MGA Zone	50	559418	mE	7018409	mN	
Habitat	Midslope, gentle north-facing slope.					
Soil	Red-orange sand to sandy clay					
Rock Type	Continuous BIF, ferrous and quartz stones/boulders and surface level plates					
Vegetation	*Acacia aneura* open shrubland *to* high shrubland over *Eremophila latrobei* subsp. *latrobei* low open shrubland over *Ptilotus schwartzii* very open herbs over *Aristida contorta* scattered tussock grasses. Midslope, gentle north-facing slope.					
Veg Condition	Poor, grazed by hard hooved animals					
Fire Age	None evident					
Notes	Sparse leaf litter, mainly under shrubs. Sparse wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura*
Shrubs 1 - 2m	2 - 10%	*Thryptomene decussata*
Shrubs < 1m	< 2%	*Acacia pruinocarpa, Grevillea berryana*
Shrubs < 0.5m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Ptilotus schwartzii, Solanum lasiophyllum*
Tussock grasses	< 2%	*Aristida contorta*

Phase 3 Burrow Pits

722 WRE Site BPC01

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	BPC East						
MGA Zone	50	581233	**mE**	7031767	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust						
Vegetation	*Acacia aneura* var. *conifera* low woodland over *Senna artemisioides* subsp. *petiolaris* open shrubland over *Ptilotus obovatus* low open heath over *Aristida contorta* closed tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf litter, sparse wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *conifera, Eremophila longifolia*
Shrubs > 2m	< 2%	*Acacia tetragonophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia victoriae, Grevillea striata, Rhagodia eremaea, Senna artemisioides* subsp. *petiolaris*
Shrubs < 0.5m	30 - 70%	*Ptilotus obovatus* var. *obovatus, Solanum ashbyae*
Tussock grasses	> 70%	*Aristida contorta, Enneapogon cylindricus, Enneapogon cylindricus*

722 WRE Site BPC02

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20
Location	BPC East					
MGA Zone	50	581030	**mE**	7031651	**mN**	
Habitat	Flat/plain					
Soil	Red-orange/brown sand					
Rock Type	Surface crust, loose soil, coarse gravel/pebbles					
Vegetation	Mixed *Acacia* spp. high open shrubland over *Senna artemisioides* subsp. *petiolaris* and *Ptilotus obovatus* low shrubland over *Enneapogon cylindricus)* open tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Neg leaf and wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia tetragonophylla, Acacia victoriae*
Shrubs 1 - 2m	< 2%	*Acacia tetragonophylla, Acacia victoriae, Eremophila falcata, Eremophila glabra* subsp. *tomentosa, Pimelea microcephala* subsp. *microcephala, Rhagodia eremaea, Scaevola spinescens, Senna artemisioides* subsp. *Petiolaris*
Shrubs < 1m	10 - 30%	*Acacia murrayana, Acacia ramulosa* var. *ramulosa, Senna artemisioides* subsp. *Petiolaris*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon cylindricus*
Sedges	< 2%	*Austrostipa elegantissima*
Climbers	< 2%	CONVOLVULACEAE sp.
Herbs	< 2%	*Maireana appressa, Ptilotus exaltatus*

722 WRE Site BPC03

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit C						
MGA Zone	50	580844	**mE**	7031891	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	Mixed *Acacia* spp. high shrubland over *Senna artemisioides* subsp. *petiolaris* low scattered shrubs over *Ptilotus obovatus* low shrubland over *Aristida contorta* and *Monochatne paridoxus* open tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Sparse leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *conifera*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *aneura, Acacia burkittii, Acacia craspedocarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	< 2%	*Psydrax suaveolens*
Shrubs < 1m	< 2%	*Senna artemisioides* subsp. *petiolaris*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon cylindricus, Monachather paradoxus*

722 WRE Site BPC04

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit C						
MGA Zone	50	579977	**mE**	7031713	**mN**		
Habitat	Flat/plain						
Soil	Red-orange/brown sand						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles						
Vegetation	*Acacia burkittii* open scrub over *Senna artemisioides* subsp. *petiolaris* open shrubland over *Ptilotus obovatus* low shrubland over *Enneapogon cylindricus* scattered tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf litter, sparse wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia burkittii*
Shrubs 1 - 2m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Senna artemisioides* subsp. *petiolaris*
Shrubs < 1m	< 2%	*Scaevola spinescens*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus, Solanum ashbyae*
Tussock grasses	< 2%	*Enneapogon cylindricus*
Herbs	< 2%	*Ptilotus exaltatus*

722 WRE Site BPC05

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit C						
MGA Zone	50	579814	**mE**	7031869	**mN**		
Habitat	Flat/plain, dry lake bed						
Soil	Red-orange/brown sandy clay						
Rock Type	Cracked clay, surface crust, fine gravel, coarse gravel/pebbles						
Vegetation	*Eremophila maculata* subsp. *brevifolia* low open heath over *Enneapogon cylindricus* very open tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf and wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs < 0.5m	30 - 70%	*Eremophila maculata* subsp. *brevifolia, Sclerolaena diacantha*
Tussock grasses	2 - 10%	*Enneapogon cylindricus*
Herbs	< 2%	*Lawrencia densiflora, Streptoglossa liatroides*

722 WRE Site BPC06

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Beebyru North						
MGA Zone	50	578651	**mE**	7032379	**mN**		
Habitat	Flat/plain, calcrete pan (seasonally inundated) gilgai						
Soil	Orange clay						
Rock Type	Cracked clay, surface crust, coarse gravel/pebbles						
Vegetation	*Eremophila maculata* subsp. *brevifolia* and *Sclerolaena diacantha* low shrubland over *Lawrencia densiflora* very open herbs over *Enneapogon* sp. and *Eragrostis dielsii* very open tussock grassland.						
Veg Condition	Poor (heavily grazed, trampled - cows)						
Fire Age	None evident						
Notes	Neg leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs 1 - 2m	< 2%	*Eremophila maculata* subsp. *brevifolia*
Shrubs < 0.5m	10 - 30%	*Sclerolaena diacantha, Sclerolaena diacantha*
Tussock grasses	2 - 10%	*Enneapogon cylindricus, Enneapogon* sp., *Eragrostis dielsii, Sporobolus australasicus*
Herbs	2 - 10%	*Lawrencia densiflora, Ptilotus exaltatus* var. *exaltatus*

722 WRE Site BPC07

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Beebyru North						
MGA Zone	50	577958	**mE**	7032287	**mN**		
Habitat	Flat/plain						
Soil	Red-orange hard clay						
Rock Type	Solid clay (10%), fine gravel (80%), coarse gravel/pebbles (10%)						
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura* high open shrubland over *Eremophila forrestii* subsp. *forrestii, Ptilotus schwartzii* and *Ptilotus obovatus var obovatus* and *Solanum ashbyae* low open shrubland over *Eriachne pulchella* subsp. *dominii* and *Aristida contorta* very open tussock grassland.						
Veg Condition	Good (old drill lines adjacent, grazing track)						
Fire Age	None evident						
Notes	Mod leaf litter, sparse wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia aneura* var. *major*
Shrubs 1 - 2m	< 2%	*Acacia ramulosa* var. *linophylla, Rhagodia eremaea*
Shrubs < 1m	2 - 10%	*Enchylaena tomentosa, Eremophila forrestii* subsp. *forrestii*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis eriopoda, Eriachne pulchella* subsp. *dominii, Monachather paradoxus*

722 WRE Site BPC08

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Beebyru North						
MGA Zone	50	577662	**mE**		7032721	**mN**	
Habitat	Flat/plain						
Soil	Orange sandy clay						
Rock Type	Fine gravel (40%), loose soil (20%), coarse gravel/pebbles (40%)						
Vegetation	*Eucalyptus striaticaly*x scattered trees over *Eremophila falcata* open shrubland to high open shrubland over *Senna stricta* low open shrubland over *Ptilotus exaltatus* var. *exaltatus* very open herbs over *Enneapogon caerulescens* open tussock grassland.						
Veg Condition	Good (grazing, trampling)						
Fire Age	None evident						
Notes	Mod leaf litter, sparse wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	*Eucalyptus striaticaly*x
Shrubs > 2m	2 - 10%	*Eremophila falcata*
Shrubs 1 - 2m	2 - 10%	*Acacia aff. oswaldii, Acacia ramulosa* var. *linophylla, Eremophila falcata*
Shrubs < 1m	2 - 10%	*Acacia pruinocarpa, Eremophila falcata, Senna stricta*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Sclerolaena diacantha, Sclerolaena diacantha, Senna artemisioides* subsp. *petiolaris, Solanum ashbyae*
Tussock grasses	10 - 30%	*Enneapogon caerulescens*
Herbs	2 - 10%	*Lawrencia densiflora, Ptilotus exaltatus* var. *exaltatus*

722 WRE Site BPC09

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit C						
MGA Zone	50	579024	**mE**	7032277	**mN**		
Habitat	Flat/plain, riparian far BPC6						
Soil	Orange sand/sandy clay						
Rock Type	Cracked clay (5%), fine gravel (60%), loose soil (10%), coarse gravel/pebbles (25%)						
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia burkittii* and *Acacia victoriae* open shrubland over *Scaevola spinescens* and *Senna stricta* low open shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Enneapogon caerulescens* and *Eragrostis setifolia* open tussock grassland.						
Veg Condition	Poor (heavily trampled)						
Fire Age	None evident						
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura*
Shrubs 1 - 2m	2 - 10%	*Acacia burkittii, Acacia tetragonophylla, Acacia victoriae*
Shrubs < 1m	2 - 10%	*Eremophila forrestii, Eremophila latrobei* subsp. *latrobei, Rhagodia eremaea, Scaevola spinescens, Senna stricta*
Shrubs < 0.5m	10 - 30%	*Eremophila maculata* subsp. *brevifolia, Ptilotus obovatus* var. *obovatus, Sclerolaena diacantha, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens, Eragrostis setifolia*
Herbs	< 2%	*Ptilotus exaltatus* var. *exaltatus, Sclerolaena diacantha*

722 WRE Site BPC10

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20
Location	Burrow Pit C					
MGA Zone	50	579391	**mE**	7031751	**mN**	
Habitat	Flat/plain, slight calcrete mound					
Soil	Orange clay/sandy clay					
Rock Type	Loose soil (5%), coarse gravel/pebbles (5%), stones (90%)					
Vegetation	*Acacia burkittii* high shrubland over *Senna artemisioides* subsp. *helmsii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Enneapogon caerulescens* open tussock grassland.					
Veg Condition	Good (grazing)					
Fire Age	None evident					
Notes	Sparse wood and leaf litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia burkittii*
Shrubs 1 - 2m	< 2%	*Grevillea berryana*
Shrubs < 1m	2 - 10%	*Eremophila latrobei* subsp. *latrobei, Exocarpos aphyllus, Pimelea microcephala* subsp. *microcephala, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Sida ectogama*
Shrubs < 0.5m	2 - 10%	*Enchylaena tomentosa, Ptilotus obovatus* var. *obovatus, Senna stricta, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon caerulescens*
Herbs	< 2%	*Ptilotus exaltatus* var. *exaltatus*

722 WRE Site BPE01

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Burrow Pit East						
MGA Zone	50	586684	**mE**	7034277	**mN**		
Habitat	Flat/plain, creek bed, creek bank						
Soil	Red-orange sand/sandy clay						
Rock Type	Surface crust, loose soil, stones/boulders						
Vegetation	*Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)* and *Acacia tetragonophylla* open scrub over *Eremophila fraseri* subsp. *parva medium* shrubland over *Enneapogon cylindricus* and *Aristida contorta* very open tussock grassland*.*						
Veg Condition	Excellent (grazing disturbance)						
Fire Age	None evident						
Notes	Sparse leaf litter mainly under shrubs, neg wood litter						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*), Acacia tetragonophylla, Eremophila fraseri* subsp. *Parva*
Shrubs 1 - 2m	10 - 30%	*Eremophila exilifolia, Eremophila fraseri* subsp. *Parva, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	< 2%	*Eremophila platycalyx* subsp. *platycalyx*
Shrubs < 0.5m	< 2%	*Acacia craspedocarpa, Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon cylindricus*

722 WRE Site BPE02

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	585309	**mE**	7032299	**mN**		
Habitat	Flat/plain, low lying Mulga						
Soil	Red-orange sandy clay						
Rock Type	Loose soil (95%), coarse gravel/pebbles (5%)						
Vegetation	*Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* low woodland over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* high shrubland over *Eremophila forrestii* subsp. *forrestii sometimes with Eremophila georgei* open heath over *Monachather paradoxus* open tussock grassland.						
Veg Condition	Good (minimal grazing)						
Fire Age	None evident						
Notes	Moderate leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *intermedia, Acacia pruinocarpa, Psydrax latifolia, Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *argentea, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Eremophila clarkei, Eremophila forrestii* subsp. *forrestii, Eremophila georgei*
Shrubs < 0.5m	< 2%	*Hibiscus coatesii, Maireana villosa, Ptilotus obovatus* var. *obovatus, Sida cardiophylla, Solanum ashbyae*
Tussock grasses	10 - 30%	*Eriachne lanata, Monachather paradoxus*

722 WRE Site BPE03

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Plateau						
MGA Zone	50	585158	**mE**	7033155	**mN**		
Habitat	Flat/plain, ridgetop, plateau above breakaway						
Soil	White/orange sand						
Rock Type	Surface crust, fine gravel, loose soil, coarse gravel/pebbles, stones/boulders, surface level plates						
Vegetation	*Acacia ramulosa* var. *ramulosa* and *Acacia burkittii* shrubland over *Eremophila latrobei* subsp. *latrobei* low open shrubland over *Calytrix erosipetala* low shrubland over *Tripogon loliiformis* very open tussock grassland.						
Veg Condition	Excellent (grazing disturbance)						
Fire Age	None evident						
Notes	Neg leaf and wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	< 2%	*Acacia pruinocarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia burkittii, Acacia pruinocarpa, Acacia ramulosa* var. *ramulosa, Eremophila glutinosa*
Shrubs < 1m	2 - 10%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	10 - 30%	*Calytrix erosipetala, Enchylaena tomentosa, Micromyrtus sulphurea, Ptilotus obovatus* var. *obovatus, Solanum ashbyae*
Tussock grasses	2 - 10%	*Monachather paradoxus, Tripogon loliiformis*

722 WRE Site BPE05

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Burrow Pit East						
MGA Zone	50	585487	**mE**	7034280	**mN**		
Habitat	Flat/plain						
Soil	Sandy clay (60%)						
Rock Type	Fine gravel (40%)						
Vegetation	*Acacia aneura* low open woodland over *Senna* sp. Meekatharra (E. Bailey 1-26) and *Senna glaucifolia* low open shrubland to shrubland over *Senna artemisioides* subsp. *helmsii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Aristida contorta* open tussock grassland.						
Veg Condition	Good						
Fire Age	Not speciifed						
Notes	Sparse leaf and wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura*
Shrubs 1 - 2m	10 - 30%	*Acacia cockertoniana, Acacia tetragonophylla, Senna glaucifolia, Senna* sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	2 - 10%	*Eremophila jucunda* subsp. *jucunda, Eremophila platycalyx* subsp. *platycalyx, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Senna* sp. Meekatharra (E. Bailey 1-26), *Sida ectogama*
Shrubs < 0.5m	2 - 10%	*Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Maireana georgei, Maireana villosa, Ptilotus obovatus* var. *obovatus, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*

722 WRE Site BPE06

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	585632	**mE**	7033848	**mN**		
Habitat	Granite dome, base of: see notes						
Soil	Orange clay						
Rock Type	Fine gravel (80%), loose soil (20%)						
Vegetation	*Acacia rhodophloia* shrubland to high shrubland over *Prostanthera albiflora* low open shrubland over *Drosera macrantha* subsp. *eremaea* open herbs over *Tripogon loliiformis, Eragrostis tenellula* and *Aristida contorta* tussock grassland.						
Veg Condition	Poor (siginificant grazing)						
Fire Age	Old >5 yrs						
Notes	Moderate leaf and wood litter mainly under shrubs. This quad incorporates the veg type at the base of a large Granite dome.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia rhodophloia*
Shrubs 1 - 2m	10 - 30%	*Acacia rhodophloia, Psydrax rigidula*
Shrubs < 1m	< 2%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Prostanthera albiflora*
Shrubs < 0.5m	2 - 10%	*Rulingia luteiflora, Sida cardiophylla, Solanum ellipticum*
Tussock grasses	30 - 70%	*Aristida contorta, Eragrostis cumingii, Eragrostis tenellula, Tripogon loliiformis*
Herbs	10 - 30%	*Drosera macrantha* subsp. *eremaea*

722 WRE Site BPE07

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	586389	**mE**	7034215			50
Habitat	Small, low granite outcrop (see notes*)						
Soil	Red-orange clay						
Rock Type	Loose soil (10%), stones/boulders (90%)						
Vegetation	*Acacia ramulosa* var. *linophylla* low open woodland over *Acacia citrinoviridis* and *Acacia speckii* high shrubland over *Eremophila exilifolia* and *Senna artemisioides* subsp. *helmsii* low open shrubland to open shrubland over *Ptilotus obovatus* var. *obovatus* low open shrubland over *Enneapogon cylindricus* very open tussock grassland.						
Veg Condition	Good (grazing disturbance)						
Fire Age	None evident						
Notes	Sparse leaf and wood litter mainly under shrubs. Medium sized granite rocks forming a linear mound approx 40 m wide by 700 m long.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs > 2m	10 - 30%	*Acacia citrinoviridis, Acacia speckii*
Shrubs 1 - 2m	2 - 10%	*Acacia citrinoviridis, Eremophila exilifolia, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	2 - 10%	*Senna artemisioides* subsp. x *sturtii*
Shrubs < 0.5m	2 - 10%	*Hibiscus coatesii, Indigofera monophylla, Maireana convexa, Maireana georgei, Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon cylindricus*
Herbs	< 2%	*Cheilanthes lasiophylla, Cheilanthes sieberi* subsp. *sieberi, Sida* sp. *dark green fruits (S. van Leeuwen 2260)*

722 WRE Site BPE08

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Burrow Pit East						
MGA Zone	50	585343	**mE**	7033633	**mN**		
Habitat	Gully sides, breakaway, moderate slope						
Soil	Red-orange sand						
Rock Type	Surface crust, stones/boulders, surface level plates						
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia pruinocarpa* low open woodland over *Acacia burkittii* high open shrubland over *Acacia craspedocarpa* open shrubland over *Acacia craspedocarpa* and *Eremophila latrobei* subsp. *latrobei* low open heath and *Ptilotus obovatus* var. *obovatus* low shrubland.						
Veg Condition	Excellent (grazing disturbance)						
Fire Age	None evident						
Notes							

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa, Acacia pruinocarpa*
Shrubs > 2m	2 - 10%	*Acacia burkittii*
Shrubs 1 - 2m	2 - 10%	*Acacia aulacophylla, Acacia craspedocarpa, Eremophila latrobei* subsp. *Latrobei, Philotheca brucei* subsp. *brucei, Scaevola spinescens*
Shrubs < 1m	30 - 70%	*Eremophila latrobei* subsp. *Latrobei, Sida ectogama*
Shrubs < 0.5m	10 - 30%	*Ptilotus obovatus* var. *obovatus*

722 WRE Site BPE09

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Borrow Pit East						
MGA Zone	50	585363	**mE**	7033496	**mN**		
Habitat	Breakaway, moderate slope						
Soil	White sand						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders, surface level plates						
Vegetation	*Dodonaea pachyneura* and *Acacia aneura* var. *microcarpa* high open shrubland over *Ptilotus obovatus* var. *obovatus* and mixed *Chenopodiaceae* low open heath.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf and wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *microcarpa, Dodonaea pachyneura, Eremophila platycalyx* subsp. *platycalyx*
Shrubs 1 - 2m	< 2%	*Acacia aneura* var. *microcarpa, Eremophila latrobei* subsp. *latrobei, Rhagodia eremaea, Scaevola spinescens*
Shrubs < 0.5m	30 - 70%	*Atriplex semilunaris, Maireana platycarpa, Ptilotus obovatus* var. *obovatus, Sclerolaena diacantha, Sclerolaena diacantha, Sclerolaena eriacantha, Sida ectogama*
Tussock grasses	< 2%	*Enneapogon cylindricus*
Herbs	< 2%	*Amaranthus mitchellii*

722 WRE Site BPE12

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Mulga						
MGA Zone	50	504022	**mE**	7033223	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles						
Vegetation	*Acacia aneura* var. *microcarpa* low woodland over *Acacia aneura* var. *microcarpa* open shrubland to high open shrubland over mixed *Eremophila* spp. open shrubland over *Ptilotus schwartzii* low scattered shrubs over *Eragrostis eriopoda* very open tussock grassland.						
Veg Condition	Excellent (grazing disturbance)						
Fire Age	None evident						
Notes	Moderate leaf litter mainly under shrubs, neg wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa, Eremophila forrestii, Eremophila latrobei* subsp. *Latrobei*
Shrubs < 1m	2 - 10%	*Eremophila latrobei* subsp. *latrobei*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Eragrostis eriopoda*

722 WRE Site BPE14a

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	585451	**mE**	7032503	**mN**		
Habitat	Undulating plain, granite, low relief						
Soil	Red-orange sandy clay						
Rock Type	Fine gravel (90%), coarse gravel/pebbles (5%), surface level plates (5%)						
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia ramulosa* var. *ramulosa* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Thryptomene decussata* low shrubland and *Thryptomene decussata, Pluchea* ? *dentex* and *Micromyrtus sulphurea* low open shrubland over *Eriachne lanata* very open tussock grassland.						
Veg Condition	Excellent (minimal grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, neg wood litter mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *ramulosa, Acacia ramulosa* var. *ramulosa*
Shrubs < 0.5m	2 - 10%	*Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei, Micromyrtus sulphurea, Pluchea* ? *dentex, Solanum ashbyae, Thryptomene decussata*
Tussock grasses	2 - 10%	*Eragrostis eriopoda, Eriachne lanata*

722 WRE Site BPE14b

Described by	CG	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Riparian						
MGA Zone	50	585471	**mE**	7033373	**mN**		
Habitat	Lake bank (riparian), base of granite outcrop, gentle slope						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, coarse gravel/pebbles, stones/boulders						
Vegetation	*Acacia ramulosa* var. *linophylla* low woodland over *Acacia craspedocarpa* high open shrubland over *Aristida contorta* and *Tripogon loliiformis* open tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf litter, sparse wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs > 2m	2 - 10%	*Acacia craspedocarpa*
Shrubs < 1m	< 2%	*Sida ectogama*
Shrubs < 0.5m	< 2%	*Ptilotus obovatus* var. *obovatus, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Tripogon loliiformis*

722 WRE Site BPE15

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	585376	**mE**	7032971	**mN**		
Habitat	Flat/plain, salt lake						
Soil	Orange clay						
Rock Type	Salt surface crust (90%), fine gravel (10%)						
Vegetation	*Maireana glomerifolia* low shrubland over mixed *Chenopodiaceae* open herbs over *numerous Enneapogon cylindricus* and *Aristida contorta* tussock grassland.						
Veg Condition	Good (some grazing)						
Fire Age	None evident						
Notes	Neg leaf and wood litter mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs < 0.5m	10 - 30%	*Atriplex semilunaris, Maireana glomerifolia*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon cylindricus*
Herbs	10 - 30%	*Maireana appressa, Sclerolaena diacantha, Sclerolaena diacantha*

722 WRE Site BPE16

Described by	SH	**Date:**	07/07/08	**Type:**	Q	20x20	
Location	Limestone Bore						
MGA Zone	50	585521	**mE**	7033373	**mN**		
Habitat	Flat/plain, granite outcrop						
Soil	Orange sandy clay						
Rock Type	Fine gravel (30%), coarse gravel/pebbles (20%), stones/boulders (50%)						
Vegetation	*Acacia ramulosa* var. *linophylla* low woodland over *Eremophila platycalyx* subsp. *platycalyx* low open shrubland to open shrubland over *Ptilotus obovatus* var. *obovatus* and *Solanum ashbyae* low open shrubland over *Abutilon oxycarpum* very open herbs over *Cymbopogon ambiguus* open tussock grassland.						
Veg Condition	Good (some grazing by roos)						
Fire Age	None evident						
Notes	Neg leaf litter, sparse wood litter mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia ramulosa* var. *linophylla, Santalum spicatum*
Shrubs 1 - 2m	2 - 10%	*Eremophila platycalyx* subsp. *platycalyx*
Shrubs < 1m	2 - 10%	*Eremophila platycalyx* subsp. *platycalyx*
Shrubs < 0.5m	2 - 10%	*Ptilotus obovatus* var. *obovatus, Solanum ashbyae, Solanum ellipticum*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon caerulescens*
Herbs	2 - 10%	*Abutilon oxycarpum, Amaranthus mitchellii, Boerhavia* ?*coccinea, Cheilanthes lasiophylla, Cheilanthes sieberi* subsp. *sieberi, Phyllanthus erwinii*

722 WRE Site BPW01

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	577071	**mE**	7032746	**mN**		
Habitat	Ridgetop, low relief ridge						
Soil	Red-orange sandy clay						
Rock Type	Loose soil (10%), coarse gravel/pebbles (90%)						
Vegetation	*Acacia cockertoniana* open shrubland to high shrubland over *Eremophila georgei* and *Eremophila forrestii* subsp. *forrestii* low open shrubland and *Hemigenia tysonii* low shrubland over *Sida* sp. dark green fruits (S. van Leeuwen 2260) very open herbs over *Eragrostis eriopoda* scattered tussock grassland.						
Veg Condition	Good (old drill lines adjacent)						
Fire Age	None evident						
Notes	Moderate leaf litter, sparse wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia cockertoniana*
Shrubs 1 - 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia cockertoniana, Dodonaea rigida*
Shrubs < 1m	2 - 10%	*Acacia cockertoniana, Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia*
Shrubs < 0.5m	10 - 30%	*Hemigenia tysonii, Solanum ashbyae*
Tussock grasses	< 2%	*Eragrostis eriopoda*
Herbs	2 - 10%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site BPW02

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	577059	**mE**	7033032	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Fine gravel (10%), loose soil (90%)						
Vegetation	*Eucalyptus socialis* subsp. *eucentrica* open woodland over *Acacia aneura* var. *aneura* low low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Rhagodia eremaea* low open shrubland and *Ptilotus obovatus* var. *obovatus* low shrubland over *Sida* sp. dark green fruits (S. van Leeuwen 2260) very open herbs over *Monachather paradoxus* open tussock grassland.						
Veg Condition	Good (little grazing)						
Fire Age	Not specified						
Notes	Moderate leaf litter, sparse wood litter, under EUC.						

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Eucalyptus socialis* subsp. *eucentrica*
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	< 2%	*Acacia aneura* var. *major, Dodonaea pachyneura*
Shrubs < 1m	2 - 10%	*Enchylaena tomentosa, Eremophila forrestii* subsp. *forrestii, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii*
Shrubs < 0.5m	10 - 30%	*Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii, Solanum ashbyae*
Tussock grasses	10 - 30%	*Eriachne lanata, Monachather paradoxus*
Herbs	2 - 10%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site BPW03

Described by	SH	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	576626	**mE**	7032346	**mN**		
Habitat	Midslope, low relief, gentle slope						
Soil	Red-orange sandy clay						
Rock Type	Fine gravel (10%), coarse gravel/pebbles (80%), stones/boulders (10%)						
Vegetation	*Grevillea berryana* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia cockertoniana* high open shrubland over *Senna glaucifolia, Thryptomene decussata, Eremophila latrobei* subsp. *latrobei* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Sida* sp. dark green fruits (S. van Leeuwen 2260) very open herbs over *Monachather paradoxus* very open tussock grassland.						
Veg Condition	Good						
Fire Age	None evident						
Notes	Sparse leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Grevillea berryana*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *aneura, Acacia cockertoniana*
Shrubs 1 - 2m	< 2%	*Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)*
Shrubs < 1m	2 - 10%	*Dodonaea pachyneura, Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia, Thryptomene decussata*
Shrubs < 0.5m	2 - 10%	*Eremophila glutinosa, Eremophila jucunda* subsp. *jucunda, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	2 - 10%	*Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site BPW04

Described by	SH	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	573114	**mE**	7032129	**mN**		
Habitat	Upperslope, low relief ridge						
Soil	Red-orange sandy clay						
Rock Type	Loose soil (10%), coarse gravel/pebbles (10%), stones/boulders (80%)						
Vegetation	*Acacia aneura* var. *aneura* low open woodland over *Acacia cockertoniana* and *Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)* open shrubland to high shrubland over *Eremophila latrobei* subsp. *latrobei, Eremophila glutinosa* and *Ptilotus schwartzii* low open shrubland over *Sida cardiophylla* very open herbs.						
Veg Condition	Good (old drill line adjacent, 80 m away to the north)						
Fire Age	None evident						
Notes	Sparse leaf litter, moderate wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *aneura, Grevillea berryana*
Shrubs > 2m	10 - 30%	*Acacia cockertoniana*
Shrubs 1 - 2m	2 - 10%	*Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)*
Shrubs < 1m	2 - 10%	*Dodonaea rigida, Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii*
Climbers	< 2%	*Marsdenia australis*
Herbs	2 - 10%	*Sida cardiophylla*

722 WRE Site BPW05

Described by	SH	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Burrow Pit West						
MGA Zone	50	573610	**mE**	7032003	**mN**		
Habitat	Gully base, minor channel						
Soil	Clay (colour not specified)						
Rock Type	Fine gravel (50%), loose soil (10%), coarse gravel/pebbles (30%), stones/boulders (10%)						
Vegetation	*Acacia cockertoniana* and *Acacia pruinocarpa* open woodland over *Acacia aneura* var. *aneura, Acacia cockertoniana* and *Acacia pruinocarpa* low woodland over *Acacia cockertoniana* and *Psydrax latifolia* open scrub over *Eremophila georgei* low open shrubland and *Ptilotus obovatus* var. *obovatus* low shrubland.						
Veg Condition	Good						
Fire Age	None evident						
Notes	Sparse leaf litter, wood litter (??), base of trees/rocks where water has deposited them.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *aneura, Acacia aneura* var. *major, Santalum spicatum*
Shrubs > 2m	30 - 70%	*Acacia cockertoniana, Acacia pruinocarpa, Psydrax latifolia*
Shrubs < 1m	2 - 10%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila glutinosa, Senna glaucifolia, Senna stricta, Solanum ashbyae*
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum, Eremophila latrobei* subsp. *latrobei, Ptilotus obovatus* var. *obovatus*
Climbers	< 2%	*Duperreya commixta*
Herbs	< 2%	*Abutilon oxycarpum, Sida cardiophylla, Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site BPW06

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit West						
MGA Zone	50	575851	**mE**	7032724	**mN**		
Habitat	Ridgetop (slight)						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, stones/boulders						
Vegetation	*Acacia cockertoniana* and *Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)* open scrub.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, sparse wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *aneura, Acacia cockertoniana, Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)*
Shrubs 1 - 2m	< 2%	*Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *latrobei*
Shrubs < 1m	< 2%	*Dodonaea rigida, Eremophila jucunda* subsp. *jucunda, Senna glaucifolia*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii* var. *georgei*

722 WRE Site BPW07

Described by	CG	**Date:**	09/07/08	**Type:**	Q	20x20	
Location	Burrow Pit West						
MGA Zone	50	575210	**mE**	7032660	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders						
Vegetation	*Acacia aneura* var. *aneura* low open woodland over mixed *Acacia* spp. scattered tall shrubs over *Thryptomene decusatta* and *Prostanthera petrophila* open shrubland over *Thryptomene decusatta* low open shrubland over *Aluta aspera* subsp. *hesperia* low shrubland over *Eragrostis setifolia* scattered tussock grassland.						
Veg Condition	Good (tracks, grazing)						
Fire Age	None evident						
Notes	Sparse leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa, Acacia aneura* var. *intermedia*
Shrubs > 2m	< 2%	*Acacia aneura* var. *microcarpa, Acacia cockertoniana*
Shrubs 1 - 2m	2 - 10%	*Eremophila glutinosa, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Aluta aspera* subsp. *hesperia, Eremophila latrobei* subsp. *latrobei, Prostanthera petrophila, Thryptomene decussata*
Shrubs < 0.5m	10 - 30%	*Sida cardiophylla*
Tussock grasses	< 2%	*Eragrostis setifolia*

722 WRE Site BPW08

Described by	CG	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	574389	**mE**	7032529	**mN**		
Habitat	Ridgetop, shallow plateau						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders						
Vegetation	*Acacia cockertoniana* and *Acacia aneura* var. *microcarpa* high open shrubland over *Aluta aspera* subsp. *hesperia* and *Hemigenia tysonii* low closed heath.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *microcarpa, Acacia cockertoniana*
Shrubs < 1m	< 2%	*Eremophila simulans* subsp. *simulans*
Shrubs < 0.5m	> 70%	*Aluta aspera* subsp. *hesperia, Eremophila jucunda* subsp. *jucunda, Hemigenia tysonii*

722 WRE Site BPW09

Described by	CG	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Burrow Pit West						
MGA Zone	50	574188	**mE**	7032469	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia cockertoniana* low woodland over *Acacia aneura* var. *microcarpa* scattered tall shrubs over mixed *Eremophila* spp. shrubland over *Eragrostis setifolia* scattered tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *microcarpa, Acacia cockertoniana*
Shrubs > 2m	< 2%	*Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla, Eremophila simulans* subsp. *simulans*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii, Eremophila glutinosa, Eremophila latrobei* subsp. *Latrobei, Eremophila simulans* subsp. *Simulans*
Tussock grasses	< 2%	*Eragrostis setifolia*

722 WRE Site BPW10

Described by	CG	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Burrow Pit West						
MGA Zone	50	574714	**mE**	7032500	**mN**		
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	*Acacia cockertoniana* and *Acacia cockertoniana* high shrubland over mixed *Eremophila* spp. shrubland over *Sida cardiophylla* low scattered shrubs.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Mod leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Acacia cockertoniana, Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Eremophila glutinosa, Eremophila simulans* subsp. *simulans, Prostanthera petrophila*
Shrubs < 0.5m	< 2%	*Sida cardiophylla*
Herbs	< 2%	*Goodenia berardiana*

722 WRE Site BPW13

Described by	SH	**Date:**	10/07/08	**Type:**	Q	20x20	
Location	Borrow Pit West						
MGA Zone	50	573979	**mE**	7032615	**mN**		
Habitat	Midslope, very low relief						
Soil	Red-orange sandy clay						
Rock Type	Fine gravel (60%), loose soil (10%), coarse gravel/pebbles (30%)						
Vegetation	*Acacia pruinocarpa* scattered low trees over *Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)* and *Acacia cockertoniana* high open shrubland over *Eremophila forrestii* subsp. *forrestii, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia* and *Ptilotus schwartzii* low open shrubland over *Goodenia tenuiloba* very open herbs over *Monachather paradoxus* very open tussock grassland.						
Veg Condition	Good (old drill lines all over)						
Fire Age	None evident						
Notes	Sparse leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa, Psydrax suaveolens*
Shrubs > 2m	2 - 10%	*Acacia cockertoniana, Acacia* sp. Weld Range *(*A. Markey & S. Dillon 2994*)*
Shrubs < 1m	2 - 10%	*Eremophila forrestii* subsp. *forrestii, Eremophila glutinosa, Eremophila jucunda* subsp. *jucunda, Eremophila latrobei* subsp. *latrobei, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus schwartzii, Solanum ashbyae*
Tussock grasses	2 - 10%	*Eriachne pulchella* subsp. *pulchella, Monachather paradoxus, Tripogon loliiformis*
Herbs	2 - 10%	*Cheilanthes sieberi* subsp. *sieberi, Goodenia tenuiloba*

Phase 3 Haul Road

722 WRE Site HR01

Described by	CG	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	563716	**mE**	7022514	**mN**	
Habitat	Plain/flat, minor channel					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel					
Vegetation	*Acacia aneura* var. *intermedia* low open forest over *Solanum ashbyae* low open shrubland over *Aristida contorta* and *Eragrostis eriopoda* tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *intermedia, Psydrax latifolia, Psydrax rigidula*
Shrubs > 2m	< 2%	*Acacia craspedocarpa, Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs 1 - 2m	< 2%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	< 2%	*Eremophila granitica*
Shrubs < 0.5m	2 - 10%	*Maireana planifolia, Maireana platycarpa, Ptilotus obovatus, Solanum ashbyae*
Tussock grasses	30 - 70%	*Aristida contorta, Eragrostis eriopoda, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*

722 WRE Site HR02

Described by	CG	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	504383	**mE**	7022943	**mN**	
Habitat	Plain/flat, creek bed, creek bank					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel, loose soil, coarse gravel/pebbles					
Vegetation	*Acacia aneura* var. *major* and *Acacia ramulosa* var. *linophylla* low open forest over *Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* open tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *major, Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla, Acacia ramulosa* var. *linophylla*
Shrubs > 2m	< 2%	*Acacia craspedocarpa*
Shrubs 1 - 2m	< 2%	*Eremophila latrobei* subsp. *latrobei, Mirbelia rhagodioides*
Shrubs < 1m	< 2%	*Eremophila georgei*
Shrubs < 0.5m	< 2%	*Harnieria kempeana* subsp. *muelleri*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis eriopoda, Eriachne lanata, Eriachne pulchella* subsp. *pulchella*

722 WRE Site HR03

Described by	CG	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	565967	**mE**	7024046	**mN**	
Habitat	Plain/flat					
Soil	Red-orange sandy clay					
Rock Type	Surface crust					
Vegetation	*Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* low open forest over *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila simulans* subsp. *simulans* open heath over *Ptilotus schwartzii* low scattered *shrubs* over *Eriachne lanata* very open tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *intermedia, Acacia ramulosa* var. *linophylla*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Aluta aspera* subsp. *hesperia, Eremophila simulans* subsp. *simulans, Grevillea stenostachya*
Shrubs < 0.5m	< 2%	*Ptilotus schwartzii*
Tussock grasses	2 - 10%	*Eriachne lanata*

722 WRE Site HR04

Described by	CG	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	571730	**mE**	7027665	**mN**	
Habitat	Flat/plain, creek bed, creek bank					
Soil	Red-orange sand/sandy clay					
Rock Type	Fine gravel, coarse gravel/pebbles, stones/boulders					
Vegetation	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Various Senna spp.* scattered *shrubs* over *Calytrix desolata* low shrubland over *Duperreya commixta climbers* over *Cymbopogon ambiguus* very open tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Neg leaf and wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia ramulosa* var. *linophylla, Grevillea berryana, Santalum spicatum*
Shrubs > 2m	10 - 30%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia tetragonophylla*
Shrubs 1 - 2m	< 2%	*Eremophila exilifolia, Grevillea inconspicua, Grevillea stenostachya, Hibiscus sturtii* var. *forrestii, Rulingia luteiflora, Senna artemisioides* subsp. *petiolaris, Senna artemisioides* subsp. x *artemisioides, Senna artemisioides* subsp. x *sturtii, Senna glaucifolia*
Shrubs < 1m	10 - 30%	*Calytrix desolata, Chorizema genistoides, Dodonaea amplisemina, Eremophila mackinlayi* subsp. *spathulata, Heliotropium ovalifolium*
Shrubs < 0.5m	< 2%	*Indigofera monophylla*
Tussock grasses	2 - 10%	*Cymbopogon ambiguus*
Climbers	2 - 10%	*Duperreya commixta*

722 WRE Site HR05

Described by	CG	**Date:**	04/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	571137	**mE**	7027349	**mN**	
Habitat	Flat/plain, creek bed					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel, loose soil, stones/boulders					
Vegetation	*Acacia ramulosa* var. *linophylla* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Grevillea berryana* and *Acacia ramulosa* var. *linophylla* open scrub over mixed *Eremophila spp.* shrubland over *Goodenia tenuiloba* scattered herbs over *Eragrostis eriopoda* and *Eriachne lanata* scattered tussock grassland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *major, Acacia cockertoniana, Acacia ramulosa* var. *linophylla*
Shrubs > 2m	30 - 70%	*Acacia pruinocarpa, Acacia ramulosa* var. *linophylla, Acacia rhodophloia, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)*, Grevillea berryana, Santalum spicatum*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Eremophila georgei, Eremophila glutinosa, Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brucei, Senna glaucifolia*
Shrubs < 0.5m	< 2%	*Solanum ashbyae*
Tussock grasses	< 2%	*Eragrostis eriopoda, Eriachne lanata*
Herbs	< 2%	*Goodenia tenuiloba*

722 WRE Site HR06

Described by	CG	**Date:**	04/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	567092	**mE**	7024711	**mN**	
Habitat	Flat/plain					
Soil	Yellow sand					
Rock Type	Surface crust, coarse gravel/pebbles, stones/boulders					
Vegetation	*Acacia ramulosa* var. *linophylla* scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus beardii* and *Ptilotus obovatus* low shrubland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Neg leaf and wood litter.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *argentea, Acacia ramulosa* var. *linophylla*
Shrubs > 2m	< 2%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia grasbyi, Acacia ramulosa* var. *linophylla, Rhagodia eremaea*
Shrubs < 1m	< 2%	*Eremophila fraseri* subsp. *fraseri*
Shrubs < 0.5m	10 - 30%	*Ptilotus beardii, Ptilotus obovatus, Sida ectogama, Solanum lasiophyllum*

722 WRE Site HR07

Described by	CG	**Date:**	04/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	566302	**mE**	7024279	**mN**	
Habitat	Flat/plain, floodplain, creek bed					
Soil	Red-orange sandy clay					
Rock Type	Fine gravel, loose soil, coarse gravel/pebbles					
Vegetation	*Acacia aneura* var. *microcarpa* low woodland over, *Eremophila serrulata* and *Eremophila simulans* subsp. *simulans* open scrub over *Dodonaea petiolaris* and *Eremophila forrestii* shrubland over *Harnieria kempeana* low open shrubland.					
Veg Condition	Excellent (grazing)					
Fire Age	None evident					
Notes	Moderate leaf litter, neg wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *microcarpa*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *microcarpa, Dodonaea petiolaris, Eremophila forrestii, Eremophila simulans* subsp. *simulans*
Shrubs 1 - 2m	10 - 30%	*Dodonaea petiolaris, Eremophila forrestii, Eremophila glutinosa, Eremophila serrulata, Grevillea stenostachya*
Shrubs < 1m	2 - 10%	*Harnieria kempeana* subsp. *muelleri, Ptilotus obovatus* var. *obovatus*
Shrubs < 0.5m	< 2%	*Hibiscus burtonii, Maireana platycarpa, Sida cardiophylla, Sida cardiophylla, Sida* sp. dark green fruits (S. van Leeuwen 2260)

722 WRE Site HR09

Described by	SH	**Date:**	04/07/08	**Type:**	Q	20x20
Location	Haul Road Centre					
MGA Zone	50	574743	**mE**	7028902	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sand/sandy clay					
Rock Type	Fine gravel (1%), loose soil (99%)					
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia pruinocarpa* low open woodland over *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila granitica* low open shrubland and *Eremophila granitica* and *Solanum ashbyae* low shrubland over *Monachather paradoxus* and *Aristida holathera* var. *holathera* very open tussock grassland.					
Veg Condition	Not specified					
Fire Age	Not specified					
Notes	Sparse leaf litter, widespread - wood litter not specified.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa, Acacia aneura* var. *microcarpa, Acacia pruinocarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia murrayana, Acacia ramulosa* var. *linophylla*
Shrubs < 1m	2 - 10%	*Eremophila forrestii* subsp. *forrestii, Eremophila granitica, Pimelea microcephala* subsp. *microcephala, Pimelea microcephala* subsp. *microcephala, Rhagodia eremaea, Senna artemisioides* subsp. *petiolaris*
Shrubs < 0.5m	10 - 30%	*Dodonaea petiolaris, Eremophila granitica, Ptilotus obovatus, Solanum ashbyae, Solanum ferocissimum*
Tussock grasses	2 - 10%	*Aristida holathera* var. *holathera, Eragrostis eriopoda, Monachather paradoxus*
Herbs	< 2%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site HR10

Described by	SH	**Date:**	04/07/08	**Type:**		Q	20x20
Location	Haul Road East						
MGA Zone	50	575069	**mE**		7029011	**mN**	
Habitat	Flat/plain						
Soil	Red-orange sand/sandy clay						
Rock Type	Loose soil						
Vegetation	*Corymbia lenziana* open woodland over *Acacia aneura* var. *microcarpa* low open woodland over *Acacia aneura* var. *intermedia* high shrubland over *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila granitica, Eremophila forrestii* subsp. *forrestii, Ptilotus obovatus* and *Solanum ashbyae* low shrubland over *Sida ectogama* and *Abutilon oxycarpum* very open herbs over *Monachather paradoxus* open tussock grassland.						
Veg Condition	Not specified						
Fire Age	Not specified						
Notes	Plentiful leaf litter and sparse wood litter mainly under shrubs (under Corymbias).						

Species List:

Stratum	Cover	Species within each stratum
Trees 10 - 30m	2 - 10%	*Corymbia lenziana*
Trees < 10m	2 - 10%	*Acacia aneura* var. *intermedia, Acacia aneura* var. *microcarpa, Psydrax latifolia*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *intermedia*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila granitica, Pimelea microcephala* subsp. *microcephala, Rhagodia eremaea, Senna glaucifolia, Senna* sp. Austin (A. Strid 20210)
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum, Ptilotus obovatus, Solanum ashbyae, Solanum ferocissimum*
Tussock grasses	10 - 30%	*Monachather paradoxus*
Herbs	2 - 10%	*Ptilotus* ?*clementii, Sida ectogama, Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site HR11

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Haul Road West					
MGA Zone	50	561103	**mE**	7020074	**mN**	
Habitat	Flat/plain, minor channel					
Soil	Red-orange sand/sandy clay					
Rock Type	Fine gravel (80%), loose soil (10%), coarse gravel/pebbles (5%), stones/boulders (5%)					
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *major* high shrubland over *Acacia ramulosa* var. *linophylla* shrubland over *Acacia aneura* var. *microcarpa, Acacia aneura* var. *major, Dodonaea petiolaris* and *Solanum ashbyae* low open shrubland over *Sida cardiophylla* very open herbs over *Eriachne lanata* and *Monachather paradoxus* very open tussock grassland.					
Veg Condition	Good (grazing)					
Fire Age	Old (>5 yrs)					
Notes	Moderate leaf litter and sparse wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia pruinocarpa*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *major, Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia rhodophloia, Rhagodia eremaea*
Shrubs < 1m	2 - 10%	*Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Dodonaea petiolaris, Eremophila granitica, Ptilotus obovatus, Sida cardiophylla, Solanum ashbyae*
Tussock grasses	2 - 10%	*Eriachne lanata, Monachather paradoxus*
Herbs	2 - 10%	*Swainsona affinis*

722 WRE Site HR12

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Haul Road West					
MGA Zone	50	561671	**mE**	7020815	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Fine gravel (20%), loose soil (10%), coarse gravel/pebbles (70%)					
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *major* open shrubland *to* high open shrubland over *Solanum ashbyae* and *Ptilotus obovatus* low open shrubland over *Aristida contorta* open tussock grassland.					
Veg Condition	Good (grazing)					
Fire Age	Old (>5 yrs)					
Notes	Sparse leaf and wood litter - widespread.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa, Psydrax rigidula*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *major, Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	2 - 10%	*Acacia tetragonophylla*
Shrubs < 0.5m	2 - 10%	*Maireana villosa, Ptilotus obovatus, Ptilotus schwartzii* var. *georgei, Sida cardiophylla, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Eragrostis eriopoda, Eriachne pulchella* subsp. *pulchella*
Herbs	< 2%	*Goodenia tenuiloba, Ptilotus roei, Sida ectogama*
Sedges	< 2%	*Cyperus squarrosus*

722 WRE Site HR13

Described by	SH	**Date:**	03/07/08	**Type:**		Q	20x20
Location	Haul Road						
MGA Zone	50	562739	**mE**		7021607	**mN**	
Habitat	Flat/plain, minor channel						
Soil	Red-orange sand/sandy clay						
Rock Type	Fine gravel (10%), loose soil (70%), coarse gravel/pebbles (20%)						
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *microcarpa* high shrubland over *Acacia ramulosa* var. *linophylla* shrubland over *Acacia ramulosa* var. *linophylla* (juvenile) and *Acacia aneura* var. *microcarpa* (juvenile) low shrubland and *Solanum ashbyae* low open shrubland over *Aristida contorta)* open tussock grassland.						
Veg Condition	Good (grazing)						
Fire Age	Old (>5 yrs)						
Notes	Moderate leaf litter, sparse wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Psydrax suaveolens*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Acacia tetragonophylla, Eremophila forrestii* subsp. *forrestii, Rhagodia eremaea, Senna artemisioides* subsp. *helmsii, Senna glaucifolia, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Aluta aspera* subsp. *hesperia, Eremophila granitica, Psydrax rigidula, Ptilotus obovatus, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Enneapogon cylindricus, Eragrostis eriopoda, Eriachne pulchella* subsp. *pulchella*
Herbs	< 2%	*Haloragis trigonocarpa*

722 WRE Site HR14

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Haul Road West					
MGA Zone	50	571935	**mE**	7027743	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Fine gravel (10%), loose soil (60%), coarse gravel/pebbles (30%)					
Vegetation	*Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *intermedia* high shrubland over*Eremophila forrestii* subsp. *forresti* and *Acacia ramulosa* var. *linophylla* shrubland over *Ptilotus obovatus* low shrubland over *Aristida contorta* open tussock grassland.					
Veg Condition	Good (grazing, tracks)					
Fire Age	Not specified					
Notes	Moderate leaf litter, sparse wood litter, mainly under shrubs. Mulga band - patchy					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia pruinocarpa, Psydrax latifolia, Psydrax rigidula*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *intermedia, Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii*
Shrubs < 1m	< 2%	*Eremophila georgei, Eremophila glutinosa, Grevillea stenostachya, Senna glaucifolia, Spartothamnella teucriiflora*
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum, Enchylaena tomentosa, Eremophila granitica, Ptilotus obovatus, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Cymbopogon ambiguus, Enneapogon cylindricus, Eriachne lanata, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*

722 WRE Site HR15

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20	
Location	Haul Road West						
MGA Zone	50	572353	**mE**	7027955	**mN**		
Habitat	Flat/plain, minor channel						
Soil	Red-orange sandy clay						
Rock Type	Fien gravel (80%), loose soil (5%), coarse gravel/pebbles (15%)						
Vegetation	*Acacia aneura* var. *microcarpa* low open woodland over *Acacia aneura* var. *argentea* and *Acacia aneura* var. *microcarpa* high shrubland over *Acacia ramulosa* var. *linophylla* shrubland over *Dodonaea petiolaris* low open shrubland and *Harnieria kempeana* subsp. *muelleri* low shrubland over *Sida cardiophylla* and *Goodenia tenuiloba* open herbs over *Aristida contorta, Eriachne lanata* and *Monachather paradoxus* open tussock grassland.						
Veg Condition	Good (limited grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, moderate wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa, Grevillea berryana, Psydrax latifolia, Psydrax rigidula*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *argentea*
Shrubs 1 - 2m	10 - 30%	*Acacia ramulosa* var. *linophylla, Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Eremophila forrestii* subsp. *forrestii, Senna glaucifolia*
Shrubs < 1m	2 - 10%	*Abutilon oxycarpum, Dodonaea petiolaris, Eremophila glutinosa, Senna artemisioides* subsp. *helmsii, Solanum ashbyae*
Shrubs < 0.5m	10 - 30%	*Abutilon oxycarpum, Eremophila georgei, Eremophila granitica, Harnieria kempeana* subsp. *muelleri, Sida cardiophylla, Sida cardiophylla*
Tussock grasses	10 - 30%	*Aristida contorta, Eriachne lanata, Monachather paradoxus*
Herbs	10 - 30%	*Convolvulaceae sp, Goodenia tenuiloba, Hibiscus burtonii, Sida ectogama, Synaptantha tillaeacea* var. *tillaeacea*

722 WRE Site HR16

Described by	SH	**Date:**	05/07/08	**Type:**	Q	20x20	
Location	Haul Road East						
MGA Zone	50	576016	**mE**	7029468	**mN**		
Habitat	Fla/plain						
Soil	Red-orange clay						
Rock Type	Compacted clay (60%), fine gravel (35%), coarse gravel/pebbles (5%)						
Vegetation	*Acacia aneura* var. *microcarpa* scattered low trees over *Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *intermedia* high open shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila forrestii* subsp. *forrestii* low shrubland over *Goodenia tenuiloba* scattered herbs over *Monachather paradoxus* and *Eragrostis eriopoda* very open tussock grassland.						
Veg Condition	Good (some grazing)						
Fire Age	Old (>5 yrs)						
Notes	Sparse leaf litter, moderate wood litter, mainly under shrubs. Sparse Mulga between dense *Acacia ramulosa* var. *linophylla* patches.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *microcarpa*
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *intermedia*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs < 1m	10 - 30%	*Eremophila forrestii* subsp. *forrestii, Eremophila georgei, Eremophila latrobei* subsp. *latrobei, Eremophila simulans* subsp. *simulans, Psydrax suaveolens*
Shrubs < 0.5m	< 2%	*Enchylaena tomentosa, Hibiscus coatesii, Maireana villosa, Sida cardiophylla, Solanum ashbyae*
Tussock grasses	2 - 10%	*Eragrostis eriopoda, Eriachne lanata, Eriachne mucronata, Monachather paradoxus*
Herbs	< 2%	*Goodenia tenuiloba, Sida ectogama*

722 WRE Site HR17

Described by	SH	**Date:**	05/07/08	**Type:**	Q	20x20
Location	Haul Road East					
MGA Zone	50	576849	**mE**	7029667	**mN**	
Habitat	Undulating plain, very low relief hill					
Soil	Red-orange compacted clay					
Rock Type	Compacted clay (5%), fine gravel (95%)					
Vegetation	*Acacia aneura* var. *microcarpa* high open shrubland to scattered low trees over *Thryptomene decussata* and *Acacia aneura* var. *microcarpa* shrubland over *Thryptomene decussata* and *Ptilotus schwartzii* var. *georgei* low open shrubland over *Goodenia tenuiloba* very open herbs over *Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* very open tussock grassland.					
Veg Condition	Good (little grazing, old tracks)					
Fire Age	None evident					
Notes	Neg leaf litter, sparse wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	*Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Thryptomene decussata*
Shrubs < 1m	2 - 10%	*Thryptomene decussata*
Shrubs < 0.5m	2 - 10%	*Eremophila jucunda* subsp. *jucunda, Maireana georgei, Maireana thesioides, Ptilotus obovatus* var. *obovatus, Ptilotus schwartzii* var. *georgei, Sida ectogama, Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon cylindricus, Eragrostis eriopoda, Eriachne pulchella* subsp. *pulchella, Monachather paradoxus*
Herbs	2 - 10%	*Goodenia tenuiloba*

722 WRE Site HR18

Described by	CG	**Date:**	04/07/08	**Type:**		Q	20x20
Location	Haul Road West						
MGA Zone	50	577286	**mE**		7029627	**mN**	
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	*Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *microcarpa* open scrub over *Eremophila forrestii* shrubland over *Solanum ashbyae, Sida cardiophylla* and *Hibiscus burtonii* low open shrubland over *Monachather paradoxus* and *Eriachne lanata* very open tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Sparse leaf litter, neg wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila forrestii, Rhagodia eremaea*
Shrubs < 0.5m	2 - 10%	*Hibiscus burtonii, Sida cardiophylla, Solanum ashbyae*
Tussock grasses	2 - 10%	*Enneapogon cylindricus, Eriachne lanata, Monachather paradoxus*

722 WRE Site HR19

Described by	CG	**Date:**	03/07/08	**Type:**		Q	20x20
Location	Haul Road East						
MGA Zone	50	577838	**mE**		7029714	**mN**	
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	*Acacia aneura* var. *microcarpa* high shrubland over *Aristida contorta* open tussock grassland.						
Veg Condition	Good (grazing)						
Fire Age	None evident						
Notes	Leaf litter/wood litter not specified. Open Mulga.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Grevillea berryana*
Shrubs 1 - 2m	< 2%	*Eremophila latrobei* subsp. *latrobei, Eremophila simulans* subsp. *simulans*
Shrubs < 0.5m	< 2%	*Eremophila clarkei, Maireana villosa, Ptilotus schwartzii* var. *georgei, Solanum ashbyae*
Tussock grasses	10 - 30%	*Aristida contorta, Monachather paradoxus*

722 WRE Site HR20

Described by	CG	**Date:**	04/07/08	**Type:**	Q	20x20
Location	Haul Road West					
MGA Zone	50	578621	**mE**	7029801	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles					
Vegetation	*Ptilotus schwartzii* var. *georgei, Solanum ashbyae* and *Maireana villosa* low scattered *shrubs* over *Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* tussock grassland.					
Veg Condition	Good (tracks, grazing)					
Fire Age	None evident					
Notes	Neg leaf and wood litter. Very open grass/shrub land.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs < 0.5m	< 2%	*Maireana villosa, Ptilotus schwartzii* var. *georgei, Solanum ashbyae*
Tussock grasses	30 - 70%	*Aristida contorta, Eriachne pulchella* subsp. *pulchella*
Herbs	< 2%	*Trianthema oxycalyptra* var. *oxycalyptra*

722 WRE Site HR21

Described by	CG	**Date:**	04/07/08	**Type:**		Q	20x20
Location	Creekline						
MGA Zone	50	579184	**mE**		7029888	**mN**	
Habitat	Flat/plain, minor channel						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel						
Vegetation	*Acacia cuthbertsonii* subsp. *cuthbertsonii* and *Psydrax latifolia* low open forest over *Eremophila clarkei* and *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila clarkei* shrubland over *Sida* sp. golden calyces glabrous (H.N. Foote 32) and *Solanum lasiophyllum* open herbs over *Monachather paradoxus* and *Eriachne lanata* very open tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Plentiful leaf litter, moderate wood litter, mainly under shrubs. Dense creekline.						

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	*Acacia aneura* var. *microcarpa, Acacia cuthbertsonii* subsp. *cuthbertsonii, Psydrax latifolia*
Shrubs > 2m	30 - 70%	*Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Eremophila clarkei*
Shrubs < 1m	< 2%	*Ptilotus obovatus* var. *obovatus, Spartothamnella teucriiflora*
Shrubs < 0.5m	< 2%	*Abutilon oxycarpum, Hibiscus coatesii, Maireana villosa, Sida* sp. dark green fruits (S. van Leeuwen 2260), *Solanum ferocissimum, Solanum lasiophyllum*
Tussock grasses	2 - 10%	*Eriachne lanata, Monachather paradoxus*
Climbers	< 2%	*Marsdenia australis*
Herbs	10 - 30%	*Sida* sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site HR23a

Described by	CG	**Date:**	05/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	580496	**mE**	7029551	**mN**	
Habitat	Plain/flat					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel					
Vegetation	*Acacia ramulosa* var. *linophylla* low open woodland over *Eremophila jucunda* subsp. *jucunda* open scrub over *Eriachne lanata* open tussock grassland.					
Veg Condition	Good (grazing)					
Fire Age	None evident					
Notes	Mod leaf litter, neg wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	30 - 70%	*Eremophila jucunda* subsp. *jucunda*
Shrubs < 1m	< 2%	*Solanum ashbyae*
Shrubs < 0.5m	< 2%	*Maireana platycarpa*
Tussock grasses	10 - 30%	*Eragrostis eriopoda, Eriachne lanata*

722 WRE Site HR23b

Described by	CG	**Date:**	05/07/08	**Type:**		Q	20x20
Location							
MGA Zone	50	580171	**mE**		7029992	**mN**	
Habitat	Flat/plain						
Soil	Red-orange sandy clay						
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles						
Vegetation	*Acacia ramulosa* var. *linophylla* scattered tall *shrubs* over *Ptilotus schwartzii* var. *georgei* low open shrubland over *Aristida contorta, Monachather paradoxus* and *Eragrostis eriopoda* tussock grassland.						
Veg Condition	Excellent (grazing)						
Fire Age	None evident						
Notes	Neg leaf and wood litter.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	< 2%	*Acacia ramulosa* var. *linophylla, Acacia tetragonophylla*
Shrubs < 1m	< 2%	*Eremophila forrestii*
Shrubs < 0.5m	2 - 10%	*, Ptilotus schwartzii* var. *georgei*
Tussock grasses	30 - 70%	*Aristida contorta, Eragrostis eriopoda, Monachather paradoxus*

722 WRE Site HR25

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Haul Road W6					
MGA Zone	50	580826	**mE**	7029203	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Surface crust, fine gravel, coarse gravel/pebbles					
Vegetation	*Acacia aneura* var. *microcarpa, Eremophila forrestii* subsp. *forrestii* and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila jucunda* subsp. *jucunda, Ptilotus obovatus* var. *obovatus* and *Maireana platycarpa* low shrubland over *Monachather paradoxus* very open tussock grassland.					
Veg Condition	Good (grazing)					
Fire Age	None evident					
Notes	Sparse leaf litter, neg woodl litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *linophylla, Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *petiolaris*
Shrubs < 0.5m	10 - 30%	*Eremophila jucunda* subsp. *jucunda, Maireana platycarpa, Maireana villosa, Ptilotus obovatus* var. *obovatus*
Tussock grasses	2 - 10%	*Monachather paradoxus*
Herbs	< 2%	*Ptilotus roei*

722 WRE Site HR26

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	570579	**mE**	7027118	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Loose soil (50%), coarse gravel/pebbles (50%)					
Vegetation	*Acacia pruinocarpa* and *Acacia aneura* var. *major* low open woodland over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *major* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii* subsp. *forrestii* shrubland over *Eremophila georgei* and *Solanum ashbyae* low open shrubland over *Eragrostis eriopoda, Monachather paradoxus* and *Eriachne lanata* very open tussock grassland.					
Veg Condition	Good (some grazing - litter - corrugated iron)					
Fire Age	Old (>5 yrs)					
Notes	Mod leaf litter, sparse wood llitter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *major, Acacia pruinocarpa, Psydrax latifolia, Psydrax rigidula, Psydrax suaveolens, Santalum leptocladum*
Shrubs > 2m	10 - 30%	*Acacia aneura* var. *major, Acacia ramulosa* var. *linophylla*
Shrubs 1 - 2m	10 - 30%	*Acacia aneura* var. *microcarpa, Eremophila forrestii* subsp. *forrestii*
Shrubs < 1m	2 - 10%	*Eremophila georgei, Eremophila granitica, Senna glaucifolia, Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Abutilon oxycarpum, Enchylaena tomentosa, Maireana villosa, Ptilotus obovatus, Solanum ashbyae*
Tussock grasses	2 - 10%	*Eragrostis eriopoda, Eriachne lanata, Monachather paradoxus*
Herbs	< 2%	*Goodenia tenuiloba, Sida ectogama*

722 WRE Site HR27

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location						
MGA Zone	50	570335	**mE**	7026986	**mN**	
Habitat	Flat/plain					
Soil	Red-orange sandy clay					
Rock Type	Loose soil (10%), coarse gravel/pebbles (90%) scree					
Vegetation	*Acacia aneura* var. *microcarpa* and *Acacia ramulosa* var. *ramulosa* high open shrubland over *Acacia aneura* var. *microcarpa* open shrubland over *Ptilotus schwartzii* var. *georgei* low open shrubland over *Goodenia tenuiloba* very open herbs over *Aristida contorta* and *Eragrostis eriopoda* very open tussock grassland.					
Veg Condition						
Fire Age						
Notes	Leaf/wood litter not specified.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia aneura* var. *microcarpa*
Shrubs 1 - 2m	2 - 10%	*Acacia ramulosa* var. *ramulosa*
Shrubs < 1m	< 2%	*Senna artemisioides* subsp. *helmsii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Ptilotus rotundifolius, Ptilotus schwartzii* var. *georgei, Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis eriopoda, Monachather paradoxus*
Herbs	2 - 10%	*Cheilanthes sieberi* subsp. *sieberi, Goodenia tenuiloba, Goodenia tenuiloba*

722 WRE Site HR28

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Haul Road W of W6					
MGA Zone	50	570265	**mE**	7026936	**mN**	
Habitat	Flat/plain, minor channel					
Soil	Red-orange sand/sandy clay					
Rock Type	Fine gravel (40%), loose soil (10%), coarse gravel/pebbles (50%)					
Vegetation	*Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta climbers* over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.					
Veg Condition	Good (some grazing)					
Fire Age	None evident					
Notes	Mod leaf litter, sparse wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa, Acacia aneura* var. *microcarpa, Psydrax latifol Santalum spicatum*
Shrubs > 2m	30 - 70%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	30 - 70%	*Acacia ramulosa* var. *linophylla, Acacia speckii, Acacia tetragonophylla, Acacia* Weld Range (A. Markey & S. Dillon 2994), *Eremophila exilifolia*
Shrubs < 1m	10 - 30%	*Dodonaea pachyneura, Eremophila exilifolia, Eremophila phyllopoda* subs *phyllopoda, Hibiscus sturtii* var. *forrestii, Pimelea microcephala* subs *microcephala, Senna artemisioides* subsp. *helmsii, Senna glaucifol Spartothamnella teucriiflora*
Shrubs < 0.5m	2 - 10%	*Amyema maidenii, Chorizema genistoides, Dodonaea amplisemina, Grevil inconspicua, Indigofera monophylla, Ptilotus obovatus*
Tussock grasses	2 - 10%	*Aristida contorta, Cymbopogon ambiguus, Eragrostis eriopoda, Eriachne pulche* subsp. *pulchella*
Climbers	2 - 10%	*Duperreya commixta*
Herbs	2 - 10%	*Goodenia tenuiloba, Haloragis trigonocarpa, Ptilotus helipteroides, Sida ectogama*

722 WRE Site HR29

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20	
Location	Haul Road Centre						
MGA Zone	50	569789	**mE**	7026655	**mN**		
Habitat	Footslope, low relief hill, gentle slope						
Soil	Red-orange sandy clay						
Rock Type	Coarse gravel/pebbles (60%), stones/boulders (40%), scree						
Vegetation	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high open shrubland over *Eremophila exilifolia, Eremophila macmillaniana* and *Senna artemisioides* subsp. *helmsii* low shrubland and *Ptilotus obovatus* low open shrubland over *numerous Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* tussock grassland.						
Veg Condition	Excellent (No grazing)						
Fire Age	None evident						
Notes	Sparse leaf and wood litter, mainly under shrubs.						

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	< 2%	*Calytrix desolata, Eremophila macmillaniana*
Shrubs < 1m	10 - 30%	*Calytrix desolata, Eremophila exilifolia, Senna artemisioides* subsp. *helmsii, Senna artemisioides* subsp. x *sturtii, Senna glaucifolia*
Shrubs < 0.5m	2 - 10%	*Dodonaea amplisemina, Ptilotus obovatus, Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Enneapogon cylindricus, Eriachne pulchella* subsp. *pulchella*
Herbs	< 2%	*Sida ectogama*

722 WRE Site HR30

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Madoonga WD					
MGA Zone	50	569357	**mE**	7026385	**mN**	
Habitat	Undulating plain, low relief scree slope					
Soil	Red-orange sandy clay					
Rock Type	Coarse gravel/pebbles (90%), stones/boulders (10%)					
Vegetation	*Acacia aneura* var. *microcarpa* low open woodland over *Eremophila oppositifolia* subsp. *angustifolia* high open shrubland over *Acacia grasbyi* shrubland over *Senna* sp. Austin (A. Strid 20210) low open shrubland and *Maireana georgeii* low shrubland over *Goodenia tenuiloba* very open herbs over *Eragrostis eriopodai* and *Aristida contorta)* very open tussock grassland.					
Veg Condition	Good (minimal grazing)					
Fire Age	None evident					
Notes	Sparse leaf and wood litter, mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	*Acacia aneura* var. *microcarpa*
Shrubs > 2m	2 - 10%	*Eremophila oppositifolia* subsp. *angustifolia*
Shrubs 1 - 2m	10 - 30%	*Acacia grasbyi, Acacia tetragonophylla, Eremophila oppositifolia* subsp. *angustifolia, Senna* sp. Austin (A. Strid 20210)
Shrubs < 1m	2 - 10%	*Eremophila macmillaniana, Maireana thesioides, Salsola tragus, Scaevola spinescens, Senna artemisioides* subsp. *helmsii, Senna* sp. Austin (A. Strid 20210), *Senna* sp. Meekatharra (E. Bailey 1-26), *Senna stricta*
Shrubs < 0.5m	10 - 30%	*Eremophila exilifolia, Eremophila jucunda* subsp. *jucunda, Maireana convexa, Maireana georgei, Ptilotus obovatus, Ptilotus schwartzii* var. *georgei, Sclerolaena diacantha, Sida ectogama, Solanum ashbyae*
Tussock grasses	2 - 10%	*Aristida contorta, Eragrostis eriopoda*
Herbs	2 - 10%	*Goodenia tenuiloba*

722 WRE Site MWD01

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	HR Cent					
MGA Zone	50	558832	**mE**	7019504	50	
Habitat	Flat/plain, floodplain, wetland-ish					
Soil	Red-orange clay/sandy clay					
Rock Type	Cracked clay, surface crust					
Vegetation	*Grevillea striata* and *Acacia aneura* var. *conifera* low woodland over *Scaevola spinescens* open shrubland over *Peplidium* sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158) and *Marsilea drummondii* herbs over *Eragrostis* sp. and *Eriachne helmsii* scattered tussock grassland.					
Veg Condition	Good (tracks, grazing, weeds)					
Fire Age	None evident					
Notes	Moderate leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	*Acacia aneura* var. *conifera, Grevillea striata, Santalum spicatum*
Shrubs > 2m	< 2%	*Acacia craspedocarpa, Senna glutinosa* subsp. *chatelainiana*
Shrubs 1 - 2m	2 - 10%	*Scaevola spinescens*
Tussock grasses	< 2%	*Eragrostis* sp., *Eriachne helmsii*
Climbers	< 2%	*Lysiana murrayi*
Herbs	30 - 70%	*Centipeda thespidioides, Marsilea drummondii, Peplidium* sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)
Sedges	< 2%	*Austrostipa elegantissima*

722 WRE Site MWD02

Described by	SH	**Date:**	03/07/08	**Type:**	Q	20x20
Location	Madoonga WD					
MGA Zone	50	558804	**mE**	7019050	**mN**	
Habitat	Flat/plain, seasonally inundated wetland					
Soil	Orange clay					
Rock Type	Cracked clay (10%), fine gravel (10%), coarse gravel/pebbles (80%)					
Vegetation	*Melaleuca stereophloia* high open shrubland over *Eremophila arachnoides* subsp. *arachnoides* shrubland over *Senna stricta* and *Sclerolaena densiflora* low open shrubland over *Zygophyllum* ? *eremaeum* open herbs over *Enneapogon cylindricus* open tussock grassland.					
Veg Condition	Good (some grazing from cows)					
Fire Age	None evident					
Notes	Sparse leaf and wood litter mainly under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	*Acacia burkittii*
Shrubs 1 - 2m	10 - 30%	*Acacia tetragonophylla, Acacia victoriae, Eremophila arachnoides* subsp. *arachnoides, Hakea preissii, Melaleuca stereophloia, Senna glutinosa* subsp. x *luerssenii*
Shrubs < 1m	< 2%	*Eremophila maculata* subsp. *brevifolia, Lycium australe, Rhagodia eremaea, Senna glaucifolia,*
Shrubs < 0.5m	2 - 10%	*Lawrencia chrysoderma, Maireana carnosa, Maireana lobiflora, Maireana triptera, Ptilotus obovatus, Sclerolaena densiflora, Senna* sp. Meekatharra (E. Bailey 1-26), *Senna stricta, Solanum ashbyae, Zygophyllum aurantiacum*
Tussock grasses	10 - 30%	*Enneapogon cylindricus, Eragrostis dielsii*
Herbs	10 - 30%	*Boerhavia coccinea, Goodenia berardiana, Ptilotus exaltatus, Ptilotus helipteroides, Schoenia cassiniana, Zygophyllum* ? *eremaeum*

APPENDIX F DENDOGRAM OF MULTVARIATE ANALYSIS

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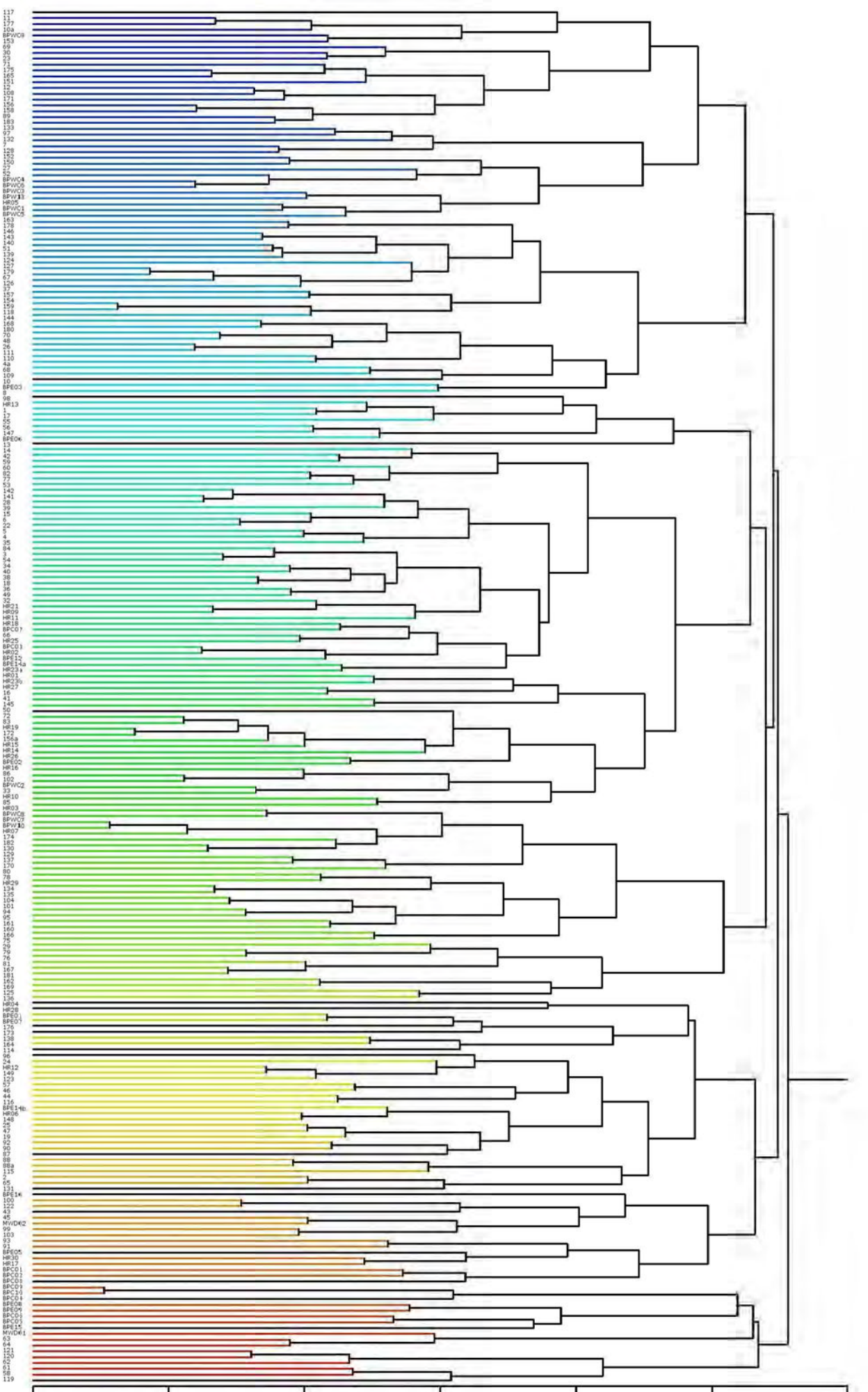


Figure 3.2

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APPENDIX G SPECIES BY SITE MATRIX

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NAME	WREIA01	WREIA02	WREIA03	WREIA04	WREIA05	WREIA06	WREIA07	WREIA08	WREIA10	WREIA100	WREIA101	WREIA102	WREIA103	WREIA104	WREIA108	WREIA109	WREIA11	WREIA110	WREIA111	WREIA114	WREIA12	WREIA13	WREIA14	WREIA15	WREIA16	WREIA17	WREIA18	WREIA19	WREIA22	WREIA23	WREIA24	WREIA25	WREIA26	WREIA27	WREIA28	WREIA29	WREIA30	WREIA32	WREIA33	WREIA34	WREIA35	WREIA36	WREIA37	WREIA38	WREIA39	WREIA40	WREIA41	WREIA42	WREIA43
Abutilon macrum	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	2	0	2	0	0	2
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Abutilon oxycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum subsp. *prostratum*	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Acacia aneura var. aneura	3	4	1	2	3	1	0.1	0	0	2	3	3	1	2	3	2	3	1	3	2	1	0	0.1	3	3	1	1	1	2	2	3	4	2	2	4	3	3	3	3	2	3	0	2	4	3	3	2	3	0
Acacia aneura var. *argentea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. conifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. *fuliginea*	0	1	0	0	3	0	0	0	0	2	0	0	0	0.1	0	0	3	0	0	0	0	0	0	1	1	0	0	2	0	0	2	4	0	0	2	0	2	0	0	0	2	0	0	0.1	0	0	0	0	0
Acacia burkittii	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cockertoniana	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Acacia effusifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia craspedocarpa	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Acacia cuthbertsonii subsp. *cuthbertsonii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Acacia exocarpoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia grasbyi	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia minyura	2	0	0	0	0	0	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia murrayana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia pruinocarpa	0	0	0.1	0	0	0.1	0.1	1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	1	0	0	0	1	1	0	1	2	0	0.1	0	1	0.1	1	0	0	2	2	3	0	0	0
Acacia quadrimarginea	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Acacia ramulosa var. linophylla	2	0	3	3	3	2	2	0	2	0	0	3	0	0	2	0	3	0	0	0	3	2	4	2	3	3	3	0.1	2	2	0	3	0	3	3	1	2	4	3	3	3	3	0	3	2	3	2	3	0
Acacia ramulosa var. ramulosa	0	0	1	0	0	0	0	2	0	4	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
Acacia rhodophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sibirica	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	2	0	1	0	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	0	0	0	0	0	0.1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia speckii	0	0	0	0	0	0	0	0	0	0	0.1	0	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia tetragonophylla	1	2	0	0	0	0.1	0	0	0	1	1	0	0	1	0	0	0	0	0	0.1	0	0	0.1	0.1	0	1	0.1	2	0	0	0	0.1	0	0	2	0	0	0	0.1	0	0	0	0	1	0	0	0	0
Acacia victoriae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allocasuarina acutivalvis subsp. *acutivalvis*	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluta aspera subsp. *hesperia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	4	0	0	0.1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex bunburyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semilunaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	1	3
Baeckea sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia perennis subsp. *exigua*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachychiton gregorii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
Calytrix desolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes lasiophylla	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi subsp. *sieberi*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium gaudichaudianum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	0	1	0	0	0	0	0	1	0	0	1	1	0	1	2	0.1	0	1	1	1	0	1
Chorizema genistoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corymbia lenziana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Cratystylis subspinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbopogon ambiguus	0	0	0	0	0	0	0.1	1	0	1	1	0	0	0	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
Dianella revoluta var. *divaricata*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea amplisemina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea pachyneura	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	2	0	0.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea petiolaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Dodonaea rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa subsp. *angustissima*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duperreya commixta	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enneapogon caerulescens	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2

NAME	WREIA01	WREIA02	WREIA03	WREIA04	WREIA05	WREIA06	WREIA07	WREIA08	WREIA10	WREIA100	WREIA101	WREIA102	WREIA103	WREIA104	WREIA108	WREIA109	WREIA11	WREIA110	WREIA111	WREIA114	WREIA12	WREIA13	WREIA14	WREIA15	WREIA16	WREIA17	WREIA18	WREIA19	WREIA22	WREIA23	WREIA24	WREIA25	WREIA26	WREIA27	WREIA28	WREIA29	WREIA30	WREIA32	WREIA33	WREIA34	WREIA35	WREIA36	WREIA37	WREIA38	WREIA39	WREIA40	WREIA41	WREIA42	WREIA43
Enneapogon cylindricus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila arachnoides subsp. *arachnoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila clarkei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	1	1	0	0	0	1	0.1	1	0	0	0	0
Eremophila compacta subsp. *compacta*	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *fecunda*	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila exilifolia	0	0	0	0	0	0	0	0	0	1	0	0	2	0.1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila foliosissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0
Eremophila forrestii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii subsp. *forrestii*	3	0.1	3	2	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	3	2	3	3	2	0	4	0	4	0	0	2	1	0	0	3	2	2	1	2	0	3	0	3	3	4	0
Eremophila fraseri subsp. *fraseri*	0	0.1	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila galeata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila georgei	0	0	0	0.1	1	0.1	0	0	1	0	1	0	0	0	0	0	0.1	1	3	0	0	2	1	1	0	0	0	1	1	1	0	0	1	2	4	2	1	0	1	0	0	0	0	3	1	0.1	2	1	0
Eremophila glabra subsp. *glabra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra subsp. *tomentosa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glutinosa	0	0	0	0	0	0	0	3	1	0	0	1	0	0	3	4	1	0	2	0	1	0	1	0	0	0	0	0.1	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0
Eremophila granitica	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Eremophila jucunda subsp. *jucunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *filiformis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *latrobei*	0	0	0	0	0	0	3	1	2	1	0.1	0	0.1	0	1	1	0.1	2	1	0	2	0	1	0	0	0	0	0.1	0	1	0	0	2	1	2	2	1	0	0	0	0	2	0	0.1	1	0	0.1	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eremophila mackinlayi subsp. *spathulata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0.1	0
Eremophila macmillaniana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila margarethae	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. *angustifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila pantonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila phyllopoda subsp. *phyllopoda*	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila platycalyx subsp. *platycalyx*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila punicea	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila simulans subsp. *simulans*	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0.1	0	0	0	0.1	0	0	0.1	1	0	0	0	0	0	0	0	0	0	0
Eremophila spathulata	0	0	0	0	0	0	0	0	0	0	3	0	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila spuria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Eremophila subfloccosa subsp. *lanata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne flaccida	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne helmsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne mucronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne pulchella subsp. *pulchella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus carnei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus lucasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Eucalyptus socialis subsp. *eucentrica*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus striaticalyx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus trivalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia boophthona	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frankenia laxiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycine canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Grevillea berryana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0.1	0	0	0	1	0	0
Grevillea deflexa	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Grevillea inconspicua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0
Grevillea nematophylla subsp. *supraplana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Grevillea stenostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea striata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA01	WREIA02	WREIA03	WREIA04	WREIA05	WREIA06	WREIA07	WREIA08	WREIA10	WREIA100	WREIA101	WREIA102	WREIA103	WREIA104	WREIA108	WREIA109	WREIA11	WREIA110	WREIA111	WREIA114	WREIA12	WREIA13	WREIA14	WREIA15	WREIA16	WREIA17	WREIA18	WREIA19	WREIA22	WREIA23	WREIA24	WREIA25	WREIA26	WREIA27	WREIA28	WREIA29	WREIA30	WREIA32	WREIA33	WREIA34	WREIA35	WREIA36	WREIA37	WREIA38	WREIA39	WREIA40	WREIA41	WREIA42	WREIA43
Hakea preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea recurva subsp. *arida*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia doleiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *bidens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *leiostachya*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnieria kempeana subsp. *muelleri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemigenia tysonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus burtonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	1	0	0	0
Hibiscus coatesii	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii var. *forrestii*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indigofera monophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia chrysoderma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptomeria preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana carnosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maireana glomerifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana lobiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana melanocoma	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana planifolia	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana platycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana thesioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maireana villosa	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0
Melaleuca stereophloia	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus placoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	3	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus sulphurea	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirbelia rhagodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monachather paradoxus	2	0	4	4	2	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	2	0	0	1	1	3	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia plucheacea	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia stuartii	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brevifolia*	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brucei*	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0
Pimelea microcephala subsp. *microcephala*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Pittosporum angustifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluchea dentex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera albiflora	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera althoferi subsp. *althoferi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera petrophila	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0.1	0	1	0.1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0.1	0	0	1	0	0	0	0	0	0
Psydrax latifolia	0	0	0	0	0	0	0.1	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	1	0	0	0	0.1	0	0	1	0	0.1	0	0	1	0	0.1	0	0	0
Psydrax rigidula	0	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Psydrax suaveolens	0	0	0	0.1	0.1	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0
Ptilotus luteolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus beardii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus divaricatus var. *divaricatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus var. *exaltatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus var. *obovatus*	1	1	0.1	0	1	0.1	4	1	3	3	1	0	1	2	0	0.1	0.1	1	0	2	0	1	2	1	0	3	2	2	3	0	1	2	0.1	0.1	2	2	1	0.1	1	2	2	0.1	3	3	2	3	0	0.1	3
Ptilotus rotundifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus schwartzii	0	0	0	0	1	1	0	0	0	0	0	2	0	1	1	0	0	2	2	0	0.1	0	0.1	1	2	0	0	0	1	0	1	0	2	2	0	1	1	0	1	0	0	0	0	0	1	0	2	0	0
Rhagodia eremaea	0	0	1	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum acuminatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum spicatum	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0	0	0.1	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA01	WREIA02	WREIA03	WREIA04	WREIA05	WREIA06	WREIA07	WREIA08	WREIA10	WREIA100	WREIA101	WREIA102	WREIA103	WREIA104	WREIA108	WREIA109	WREIA11	WREIA110	WREIA111	WREIA114	WREIA12	WREIA13	WREIA14	WREIA15	WREIA16	WREIA17	WREIA18	WREIA19	WREIA22	WREIA23	WREIA24	WREIA25	WREIA26	WREIA27	WREIA28	WREIA29	WREIA30	WREIA32	WREIA33	WREIA34	WREIA35	WREIA36	WREIA37	WREIA38	WREIA39	WREIA40	WREIA41	WREIA42	WREIA43
Sclerolaena densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *filifolia*	0	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Senna artemisioides subsp. *helmsii*	0	0	0	0	0	0	0	0	0	0	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *oligophylla*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *petiolaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x artemisioides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x sturtii*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna glaucifolia	0.1	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Meekatharra (E. Bailey 1-26)	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Senna stricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Sida calyxhymenia	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cardiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida ectogama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida fibulifera	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	3	2	0	0	1	0
Sida sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0	0	0	3	0	1	0	0	1	0	0	2	0	2	3	0	0	2	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0.1	0	1	0	0	0	1	0	0
Sida sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida spodochroma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ashbyae	1	1	1	1	0	0	3	0	1	1	1	1	0.1	1	0	0.1	1	0	1	0	0.1	1	1	1	1	2	0.1	1	1	0.1	1	0.1	0.1	0	1	1	0	1	1	2	2	1	0.1	1	1	2	0.1	1	1
Solanum centrale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ellipticum	0	0	0	0	0	0	0	0.1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0.1	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0
Solanum ferocissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spartothamnella teucriiflora	1	0	0	0.1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	1	0.1	0	1	0	0	0	0	0	0	0	0	0.1	0	0	0	1	1	1	0	0	0
Stenanthemum patens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum petraeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thryptomene decussata	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	1	0	3	3	0	2	0.1	0	0	0	0	0	0	0	1	0	0	2	3	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0
Tribulus suberosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94
Abutilon macrum	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0.1	3	0	0.1	0	0	0	0	2	0	0
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum subsp. *prostratum*	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
Acacia aff. oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. aneura	1	0	1	4	1	2	2	3	1	3	3	2	1	3	0	3	1	0	0	2	0	3	0	3	3	0.1	2	3	3	1	4	3	2	3	3	1	3	3	2	0	0.1	2	1	3	3	1	1	3	1
Acacia aneura var. *argentea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. conifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. *fuliginea*	0	0	0	2	0	0	0	0	0	2	2	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Acacia burkittii	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0
Acacia cockertoniana	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia effusifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia craspedocarpa	1	0	0.1	2	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0	0	3	1	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0	0	1	2	3	0
Acacia cuthbertsonii subsp. *cuthbertsonii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia exocarpoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia grasbyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia minyura	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0
Acacia murrayana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia pruinocarpa	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acacia quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ramulosa var. linophylla	0	0	0	0	0	2	3	0	2	2	3	0	4	3	0	1	3	0	0	0	0	0	4	0	0	0	0	0	4	2	0	3	0	0	0	0	2	3	3	3	3	2	0	0	0	2	0	0	0
Acacia ramulosa var. ramulosa	0	0	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0
Acacia rhodophloia	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Acacia sibirica	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.1	0	3	0	0
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	1	4	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	3
Acacia speckii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Acacia tetragonophylla	2	0	2	3	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0	0	2	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	2	1	3	1	1
Acacia victoriae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allocasuarina acutivalvis subsp. *acutivalvis*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluta aspera subsp. *hesperia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex bunburyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semilunaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Austrostipa scabra	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Baeckea sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia perennis subsp. *exigua*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachychiton gregorii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
Calytrix desolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Cheilanthes lasiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cheilanthes sieberi subsp. *sieberi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Chenopodium gaudichaudianum	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chorizema genistoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corymbia lenziana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cratystylis subspinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbopogon ambiguus	0	0	0	1	0	0.1	0	1	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0.1	0	0	1	1	3	0	0	0	0	0	0	0	0	0	1	0	2
Dianella revoluta var. *divaricata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea amplisemina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea pachyneura	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea petiolaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa subsp. *angustissima*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duperreya commixta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enneapogon caerulescens	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	

NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94
Enneapogon cylindricus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila arachnoides subsp. *arachnoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila clarkei	0	0	0	0	0	1	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *compacta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *fecunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila exilifolia	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0
Eremophila falcata	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila foliosissima	0	0	0	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii subsp. *forrestii*	0	0	0	0	0	2	1	0.1	1	0.1	4	2	4	0	0	2	4	0	0	0	0	1	0.1	0	0	0	0	0	3	2	0	0.1	1	0	1	0	1	2	3	2	0	1	1	0.1	0.1	0	2	0	1
Eremophila fraseri subsp. *fraseri*	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	1	1	0
Eremophila galeata	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila georgei	0	0	0	0	1	0	0	0	1	0.1	3	0	0	1	1	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0.1	0	0	0	0.1	1	0	0
Eremophila glabra subsp. *glabra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra subsp. *tomentosa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glutinosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	2	0	1	0	1	3	1	0	0.1	0	3	3	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Eremophila granitica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	2	3	3	0	0	0	0	0	0	0	0
Eremophila jucunda subsp. *jucunda*	0	0	0	0	0	0	1	0	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *filiformis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *latrobei*	0	0	0	0	2	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.1	3	2	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	0.1	0	1	0	0	0
Eremophila longifolia	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila mackinlayi subsp. *spathulata*	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	1	0	0
Eremophila macmillaniana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Eremophila maculata subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila margarethae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. *angustifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila pantonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila phyllopoda subsp. *phyllopoda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila platycalyx subsp. *platycalyx*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3	2
Eremophila punicea	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila simulans subsp. *simulans*	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0
Eremophila spathulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila spuria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila subfloccosa subsp. *lanata*	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne flaccida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne helmsii	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Eriachne lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne mucronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne pulchella subsp. *pulchella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus carnei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus lucasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis subsp. *eucentrica*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus striaticalyx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus trivalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia boophthona	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frankenia laxiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycine canescens	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	2	0	0	0	0	0	0
Grevillea berryana	0	0	0	0	0	0	3	0	0.1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0
Grevillea deflexa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0
Grevillea inconspicua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0
Grevillea nematophylla subsp. *supraplana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea stenostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea striata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94
Hakea preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea recurva subsp. *arida*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia doleiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *bidens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *leiostachya*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnieria kempeana subsp. *muelleri*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Hemigenia tysonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Hibiscus burtonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Hibiscus coatesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii var. *forrestii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indigofera monophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Lawrencia chrysoderma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptomeria preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana carnosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	3	0	0	0
Maireana glomerifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Maireana lobiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana melanocoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana planifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana platycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana thesioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana villosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	0	0	0
Melaleuca stereophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus placoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus sulphurea	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirbelia rhagodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monachather paradoxus	0	0	0	0	0.1	2	1	0	0	2	3	2	0	0	0	1	0	0	0	0	0	0	3	0	1	0	2	0	2	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia plucheacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia stuartii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brucei*	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala subsp. *microcephala*	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporum angustifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluchea dentex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Prostanthera albiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Prostanthera althoferi subsp. *althoferi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Prostanthera petrophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psydrax latifolia	0	0	0	0	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Psydrax rigidula	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	1	0	0	0.1	0	0	0	0.1	0	0	0	0
Psydrax suaveolens	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0
Ptilotus luteolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus beardii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0
Ptilotus divaricatus var. *divaricatus*	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus var. *exaltatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus var. *obovatus*	1	1	0.1	0.1	0.1	3	0	3	0	0	1	0.1	0	1	0	1	2	1	0	0	0	1	0.1	1	2	0	1	0	0	1	1	2	1	2	1	0.1	1	0	1	3	0	2	3	0	1	3	2	1	2
Ptilotus rotundifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus schwartzii	0	0	0	0	1	0	1	0	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0
Rhagodia eremaea	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0
Santalum acuminatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum spicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94
Sclerolaena densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *filifolia*	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *helmsii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.1	3	2	1	2	4	1	0	0	0	0	0	0	0	0.1	0	1	1	3
Senna artemisioides subsp. *oligophylla*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *petiolaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Senna artemisioides subsp. *x artemisioides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0
Senna artemisioides subsp. *x sturtii*	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Senna glaucifolia	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Senna sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Meekatharra (E. Bailey 1-26)	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	2	2	3	0
Senna stricta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida calyxhymenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	2	0
Sida cardiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida ectogama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida fibulifera	0	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Sida sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	2	0	1	2	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0
Sida sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida spodochroma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ashbyae	1	1	1	1	1	2	1	1	0	1	1	1	0	1	0	1	2	0	0	0	0	1	2	1	1	0	1	0	2	0.1	1	1	1	2	1	0.1	1	2	1	0.1	0.1	1	1	1	1	1	1	1	1
Solanum centrale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0
Solanum ellipticum	0	0	0	0	0	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Solanum ferocissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spartothamnella teucriiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Stenanthemum patens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum petraeum	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thryptomene decussata	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Tribulus suberosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA95	WREIA96	WREIA97	WREIA98	WREIA99	WRE210a	WRE2115	WRE2116	WRE2117	WRE2118	WRE2119	WRE2120	WRE2121	WRE2122	WRE2123	WRE2124	WRE2125	WRE2126	WRE2127	WRE2128	WRE2129	WRE2130	WRE2131	WRE2132	WRE2133	WRE2134	WRE2135	WRE2136	WRE2137	WRE2138	WRE2139	WRE2140	WRE2141	WRE2142	WRE2143	WRE2144	WRE2145	WRE2146	WRE2147	WRE2148	WRE2149	WRE2150	WRE2151	WRE2152	WRE2153	WRE2154	WRE2156	WRE2156a	WRE2157
Abutilon macrum	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum subsp. *prostratum*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. aneura	2	2	1	0	1	2	0	2	1	2	0	0	0	1	0	2	2	2	2	3	2	2	0	0	4	2	2	1	0	1	4	1	2	3	3	1	4	3	3	3	3	2	3	3	3	3	4	4	3
Acacia aneura var. *argentea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. conifera	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. *fuliginea*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Acacia burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cockertoniana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia effusifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0
Acacia craspedocarpa	0	0	0	0	0	0	1	0.1	0	2	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cuthbertsonii subsp. *cuthbertsonii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia exocarpoides	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	0.1	1	0	0	0	0
Acacia grasbyi	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia minyura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Acacia murrayana	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia pruinocarpa	0	2	0	1	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.1	1	2	0	0	1	0	0	0	0.1	3	3	1	1	0	0	2	0	0	0
Acacia quadrimarginea	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ramulosa var. linophylla	0.1	0	0	0	0	3	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	1	2	0	3	3	3	1	0	0.1	0	0	2	0.1	0	0	0.1
Acacia ramulosa var. ramulosa	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rhodophloia	3	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Acacia sibirica	0	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3	3	0	1	3	0	3	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
Acacia speckii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	0	0	2	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia tetragonophylla	0	0.1	0.1	0	2	0	1	1	0	0	1	0.1	1	2	0.1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0.1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Acacia victoriae	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allocasuarina acutivalvis subsp. *acutivalvis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluta aspera subsp. *hesperia*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	3	0	0
Atriplex bunburyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semilunaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baeckea sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia perennis subsp. *exigua*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachychiton gregorii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calytrix desolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes lasiophylla	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi subsp. *sieberi*	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium gaudichaudianum	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chorizema genistoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corymbia lenziana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cratystylis subspinescens	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbopogon ambiguus	0.1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0.1	2	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta var. *divaricata*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea amplisemina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea pachyneura	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0
Dodonaea petiolaris	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa subsp. *angustissima*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0.1	0	0	0	0	0
Duperreya commixta	0	0	0	0	0	0	0	0	0	0.1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enneapogon caerulescens	2	0	0	1	1	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA95	WREIA96	WREIA97	WREIA98	WREIA99	WRE210a	WRE2115	WRE2116	WRE2117	WRE2118	WRE2119	WRE2120	WRE2121	WRE2122	WRE2123	WRE2124	WRE2125	WRE2126	WRE2127	WRE2128	WRE2129	WRE2130	WRE2131	WRE2132	WRE2133	WRE2134	WRE2135	WRE2136	WRE2137	WRE2138	WRE2139	WRE2140	WRE2141	WRE2142	WRE2143	WRE2144	WRE2145	WRE2146	WRE2147	WRE2148	WRE2149	WRE2150	WRE2151	WRE2152	WRE2153	WRE2154	WRE2156	WRE2156a	WRE2157
Enneapogon cylindricus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila arachnoides subsp. *arachnoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila clarkei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *compacta*	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *fecunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila exilifolia	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	1	0	0	3	1	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila foliosissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii subsp. *forrestii*	1	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	3	0	0	1	0	0	1	0	0	0	0
Eremophila fraseri subsp. *fraseri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila galeata	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	3	0	0	0	3	0	0	0	1	0	1	0	0	3	0	0.1
Eremophila glabra subsp. *glabra*	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra subsp. *tomentosa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glutinosa	0	0	0	0	0	0.1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	3	1	0	0	0	0
Eremophila granitica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila jucunda subsp. *jucunda*	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *filiformis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *latrobei*	0	0	0.1	0	0	0.1	0	0.1	0	0	0	0	0	0	0	1	1	1	3	1	0	0	0	1	1	0	0	0	0	3	3	1	0.1	0	4	0	2	3	0	0	0	0.1	2	4	1	0	1	0	0
Eremophila longifolia	0	0.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila mackinlayi subsp. *spathulata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila macmillaniana	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	3	0	0	0	2	3	3	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila margarethae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.1	0	0	0	0
Eremophila oppositifolia subsp. *angustifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila pantonii	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila phyllopoda subsp. *phyllopoda*	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila platycalyx subsp. *platycalyx*	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila punicea	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila simulans subsp. *simulans*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Eremophila spathulata	0	0.1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila spuria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila subfloccosa subsp. *lanata*	0	0	0	0	0	0	0	0	0	0	1	0.1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne flaccida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne helmsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne mucronata	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne pulchella subsp. *pulchella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus carnei	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus lucasii	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis subsp. *eucentrica*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus striaticalyx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus trivalva	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia boophthona	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frankenia laxiflora	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycine canescens	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea berryana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	2	0	0	0	0	0.1	0	0	0	0	0	2	3	0	0	2	0	1	0	0	0.1	0	1	0	0	2	0	3
Grevillea deflexa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea inconspicua	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea nematophylla subsp. *supraplana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea stenostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Grevillea striata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WREIA95	WREIA96	WREIA97	WREIA98	WREIA99	WRE210a	WRE2115	WRE2116	WRE2117	WRE2118	WRE2119	WRE2120	WRE2121	WRE2122	WRE2123	WRE2124	WRE2125	WRE2126	WRE2127	WRE2128	WRE2129	WRE2130	WRE2131	WRE2132	WRE2133	WRE2134	WRE2135	WRE2136	WRE2137	WRE2138	WRE2139	WRE2140	WRE2141	WRE2142	WRE2143	WRE2144	WRE2145	WRE2146	WRE2147	WRE2148	WRE2149	WRE2150	WRE2151	WRE2152	WRE2153	WRE2154	WRE2156	WRE2156a	WRE2157
Hakea preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea recurva subsp. *arida*	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Tecticornia doleiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *bidens*	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *leiostachya*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnieria kempeana subsp. *muelleri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemigenia tysonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus burtonii	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus coatesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii var. *forrestii*	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Indigofera monophylla	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia chrysoderma	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptomeria preissiana	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana carnosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	1	1	2	0.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0.1	0	0	1	0	0	0	0	0	0	0
Maireana glomerifolia	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana lobiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana melanocoma	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana planifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana platycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana thesioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana villosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Melaleuca stereophloia	0	0	0	0	0	0	2	0	0	0	2	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus placoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus sulphurea	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirbelia rhagodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monachather paradoxus	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	1	0	0	0	1	0	0	0	0	2	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia plucheacea	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia stuartii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brucei*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	1	0	0	0.1	0	0	0	3	0	0	0	0	0	0	0.1
Pimelea microcephala subsp. *microcephala*	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporum angustifolium	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluchea dentex	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera albiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera althoferi subsp. *althoferi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera petrophila	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Psydrax latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0.1	0	0	0.1	0.1	0.1	0	0	0	0
Psydrax rigidula	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psydrax suaveolens	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0
Ptilotus luteolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0	0	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus beardii	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus divaricatus var. *divaricatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus var. *exaltatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus var. *obovatus*	2	3	2	2	1	1	1	1	0	3	0	0	0	2	4	3	1	3	3	4	0	0	2	0	1	2	0.1	1	0	3	4	4	1	2	3	1	0	3	1	3	2	1	0	0	0	4	2	0	0.1
Ptilotus rotundifolius	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	0.1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus schwartzii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0.1	1	0	0.1	0	1	0.1	1	2	0	0	2	0	0
Rhagodia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum acuminatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Santalum spicatum	0	0.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	3	0.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0

NAME	WREIA95	WREIA96	WREIA97	WREIA98	WREIA99	WRE210a	WRE2115	WRE2116	WRE2117	WRE2118	WRE2119	WRE2120	WRE2121	WRE2122	WRE2123	WRE2124	WRE2125	WRE2126	WRE2127	WRE2128	WRE2129	WRE2130	WRE2131	WRE2132	WRE2133	WRE2134	WRE2135	WRE2136	WRE2137	WRE2138	WRE2139	WRE2140	WRE2141	WRE2142	WRE2143	WRE2144	WRE2145	WRE2146	WRE2147	WRE2148	WRE2149	WRE2150	WRE2151	WRE2152	WRE2153	WRE2154	WRE2156	WRE2156a	WRE2157
Sclerolaena densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *filifolia*	0	0	0	0	0	0	0	0	0	0	2	0.1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *helmsii*	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0	0	2	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *oligophylla*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *petiolaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x artemisioides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x sturtii*	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Senna glaucifolia	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1	0.1	0.1	0	0	0	0	0.1	1	0	0	0	0.1	0	0	0	0	0.1	0	2	0	0	0	0
Senna sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Meekatharra (E. Bailey 1-26)	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Senna stricta	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida calyxhymenia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cardiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida ectogama	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida fibulifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	2	0	0	1
Sida sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida spodochroma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ashbyae	1	0.1	0.1	0.1	1	0.1	2	0.1	0	1	0	0.1	0	1	0.1	0	0	0.1	1	1	0	0	2	1	0	0	0.1	1	0.1	1	1	0.1	1	1	0.1	0.1	2	1	0	1	0	0	0	0	0	2	1	1	0.1
Solanum centrale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ellipticum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ferocissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spartothamnella teucriiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum patens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum petraeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	3	0	0	0	0	0	0
Thryptomene decussata	0	0	0	0.1	0	0.1	0	0	1	3	0	0	0	0	0	2	0	2	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0.1	0	2	0	0	0	0	3	1	0	0	2	0	0
Tribulus suberosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WRE2158	WRE2159	WRE2160	WRE2161	WRE2162	WRE2163	WRE2164	WRE2165	WRE2166	WRE2167	WRE2168	WRE2169	WRE2170	WRE2171	WRE2172	WRE2173	WRE2174	WRE2175	WRE2176	WRE2177	WRE2178	WRE2179	WRE2180	WRE2181	WRE2182	WRE2183	HR01	HR02	HR03	HR04	HR05	HR06	HR07	HR09	HR10	HR11	HR12	HR13	HR14	HR15	HR16	HR17	HR18	HR19	HR21	HR23a	HR23b	HR25	HR26
Abutilon macrum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0	0.1	0	0	0	1
Abutilon oxycarpum subsp. *prostratum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. aneura	4	1	2	1	1	3	3	3	3	0	4	0	2	3	3	2	3	3	0	3	3	3	3	0	3	0	3	3	3	0	0.1	0.1	3	2	3	3	2	3	3	3	2	1	1	3	2	0	0	3	3
Acacia aneura var. *argentea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Acacia aneura var. conifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. *fuliginea*	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cockertoniana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia effusifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia craspedocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cuthbertsonii subsp. *cuthbertsonii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Acacia exocarpoides	0	0	0	0	0	0	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia grasbyi	0	0	0.1	0	0	3	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia minyura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia murrayana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia pruinocarpa	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	1	0	0	2	0	1	2	0	2	0	0	0	0	0	0	0	0	2
Acacia quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ramulosa var. linophylla	0	0	1	2	0	0	0	1	1	0	0	0	2	0.1	0	0	3	2	0	4	0	0	0	0	0	0	1	1	4	2	2	1	0	3	3	3	0	3	3	3	2	0	4	0	2	2	1	2	3
Acacia ramulosa var. ramulosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rhodophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sibirica	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	0	0	3	3	3	0	0	0	1	4	0	3	3	0	0	0	3	2	0	0	2	0	3	2	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Acacia speckii	0	0	2	2	2	0	3	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia tetragonophylla	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0	0	1	0.1	0	0	0	1	0	0	0	0	0.1	0	0
Acacia victoriae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allocasuarina acutivalvis subsp. *acutivalvis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluta aspera subsp. *hesperia*	1	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Atriplex bunburyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semilunaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baeckea sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia perennis subsp. *exigua*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachychiton gregorii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calytrix desolata	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes lasiophylla	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi subsp. *sieberi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium gaudichaudianum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chorizema genistoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corymbia lenziana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cratystylis subspinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbopogon ambiguus	0	0	0	0	2	0	1	0	0	0	0	0	3	0	0	0	0	0	1	0	1	0	0.1	0.1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Dianella revoluta var. *divaricata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea amplisemina	0	0	0	0.1	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea pachyneura	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea petiolaris	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
Dodonaea rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa subsp. *angustissima*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duperreya commixta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0.1
Enneapogon caerulescens	0	0	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WRE2158	WRE2159	WRE2160	WRE2161	WRE2162	WRE2163	WRE2164	WRE2165	WRE2166	WRE2167	WRE2168	WRE2169	WRE2170	WRE2171	WRE2172	WRE2173	WRE2174	WRE2175	WRE2176	WRE2177	WRE2178	WRE2179	WRE2180	WRE2181	WRE2182	WRE2183	HR01	HR02	HR03	HR04	HR05	HR06	HR07	HR09	HR10	HR11	HR12	HR13	HR14	HR15	HR16	HR17	HR18	HR19	HR21	HR23a	HR23b	HR25	HR26
Enneapogon cylindricus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0.1	0.1	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1	0	0	1	0	0	0.1	0	0	1	2	0	0	2	1	0	0	0	3	1	0	2
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila arachnoides subsp. *arachnoides*	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila clarkei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3	0	0	0	0	0
Eremophila compacta subsp. *compacta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *fecunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila exilifolia	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila foliosissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii subsp. *forrestii*	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	2	1	3	0	0	1	3	2	3	0	3	0	0	0	2	3
Eremophila fraseri subsp. *fraseri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila galeata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila georgei	3	0	0	0	0	1	0	0	0	2	0	0	2	0	0	0	0	0	0	0	3	0	0.1	0	0	0	0	1	0	0	1	0.1	1	0	0	0	0	0	1	0.1	1	0	0	0	0	0	0	2
Eremophila glabra subsp. *glabra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra subsp. *tomentosa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glutinosa	0	0	1	1	3	3	0	3	0	0	3	0	0	0	0	0	0	3	0	2	0.1	0	3	1	0	0	0	0	0	0	0.1	0	1	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0
Eremophila granitica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	3	3	1	0	1	1	1	0	0	0	0	0	0	0	1
Eremophila jucunda subsp. *jucunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	3	0	1	0
Eremophila latrobei subsp. *filiformis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *latrobei*	2	0	0	0	0	2	0	2	0	0	0	0	1	0.1	3	0	0	2	0	1	0	1	0	0	0	2	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	1	0	0	0.1	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila mackinlayi subsp. *spathulata*	0	0	0	4	2	0	0	0	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila macmillaniana	0	0	0	0	0	0	3	0	0	0	0	3	2	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila margarethae	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. *angustifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila pantonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila phyllopoda subsp. *phyllopoda*	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila platycalyx subsp. *platycalyx*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila punicea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila simulans subsp. *simulans*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0
Eremophila spathulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila spuria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila subfloccosa subsp. *lanata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne flaccida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne helmsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	2	0	0	1	3	1	0	1	0	1	1	0	0	2
Eriachne mucronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Eriachne pulchella subsp. *pulchella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus carnei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus lucasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis subsp. *eucentrica*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus striaticalyx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus trivalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia boophthona	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frankenia laxiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycine canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea berryana	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0.1	0	0	0	1	0	0	0	0
Grevillea deflexa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea inconspicua	0	0	0	0	2	0	0	0	0	0	0	0.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea nematophylla subsp. *supraplana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea stenostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Grevillea striata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WRE2158	WRE2159	WRE2160	WRE2161	WRE2162	WRE2163	WRE2164	WRE2165	WRE2166	WRE2167	WRE2168	WRE2169	WRE2170	WRE2171	WRE2172	WRE2173	WRE2174	WRE2175	WRE2176	WRE2177	WRE2178	WRE2179	WRE2180	WRE2181	WRE2182	WRE2183	HR01	HR02	HR03	HR04	HR05	HR06	HR07	HR09	HR10	HR11	HR12	HR13	HR14	HR15	HR16	HR17	HR18	HR19	HR21	HR23a	HR23b	HR25	HR26
Hakea preissii	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea recurva subsp. *arida*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia doleiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *bidens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *leiostachya*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnieria kempeana subsp. *muelleri*	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Heliotropium ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemigenia tysonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus burtonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Hibiscus coatesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Hibiscus sturtii var. *forrestii*	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indigofera monophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia chrysoderma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptomeria preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana carnosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Maireana glomerifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana lobiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana melanocoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana planifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana platycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Maireana thesioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Maireana tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana villosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0.1	0	0	1	2	0	0	0.1	1
Melaleuca stereophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus placoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus sulphurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirbelia rhagodioides	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monachather paradoxus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	2	3	2	0	0	1	3	2	0.1	2	0.1	1	0	3	2	2
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia plucheacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia stuartii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brucei*	0	0	0	0	0	2	0	0	0	0	2	0	1	0	0	0	0	0	2	0	1	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala subsp. *microcephala*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporum angustifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluchea dentex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera albiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera althoferi subsp. *althoferi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera petrophila	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psydrax latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.1	0	0	0	1	1	0	0	0	0	2	0	0	1
Psydrax rigidula	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	1	0	0	0	0	0	0	0	0	1
Psydrax suaveolens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	1
Ptilotus luteolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus beardii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus divaricatus var. *divaricatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus var. *exaltatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus var. *obovatus*	2	3	1	2	4	1	1	0	3	1	2	1	1	0	0	0	0	1	3	0	3	2	2	1	0	0	0	0	0	0	1	1	0	3	1	2	2	3	0	0	0.1	0	0	2	0	0	1	2
Ptilotus rotundifolius	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus schwartzii	2	0	0	0	0	0	0	2	1	0	2	0	0	0	0.1	0	0	1	0	0	0	0	0.1	0	1	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0.1	0	0	2	0	0
Rhagodia eremaea	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	1	1	1	0	1	0	0	0	0	0.1	0	0	0	0	0	0
Santalum acuminatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum spicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	WRE2158	WRE2159	WRE2160	WRE2161	WRE2162	WRE2163	WRE2164	WRE2165	WRE2166	WRE2167	WRE2168	WRE2169	WRE2170	WRE2171	WRE2172	WRE2173	WRE2174	WRE2175	WRE2176	WRE2177	WRE2178	WRE2179	WRE2180	WRE2181	WRE2182	WRE2183	HR01	HR02	HR03	HR04	HR05	HR06	HR07	HR09	HR10	HR11	HR12	HR13	HR14	HR15	HR16	HR17	HR18	HR19	HR21	HR23a	HR23b	HR25	HR26
Sclerolaena densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *filifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *helmsii*	0	0	0.1	3	2	0	0	0	1	1	0	2	2	0	0	0	2	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *oligophylla*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *petiolaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
Senna artemisioides subsp. *x artemisioides*	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x sturtii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna glaucifolia	0	0	3	1	3	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	1	2	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.1
Senna sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Meekatharra (E. Bailey 1-26)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna stricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida calyxhymenia	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cardiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0.1	0	0	2	0.1	0	1	0	0	0	0	0
Sida ectogama	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	2	0	0.1	0	0	1	1	1	0	0	0	0	0	0.1
Sida fibulifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. golden calyces glabrous (H.N. Foote 32)	1	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Sida spodochroma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ashbyae	1	2	0.1	2	0	0.1	1	1	1	0	0	0	1	0.1	1	0.1	1	1	0	1	1	1	1	0	1	0.1	2	0	0	0	0.1	0.1	0	3	3	2	2	2	2	2	1	0.1	1	1	1	0.1	0	0	2
Solanum centrale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ellipticum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ferocissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Spartothamnella teucriiflora	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	0	0	0	0.1
Stenanthemum patens	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum petraeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thryptomene decussata	3	1	0	0	0	0	0	2	0	0	1	0	0	2	3	1	0	2	3	0	1	3	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Tribulus suberosus	0	0	1	1	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

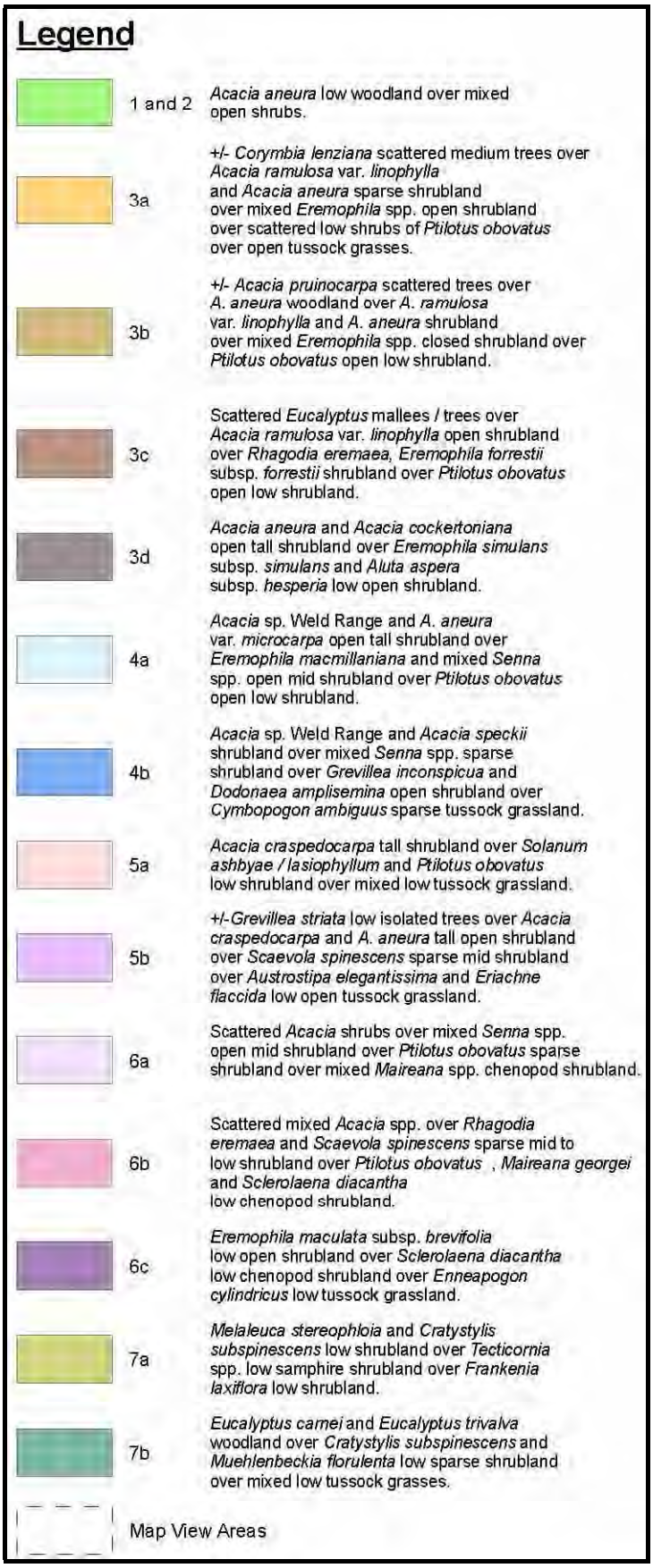
NAME	HR27	HR28	HR29	HR30	MWD01	MWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13
Abutilon macrum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abutilon oxycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0
Abutilon oxycarpum subsp. *prostratum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aff. quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. aneura	2	2	0	2	3	0	3	0	2	0	0	0	2	0	2	0	0	3	0	0	0	0	2	1	3	1	0	0	0	0.1	2	2	2	3	1	2	1	3	0	0
Acacia aneura var. *argentea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. conifera	0	0	0	0	3	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura var. *fuliginea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia burkittii	0	0	0	0	0	0.1	0	0	2	4	0	0	0	0	2	3	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cockertoniana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	2	3	3	4	1	2	3	3	2
Acacia effusifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia craspedocarpa	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia cuthbertsonii subsp. *cuthbertsonii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia exocarpoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia grasbyi	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia minyura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia murrayana	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia pruinocarpa	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0.1	1	0	0	0	2	0	0	2	0	0	0	0	0.1	0	0	2	0	0	0	0	0	1
Acacia quadrimarginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ramulosa var. linophylla	0	4	0	0	0	0	0	0	3	0	0	0	1	0.1	0	0	3	3	0	0	0	2	0	0	2	2	3	0	3	0	3	0	0	0	0	0	0	3	3	0
Acacia ramulosa var. ramulosa	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rhodophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sibirica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	2
Acacia speckii	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia tetragonophylla	0	2	0	1	0	0.1	0.1	2	0	0	0	0	0	0	0.1	0	2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia victoriae	0	0	0	0	0	1	0.1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allocasuarina acutivalvis subsp. *acutivalvis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluta aspera subsp. *hesperia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	0	0
Atriplex bunburyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semilunaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baeckea sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia perennis subsp. *exigua*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachychiton gregorii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calytrix desolata	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes lasiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi subsp. *sieberi*	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Chenopodium gaudichaudianum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chorizema genistoides	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corymbia lenziana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cratystylis subspinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbopogon ambiguus	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta var. *divaricata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea amplisemina	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea pachyneura	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0
Dodonaea petiolaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	2	0	0	0	0	0
Dodonaea viscosa subsp. *angustissima*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duperreya commixta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Enneapogon caerulescens	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0

NAME	HR27	HR28	HR29	HR30	MWD01	MWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13
Enneapogon cylindricus	0	0	1	0	0	3	0.1	3	1	1	2	0.1	0	0	0	0	1	0	0	0	0	2	0	1	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	2	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	0	0
Eremophila arachnoides subsp. *arachnoides*	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila clarkei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *compacta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila compacta subsp. *fecunda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila exilifolia	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila falcata	0	0	0	0	0	0	0	0.1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila foliosissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila forrestii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Eremophila forrestii subsp. *forrestii*	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	0	2	1	1	0.1	1	0.1	0	0	3	0	2
Eremophila fraseri subsp. *fraseri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila galeata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0.1	0.1	0	0	0	0	0	0	0	0	2	0	0	0.1	2	0	0	0	0	0	0
Eremophila glabra subsp. *glabra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra subsp. *tomentosa*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glutinosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	1	0	0.1	2	0.1	0	0.1	0	2	1	0.1
Eremophila granitica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila jucunda subsp. *jucunda*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	1	0	1	0	0	1
Eremophila latrobei subsp. *filiformis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila latrobei subsp. *latrobei*	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0.1	0	0	2	0.1	0	0	3	2	2	0.1	0	0	0	0.1	0.1	2	2	0.1	1	2	0	2	0	2
Eremophila longifolia	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila mackinlayi subsp. *spathulata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila macmillaniana	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata subsp. *brevifolia*	0	0	0	0	0	0.1	0	0	0	0	4	2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila margarethae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. *angustifolia*	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila pantonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila phyllopoda subsp. *phyllopoda*	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila platycalyx subsp. *platycalyx*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0.1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Eremophila punicea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila simulans subsp. *simulans*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0
Eremophila spathulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila spuria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila subfloccosa subsp. *lanata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne flaccida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne helmsii	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	2	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Eriachne mucronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriachne pulchella subsp. *pulchella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Eucalyptus carnei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus lucasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis subsp. *eucentrica*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Eucalyptus striaticalyx	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus trivalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia boophthona	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frankenia laxiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycine canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea berryana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.1	0	0	0	0	0	0	0
Grevillea deflexa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea inconspicua	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea nematophylla subsp. *supraplana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea stenostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea striata	0	0	0	0	2	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	HR27	HR28	HR29	HR30	MWD01	MWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13
Hakea preissii	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea recurva subsp. *arida*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia doleiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *bidens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia indica subsp. *leiostachya*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnieria kempeana subsp. *muelleri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemigenia tysonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0
Hibiscus burtonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus coatesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii var. *forrestii*	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indigofera monophylla	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia chrysoderma	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lawrencia densiflora	0	0	0	0	0	0	0	0	0	0	0.1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptomeria preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Maireana carnosa	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana glomerifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Maireana lobiflora	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana melanocoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana planifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana platycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana thesioides	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana villosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Melaleuca stereophloia	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus placoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromyrtus sulphurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirbelia rhagodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monachather paradoxus	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	3	0.1	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	2
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia plucheacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia stuartii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brevifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philotheca brucei subsp. *brucei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala subsp. *microcephala*	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pittosporum angustifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pluchea dentex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera albiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera althoferi subsp. *althoferi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prostanthera petrophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Psydrax latifolia	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Psydrax rigidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psydrax suaveolens	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Ptilotus luteolus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus beardii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus divaricatus var. *divaricatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus var. *exaltatus*	0	0	0	0	0	0	0	0.1	0	0.1	0	0.1	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus var. *obovatus*	0	2	2	1	0	0	4	3	3	3	0	0	2	1	3	2	1	1	0.1	2	0	2	3	3	0	0	1	0	2	0	3	2	0	3	0	0	0	0	0	0
Ptilotus rotundifolius	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus schwartzii	2	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	2	0	0.1	0	0	0	0	2
Rhagodia eremaea	0	0	0	0	0	0.1	1	0.1	0	0	0	0	0.1	0	0.1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Santalum acuminatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santalum spicatum	0	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0
Scaevola spinescens	0	0	0	1	2	0	0	0.1	0	0.1	0	0	0	0	2	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAME	HR27	HR28	HR29	HR30	MWD01	MWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13
Sclerolaena densiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0.1	2	0	1	0.1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *filifolia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *helmsii*	0.1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *oligophylla*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *petiolaris*	0	0	0	0	0	0	1	3	1	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x artemisioides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna artemisioides subsp. *x sturtii*	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna glaucifolia	0.1	2	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.1	0	2	0.1	0.1	0.1	0	0	0	0	2
Senna sp. Austin (A. Strid 20210)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna sp. Meekatharra (E. Bailey 1-26)	0	0	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna stricta	0	0	0	1	0	2	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0
Sida calyxhymenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cardiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0.1	0	0	1	0
Sida ectogama	0	1	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	1	0	0	3	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida fibulifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	2	2	0	0.1	0	0	0	0	0	0
Sida sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida spodochroma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ashbyae	2	0	1	1	0	2	0.1	0	0	0.1	0	0	2	1	1	1	0	1	0.1	1	0	0	0	0	0	0.1	1	0	2	0.1	1	0	0	1	0	0	0	0	0	0.1
Solanum centrale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum ellipticum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Solanum ferocissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spartothamnella teucriiflora	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum patens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenanthemum petraeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thryptomene decussata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	3	0	0	0	0
Tribulus suberosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX H VEGETATION MAPS AT HIGHER RESOLUTION



- **Figure G.1:** Legend for Vegetation Communities.

530000 540000 550000 560000 570000 580000 590000

7040000 7030000 7020000 7010000

Legend

- 1 and 2 — *Acacia aneura* low woodland over mixed open shrubs.
- 3a — +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* sparse shrubland over mixed *Eremophila* spp. open shrubland over scattered low shrubs of *Ptilotus obovatus* over open tussock grasses.
- 3b — +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.
- 3c — Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea, Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.
- 3d — *Acacia aneura* and *Acacia cockertoniana* open tall shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.
- 4a — *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.
- 4b — *Acacia* sp. Weld Range and *Acacia speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemina* open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.
- 5a — *Acacia craspedocarpa* tall shrubland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.
- 5b — +/-*Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.
- 6a — Scattered *Acacia* shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.
- 6b — Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus* , *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.
- 6c — *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.
- 7a — *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.
- 7b — *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.
- Map View Areas

1 2 3 4

N

0 4 8

Kilometres

Absolute Scale - 1:175,000

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Weld Range Vegetation Overview Map

Figure: 4.2
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S055

A3

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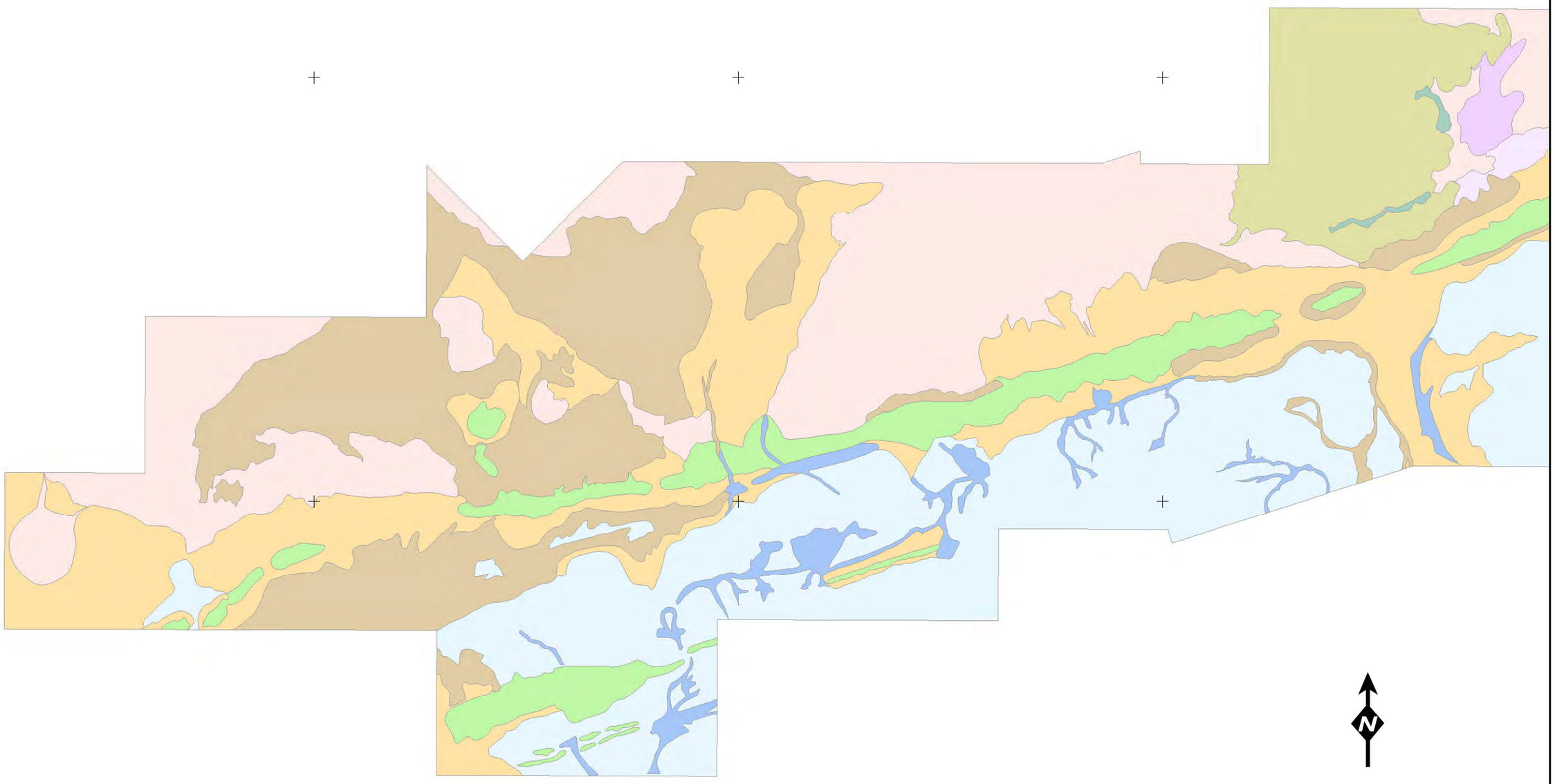
540000 545000 550000 555000

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Legend

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b



N

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Kilometres

Absolute Scale - 1:50,000

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Weld Range Vegetation Map 1

Figure: G.**2**
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S056

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Legend

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b

N

0 1 2

Kilometres

Absolute Scale - 1:50,000

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Weld Range Vegetation Map 2

Figure: G.**3**
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S057

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560000 565000 570000 575000

7035000

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Legend

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b

N

0 0.9 1.8

Kilometres

Absolute Scale - 1:50,000

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Weld Range Vegetation Map 3

Figure: G.4
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S058

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N

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Kilometres

Absolute Scale - 1:50,000

Legend

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b

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Weld Range Vegetation Map 4

Figure: G.**5**
Project ID: 722

Drawn: SG
Date: 04/11/09

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

Unique Map ID: S059

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APPENDIX I EXPLANATION OF CONSERVATION CODES

Table H.1: Explanation of Codes for Threatened Ecological Communities (TEC).

Code	Definition
PD: Presumed Totally Destroyed	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and one of two conditions (A or B) apply.
CR: Critically Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as *Critically Endangered* when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).
EN: Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as *Endangered* when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).
VU: Vulnerable	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as *Vulnerable* when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).

Table H.2: Explanation of Codes for Priority Ecological Communities (PEC).

Code	Definition
P1: Priority One	Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two	Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three	(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four	Ecological communities that are adequately known, *Rare* but not threatened or meet criteria for *Near Threatened*, or that have been recently removed from the threatened list. These communities require regular monitoring. (a) *Rare*. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (b) *Near Threatened*. Ecological communities that are considered to have been adequately surveyed and that do not qualify for *Conservation Dependent*, but that are close to qualifying for *Vulnerable*. (c) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5: Priority Five	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Table H.3: Explanation of Codes for Flora Protected under the Commonwealth 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 H.4: Definition of Declared Rare and Priority Flora 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.

Atkins, K.J., Declared Rare and Priority Flora List, Oct. 2010, DEC.

APPENDIX J SPECIES LIST

Family	Species	P1	P2	P3	R	TFS
Acanthaceae	*Harnieria kempeana* subsp. *muelleri*	x	x	x		x
Adiantaceae	*Cheilanthes lasiophylla*	x	x	x		
	Cheilanthes sieberi subsp. *sieberi*	x	x	x		
Aizoaceae	*Trianthema oxycalyptra* var. *oxycalyptra*			x		
Amaranthaceae	*Alternanthera denticulata*	x		x		x
	Amaranthus cuspidifolius	x		x		
	Ptilotus ?clementii			x		
	Ptilotus aervoides	x				
	⚐ ***Ptilotus luteolus*** **(P1)**		x			x
	⚐ ***Ptilotus beardii*** **(P3)**	x	x	x	x	x
	Ptilotus divaricatus var. *divaricatus*	x	x			
	Ptilotus exaltatus var. *exaltatus*	x		x		
	Ptilotus gaudichaudii var. *gaudichaudii*	x				x
	Ptilotus gomphrenoides					x
	Ptilotus helipteroides var. *helipteroides*	x		x		
	Ptilotus obovatus	x	x	x	x	x
	Ptilotus polystachyus var. *polystachyus*	x	x			
	Ptilotus roei	x		x		x
	Ptilotus rotundifolius	x	x	x		x
	Ptilotus schwartzii var. *georgei*			x		x
	Ptilotus schwartzii var. *schwartzii*	x	x		x	x
Asclepiadaceae	*Marsdenia australis*	x	x	x	x	x
	Rhyncharrhena linearis	x				
Asparagaceae	*Thysanotus manglesianus*	x	x			
Asteraceae	*Angianthus tomentosus*	x				
	Brachyscome ciliaris var. *ciliaris*	x				
	Calocephalus multiflorus	x	x			
	Centipeda thespidioides			x		
	Cratystylis subspinescens	x	x	x		
	Erymophyllum ramosum	x				

Family	Species	P1	P2	P3	R	TFS
	Gnephosis tenuissima	x	x			
	Minuria cunninghamii	x				
	Myriocephalus guerinae	x				
	Olearia humilis	x				
	Olearia plucheacea	x	x			
	Olearia stuartii	x	x			
	Pluchea dentex	x		x		
	Podolepis capillaris	x	x		x	
	Podolepis lessonii	x				
	Pogonolepis stricta	x				
	Pterocaulon sphacelatum	x				
	Rhodanthe citrina	x				
Asteraceae	*Rhodanthe humboldtiana*	x				
	Rhodanthe sterilescens			x		
	Schoenia cassiniana	x		x		x
	Sonchus oleraceus	x				
	Streptoglossa cylindriceps	x				
	Streptoglossa liatroides			x		
	Vittadinia ?sulcata	x				
	Waitzia acuminata var. *acuminata*	x				
Boraginaceae	*Halgania cyanea* var. Allambi Stn (B.W. Strong 676)	x				x
	Heliotropium inexplicitum		x			
	Heliotropium ovalifolium	x		x		x
	Heliotropium pachyphyllum					x
	Trichodesma zeylanicum var. *zeylanicum*	x				
Brassicaceae	*Lepidium phlebopetalum*					x
	Lepidium platypetalum	x				
Caesalpiniaceae	*Senna artemisioides* subsp. *artemisioides*	x		x		
	Senna artemisioides subsp. *filifolia*	x	x			x
	Senna artemisioides subsp. *helmsii*	x	x	x		x
	Senna artemisioides subsp. *oligophylla*		x			

Family	Species	P1	P2	P3	R	TFS
	Senna artemisioides subsp. *oligophylla* x *helmsii*	x				
	Senna artemisioides subsp. *petiolaris*	x		x		x
	Senna artemisioides subsp. *sturtii* x *Senna* sp. Meekatharra					x
	Senna artemisioides subsp. x *artemisioides*	x	x	x		
	Senna artemisioides subsp. x *sturtii*	x	x	x		x
	Senna charlesiana				x	
	Senna glaucifolia	x	x	x	x	x
	Senna glutinosa subsp. *chatelainiana*			x		x
	Senna glutinosa subsp. x *luerssenii*			x	x	
	Senna sp. Austin (A. Strid 20210)		x	x		x
	Senna sp. Meekatharra (E. Bailey 1-26)	x	x	x	x	x
	Senna sp. Meekatharra x *artemisioides* subsp. x *sturtii*	x				
	Senna stricta	x		x		
Campanulaceae	*Wahlenbergia tumidifructa*		x	x		
Casuarinaceae	*Allocasuarina acutivalvis* subsp. *acutivalvis*	x	x			
Chenopodiaceae	*Atriplex bunburyana*	x	x			
	Atriplex cephalantha		x			
	Atriplex nummularia	x	x			
	Atriplex semilunaris			x		
	Atriplex vesicaria	x	x			
	Chenopodium gaudichaudianum	x	x			
	Dissocarpus paradoxus	x	x	x		
Chenopodiaceae	*Enchylaena tomentosa* var. *tomentosa*			x	x	
	Maireana appressa			x		
	Maireana carnosa	x		x		
	Maireana convexa			x		
	Maireana georgei	x	x	x		x
	Maireana glomerifolia	x	x	x		
	Maireana lobiflora	x		x		
	Maireana melanocoma	x	x			

Family	Species	P1	P2	P3	R	TFS
	Maireana planifolia	x		x		x
	Maireana platycarpa			x	x	
	Maireana pyramidata			x		
	Maireana thesioides			x		
	Maireana tomentosa	x	x		x	x
	Maireana trichoptera	x				
	Maireana triptera	x	x	x		x
	Maireana villosa	x		x	x	x
	Rhagodia eremaea	x	x	x	x	x
	Salsola australis		x			
	Salsola tragus			x		
	Sclerolaena convexula	x				
	Sclerolaena densiflora	x		x	x	
	Sclerolaena diacantha			x	x	
	Sclerolaena eriacantha	x		x		
	Sclerolaena fusiformis		x			
	Sclerolaena patenticuspis	x				
	Sclerolaena uniflora	x				
	***Tecticornia cymbiformis* (P3)**		x			
	Tecticornia doleiformis	x				
	Tecticornia indica subsp. *bidens*		x			
	Tecticornia indica subsp. *leiostachya*	x				
Chloanthaceae	*Spartothamnella teucriiflora*	x	x	x	x	
Colchicaceae	*Wurmbea densiflora*				x	x
Convolvulaceae	*Duperreya commixta*	x	x	x		
	Duperreya sericea	x				
Cuscutaceae	***Cuscuta epithymum**	x	x			
Cyperaceae	*Bulbostylis barbata*	x				
	Cyperus iria			x		x
	Cyperus squarrosus			x		
Droseraceae	*Drosera macrantha* subsp. *eremaea*			x		

Family	Species	P1	P2	P3	R	TFS
Elatinaceae	*Bergia perennis* subsp. *exigua*	x				
Euphorbiaceae	⚐ ***Beyeria lapidicola*** **(P1)**		x	x		
	Euphorbia boophthona	x	x			
	Euphorbia drummondii	x				
Euphorbiaceae	⚐ ***Euphorbia sarcostemmoides*** **(P1)**					x
	Phyllanthus erwinii	x		x		
	⚐ ***Sauropus*** **sp. Woolgorong (M. Officer s.n. 10/8/94) (P1)**	x				x
Frankeniaceae	*Frankenia cinerea*					
	Frankenia fecunda					x
	Frankenia laxiflora	x	x	x		
	Frankenia setosa	x				
Gentianaceae	*Centaurium clementii*	x	x			
	Centaurium spicatum		x			
Geraniaceae	*Erodium cygnorum*				x	
Goodeniaceae	*Goodenia berardiana*			x		x
	⚐ ***Goodenia berringbinensis*** **(P4)**	x		x		
	⚐ ***Goodenia lyrata*** **(P1)**	x		x		x
	Goodenia tenuiloba	x	x	x		x
	Goodenia triodiophila					x
	Lobelia heterophylla	x				
	Scaevola spinescens	x	x	x		x
	Scaevola tomentosa	x				
Gyrostemonaceae	*Codonocarpus cotinifolius*			x		
Haloragaceae	*Haloragis odontocarpa* forma *rugosa*					x
	Haloragis trigonocarpa			x		
Lamiaceae	⚐ ***Hemigenia*** **sp. nov. (aff. exilis) (SOI)**		x			
	⚐ ***Hemigenia tysonii*** **(P3)**	x	x	x		x
	Prostanthera albiflora	x	x	x		
	Prostanthera althoferi subsp. *althoferi*	x	x			x
	⚐ ***Prostanthera ferricola*** **(P3)**		x			
	⚐ ***Prostanthera petrophila*** **(P3)**	x	x	x		x

Family	Species	P1	P2	P3	R	TFS
	Prostanthera wilkieana					x
Lobeliaceae	*Lotus australis*					x
Loranthaceae	*Amyema fitzgeraldii*	x				
	Amyema maidenii			x		
	Lysiana murrayi	x	x	x		
Malvaceae	*Abutilon cryptopetalum*				x	
	Abutilon leucopetalum					x
	Abutilon macrum	x				
	Abutilon otocarpum	x	x			
	Abutilon oxycarpum		x	x	x	x
	Abutilon oxycarpum subsp. *prostratum*	x				
	Hibiscus burtonii	x	x	x	x	x
	Hibiscus coatesii	x		x	x	
	Hibiscus garneri			x		
	Hibiscus sturtii var. *forrestii*	x	x	x		x
	Lawrencia chrysoderma	x	x			
Malvaceae	*Lawrencia densiflora*			x		x
	Sida ammophila	x				
	Sida calyxhymenia	x	x			
	Sida cardiophylla			x		x
	Sida ectogama		x	x	x	x
	Sida fibulifera	x	x		x	
	Sida sp. dark green fruits (S. van Leeuwen 2260)	x	x	x	x	x
	Sida sp. Excedentifolia (J.L. Egan 1925)	x				
	Sida sp. Golden calyces glabrous (H.N. Foote 32)	x	x	x	x	x
	Sida sp. Pindar (A. Mitchell 3585)					x
	Sida spodochroma	x				
Marsileaceae	*Marsilea drummondii*			x		
Mimosaceae	⚐ ***Acacia ?burrowsiana* (P3)**			x		
	Acacia aff. *Oswaldii*			x		
	Acacia aff. *Quadrimarginea*	x	x			

Family	Species	P1	P2	P3	R	TFS
	Acacia aneura var. *aneura*	x	x	x	x	x
	Acacia aneura var. *argentea*	x		x		x
	Acacia aneura var. *conifera*		x	x	x	x
	Acacia aneura var. *fuliginea*	x	x		x	
	Acacia aneura var. *intermedia*	x	x	x	x	
	Acacia aneura var. *macrocarpa*					x
	Acacia aneura var. *major*	x	x	x	x	
	Acacia aneura var. *microcarpa*		x	x	x	
	Acacia aneura var. *tenuis*					x
	Acacia aulacophylla			x		
	Acacia ayersiana					x
	Acacia burkittii	x	x	x		
	Acacia citrinoviridis	x		x		
	Acacia cockertoniana	x	x	x		x
	Acacia craspedocarpa	x	x	x	x	x
	Acacia craspedocarpa x *aneura*				x	
	Acacia cuthbertsonii subsp. *Cuthbertsonii*	x		x		x
	Acacia effusifolia		x			
	Acacia exocarpoides	x	x			x
	Acacia grasbyi	x	x	x		x
	Acacia kempeana					x
	Acacia ligulata	x				
	Acacia longispinea	x				
	Acacia masliniana					x
	Acacia minyura	x	x			x
	Acacia minyura x *ayersiana*		x			
	Acacia murrayana	x	x	x	x	x
Mimosaceae	*Acacia paraneura*				x	x
	Acacia pruinocarpa	x	x	x	x	x
	Acacia quadrimarginea	x	x			
	Acacia ramulosa var. *linophylla*	x	x	x	x	x

Family	Species	P1	P2	P3	R	TFS
	Acacia ramulosa var. *ramulosa*	x	x	x		x
	Acacia rhodophloia	x	x	x		x
	Acacia sclerosperma subsp. *Sclerosperma*	x	x	x		
	Acacia sibirica	x	x			
	⚐ ***Acacia* sp. Nov. (aff kochii) SOI**					x
	Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	x	x	x		x
	⚐ ***Acacia speckii* (P3)**	x	x	x		x
	Acacia tetragonophylla	x	x	x	x	x
	Acacia victoriae	x	x	x		
Myoporaceae	*Eremophila* aff. *Georgei*	x	x			
	⚐ ***Eremophila arachnoids* subsp. *arachnoids* (P3)**		x	x		
	Eremophila clarkei	x	x	x	x	x
	Eremophila compacta subsp. *Compacta*	x	x			
	Eremophila compacta subsp. *Fecunda*	x				
	Eremophila exilifolia	x	x	x		x
	Eremophila falcata	x		x		
	Eremophila foliosissima	x	x		x	
	Eremophila forrestii subsp. *forrestii*	x	x	x	x	x
	Eremophila fraseri subsp. *fraseri*			x	x	
	Eremophila fraseri subsp. *parva*	x		x		x
	Eremophila galeata	x	x		x	
	Eremophila georgei	x	x	x	x	x
	Eremophila gibsonii				x	
	Eremophila gilesii subsp. *gilesii*			x		
	Eremophila gilesii subsp. *variabilis*		x	x		x
	Eremophila glabra subsp. *glabra*	x	x			
	Eremophila glabra subsp. *tomentosa*	x		x		
	Eremophila glutinosa	x	x	x	x	x
	Eremophila granitica	x		x		
	Eremophila hughesii subsp. *hughesii*		x		x	x
	Eremophila jucunda subsp. *jucunda*	x	x	x	x	x

Family	Species	P1	P2	P3	R	TFS
	Eremophila latrobei subsp. *filiformis*	x				
	Eremophila latrobei subsp. *latrobei*	x	x	x	x	x
	Eremophila longifolia	x	x	x		
	Eremophila mackinlayi subsp. *spathulata*	x	x	x		
	Eremophila macmillaniana	x	x	x		x
	Eremophila maculata subsp. *brevifolia*	x		x		
	Eremophila margarethae	x	x			
Myoporaceae	*Eremophila oldfieldii* subsp. *angustifolia*	x				
	Eremophila oppositifolia subsp. *angustifolia*	x		x		
	Eremophila pantonii	x	x			
	Eremophila pendulina					x
	Eremophila phyllopoda subsp. *phyllopoda*	x	x	x		
	Eremophila platycalyx subsp. *platycalyx*	x	x	x		
	Eremophila punicea	x	x		x	
	Eremophila serrulata			x	x	
	Eremophila simulans subsp. *simulans*	x	x	x	x	x
	Eremophila spathulata	x	x			
	Eremophila spuria	x			x	
	Eremophila subfloccosa subsp. *lanata*	x	x			
Myrtaceae	*Aluta aspera* subsp. *hesperia*	x	x	x		x
	⚐ ***Baeckea* sp. Melita Station (H. Pringle 2738) (P3)**	x	x			x
	Calytrix desolata	x	x	x		x
	⚐ ***Calytrix erosipetala* (P3)**			x		
	Corymbia lenziana	x	x	x	x	x
	Eucalyptus carnei	x	x			
	Eucalyptus gypsophila		x			
	Eucalyptus leptopoda subsp. *elevata*					x
	Eucalyptus lucasii	x	x			
	Eucalyptus oleosa subsp. *oleosa*					x
	Eucalyptus socialis subsp. *eucentrica*			x		
	Eucalyptus striaticalyx			x		

Family	Species	P1	P2	P3	R	TFS
	Eucalyptus trivalva	x	x			x
	⚐ ***Homalocalyx echinulatus*** **(P3)**	x	x			x
	Melaleuca stereophloia	x	x	x		x
	⚐ ***Micromyrtus placoides*** **(P3)**	x	x			x
	Micromyrtus racemosa var. racemosa					
	Micromyrtus sulphurea	x	x	x		x
	Thryptomene costata					x
	Thryptomene decussata	x	x	x		x
	⚐ ***Verticordia jamiesonii*** **(P3)**					x
Nyctaginaceae	*Boerhavia coccinea*			x		
	Nicotiana occidentalis subsp. *obliqua*					x
Oxalidaceae	*Oxalis perennans*	x				
Fabaceae	*Chorizema genistoides*			x		x
	Cullen cinereum	x				x
	Glycine canescens	x				
	Indigofera brevidens	x				
	Indigofera gilesii subsp. *gilesii*					x
	Indigofera monophylla	x		x		x
	⚐ ***Mirbelia ?stipitata*** **(P3)**	x	x			
	Mirbelia rhagodioides	x		x		x
Papillionaceae	*Swainsona affinis*			x		
	Swainsona laciniata	x				
Phormiaceae	*Dianella revoluta* var. *divaricata*	x	x			
Pittosporaceae	*Pittosporum angustifolium*	x	x	x		
Poaceae	****Cenchrus ciliaris***					x
	Aristida contorta	x	x	x	x	x
	Aristida holathera var. *holathera*	x	x	x	x	
	Austrostipa elegantissima	x		x		
	Austrostipa scabra	x				
	Cymbopogon ambiguus	x	x	x		
	Digitaria brownii	x				

Family	Species	P1	P2	P3	R	TFS
	Enneapogon caerulescens	x	x		x	
	Enneapogon cylindricus	x		x		
	Eragrostis australasica	x	x		x	
	Eragrostis cumingii	x		x		
	Eragrostis dielsii	x	x	x		
	Eragrostis eriopoda	x	x	x	x	x
	Eragrostis kennedyae	x				
	Eragrostis lanipes	x	x			x
	Eragrostis leptocarpa	x				
	Eragrostis pergracilis	x	x			
	Eragrostis setifolia			x		x
	Eragrostis tenellula			x		
	Eriachne flaccida	x				
	Eriachne helmsii	x	x	x	x	x
	Eriachne lanata			x		
	Eriachne mucronata	x	x	x		x
	Eriachne pulchella subsp. *dominii*	x		x		
	Eriachne pulchella subsp. *pulchella*	x	x	x		
	Iseilema membranaceum	x				
	Monachather paradoxus	x	x	x	x	x
	Sporobolus australasicus			x		
	Thyridolepis multiculmis	x			x	x
	Triodia melvillei					x
	Triodia schinzii					x
	Tripogon loliiformis			x		
Polygonaceae	*Muehlenbeckia florulenta*	x	x			
Portulacaceae	***Portulaca oleracea**	x				
	Calandrinia sp. The Pink Hills (F. Obbens FO 19/06)	x				
	Calandrinia translucens	x				
Primulaceae	***Anagallis arvensis**					x
Proteaceae	*Grevillea berryana*	x	x	x		x

Family	Species	P1	P2	P3	R	TFS
	Grevillea deflexa	x		x		x
Proteaceae	*Grevillea eriostachya*					x
	Grevillea extorris		x			
	***Grevillea inconspicua* (P4)**	x	x	x		x
	Grevillea nematophylla subsp. *supraplana*	x			x	x
	⚐ ***Grevillea stenostachya* (P3)**	x	x	x	x	x
	Grevillea striata	x		x		
	Hakea lorea subsp. *lorea*	x	x			
	Hakea preissii		x	x	x	x
	Hakea recurva subsp. *arida*	x	x			
Rhamnaceae	⚐ ***Stenanthemum patens* (P1)**		x			
	Stenanthemum petraeum	x	x	x		x
Rubiaceae	*Psydrax latifolia*	x	x	x	x	x
	Psydrax rigidula	x	x	x	x	x
	Psydrax suaveolens	x	x	x	x	x
	Synaptantha tillaeacea var. *tillaeacea*			x		
Rutaceae	*Philotheca brucei* subsp. *brevifolia*	x				
	Philotheca brucei subsp. *brucei*	x	x	x		x
	Philotheca sericea					x
Santalaceae	*Exocarpos aphyllus*		x	x		x
	Leptomeria preissiana	x	x			
	Santalum acuminatum	x	x			x
	Santalum lanceolatum		x			
	Santalum spicatum	x	x	x		x
Sapindaceae	*Dodonaea adenophora*		x			
	⚐ ***Dodonaea amplisemina* (P3)**	x	x	x		x
	Dodonaea microzyga var. *acrolobata*		x			x
	Dodonaea pachyneura	x	x	x		x
	Dodonaea petiolaris	x	x	x		x
	Dodonaea rigida	x		x		x
	Dodonaea viscosa subsp. *angustissima*		x			

Family	Species	P1	P2	P3	R	TFS
	Dodonaea viscosa subsp. *mucronata*		x			
	Dodonaea viscosa subsp. *spatulata*					x
Scrophulariaceae	*Peplidium* sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)			x		x
	Stemodia florulenta					x
	Stemodia viscosa		x			
Solanaceae	***Solanum nigrum**					x
	Lycium australe			x		
	Solanum ashbyae	x	x	x		
	Solanum centrale	x	x			
	Solanum ellipticum	x	x	x	x	x
	Solanum ferocissimum		x	x		
	Solanum lachnophyllum					x
	Solanum lasiophyllum	x	x	x	x	x
Sterculiaceae	*Brachychiton gregorii*	x				x
	Keraudrenia velutina subsp. *elliptica*					x
	Rulingia luteiflora			x		
Stylidiaceae	*Stylidium longibracteatum*		x			x
Thymelaeaceae	*Pimelea microcephala* subsp. *microcephala*	x	x	x		x
	Pimelea trichostachya					x
Urticaceae	*Parietaria cardiostegia*	x				
Zygophyllaceae	*Tribulus suberosus*	x	x			x
	Zygophyllum aurantiacum	x		x		
	Zygophyllum eremaeum	x	x	x		

Key:

- **bold font** indicates priority flora species (where P1, P2, P3, P4 = priority rank)
- **Bold font** plus **SOI** indicates species of interest
- * **bold font** indicates introduced / weed species
- Header row:
- P1 = phase 1, P2 = phase 2, and P3 = phase 3 surveys;
- R = rail corridor survey; and
- TFS = threatened flora survey

APPENDIX K PRIORITY FLORA AND SPECIES OF INTEREST LOCATIONS

Priority	Species	Easting (mE)	Northing (mN)	Phase
1	*Acacia ?burrowsiana*	567084	7024726	3 phase
1	*Euphorbia sarcostemmoides*	575500	7027147	TFS
1	*Euphorbia sarcostemmoides*	575531	7027235	TFS
1	*Euphorbia sarcostemmoides*	587183	7033246	TFS
1	*Euphorbia sarcostemmoides*	582053	7029809	TFS
1	*Goodenia lyrata*	558162	7019250	3 phase
1	*Goodenia lyrata*	567084	7024726	3 phase
1	*Goodenia lyrata*	589471	7037203	3 phase
1	*Goodenia lyrata*	558712	7019585	TFS
1	*Ptilotus astrolasius* var. *luteolus*	588151	7033952	3 phase
1	*Ptilotus astrolasius* var. *luteolus*	588342	7034114	3 phase
1	*Ptilotus astrolasius* var. *luteolus*	589461	7036537	3 phase
1	*Ptilotus astrolasius* var. *luteolus*	589791	7037197	TFS
1	*Ptilotus astrolasius* var. *luteolus*	589858	7037769	TFS
1	*Stenanthemum patens*	550940	7015223	3 phase
1	*Stenanthemum patens*	562005	7019220	3 phase
1	*Stenanthemum patens*	564390	7019704	3 phase
1	*Stenanthemum patens*	561759	7018922	TFS
2	*Beyeria lapidicola*	547792	7014738	3 phase
2	*Beyeria lapidicola*	560531	7019104	TFS
2	*Beyeria lapidicola*	560587	7019462	TFS
2	*Beyeria lapidicola*	560950	7019723	TFS
2	*Beyeria lapidicola*	561117	7019765	TFS
2	*Beyeria lapidicola*	561460	7020313	TFS
2	*Beyeria lapidicola*	581417	7026880	TFS
2	*Beyeria lapidicola*	582628	7027320	TFS
2	*Beyeria lapidicola*	573604	7032170	TFS
3	*Acacia speckii*	550940	7015223	3 phase
3	*Acacia speckii*	560836	7016798	3 phase
3	*Acacia speckii*	563054	7019695	3 phase

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Acacia speckii*	563264	7018400	3 phase
3	*Acacia speckii*	563572	7018064	3 phase
3	*Acacia speckii*	563797	7018544	3 phase
3	*Acacia speckii*	564239	7018334	3 phase
3	*Acacia speckii*	564390	7019704	3 phase
3	*Acacia speckii*	570265	7026936	3 phase
3	*Acacia speckii*	574397	7025516	3 phase
3	*Acacia speckii*	587069	7034505	3 phase
3	*Acacia speckii*	588151	7033952	3 phase
3	*Acacia speckii*	588342	7034114	3 phase
3	*Acacia speckii*	589461	7036537	3 phase
3	*Acacia speckii*	589858	7037769	3 phase
3	*Acacia speckii*	558735	7017685	TFS
3	*Acacia speckii*	561319	7018699	TFS
3	*Acacia speckii*	561400	7018812	TFS
3	*Acacia speckii*	561509	7018970	TFS
3	*Acacia speckii*	561569	7018879	TFS
3	*Acacia speckii*	561632	7018846	TFS
3	*Acacia speckii*	561679	7018889	TFS
3	*Acacia speckii*	561754	7019035	TFS
3	*Acacia speckii*	561847	7019155	TFS
3	*Acacia speckii*	561898	7019125	TFS
3	*Acacia speckii*	561944	7019142	TFS
3	*Acacia speckii*	561953	7019275	TFS
3	*Acacia speckii*	562018	7019293	TFS
3	*Acacia speckii*	562093	7019330	TFS
3	*Acacia speckii*	562125	7019257	TFS
3	*Acacia speckii*	562213	7019279	TFS
3	*Acacia speckii*	562390	7019403	TFS
3	*Acacia speckii*	562493	7019440	TFS
3	*Acacia speckii*	562680	7019456	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Acacia speckii*	562857	7019609	TFS
3	*Acacia speckii*	570078	7022147	TFS
3	*Acacia speckii*	572303	7024012	TFS
3	*Acacia speckii*	577123	7025472	TFS
3	*Acacia speckii*	577241	7025506	TFS
3	*Acacia speckii*	577339	7025505	TFS
3	*Acacia speckii*	577372	7025476	TFS
3	*Acacia speckii*	577416	7025521	TFS
3	*Acacia speckii*	577553	7025405	TFS
3	*Acacia speckii*	577828	7025640	TFS
3	*Acacia speckii*	577941	7025554	TFS
3	*Acacia speckii*	578079	7025460	TFS
3	*Acacia speckii*	578275	7025532	TFS
3	*Acacia speckii*	578411	7025590	TFS
3	*Acacia speckii*	578503	7025440	TFS
3	*Acacia speckii*	578605	7025579	TFS
3	*Acacia speckii*	578993	7025556	TFS
3	*Acacia speckii*	579112	7025609	TFS
3	*Acacia speckii*	581198	7026759	TFS
3	*Acacia speckii*	581403	7026754	TFS
3	*Acacia speckii*	581492	7026870	TFS
3	*Acacia speckii*	581492	7026870	TFS
3	*Acacia speckii*	581492	7026870	TFS
3	*Acacia speckii*	582529	7026981	TFS
3	*Acacia speckii*	582547	7027157	TFS
3	*Acacia speckii*	582642	7027158	TFS
3	*Acacia speckii*	582735	7027237	TFS
3	*Acacia speckii*	581786	7026819	TFS
3	*Acacia speckii*	585997	7032081	TFS
3	*Acacia speckii*	586389	7034215	TFS
3	*Acacia speckii*	589791	7037197	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Calytrix erosipetala*	585158	7033155	3 phase
3	*Dodonaea amplisemina*	550940	7015223	3 phase
3	*Dodonaea amplisemina*	560839	7016798	3 phase
3	*Dodonaea amplisemina*	562005	7019220	3 phase
3	*Dodonaea amplisemina*	563054	7019695	3 phase
3	*Dodonaea amplisemina*	563264	7018400	3 phase
3	*Dodonaea amplisemina*	564239	7018334	3 phase
3	*Dodonaea amplisemina*	565757	7018550	3 phase
3	*Dodonaea amplisemina*	587841	7033527	3 phase
3	*Dodonaea amplisemina*	588151	7033952	3 phase
3	*Dodonaea amplisemina*	589791	7037197	3 phase
3	*Dodonaea amplisemina*	589858	7037769	3 phase
3	*Dodonaea amplisemina*	570265	7026936	3 phase
3	*Dodonaea amplisemina*	558401	7019440	TFS
3	*Dodonaea amplisemina*	558772	7019874	TFS
3	*Dodonaea amplisemina*	561172	7018782	TFS
3	*Dodonaea amplisemina*	561302	7018709	TFS
3	*Dodonaea amplisemina*	561509	7018970	TFS
3	*Dodonaea amplisemina*	561601	7018904	TFS
3	*Dodonaea amplisemina*	561701	7019159	TFS
3	*Dodonaea amplisemina*	561831	7019081	TFS
3	*Dodonaea amplisemina*	561922	7019264	TFS
3	*Dodonaea amplisemina*	562249	7019285	TFS
3	*Dodonaea amplisemina*	562448	7021001	TFS
3	*Dodonaea amplisemina*	562734	7020471	TFS
3	*Dodonaea amplisemina*	570103	7022057	TFS
3	*Eremophila arachnoides* subsp. *arachnoides*	558804	7019050	3 phase
3	*Eremophila arachnoides* subsp. *arachnoides*	563572	7018064	3 phase
3	*Grevillea stenostachya*	573904	7027138	3 phase
3	*Grevillea stenostachya*	566320	7030900	Rail
3	*Grevillea stenostachya*	571424	7031721	Rail

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Grevillea stenostachya*	569879	7034562	Rail
3	*Grevillea stenostachya*	560636	7019323	TFS
3	*Grevillea stenostachya*	566302	7024279	TFS
3	*Grevillea stenostachya*	571730	7027665	TFS
3	*Hemigenia tysonii*	562050	7019840	3 phase
3	*Hemigenia tysonii*	574122	7031020	3 phase
3	*Hemigenia tysonii*	556658	7017299	TFS
3	*Hemigenia tysonii*	558681	7018213	TFS
3	*Hemigenia tysonii*	558760	7018308	TFS
3	*Hemigenia tysonii*	559017	7018309	TFS
3	*Hemigenia tysonii*	559573	7018687	TFS
3	*Hemigenia tysonii*	559626	7019260	TFS
3	*Hemigenia tysonii*	559703	7018751	TFS
3	*Hemigenia tysonii*	560167	7019292	TFS
3	*Hemigenia tysonii*	560308	7019342	TFS
3	*Hemigenia tysonii*	560411	7019210	TFS
3	*Hemigenia tysonii*	560518	7019494	TFS
3	*Hemigenia tysonii*	560606	7019506	TFS
3	*Hemigenia tysonii*	560714	7019388	TFS
3	*Hemigenia tysonii*	561096	7019606	TFS
3	*Hemigenia tysonii*	561625	7019347	TFS
3	*Hemigenia tysonii*	562872	7020537	TFS
3	*Hemigenia tysonii*	564121	7021780	TFS
3	*Hemigenia tysonii*	564217	7021913	TFS
3	*Hemigenia tysonii*	564414	7021188	TFS
3	*Hemigenia tysonii*	565276	7023383	TFS
3	*Hemigenia tysonii*	566373	7024109	TFS
3	*Hemigenia tysonii*	566437	7023961	TFS
3	*Hemigenia tysonii*	566541	7024516	TFS
3	*Hemigenia tysonii*	566733	7024348	TFS
3	*Hemigenia tysonii*	567257	7025769	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Hemigenia tysonii*	567393	7025639	TFS
3	*Hemigenia tysonii*	567516	7025512	TFS
3	*Hemigenia tysonii*	568242	7024243	TFS
3	*Hemigenia tysonii*	568349	7024996	TFS
3	*Hemigenia tysonii*	568488	7024911	TFS
3	*Hemigenia tysonii*	568634	7024944	TFS
3	*Hemigenia tysonii*	568768	7024189	TFS
3	*Hemigenia tysonii*	568955	7024054	TFS
3	*Hemigenia tysonii*	569165	7024299	TFS
3	*Hemigenia tysonii*	569477	7024901	TFS
3	*Hemigenia tysonii*	570400	7025736	TFS
3	*Hemigenia tysonii*	570545	7025764	TFS
3	*Hemigenia tysonii*	570639	7025602	TFS
3	*Hemigenia tysonii*	570769	7030069	TFS
3	*Hemigenia tysonii*	570901	7029822	TFS
3	*Hemigenia tysonii*	571091	7029068	TFS
3	*Hemigenia tysonii*	571244	7027859	TFS
3	*Hemigenia tysonii*	571382	7028067	TFS
3	*Hemigenia tysonii*	571831	7026291	TFS
3	*Hemigenia tysonii*	571971	7026386	TFS
3	*Hemigenia tysonii*	574282	7034219	TFS
3	*Hemigenia tysonii*	574352	7034021	TFS
3	*Hemigenia tysonii*	567777	7025547	TFS
3	*Hemigenia tysonii*	574389	7032529	TFS
3	*Hemigenia tysonii*	577071	7032746	TFS
3	*Hemigenia tysonii*	584122	7031020	TFS
3	*Hemigenia tysonii*	569161	7026298	TFS
3	*Hemigenia tysonii*	561838	7021123	TFS
3	*Homalocalyx echinulatus*	574031	7027464	3 phase
3	*Homalocalyx echinulatus*	578730	7028969	3 phase
3	*Homalocalyx echinulatus*	558760	7018308	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Homalocalyx echinulatus*	558824	7018217	TFS
3	*Homalocalyx echinulatus*	559017	7018309	TFS
3	*Homalocalyx echinulatus*	559116	7018358	TFS
3	*Homalocalyx echinulatus*	559217	7018376	TFS
3	*Homalocalyx echinulatus*	559583	7018695	TFS
3	*Homalocalyx echinulatus*	560740	7019401	TFS
3	*Homalocalyx echinulatus*	561548	7019762	TFS
3	*Homalocalyx echinulatus*	561749	7019907	TFS
3	*Homalocalyx echinulatus*	562048	7019703	TFS
3	*Homalocalyx echinulatus*	562145	7019776	TFS
3	*Homalocalyx echinulatus*	564402	7020695	TFS
3	*Homalocalyx echinulatus*	568392	7023727	TFS
3	*Homalocalyx echinulatus*	570316	7025461	TFS
3	*Homalocalyx echinulatus*	570425	7025563	TFS
3	*Homalocalyx echinulatus*	570653	7025609	TFS
3	*Homalocalyx echinulatus*	570876	7025846	TFS
3	*Homalocalyx echinulatus*	570912	7025882	TFS
3	*Homalocalyx echinulatus*	577608	7025164	TFS
3	*Micromyrtus placoides*	548350	7015087	3 phase
3	*Micromyrtus placoides*	549405	7015196	3 phase
3	*Micromyrtus placoides*	563088	7020263	3 phase
3	*Micromyrtus placoides*	572647	7026444	3 phase
3	*Micromyrtus placoides*	558760	7018308	TFS
3	*Micromyrtus placoides*	559289	7018149	TFS
3	*Micromyrtus placoides*	559453	7018211	TFS
3	*Micromyrtus placoides*	561016	7019768	TFS
3	*Micromyrtus placoides*	561117	7019765	TFS
3	*Micromyrtus placoides*	561490	7019622	TFS
3	*Micromyrtus placoides*	561548	7019762	TFS
3	*Micromyrtus placoides*	561705	7019845	TFS
3	*Micromyrtus placoides*	561776	7019082	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Micromyrtus placoides*	561880	7020167	TFS
3	*Micromyrtus placoides*	562021	7019899	TFS
3	*Micromyrtus placoides*	562189	7020355	TFS
3	*Micromyrtus placoides*	562197	7020219	TFS
3	*Micromyrtus placoides*	562454	7020176	TFS
3	*Micromyrtus placoides*	562621	7020437	TFS
3	*Micromyrtus placoides*	562821	7020611	TFS
3	*Micromyrtus placoides*	577367	7025296	TFS
3	*Micromyrtus placoides*	577608	7025164	TFS
3	*Micromyrtus placoides*	578509	7025277	TFS
3	*Micromyrtus placoides*	579367	7025667	TFS
3	*Micromyrtus placoides*	579995	7026062	TFS
3	*Micromyrtus placoides*	580167	7026185	TFS
3	*Micromyrtus placoides*	580264	7026142	TFS
3	*Micromyrtus placoides*	581064	7026834	TFS
3	*Micromyrtus placoides*	581287	7027128	TFS
3	*Micromyrtus placoides*	581461	7026889	TFS
3	*Micromyrtus placoides*	581596	7026721	TFS
3	*Micromyrtus placoides*	581755	7026819	TFS
3	*Micromyrtus placoides*	581838	7026865	TFS
3	*Micromyrtus placoides*	581977	7027079	TFS
3	*Micromyrtus placoides*	582023	7026950	TFS
3	*Micromyrtus placoides*	582147	7026843	TFS
3	*Micromyrtus placoides*	582744	7027252	TFS
3	*Micromyrtus placoides*	582914	7027228	TFS
3	*Mirbelia ?stipitata*	560836	7016798	3 phase
3	*Mirbelia ?stipitata*	564390	7019704	3 phase
3	*Mirbelia ?stipitata*	585997	7032081	3 phase
3	*Mirbelia ?stipitata*	586292	7033420	3 phase
3	*Mirbelia ?stipitata*	589791	7037197	3 phase
3	*Prostanthera ferricola*	532005	7019220	3 phase

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Prostanthera petrophila*	547755	7014970	3 phase
3	*Prostanthera petrophila*	548351	7015088	3 phase
3	*Prostanthera petrophila*	549405	7015196	3 phase
3	*Prostanthera petrophila*	562050	7019840	3 phase
3	*Prostanthera petrophila*	562938	7019075	3 phase
3	*Prostanthera petrophila*	563054	7019695	3 phase
3	*Prostanthera petrophila*	564237	7020615	3 phase
3	*Prostanthera petrophila*	572647	7026444	3 phase
3	*Prostanthera petrophila*	577572	7028469	3 phase
3	*Prostanthera petrophila*	581786	7026819	3 phase
3	*Prostanthera petrophila*	586292	7033420	3 phase
3	*Prostanthera petrophila*	557184	7017425	TFS
3	*Prostanthera petrophila*	558101	7018013	TFS
3	*Prostanthera petrophila*	558207	7019345	TFS
3	*Prostanthera petrophila*	558478	7018528	TFS
3	*Prostanthera petrophila*	558644	7018636	TFS
3	*Prostanthera petrophila*	558848	7019954	TFS
3	*Prostanthera petrophila*	558933	7018351	TFS
3	*Prostanthera petrophila*	559057	7020001	TFS
3	*Prostanthera petrophila*	559104	7019859	TFS
3	*Prostanthera petrophila*	559448	7018831	TFS
3	*Prostanthera petrophila*	559536	7018674	TFS
3	*Prostanthera petrophila*	559767	7019203	TFS
3	*Prostanthera petrophila*	559970	7019254	TFS
3	*Prostanthera petrophila*	560161	7019333	TFS
3	*Prostanthera petrophila*	560636	7019323	TFS
3	*Prostanthera petrophila*	560930	7018974	TFS
3	*Prostanthera petrophila*	560948	7019284	TFS
3	*Prostanthera petrophila*	561441	7019119	TFS
3	*Prostanthera petrophila*	561609	7019234	TFS
3	*Prostanthera petrophila*	561831	7019011	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Prostanthera petrophila*	562287	7021192	TFS
3	*Prostanthera petrophila*	563939	7020413	TFS
3	*Prostanthera petrophila*	564418	7020755	TFS
3	*Prostanthera petrophila*	568353	7023394	TFS
3	*Prostanthera petrophila*	568363	7023401	TFS
3	*Prostanthera petrophila*	568647	7030695	TFS
3	*Prostanthera petrophila*	568724	7024883	TFS
3	*Prostanthera petrophila*	569729	7024895	TFS
3	*Prostanthera petrophila*	569863	7024863	TFS
3	*Prostanthera petrophila*	569990	7022223	TFS
3	*Prostanthera petrophila*	570335	7025481	TFS
3	*Prostanthera petrophila*	570464	7025588	TFS
3	*Prostanthera petrophila*	570571	7025509	TFS
3	*Prostanthera petrophila*	570716	7026524	TFS
3	*Prostanthera petrophila*	572978	7022947	TFS
3	*Prostanthera petrophila*	573103	7023026	TFS
3	*Prostanthera petrophila*	576940	7025166	TFS
3	*Prostanthera petrophila*	577757	7025301	TFS
3	*Prostanthera petrophila*	579914	7026097	TFS
3	*Prostanthera petrophila*	580112	7026083	TFS
3	*Prostanthera petrophila*	580419	7026204	TFS
3	*Prostanthera petrophila*	581064	7026834	TFS
3	*Prostanthera petrophila*	582755	7027101	TFS
3	*Prostanthera petrophila*	582855	7027120	TFS
3	*Prostanthera petrophila*	583592	7027761	TFS
3	*Prostanthera petrophila*	583848	7027638	TFS
3	*Prostanthera petrophila*	583956	7027660	TFS
3	*Ptilotus beardii*	546935	7015506	3 phase
3	*Ptilotus beardii*	585672	7033112	3 phase
3	*Ptilotus beardii*	586714	7035414	3 phase
3	*Ptilotus beardii*	567491	7027591	Rail

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	*Ptilotus beardii*	567092	7024711	TFS
3	*Ptilotus beardii*	587785	7036179	TFS
3	*Tecticornia cymbiformis*	558093	7018841	3 phase
3	*Tecticornia cymbiformis*	558160	7019242	3 phase
3	*Verticordia jamiesonii*	581918	7026848	TFS
3	*Verticordia jamiesonii*	581945	7026861	TFS
4	*Baeckea* sp. Melita Station	548351	7015088	3 phase
4	*Baeckea* sp. Melita Station	563088	7020263	3 phase
4	*Baeckea* sp. Melita Station	573975	7027033	3 phase
4	*Baeckea* sp. Melita Station	561940	7019839	TFS
4	*Baeckea* sp. Melita Station	562021	7019899	TFS
4	*Baeckea* sp. Melita Station	562117	7019984	TFS
4	*Baeckea* sp. Melita Station	562241	7020245	TFS
4	*Baeckea* sp. Melita Station	562592	7020430	TFS
4	*Baeckea* sp. Melita Station	562792	7020487	TFS
4	*Baeckea* sp. Melita Station	562818	7020495	TFS
4	*Baeckea* sp. Melita Station	577371	7025263	TFS
4	*Baeckea* sp. Melita Station	577409	7025262	TFS
4	*Baeckea* sp. Melita Station	577537	7025295	TFS
4	*Baeckea* sp. Melita Station	577917	7025362	TFS
4	*Baeckea* sp. Melita Station	578429	7025292	TFS
4	*Baeckea* sp. Melita Station	579183	7025537	TFS
4	*Baeckea* sp. Melita Station	579222	7025547	TFS
4	*Baeckea* sp. Melita Station	583848	7027638	TFS
4	*Baeckea* sp. Melita Station	583956	7027660	TFS
4	*Goodenia berringbinensis*	558712	7019585	TFS
4	*Goodenia berringbinensis*	558753	7019308	TFS
4	*Grevillea inconspicua*	562005	7019220	3 phase
4	*Grevillea inconspicua*	563054	7019695	3 phase
4	*Grevillea inconspicua*	563264	7018400	3 phase
4	*Grevillea inconspicua*	578288	7029509	3 phase

Priority	Species	Easting (mE)	Northing (mN)	Phase
4	*Grevillea inconspicua*	587841	7033527	3 phase
4	*Grevillea inconspicua*	588225	7035560	3 phase
4	*Grevillea inconspicua*	561445	7018951	TFS
4	*Grevillea inconspicua*	561766	7019078	TFS
4	*Grevillea inconspicua*	561832	7019153	TFS
4	*Grevillea inconspicua*	561921	7019142	TFS
4	*Grevillea inconspicua*	562437	7019414	TFS
4	*Grevillea inconspicua*	562621	7020437	TFS
4	*Grevillea inconspicua*	562749	7019509	TFS
4	*Grevillea inconspicua*	562803	7019561	TFS
4	*Grevillea inconspicua*	570193	7021897	TFS
4	*Grevillea inconspicua*	570265	7026936	TFS
4	*Grevillea inconspicua*	571730	7027665	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	559507	7019357	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	559650	7017115	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	560411	7019210	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	560436	7019236	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561545	7018794	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561549	7018868	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561599	7018842	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561632	7018846	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561679	7018889	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561710	7018900	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	561755	7018960	TFS
SOI	*Acacia* sp. Nov. (aff. *kochii*)	568817	7022763	TFS
SOI	*Hemigenia* sp. nov. (aff. *exilis*)	559931	7017810	TFS
SOI	*Hemigenia* sp. nov. (aff. *exilis*)	564207	7018599	TFS
SOI	*Hemigenia* sp. nov. (aff. *exilis*)	573642	7027151	TFS

Note: Datum = WGS84, Zone = 50J.
P1, P2, P3, P4 = Priority flora taxa, SOI = species of interest.

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APPENDIX L VOUCHER SPECIMENS LODGED WITH THE WA HERBARIUM

(included as a separate PDF)

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Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Acacia burrowsiana* **Maslin** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-09 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 567084 mE, 7024726 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☑ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-09 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Amyema maidenii* (Blakely) Barlow **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-25 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 04/07/2008

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 570265 mE, 7026936 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat/Plain ☑	Drainage line ☐	Lake Edge ☐
Firebreak ☐	Other ☑	Specify: **Minor channel**		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Boulder ☐ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-25 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Acacia* **aff.** *oswaldii* **DEFL POPULATION No.:** _____

DRF ☐ Species of Interest ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-09 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 09/07/2008

REGION: Murchison DISTRICT: _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 579008 mE, 7032190 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☑ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-09 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Environment and Conservation

TAXON: *Acacia speckii* **R.S.Cowan & Maslin** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P3** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Amy Capobianco 722ph2-AC-03 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 17/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 588342 mE, 7034114 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

LANDFORM:

Ridgetop ☑	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat ❒	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **BIF**

ROCK FORM: Sheet ❒ Stones ☑ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ❒ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range and *Acacia speckii* shrubland over *Eremophila macmillaniana* and *Ptilotus astrolasius* var. *luteolus* low open shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Amy Capobianco 722ph2-AC-03 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Acacia speckii* **R.S.Cowan & Maslin** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph2-SH-11 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 563572 mE, 7018064 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Midslope ☑	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia speckii* high shrubland over *Senna glaucifolia* low open shrubland to shrubland over *Maireana georgei* low open heath over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph2-SH-11 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Acacia speckii* **R.S.Cowan & Maslin** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-07 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 570265 mE, 7026936 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Minor Channel ☑ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat Plain ☑ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☑ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-07 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Acacia speckii* **R.S.Cowan & Maslin** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-03 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 567863 mE, 7025267 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-03 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Species	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994)
Collector	Scott Hitchcock 722ph3-SH-28 (*ecologia* Environment)
Date	04/07/2008
Determinavit	Peter Jobson
Nearest Named Location	Weld Range, proposed Haul Road
Coordinates	570265 mE, 7026936 mN (Zone = 50J, Datum = WGS84)
Associated Species	*Acacia aneura* var. *microcarpa*, *Acacia* sp. Weld Range, *Acacia ramulosa* var. *linophylla*, *Calytrix desolata*, *Eremophila exilifolia*, *Grevillea inconspicua*, *Duperreya commixta*, *Goodenia tenuiloba*, *Cymbopogon ambiguus*.

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Baeckea*** **sp. Melita Station (H. Pringle 2738)** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Amy Capobianco 722ph2-AC-01 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 563088 mE, 7020263 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Footslope ☑	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Boulder ☐ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☐ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Amy Capobianco 722ph2-AC-01 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Baeckea* **sp. Melita Station (H. Pringle 2738)** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph2-JN-02 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 18/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 573888 mE, 7027108 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph2-JN-02 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Baeckea*** **sp. Melita Station (H. Pringle 2738)** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-13 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 09/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 548351 mE, 7015088 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hill crest ☑ Cliff ☐ Hill slope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Coarse Gravel ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia sibirica* high open shrubland over *Thryptomene decussata* shrubland over *Calytrix desolata* and *Micromyrtus sulphurea* low shrubland over *Goodenia tenuiloba* herbs over *Monachather paradoxus* scattered tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-13 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Baeckea*** **sp. Melita Station (H. Pringle 2738)** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-12 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 12/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 562050 mE, 7019840 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Minor Channel ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **Ferrous, ?Calcrete**

ROCK FORM: Sheet ☐ Boulder ☑ Fine Gravel ☑ Coarse Gravel ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia rhodophloia* and *Thryptomene decussata* scattered tall shrubs over *Baeckea* sp. Melita Station and *Acacia rhodophloia* scattered shrubs over *Micromyrtus placoides, Baeckea* sp. Melita Station and *Aluta aspera* subsp. *hesperia* low shrubland over *Goodenia tenuiloba* scattered herbs over scattered tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-12 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Beyeria lapidicola* **Halford & R.J.F.Hend.** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P2** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Scott Hitchcock 722ph3-SH-05 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 10/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits

GPS LOCATION: 50J – 573604 mE, 7032170 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat ❒	Drainage line ☑	Lake Edge ❒
Firebreak ❒	Other ❒ Specify: _____			

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ❒ Loam ❒ Clay ❒ Peat ❒ Gravel ❒

SOIL COLOUR: Red ❒ Brown ❒ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-05 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Beyeria lapidicola* **Halford & R.J.F.Hend.** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P2** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Scott Hitchcock 722ph2-SH-22 (*ecologia* Environment) **TITLE:Botanist** **SURVEY DATE: 15/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 547792 mE, 7014738 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:
Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM:
Hilltop ❒ Cliff ❒ Footslope ☑ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat/Plain ☑ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ☑ Dolerite ❒ Limestone ❒ Other: **Ferrous**

ROCK FORM: Sheet ❒ Boulder ❒ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* subsp. *forrestii* low open shrubland to shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ☑ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ❒

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Scott Hitchcock 722ph2-SH-22 (*ecologia* Environment)** Date: **05/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Calytrix erosipetala* Craven **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-13 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 07/07/2008

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J – 585158 mE, 7033155 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☐ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Ridgetop ☑ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☑ Specify: **Plateau above breakaway**

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Orange ☑ Yellow ☐ White ☑ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *ramulosa* and *Acacia burkittii* shrubland over *Eremophila latrobei* subsp. *latrobei* low open shrubland over *Calytrix erosipetala* low shrubland over *Tripogon loliiformis* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-13 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Dodonaea amplisemina* K.A.Sheph. & Rye **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-16 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 11/11/2006

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 565758 mE, 7018550 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☑ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-16 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Dodonaea amplisemina*** **K.A.Sheph. & Rye** **DEFL POPULATION No.:** _____
DRF ❒ Priority Species: **P3** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Joshua Gilovitz 722ph3-CG-06 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS Location: 50J – 571730 mE, 7027665 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:
Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM:
Creek bed/bank ☑ Cliff ❒ Slope ❒ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat Plain ☑ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **BIF, Ferrous**

ROCK FORM: Sheet ❒ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-06 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Dodonaea amplisemina* **K.A.Sheph. & Rye** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P3** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Scott Hitchcock 722ph3-SH-03 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 570265 mE, 7026936 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS: Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM: Minor Channel ☑ Cliff ❒ Slope ❒ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat Plain ☑ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-03 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Drosera macrantha* **subsp.** *eremaea* **N.G.Marchant & Lowrie** **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-21(*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 07/07/2008

REGION: Murchsion **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J – 585632 mE, 7033848 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☑ Specify: **Base of Granite dome**

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **Quartz**

ROCK FORM: Sheet ☐ Boulder ☐ Fine Gravel ☑ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia rhodophloia* shrubland to high shrubland over *Prostanthera albiflora* low open shrubland over *Drosera macrantha* subsp. *eremaea* open herbs over *Tripogon loliiformis*, *Eragrostis tenellula* and *Aristida contorta* tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-21(*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Eremophila arachnoides* **Chinnock subsp.** *arachnoides* **DEFL POPULATION No.:** _____
DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐
FROM: Scott Hitchcock 722ph2-SH-19 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 20/04/2007
REGION: Murchison DISTRICT: _____ **SHIRE:** _____
LOCATION: Weld Range

GPS LOCATION: 50J – 563572 mE, 7018064 mN
GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☐ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Midslope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**
ROCK FORM: Sheet ☐ Stones/Boulders ☑ Coarse Gravel ☑ Pebbles ☑
SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐
SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐
SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia speckii* high shrubland over *Senna glaucifolia* low open shrubland to shrubland over *Maireana georgei* low open heath over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)
REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑
POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____
CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____
FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐
FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐
ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐
COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph2-SH-19 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Eriachne lanata* Lazarides **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-24 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 07/07/2008

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J – 585451 mE, 7032503 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Undulating Plain ☑ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☑ Boulders ☐ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinocarpa* low open woodland over *Acacia ramulosa* var. *ramulosa* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Thryptomene decussata* low shrubland and *Thryptomene decussata*, *Pluchea ?dentex* and *Micromyrtus sulphurea* low open shrubland over *Eriachne lanata* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-24 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Euphorbia sarcostemmoides* **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Melissa Hay MH-956-01 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 10/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range.

GPS LOCATION: 50J – 582053 mE, 7029809 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☑ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☑ Clay ☑ Peat ☐ Gravel ☑

SOIL COLOUR: Red ☑ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): Sparse to open *A. aneura* var. *microcarpa* and/or *A. pruinocarpa* trees over sparse to medium mixed *Acacia* spp. tall shrubs over sparse to open mixed *Ptilotus* spp., *Senna* spp., and *Eremophila* spp. medium shrubs over sparse *Ptilotus obovatus* or other small shrubs often over sparse *Aristida contorta* tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Melissa Hay MH-956-01 (*ecologia* Environment)** Date: **19/10/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Eucalyptus socialis* **subsp.** *eucentrica* **(L.A.S.Johnson & K.D.Hill) D.Nicolle** **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-26 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 09/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 577619 mE, 7033024 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☑ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☑ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-26 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Grevillea inconspicua*** **Diels** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P4** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Scott Hitchcock 722ph3-SH-01 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 570265 mE, 7026936 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:
Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM: Minor Channel ☑ Cliff ❒ Slope ❒ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat Plain ☑ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-01 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Grevillea inconspicua*** **Diels** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P4** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Joshua Gilovitz 722ph3-CG-10 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS Location: 50J – 571730 mE, 7027665 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:
Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM: Creek bed/bank ☑ Cliff ❒ Slope ❒ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat Plain ☑ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **BIF, Ferrous**

ROCK FORM: Sheet ❒ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-10 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Grevillea inconspicua* **Diels** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P4** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-15 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 588225 mE, 7035560 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Creek bed/bank ☑
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Coarse Gravel ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinocarpa* and *Acacia ramulosa* var. *ramulosa* open woodland over *Acacia aneura* var. *aneura* low open woodland over *Acacia quadrimarginea* and *Acacia aneura* var. *aneura* high shrubland over *Senna artemisioides* subsp. *sturtii* low open shrubland to open shrubland over *Ptilotus obovatus* var. *obovatus* and *Grevillea inconspicua* low shrubland over *Abutilon macrum* herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☑ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-15 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Goodenia berringbinensis* Carolin **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P4** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph1-JN-01 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 10/11/2006

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 558753 mE, 7019308 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Floodplain ☑ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☑ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *fuliginea* and *Grevillea striata* low open woodland to open woodland over *Acacia craspedocarpa* and *Acacia tetragonophylla* high shrubland over *Melaleuca stereophloia* shrubland over *Melaleuca stereophloia* and *Scaevola spinescens* low open shrubland over *Goodenia* sp. Weld Range open herbs over *Eragrostis pergracilis* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-01 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Goodenia berringbinensis* Carolin **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P4** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-14 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 10/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, Madoonga Waste Dumps

GPS LOCATION: 50J – 558712 mE, 7019585 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-14 (*ecologia* Environment)** Date: **05/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Goodenia lyrata* Carolin **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P1** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Joshua Gilovitz 722ph3-CG-12 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 10/07/2008

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, Madoonga Waste Dumps

GPS LOCATION: 50J – 558712 mE, 7019585 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat ❒	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ❒ Loam ❒ Clay ❒ Peat ❒ Gravel ❒

SOIL COLOUR: Red ❒ Brown ❒ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ☑ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-12 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Grevillea stenostachya* **C.A.Gardner** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P3** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Scott Hitchcock 722ph3-SH-02 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 571935 mE, 7027743 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat Plain ☑	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **Ferrous**

ROCK FORM: Sheet ❒ Boulder ❒ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *intermedia* high shrubland over *Eremophila forrestii* subsp. *forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Ptilotus obovatus* low shrubland over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-02 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Grevillea stenostachya* **C.A.Gardner** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-05 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 565967 mE, 7024046 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat Plain ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* low open forest over *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila simulans* subsp. *simulans* open heath over *Ptilotus schwartzii* low scattered shrubs over *Eriachne lanata* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-05 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Environment and Conservation

TAXON: *Grevillea stenostachya* **C.A.Gardner** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-02 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 566302 mE, 7024279 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Floodplain ☑	Creek bed ☑	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat Plain ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Boulder ☐ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low woodland over *Eremophila serrulata* and *Eremophila simulans* subsp. *simulans* open scrub over *Dodonaea petiolaris* and *Eremophila forrestii* shrubland over *Harnieria kempeana* subsp. *muelleri* low open shrubland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-02 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Grevillea stenostachya* C.A.Gardner **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-04 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS Location: 50J – 571730 mE, 7027665 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Creek bed/bank ☑ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat Plain ☑ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-04 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Hemigenia* **sp. nov (aff.** *exilis***)** **DEFL POPULATION No.:** _____

DRF ❒ Species of Interest: ☑ Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Jeremy Naaykens 722ph2-JN-10 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 21/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 559931 mE, 7017810 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:
Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM:
Hilltop ❒ Cliff ❒ Midslope ☑ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat ❒ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **BIF**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high shrubland to low open woodland over *Acacia* sp. Weld Range shrubland over *Senna glaucifolia* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ☑ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ❒

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Jeremy Naaykens 722ph2-JN-10 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Homalocalyx echinulatus*** **Craven** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph1-JN-05 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 07/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 578730 mE, 7028969 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

_____

_____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-05 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

T TAXON: *Hemigenia tysonii* **F.Muell.** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-11 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 567777 mE, 7025547 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-11 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Environment and Conservation

TAXON: ***Hemigenia tysonii*** **F.Muell.** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-04 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 569161 mE, 7026298 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Undulating Plain ☑ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-04 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Hemigenia tysonii* **F.Muell.** **DEFL POPULATION No.:** _____
DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph3-SH-08 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 09/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits West

GPS LOCATION: 50J – 577071 mE, 7032746 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridgetop ☑ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**
ROCK FORM: Sheet ☐ Boulder ☐ Gravel ☑ Pebbles ☑
SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐
SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐
SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia cockertoniana* open shrubland to high shrubland over *Eremophila georgei* and *Eremophila forrestii* subsp. *forrestii* low open shrubland and *Hemigenia tysonii* low shrubland over *Sida* sp. dark green fruits (S. van Leeuwen 2260) very open herbs over *Eragrostis eriopoda* scattered tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)
REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑
POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____
CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____
FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐
FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐
ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐
COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph3-SH-08 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Micromyrtus placoides* Rye **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P1** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Jeremy Naaykens 722ph1-JN-06 (*ecologia* Environment) TITLE:Botanist SURVEY DATE: 07/11/2006

REGION: Murchison DISTRICT: _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 572381 mE, 7026342 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS: Nature Reserve ❒ Private ❒ Gravel Res. MRD ❒ Rail Reserve ❒
National Park ❒ Pastoral Lease ☑ Gravel Res. Shire ❒ Rd. Verge Shire ❒
State Forest ❒ UCL ❒ Other Shire Res. ❒ Rd. Verge MRD ❒
Water Reserve ❒ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ❒

LANDFORM: Hilltop ❒ Cliff ❒ Hill slope ☑ Valley ❒ Swamp ❒
Outcrop ❒ Breakaway ❒ Low Plain ❒ Gully ❒ Riverbank ❒
Ridge ❒ Sand Dune ❒ Flat ❒ Drainageline ❒ Lake Edge ❒
Firebreak ❒ Other ❒ Specify: _____

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia aneura* var. *aneura* and *Prostanthera petrophila* shrubland over *Aluta aspera* subsp. *hesperia* low open heath.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

_____

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-06 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Micromyrtus placoides* **Rye** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-18 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 09/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 548351 mE, 7015088 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Hill crest ☑ Cliff ☐ Hill slope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Coarse Gravel ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia sibirica* high open shrubland over *Thryptomene decussata* shrubland over *Calytrix desolata* and *Micromyrtus sulphurea* low shrubland over *Goodenia tenuiloba* herbs over *Monachather paradoxus* scattered tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-18 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Micromyrtus placoides*** **Rye** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Amy Capobianco 722ph2-AC-02 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 563088 mE, 7020263 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS: Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM: Hilltop ☐ Cliff ☐ Footslope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Boulder ☐ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☐ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Amy Capobianco 722ph2-AC-02 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Micromyrtus placoides* **Rye** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-17 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 12/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 562050 mE, 7019840 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Minor channel ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **Ferrous, ?Calcrete**

ROCK FORM: Sheet ☐ Boulder ☑ Fine Gravel ☑ Coarse Gravel ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia rhodophloia* and *Thryptomene decussata* scattered tall shrubs over *Baeckea* sp. Melita Station and *Acacia rhodophloia* scattered shrubs over *Micromyrtus placoides, Baeckea* sp. Melita Station and *Aluta aspera* subsp. *hesperia* low shrubland over *Goodenia tenuiloba* scattered herbs over scattered tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

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VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-17 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Mirbelia ?stipitata* Crisp & J.M.Taylor **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph1-JN-08 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 585997 mE, 7032081 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☐ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainage line ☑ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered trees over *Acacia aneura* var. *aneura* and *Acacia burkittii* low woodland over *Acacia aneura* var. *aneura* and *Acacia tetragonophylla* highh shrubland over *Acacia jamesiana* open shrubland over *Calytrix desolata* and *Grevillea deflexa* low open shrubland over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-08 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Ptilotus astrolasius* **var.** *luteolus* **Benl & H.Eichler** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph2-SH-14 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 17/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 588151 mE, 7033952 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Midslope ☑	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☑	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainage line ☑	Lake Edge ☐
Firebreak ☐	Other ☐ Specify: _____			

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☐ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range high shrubland over *Eremophila macmillaniana* open shrubland over *Eremophila exilifolia* and *Dodonaea amplisemina* low shrubland over *Enneapogon caerulescens* and *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph2-SH-14 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Ptilotus beardii* **Benl** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-23 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 03/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 587785 mE, 7036179 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: _____

ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☐ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-23 (*ecologia* Environment)** Date: **05/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Ptilotus beardii* Benl **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-01 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 04/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 567092 mE, 7024711 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat Plain ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☐ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☐ Brown ☐ Yellow ☑ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *linophylla* scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus beardii* and *Ptilotus obovatus* low shrubland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-01 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Prostanthera ferricola*** **B.J.Conn & K.A.Sheph.** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph2-JN-09 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 21/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 562005 mE, 7019220 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Midslope ☑	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Calytrix desolata* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph2-JN-09 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Prostanthera petrophila*** **B.J.Conn** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph1-JN-04 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 07/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 572381 mE, 7026342 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Hill slope ☑	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia aneura* var. *aneura* and *Prostanthera petrophila* shrubland over *Aluta aspera* subsp. *hesperia* low open heath.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

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_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-04 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Prostanthera petrophila* **B.J.Conn** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Joshua Gilovitz 722ph3-CG-08 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 09/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits West

GPS LOCATION: 50J – 575210 mE, 7032660 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☐ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat Plain ☑ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **Ferrous**

ROCK FORM: Sheet ☐ Stones/Boulders ☑ Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *intermedia* low open woodland over *Acacia* spp. scattered tall shrubs over *Thryptomene decussata* and *Prostanthera petrophila* open shrubland over *Thryptomene decussata* low open shrubland over *Aluta aspera* subsp. *hesperia* low shrubland over *Eragrostis setifolia* scattered tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

_____

_____

_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-08 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Prostanthera petrophila*** **B.J.Conn** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P1** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Joshua Gilovitz 722ph3-CG-07 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 10/07/2008**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range, proposed Borrow Pits

GPS LOCATION: 50J – 574714 mE, 7032500 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat Plain ☑	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ☑ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Fine Gravel ☑ Concretionary Gravel ❒

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *linophylla* and *Acacia cockertoniana* high shrubland over *Eremophila* spp. shrubland over *Sida cardiophylla* low scattered shrubs.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒
Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒
Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Joshua Gilovitz 722ph3-CG-07 (*ecologia* Environment)** Date: **25/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Prostanthera petrophila*** **B.J.Conn** **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph2-SH-10 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 562094 mE, 7019416 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Midslope ☑	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat ☐	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐	Specify: _____		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **BIF, Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Fluviatile Gravel ☐ Concretionary Gravel ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* open scrub over *Eremophila glutinosa* shrubland over *Dodonaea pachyneura* and *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Aristida holathera* scattered tussock grasses.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph2-SH-10 (*ecologia* Environment)** Date: **26/02/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Sauropus* **sp. Woolgorong (M. Officer s.n. 10/8/94)** **DEFL POPULATION No.:** _____
DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐
FROM: Scott Hitchcock 722ph1-SH-20 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 06/11/2006**
REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____
LOCATION: Weld Range

GPS LOCATION: 50J – 578433 mE, 7029011 mN
GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hill crest ☑ Cliff ☐ Hill slope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, non-banded Ferrous**
ROCK FORM: Sheet ☑ Boulder ☑ Fluviatile Gravel ☐ Concretionary Gravel ☐
SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐
SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐
SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* and *Acacia* aff. *quadrimarginea* low open woodland over *Acacia aneura* var. *aneura* and *Thryptomene decussata* scattered tall shrubs over *Eremophila latrobei* subsp. *latrobei* and *Philotheca brucei* subsp. *brucei* open shrubland over *Eremophila latrobei* subsp. *latrobei, Philotheca brucei* subsp. *brucei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia tenuiloba* very open herbs over *Eriachne mucronata* (desert form) open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)
REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑
POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____
CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____
FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐
FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐
ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐
COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-20 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Stenanthemum patens* Rye **DEFL POPULATION No.:** _____

DRF ☐ Priority Species: **P1** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens 722ph2-JN-07 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/04/2007**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 562005 mE, 7019220 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☐ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Midslope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other: **BIF, Ferrous**

ROCK FORM: Sheet ☑ Stones/Boulders ☑ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Calytrix desolata* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☑ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☐

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens 722ph2-JN-07 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Sclerolaena uniflora* **R.Br.** **DEFL POPULATION No.:** _____

DRF ❒ Range Extension ☑ Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Jeremy Naaykens 722ph1-JN-11 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 08/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 549879 mE, 7017184 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Undulating Plain ☑	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat ❒	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: **non-banded Ferrous**

ROCK FORM: Sheet ❒ Rocks ☑ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ☑ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ☑ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. ?*intermedia* scattered low trees over *Acacia aneura* var. ?*intermedia* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila forrestii*, *Eremophila granitica*, *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Aristida contorta* tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Jeremy Naaykens 722ph1-JN-11 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Tecticornia cymbiformis* **K.A.Sheph. & Paul G.Wilson** **DEFL POPULATION No.:** _____

DRF ❒ Priority Species: **P3** Partial Survey ❒ Full Survey ☑ New Population ❒

FROM: Amy Capobianco 722ph2-AC-04 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 15/04/2007

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 558093 mE, 7018841 mN

GPS DATUM: AGD84 ❒ GDA94 ❒ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ❒ None ❒

LAND STATUS:

Nature Reserve ❒	Private ❒	Gravel Res. MRD ❒	Rail Reserve ❒
National Park ❒	Pastoral Lease ☑	Gravel Res. Shire ❒	Rd. Verge Shire ❒
State Forest ❒	UCL ❒	Other Shire Res. ❒	Rd. Verge MRD ❒
Water Reserve ❒	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ❒

LANDFORM:

Hilltop ❒	Cliff ❒	Slope ❒	Valley ❒	Swamp ❒
Outcrop ❒	Breakaway ❒	Low Plain ❒	Gully ❒	Riverbank ❒
Ridge ❒	Sand Dune ❒	Flat/Plain ☑	Drainageline ❒	Lake Edge ❒
Firebreak ❒	Other ❒	Specify: _____		

ROCK TYPE: Laterite ❒ Granite ❒ Dolerite ❒ Limestone ❒ Other: _____

ROCK FORM: Sheet ❒ Boulder ❒ Fluviatile Gravel ❒ Concretionary Gravel ❒

SOIL TYPE: Sand ❒ Loam ❒ Clay ☑ Peat ❒ Gravel ❒

SOIL COLOUR: Red ❒ Orange ☑ Yellow ❒ White ❒ Grey ❒

SOIL CONDITION: Moist ❒ Inundated ❒ Dry ❒ Saline ❒ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Eucalyptus carnei* woodland over *Eremophila pantonii* scattered shrubs over *Atriplex* sp. and *Tecticornia cymbiformis* low open shrubland over *Eragrostis pergracilis* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ❒ Estimate ❒ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ❒ Flower bud ❒ Flower ❒ Immat. fruit ❒ Fruit ❒ Old Fruit ❒ Vegetative ☑

POLLINATORS: Native bees ❒ Honey bees ❒ Other insects ❒ Birds ❒ Mammals ❒

Other observations: _____

CONDITION OF POPULATION: Healthy ❒ Moderate ❒ Poor ❒ Disturbed ❒ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ❒ Mining ☑ Recreation ❒ Roadworks ❒ Grazing ☑ Weeds ❒

Salinity ❒ Disease ❒ Prescribed Burning ❒ Other ❒ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ❒ Autumn ❒ Winter ❒ Spring ❒

FENCING: Not Required ❒ Fenced ❒ Required ❒ Replace/Repair ❒

ROADSIDE MARKERS: Not Required ❒ Present ❒ Required ❒ Replace ❒ Reposition ❒

OTHER COMMENTS (include action taken/required): _____

_____

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_____

_____

VOUCHER SPECIMEN: Regional Herb. ❒ District Herb. ❒ WA Herb. ☑ Other ❒

_____

ATTACHED: Map ❒ Mudmap ❒ Illustration ❒ Photo ❒ Field Notes ❒

COPY SENT TO: Regional Office ❒ District Office ❒ Other ❒ Specify: _____

Signed: **Amy Capobianco 722ph2-AC-04 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: ***Triodia schinzii*** (Henrard) Lazarides **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Melissa Hay 906-MH-01 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 11/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 580188 mE, 7034566 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat/Plain ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☐ Specify:			

ROCK TYPE: Laterite ☐ Granite ☐ Dolerite ☐ Limestone ☐ Other:

ROCK FORM: Sheet ☐ Boulder ☐ Coarse Gravel ☐ Pebbles ☐

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* var. *obovatus* over mixed open tussock grassland with small patches of *Triodia schinzii*.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19___ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

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_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Melissa Hay 906-MH-01 (*ecologia* Environment)** Date: **19/10/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Trichodesma zeylanicum* **(Burm.f.) R.Br. var.** *zeylanicum* **DEFL POPULATION No.:** _____

DRF ☐ Range Extension ☑ Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Scott Hitchcock 722ph1-SH-27 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 11/11/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 560383 mE, 7016704 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:

Nature Reserve ☐	Private ☐	Gravel Res. MRD ☐	Rail Reserve ☐
National Park ☐	Pastoral Lease ☑	Gravel Res. Shire ☐	Rd. Verge Shire ☐
State Forest ☐	UCL ☐	Other Shire Res. ☐	Rd. Verge MRD ☐
Water Reserve ☐	Other ☑	Specify: **Mining Lease**	

Landowner/manager present during inspection: ☐

LANDFORM:

Hilltop ☐	Cliff ☐	Slope ☐	Valley ☐	Swamp ☐
Outcrop ☐	Breakaway ☐	Low Plain ☐	Gully ☐	Riverbank ☐
Ridge ☐	Sand Dune ☐	Flat/Plain ☑	Drainageline ☐	Lake Edge ☐
Firebreak ☐	Other ☑	Specify: **Creek bed and bank**		

ROCK TYPE: Laterite ☐ Granite ☑ Dolerite ☐ Limestone ☐ Other: **non-banded Ferrous, quartz**

ROCK FORM: Sheet ☐ Boulder ☐ Coarse Gravel ☑ Pebbles ☑

SOIL TYPE: Sand ☑ Loam ☐ Clay ☑ Peat ☐ Gravel ☐

SOIL COLOUR: Red ☑ Orange ☑ Yellow ☐ White ☐ Grey ☐

SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* woodland to low open forest over *Acacia ramulosa* var. *linophylla* high shrubland over *Senna artemisioides* subsp. *helmsii* and *Senna* sp. Meekatharra low open shrubland to shrubland over *Ptilotus obovatus* var. *obovatus* low open shrubland over *Marsdenia australis* climbers over *Abutilon macrum* and *Sida fibulifera* open herbs over *Aristida contorta* and *Austrostipa scabra* open tussock grassland.

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑

POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐

Other observations: _____

CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

_____

_____

_____

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐

Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____

FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐

FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐

ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

_____

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_____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

_____

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Scott Hitchcock 722ph1-SH-27 (*ecologia* Environment)** Date: **03/03/2009**

NOTE: Map or further information may be attached or given on the back of this form.

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RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Department of Environment and Conservation

RARE FLORA REPORT FORM

TAXON: *Verticordia jamiesonii* **DEFL POPULATION No.:** _____
DRF ☐ Priority Species: **P3** Partial Survey ☐ Full Survey ☑ New Population ☐

FROM: Jeremy Naaykens JN-702-13 (*ecologia* Environment) **TITLE: Botanist** **SURVEY DATE: 20/07/2006**

REGION: Murchison **DISTRICT:** _____ **SHIRE:** _____

LOCATION: Weld Range

GPS LOCATION: 50J – 581946 mE, 7026862 mN

GPS DATUM: AGD84 ☐ GDA94 ☐ GDA94-Compatible (e.g. **WGS84**) ☑ Unknown ☐ None ☐

LAND STATUS:
Nature Reserve ☐ Private ☐ Gravel Res. MRD ☐ Rail Reserve ☐
National Park ☐ Pastoral Lease ☑ Gravel Res. Shire ☐ Rd. Verge Shire ☐
State Forest ☐ UCL ☐ Other Shire Res. ☐ Rd. Verge MRD ☐
Water Reserve ☐ Other ☑ Specify: **Mining Lease**
Landowner/manager present during inspection: ☐

LANDFORM:
Hilltop ☐ Cliff ☐ Slope ☑ Valley ☐ Swamp ☐
Outcrop ☐ Breakaway ☐ Low Plain ☐ Gully ☐ Riverbank ☐
Ridge ☐ Sand Dune ☐ Flat/Plain ☐ Drainageline ☐ Lake Edge ☐
Firebreak ☐ Other ☐ Specify: _____

ROCK TYPE: Laterite ☑ Granite ☐ Dolerite ☐ Limestone ☐ Other: Ferrous _____
ROCK FORM: Sheet ☐ Boulder ☐ Fluviatile Gravel ☐ Concretionary Gravel ☐
SOIL TYPE: Sand ☐ Loam ☑ Clay ☑ Peat ☐ Gravel ☐
SOIL COLOUR: Red ☐ Orange ☑ Yellow ☐ White ☐ Grey ☐
SOIL CONDITION: Moist ☐ Inundated ☐ Dry ☐ Saline ☐ Other: _____

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura var. aneura scrub, over Eremophila glutinosa/ Eremophila latrobei subsp. latrobei low shrubs, over Philotheca brucei subsp. brucei dwarf shrubs.*

ASSOCIATED SPECIES: _____

No. of PLANTS: Mature: _____ Seedlings: _____ Dead: _____ Actual ☐ Estimate ☐ Area Occupied: _____
(Leave blank if unable to observe, or no attempt made to count plants)
REPRODUCTIVE STATE: Clonal ☐ Flower bud ☐ Flower ☐ Immat. fruit ☐ Fruit ☐ Old Fruit ☐ Vegetative ☑
POLLINATORS: Native bees ☐ Honey bees ☐ Other insects ☐ Birds ☐ Mammals ☐
Other observations: _____
CONDITION OF POPULATION: Healthy ☐ Moderate ☐ Poor ☐ Disturbed ☐ Comment:

POTENTIAL THREATS: Firebreaks ☐ Mining ☑ Recreation ☐ Roadworks ☐ Grazing ☑ Weeds ☐
Salinity ☐ Disease ☐ Prescribed Burning ☐ Other ☐ Comment: _____
FIRE HISTORY: Not known ☑ Burnt in 19____ Summer ☐ Autumn ☐ Winter ☐ Spring ☐
FENCING: Not Required ☐ Fenced ☐ Required ☐ Replace/Repair ☐
ROADSIDE MARKERS: Not Required ☐ Present ☐ Required ☐ Replace ☐ Reposition ☐

OTHER COMMENTS (include action taken/required): _____

VOUCHER SPECIMEN: Regional Herb. ☐ District Herb. ☐ WA Herb. ☑ Other ☐

ATTACHED: Map ☐ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐
COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ Specify: _____

Signed: **Jeremy Naaykens JN-702-13 (*ecologia* Environment)** Date: **19/10/2009**

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

APPENDIX M EXPLANATION OF DECLARED PLANT CODES

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 Aims 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.
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.
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 N DEC VEGETATION COMMUNITIES DESCRIBED FOR SELECTED BIF RANGES LYING NORTH OF MOUNT MAGNET

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Range	Landform Code	Associated Landforms	Vegetation Description	Veg Type
WNT	BIF	Ironstone hills.	Sparse to open woodlands and shrublands of *Acacia aneura* and other *Acacia* spp. (*A. citrinoviridis, A. tetragonophylla, A. quadrimarginea, A. pruinocarpa, A. demissa and A. rhodophloia*), *Hake preissii, Grevillea berryana* and *Eremophila macmillaniana* over sparse to open shrublands of *Eremophila* spp. (*E. phyllopoda, E. spathulata, E. glutinosa, E. jucunda* subsp. *jucunda, E. latrobei subp. latrobei* and *E. galeata*), *Senna* spp. (*S. artemisioides* subsp. *petiolaris, S. artemisioides* subsp. *helmsii, S.* sp. Meekatharra and *S. glaucifolia*), *Acacia craspedocarpa* and *Dodonaea viscosa* subsp. *mucronata* over isolated grasslands of *Cymbopogon ambiguus*.	4
PERS	BIF	Crests and slopes of BIF and iron rich chert, or on basalt and felsic rocks.	Open to sparse shrubland of *Acacia aneura* and *A. quadrimarginea* over isolated to sparse shrubland of *Eremophila* spp. (*E. latrobei, E. foliosissima* and *E. galeata*) and *Thryptomene decussata* over isolated to sparse shrubland of *P. schwartz*i.	2
PERS	BIF	Crests and slopes of BIF and iron rich chert.	Open to sparse shrubland of *Acacia aneura, Grevillea berryana,* and *Acacia* spp. (*A. quadrimarginea, A. tetragonophylla* and *Acacia* cf. *resinimarginea)* over open to sparse shrubland of *Scaevola spinescens* and *Eremophila latrobei* and *Senna* sp. Meekatharra over isolated to sparse shrublands of *Ptilotus* spp. (*P. obovatus* and *P. schwartzii*) and *Maireana georgii*.	3
WR	BIFMID	1a) Moderate hill slopes, very rocky terrain and outcrops of BIF. 1b) Rocky, gentle to moderate inclines.	*1a) Acacia aneura*, A. *ramulosa* and / or *Acacia* sp. Weld Range (A. Markey and S. Dillon 2994), over sparse *Eremophila* spp. 1b) Open to sparse shrubland of *Acacia aneura* (var. *microphylla, aneura* and *argentea), Acacia* sp. Weld Range & *Grevillea berryana*, over *Eremophila* spp. low shrubs.	1a and 1b
LEEST	BIFMID	Mid-slopes of BIF with a gentle to moderate gradient.	Tall open *Acacia* shrubland, particularly *Acacia quadrimarginea*, over sparse to open mid-stratum of *Eremophila margarethae* and *Senna glaucifolia* shrubs with open hummock grasslands of *Triodia melvillei*.	1
WR	BIFOUT	Massive rocky outcrops of BIF, moderate to steep hill slopes.	Sparse to open shrubland of *Acacia aneura* var. *microcarpa* and / or A. *aneura* var. *aneura*, over mid stratum shrub layer of *Thryptomene decussata*, *Philotheca brucei* subsp. *brucei*, and *Eremophila* spp.	2
JFH	BIFOUT	Midslope quadrats on south-eastern ridge of massive, haematite enriched outcrops.	*Acacia aneura* cf. var. *microcarpa* and occasional *Acacia pruinocarpa* over *Eremophila latrobei* subsp. *latrobei, Dodonaea petiolaris, Eremophila flabellata, Sida* sp. (Markey and Dillon 4126) and, less frequently, *Ptilotus rootundifolius, Eremophila jucunda* subsp. *jucunda, Harnieria kempeana* subsp. *muelleri.*	6
MR	CRELOW	Crests to the lower slopes of the range.	Tall shrubs of *Acacia aneura* var. *microcarpa* and *A. quadrimarginea*, mid-stratum shrubs *Eremophila latrobei* subsp. *latrobei, E. jucunda* and sparse *Ptilotus schwartzii*.	4

JH	CREMID	Along the entire range mainly on crests and midslopes.	Woodlands and shrublands of *A. aneura* cf. var. *aneura* or *A. aneura* cf. var. *tenuis* occasionally associated with *A. rhodophloia* woodlands over shrublands of *Ptilotus obovatus* and *Dodonaea petiolaris*.	2
JH	CREMID	On crests and midslopes of rocky outcrops on the entire range.	Open woodlands, woodlands and shrublands of *A. aneura* cf. var. *aneura* and *A. citrinoviridis* over *Ptilotus obovatus*.	3
LEEST	CREMID	Midslopes to crests with coarse weathered ironstone fragments.	Open shrubland of *Acacia aneura* var. *microcarpa* over *Eremophila latrobei* subsp. *latrobei* with sparse cover of *Ptilotus obovatus*, *P. schwartzii* and *Tribulus suberosus*.	2
PERS	CREMID	Crests and midslopes of ultramafic and metabasalt derived hills.	Open to sparse shrubland of *Acacia* cf. *resinimarginea* and *A. grasbyi* over open to sparse shrubland of *Senna* spp. (*S. artemisioides* subsp. *helmsii* and *Senna* sp. Meekatharra) over isolated to open shrubland of *Cheilanthes sieberi* subsp. *sieberi, Calytrix desolata* or *Harnieria kempeana* subsp. *muelleri*.	1
RR&MG	CRESLOPE	Slopes and crests of banded ironstone on Robinson Range.	Open to sparse shrubland of *Acacia aneura* over open to isolated shrubland of *Aluta maisonneuvei* subsp. *auriculata*, *Eremophila* spp. (*E. punctata*, *E. exilifolia, E. jucunda* subsp. *jucunda, E. spectabilis* subsp. *spectabilis* and *E. forrestii* subsp. *forrestii*) over forbland and grassland *of Eriachne pulchella*, *Paspalidium basicladum*, *Pitlotus polystachyus* and *Sida chrysocalyx*.	*4*
RR&MG	CRESLOPE	Crests and slopes with slightly rocky to very rocky outcrops on Robinson Range.	Open to sparse shrubland of *Acacia aneura*, *A. citrinoviridis*, *Corymbia ferriticola* subsp. *ferriticola* over *Eremophila* spp. (*E. latrobei* subsp. *latrobei, E. exilifolia*, *E. punctata*, *E. jucunda* subsp. *jucunda*, *E. pendulina* and *E. forrestii* subsp. *forrestii*), *Ptilotus obovatus, P. schwartzii*, *Sida chrysocalyx* over grasslands of *Paspalidium basicladum* and *Eriachne pulchella*.	5
RR&MG	CRESLOPE	Rocky to slightly rocky crests and midslopes of banded ironstone on the Robinson Range.	Open to sparse shrubland of *Acacia aneura*, *A. citrinoviridis* over open to sparse shrubland of *Eremophila* spp. (*E. latrobei* subsp. *latrobei, E. exilifolia* and *E. jucunda* subsp. *jucunda)*, *Senna glaucifolia* and *Sida chrysocalyx* over grassland of *Eriachne pulchella* and *Paspalidium basicladum*.	6
WNT	CRESLOPE	Upper slopes and crests with low cover of rock outcrop.	Open shrublands of *Acacia aneura* and *Grevillea berryana* over shrublands of *Eremophila latrobei* subsp. *latrobei* and *E. glutinosa* over sparse grassland of *Monachather paradoxus*.	2
WNT	CRESLOPE	Slopes and summits of laterised ironstone breakaways.	Sparse to open woodlands and shrublands of *Acacia aneura*, *A. citrinoviridis* and *A. pruinocarpa* over sparse to open shrublands of *Eremophila phyllopoda*, *Dodonaea viscosa* subsp. *mucronata, Micromyrtus sulphurea*, *Calytrix erosipetala, Philotheca citrina, P. brucei* subsp. *cinerea, Eremophila georgei, Thryptomene decussata* and *Ptilotus obovatus*.	3

B&TP	CRESLOPE	Crest and upper slopes of both ranges	Isolated to sparse shrublands of *Acacia aneura* and *A. ramulosa* over open to sparse shrublands of *Thryptomene decussata, Eremophila latrobei, E. glutinosa* and *A. scleroclada* over open to sparse shrublands and grasslands of *Sida* sp. Golden calyces glabrous, *Ptilotus obovatus, P. schwartzii, Eriachne pulchella* and *Aristida contorta*.	1
MR	CRESLOPE	Upper portion of the lanscape.	Tall open shrubland of *Acacia aneura* over sparse shrubs of *Ptilotus obovatus*, *Scaevola spinescens, Lepidium platypetalum* and *Maireana triptera*.	1
LAKMA	CRESLOPE	Upper slopes and rocky crests.	Tall shrubs of *Acacia aneura* var. *microcarpa* over mid-stratum of *Eremophila latrobei* subsp. *latrobei* with sparse cover of *Ptilotus schwartzii*.	2
JFH	CRESLOPE	Crests and steeper upper slopes.	Sparse open tall shrubland of *Acacia aneura* var. cf. *microcarpa, Grevillea berryana*, and (less commonly, *Acacia aneura* cf. var *argentea, Acacia quadrimarginea*) over mid story shrub stratum of *Eremophila latrobei* subsp. *latrobei, Prostanthera campbellii* (occasionally *Dodonaea petiolaris* and *Baeckea* sp. Melita Station, *Eremophila punctata* and *E. flabellata*), over common sub shrubs *Ptilotus obovatus, Sida chrysocalyx, Sida excedentifolia,* the perennial herb, *Ptilotus schwartzii,* the geophyte, *Cheilanthes brownii*, and the perannial grasses, *Eriachne helmsii, E. mucronata* and *Monachather paradoxus*.	1
LEEST	CRESLOPE	Crests and upper slopes of ironstone formations.	Sparse tall shrubs of *Acacia aneura* var. *microcarpa* and *A. citrinoviridis* over isolated to sparse shrubland of *Eremophila latrobei* subsp. *latrobei, E. margarethae* with isoloated *Ptilotus schwartzii*.	3
BOO	CRESLOPE	1a) Gentle to moderately steep hill slopes and crests of BIF. 1b) Gently to moderately inclined mid-upper hill slopes and crests of weathered BIF.	1a) Tall open to sparse *Acacia aneura* shrubland where *A. aneura* cf. *microcarpa* is a significant indicator species, and often with additional *Acacia* spp. such as *A. quadrimarginea* or *A. thoma*. The sparse mid-stratum consists of various shrubs, including *Eremophila latrobei* subsp. *latrobei, Solanum ashbyae* and *Sida chrysocalyx*. Other common sub-shrubs include *Ptilotus schwartzii* which co-occurs with perennial grasses such as *Cymbopogon ambiguus* and *Eriachne helmsii.* 1b) *Acacia aneura* cf. *microcarpa* and *Thryptomene decussata* tall open - sparse shrubland, less frequently with *Acacia ramulosa* var. *ramulosa* as a co-dominant, over sparse mid-stratum shrubs including *Eremophila latrobei* subsp. *latrobei, Solanum ashbyae* and *Eremophila georgii*, *Dodonaea rigida* and *Sida chrysocalyx, Dodonaea petolaris, Ptilotus obovatus, Cheilanthes sieberi, Ptilotus schwartzii* and less frequently, *Scaevola spinescens.* The perennial grass *Thyridolepis multiculmis* is an indicator species in the ground layer.	1a and 1b
BOO	CRESLOPE	Steeper, rocky crests and upper slopes of BIF.	Sparse shrublands of *Acacia aneura* and *Thryptomene decussata* over mid-stratum shrubs of *Eremophila latrobei* subsp. *latrobei, Prostanthera campbellii, Philotheca brucei* subsp. *brucei, Eremophila georgei, Olearia humi*lis, *Sida chrysocalyx* and *Dodonaea petiolaris* over a ground layer that includes *Cheilanthes brownii* and perennial grasses such as *Eragrostis lacunaria*.	2
MR	CREST	South, south east facing crest.	Open shrubland of *Acacia aneura* and *A. rhodophloia* over sparse shrubs of *Eremophila forrestii* and *E. punctata* with isolated *E. jucunda*.	2

WR	DOLER	Associated with dolerite substrates	Open shrubland of *Acacia* sp. Weld Range (A. Markey and S. Dillon 2994), *Acacia aneura* and *Acacia speckii*, over sparse mid stratum of *Eremophila macmillaniana*, *Eremophila mackinlayi* subsp. *spathulata* and *Heliotropium ovalifolium*	6
BOO	GULLIES	Downslope from outcropping ridges of BIF in shallow gullies where there was some influence of associated ulramafics, mafics, cherts, shale and other metasediments.	Tall shrublands of *Acacia aneura* and *A. ramulosa* var. *ramulosa,* over various shrubs, including *Grevillea inconspicua, Senna manicula*, and *Eremophila platycalyx* subsp. *platycalyx.*	6
B&TP	LATBREAK	Laterite breakaways surrounding Mount Barloweerie.	Open to sparse shrublands of *Acacia aneura* and *A. aulacophylla* over open to sparse shrublands of *Philotheca sericea* over sparse shrublands and forblands of *Ptilotus schwartzii* and *Stylidium longibracteatum*.	3
RR&MG	LOW	Lower slopes of Robinson Range and Mount Gould	Open to sparse shrublands of *Acacia aneura* over open to isolated shrublands of *Eremophila* spp. (*E. latrobei* subsp. *latrobei, E. jucunda* subsp. *jucunda*, *E. forrestii* subsp. *forrestii*), *Ptilotus obovatus* and *P. polystachyus* over forbland and grassland of *Dysphania rhadinostachya*, *Aristida contorta*, *Eriachne pulchella* and *Goodenia tenuiloba*.	1
RR&MG	LOW	Simple and lower slopes of Robinson Range.	Sparse shrubland and woodlands of *Acacia aneura* and *A. pruinocarpa* over shrubland of *A. aneura* (juvenile), *A. ramulosa* var. *linophylla*, *Eremophila fraseri*, *E. spectabilis* subsp. *spectabilis* and *Senna glaucifolia* over forbland and grassland of *Ptilotus polystachyus*, *Eriachne pulchella* and *Paspalidium basicladum*.	3
B&TP	LOW	Lower slopes and footslopes of the Twin Peaks greenstone belt.	Open to sparse shrublands of *Acacia aneura* and *A. ramulosa* over open to sparse shrublands of *A. tetragonophylla, Senna artemisioides* subsp. *helmsii, Senna* sp. Meekatharra, *Eremophila* spp. *(E. macmillaniana, E. simulans* and *E. glutinosa*) over mid-dense to open forbland and grassland of *Ptilotus obovatus, Aristida contorta* and *Eriachne pulchella*.	2
JH	LOWCREEK	Along the entire range but mainly on creeklines and lower slopes.	Open woodlands and woodlands of *Acacia* spp. (dominants – *Acacia aneura* cf. var. *aneura*, A. *ramulosa* var. *linophylla, A. rhodophloia*) over shrublands of *Ptilotus obovatus* or *Eremophila* spp.	1

WR	LOWOUT	5a) Moderately inclined lower hillslopes and outwash plains. 5b) Moderately inclined lower hillslopes and outwash plains.	5a) Isolated emergent trees of *Acacia pruinocarpa* over *Acacia aneura* / *Acacia ramulosa*, over an open mid-stratum of shrubs. 5b) Sparse to open *Acacia* spp. shrubland (*A. aneura* cf. var. *tenuis* or *aneura* and / or *Acacia effusifolia*), over sparse *Senna* spp. and *Tribulus suberosus* low shrubs.	5a and 5b
JH	LOWOUT	Colluvial outwashes and a low crest.	Open woodlands, woodlands and isolated trees of *A. aneura* cf. var. *aneura* over shrublands of *Eremophila* spp.	5
LEEST	LOWPED	Mid to lower slopes and pediments; occasionally further upslope.	Tall to sparse open shrublands of *Acacia aneura* var. *microcarpa* with sparse mid-stratum of *Eremophila latrobei* subsp. *latrobei* over isolated hummock grassland of *Triodia melvillei* and isolated grasses of *Eragrostis eriopoda* complex.	4
JFH	LOWPED	Pediments, lower slopes and slightly low outcrops of weathered BIF and other metasediments, quartz and ultramafic lithologies, usually obscured by colluvium.	*Acacia aneura* (notably *A. aneura* var. cf. *tenuis),* and less frequently *Acacia balsamea* and *A. cuthbertsonii* subsp. *cuthbertsonii* tall open shrublands over shrubs suuch as *Scaevola spinescens, Senna artemisioides* subsp. *helmsii, Eremophila flabellata,* over sparse low shrubs such as *Maireana convexa, M. georgei, Ptilotus obovatus* and less frequently *Eremophila jucunda* subsp. *jucunda* and *Sida* sp. unisexual.	3
JFH	LOWPEDPLAIN	Lower slopes, pediments and valley flats	Tall shrubland or open tall shrubland of *Acacia aneura* (often var. cf. *microcarpa* and occasionally var. cf. *tenuis),* often with a canopy of *A. pruinocarpa*, over a typical mid stratum of *Eremophila forrestii, E. latrobei, Senna* spp., *Rhagodia eremaea, Eremophila flabellata, Sida* sp. unisexual and *Ptilotus obovatus*, usually over *P. schwartzii, Sida excedentifolia* and the perennial grass *Monachather paradoxa*.	5
BOO	LOWPEDPLAIN	Lower slopes, pediments, valley flats or plains adjacent to BIF landforms.	Shrublands of *Acacia aneura* (var. cf. *microcarpa* and var. cf. *tenuis)* often with *A. ramulosa* var. *ramulosa* as co-dominant, over a shrub stratum of *Senna* spp. (particularly *S. glaucifolia*), *Eremophila jucunda* subsp. *jucunda, Solanum lasiophyllum*, *Eremophila latrobei* subsp. *latrobei, Eremophila galeata, Ptilotus obovatus* and *P. schwartzii*.	3
LAKMA	LOWPLAIN	Lower slopes to outwash plains.	Open shrubland of *Acacia aneura* over sparse to open shrubs of *Eremophila galeata*, *Ptilotus obovatus* and *Solanum lasiophyllum*.	6
LEEST	LOWPLAIN	Lower footslopes and adjacent colluvium.	Sparse shrubland of *Acacia tetragonophylla* with isolated shrubs of *Eremophila latrobei* subsp. *latrobei* and *Ptilotus obovatus*. Other taxa in this community include sparse or open woodlands of *A. pruinocarpa* and isolated *Rhagodia eremaea*.	5

BOO	LOWULTBAS	Mafic bedrock and colluvium in the basalt hills adjacent to the BIF ridges.	Tall, sparse-open shrublands of *Acacia xanthocarpa* and *A. ramulosa* subsp. *ramulosa* over a sparse shrub layer which includes, to varying degrees, *Dodonaea rigida, Eremophila exilifolia, Senna manicula, Eremophila granitica, E. forrestii, Grevillea inconspicua, Solanum ashbyae* and *Cheilanthes lasiphylla*.	5
PERS	LOWULTBAS	Lower slopes and colluvium derived from metabasalt and ultramafic rocks.	Open to sparse *Acacia aneura* and *Acacia* spp. *(A. pruinocarpa, A. kempeana* and *A. grasbyi*) over open to sparse shrublands of *Sida ectogama, S*. sp. Meekatharra and *Eremophila pantonii* over open to sparse shrubland of *Maireana georgei* and *M. triptera*.	4
WR	MIDLOW	Mid and low to moderate hillslopes. Loose ironstone gravel and scree.	Open shrubland of *Acacia aneura* over isolated *Solanum ashbyae* and *Tribulus suberosus* low shrubs.	3
WNT	MIDLOW	Lower slopes and midslope	Open shrublands of *Acacia aneura* over shrublands of *Eremophila phyllopoda*.	1
MR	MIDLOW	Mid to lower slopes, pediments and colluvial plains adjacent to the range.	Sparse to open tall shrubland of *Acacia aneura* var. *microcarpa* over open shrubland of *Eremophila latrobei* subsp. *latrobei* and *E. jucunda*.	6
LAKMA	MIDLOW	Mid to lower slopes, with more gentle slopes than other communities.	Tall shrubs of *Acacia aneura* var. *microcarpa* and the ubiquitous shrub species *Eremophila latrobei* subsp. *latrobei* in the mid-stratum.	3
LAKMA	MIDPED	Mid slopes and pediments	Open shrubland of *Acacia burkittii* and *A. xanthocarpa* over sparse shrubland of *Grevillea inconspicua*, *Prostanthera althoferi*, *Ptilotus obovatus* and *Senna aretemisioides* subsp. x *artemisioides* with isolated cover of the perennial grass *Austrostipa elegantissima*.	4
JH	OUTCREST	Colluvial outwash and small ironstone crest.	Isolated trees of *Acacia stowardii* or woodlands of *A. aneura* cf. var. *tenuis, A. stowardii* and *A. kempeana* over sparse shrublands.	4
LAKMA	OUTCREST	From crests to the colluvial outwash plains.	Open shrubland of *Senna* sp. Meekatharra over isolated shrubs of *Scaevola spinescens* and *Ptilotus obovatus*.	5
MR	PEDIMENT	Steeper upper slopes to the pediments at the base of the range.	Sparse to open shrubland of *Acacia aneura* var. *microcarpa* over isolated *Eremophila latrobe*i subsp. *latrobei* and *Psydrax suaveolens* with isolated *Sida* sp. golden calyces glabrous.	3

BOO	PEDIMENT	Pediments of valley flats at the base of the range.	Tall, sparse to open shrublands of *Acacia aneura, A. ramulosa* var. *ramulosa* and *A. craspedocarpa*, with isolated trees of *Brachychiton gregorii*, over a sparse or open shrubland of *Solanum lasiophyllum, Senna glaucifolia, Senna* sp. Meekatharra, *S artemisioides* subsp. *helmsii, Eremophila galeata* and *Ptilotus obovatus* over perennial grasses such as *Enneapogon caerulescens* and *Monachather paradoxus*.	4
MR	PLAIN	On an east, north east flat.	Open tall shrubland of *Acacia aneura* with isolated mallees of *Eucalyptus lucasii* over isolated shrubland of *Eremophila galeata, E. jucunda* and *Sida ectogama*.	5
LAKMA	PLAIN	Outwash plains away from footslopes.	Sparse tall shrubland of *Acacia aneura* var. *microcarpa* with open mid-stratum of *Eremophila forrestii* and *Acacia ramulosa* var. *ramulosa* over sparse cover of grasses including *Austrostipa elegantissima*, *Aristida* sp. and *Eragrostis eriopoda*.	1
JFH	PLAIN	Outwash plains	Tall open shrubland of *Acacia aneura* and *A. tetragonophylla*, occasionally with isolated emergent trees of *A. pruinocarpa*, over a mosaic of shrubland and chenopods. The shrubland is dominated by *Sida* sp. unisexual, *Rhagodia eremaea*, *Eremophila flabellata, E. galeata* and *Ptilotus obovatus* which then grades into more open low chenopod shrubland an succulent geophytes, which is dominated by *Halosarcia, Maireana* and *Sclerolaena*.	4
JFH	RIDGEPED	Flat summit surfaces on ridge tops, and on the undulating pediments and valley floors off the main ridges.	Sparse open shrublands of emergent tall shrubs of *Acacia aneura* var. cf. *microcarpa, Acacia aneura* var. cf. *aneura, Grevillea berryana* and *Acacia rhodophloia* (less frequently *Acacia quadrimarginea*), over mid shrub stratum of *Eremophila punctata, E. latrobei* subsp. *latrobei. E. jucunda* subsp. *jucunda* (less commonly, *E. forrestii*), sub shrubs *Ptilotus obovatus*, *Sida chrysocalyx,* (less commonly *Ptilotus schwartzii*) and *Monachather paradoxus*. Hummocks - open grasslands of *Triodia melvillei* are a distinctive layer in this community type. Where *T. melvillei* is absent or of low abundance, low shrubs such as *Homalocalyx echinulatus*, *Eremophila forrestii* and *E. jucunda* are far more conspicuous, as are perennial grasses such as *Thyridolepis multiculmis*.	2
WR	STEEP	Steep rocky hillslopes with relatively high levels of exposed bedrock	Open shrubs of *Acacia aneura* and emergent trees of *Acacia pruinocarpa*, over *Philotheca brucei* subsp. *brucei* and *Eremophila* spp.	4
JH	STEEP	**Restricted** to the slopes of Mounts Matthew and Hale.	Shrubland of *Acacia* sp. Jack Hills, *Philotheca brucei* subsp. *cinerea*, *Eremophila* spp. over hummock grasslands of *Triodia melvillei*. Isolated trees of *A. citrinoviridis*, *A. pruinocarpa* and *Grevillea berryana* are occasionally present.	6
RR&MG	STEEP	**Restricted** to upper slopes and crests of Mount Gould	Isolated shrubland of *Acacia aneura* or *Grevillea berryana* over sparse to open shrubland of *Philotheca brucei* subsp. *cinerea*, *Eremophila latrobei* subsp. *latrobei* over hummock grassland of *Triodia melvillei*.	2

RR&MG	STEEP	**Restricted** to upper slopes and crest of Mount Fraser.	Sparse to open shrubland of *Acacia aneura* and *A. citrinoviridis* over sparse to open shrubland of *Philotheca brucei* subsp. *cinerea*, *Eremophila pendulina*, *Prostanthera ferricola*, *Pityrodia iphthima* over shrubland and hummock grassland of *Triodia melvillei*, *Amphipogon sericeus* and *Ptilotus obovatus*.	7

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Beebyn 11

Weld Range

Biological Survey

Murchison, Western Australia

Prepared for

Sinosteel Midwest Corporation Limited by

Animal Plant Mineral Pty Ltd.

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Animal Plant Mineral Pty Ltd
ABN 86 886 455 949
Tel (08) 6296 5155
Fax (08) 6296 5199
PO Box 410, Bassendean WA 6934
www.animalplantmineral.com.au

EXECUTIVE SUMMARY

Animal Plant Mineral Pty Ltd (**APM**) was commissioned by Sinosteel Midwest Corporation Limited (**SMC**) to undertake a Detailed flora and vegetation and Basic terrestrial fauna survey for a section of the Weld Range Iron Ore Project, located 72 kilometres (**km**) west southwest of Meekatharra and 60 km northwest of Cue in the Midwest region of Western Australia. The area under investigation is referred to herein as Beebyn 11 or as the Survey Area. The Survey Area totals 1056 hectares (**ha**) and is within Mining Lease (**ML**) 51/869.

The field survey was conducted between the 15th and 17th of November 2023. Winter rainfall in the season preceding the survey was below average, however annual rainfall was above average, with high falls in March and April 2023. The low rainfall preceding survey and the survey timing was a minor constraint to the completeness of the flora survey.

The flora and vegetation of the Weld Range have been well surveyed with studies conducted by Markey and Dillon (2008) and Ecologia (2009a) across the range.

Three vegetation types are described for the Survey Area. Vegetation of conservation significance was recorded as vegetation that occurs within the Weld Range Priority Ecological Community (**PEC**), excluding Disturbed areas, which totals 201 ha or 1.0% of the Weld Range PEC. The current extent of regional vegetation units present in the Survey Area is close to pre-European extent. Vegetation is in Good condition with the main disturbances being high intensity grazing leading to soil degradation and vegetation clearing for station roads and mining exploration activities. Completely Degraded areas comprise 31 ha or 3% of the Survey Area.

No Threatened (**T**) flora was recorded in the Survey Area or is known to occur in the local area. One specimen that may be a Priority (**P**) species *Hibiscus* ?*krichauffianus* was recorded but insufficient material was available to definitively determine the species. If confirmed, this would represent a significant range extension for the poorly known species. An additional three species were determined as present based upon historic survey records and 11 assessed as Likely to occur based upon the proximity of known locations and the availability of suitable habitat. Targeted search for these species would be required to determine the currency and abundance of presence within the Survey Area. Periods of fertility for these species, and therefore suitable timing for targeted search is in winter and early spring.

No Declared weeds or Weeds of National Significance were recorded or are known to occur in the local area.

Four fauna habitats are described for the Survey Area. Acacia Sand Plain is the most common habitat present covering 500 ha (47%) of the Survey Area. Mulga Woodland on Hill Slope is the next most common covering 333 ha (32%) of the Survey Area. Drainage Line and Banded Ironstone Ridge habitats are also present which cover 186 ha (18%) and 6 ha (0.6%) of the Survey Area respectively.

The literature review identified 22 species of conservation significant fauna that were assessed for likelihood of occurrence within the Survey Area. Of these, one is present, four are likely to occur and four are possibly occurring, with the remainder considered unlikely to occur due to lack of suitable habitat and/or age of record.

Conservation significant fauna that have previously been recorded within the Survey Area are:

- Northern shield-backed trapdoor spider (P3) is known to occur in the Weld Range, including within the Survey Area. Suitable habitat occurs in the Mulga Woodland on Hill Slope habitat.

Conservation significant fauna that were assessed as Likely to occur include:

- Southern whiteface has recently been listed as T under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (**EPBC Act**) but remains unlisted under Western Australian (**WA**) legislation. The species has been recorded commonly in the Weld Range and surrounding local habitats. It is unknown whether the sedentary species occurs within the Survey Area and the habitats are of poor quality due to a degraded understory and litter layer. Confirmation of species presence through targeted survey is required to unequivocally determine the presence of critical habitat;

- The Fork-tailed swift is a Migratory (**Mi**) species and due to the proximity of local records and the broad use of habitats, is considered likely to occur. The species rarely comes to land however and the Survey Area is not expected to be important habitat for the species;

- The West Coast mulga slider has been recorded in the Weld Range including in locations close to the Survey Area. The fossorial species is most likely to be found in areas where litter is prevalent and whilst the Survey Area is likely to be within the species broader area of occupation, the habitats within the Survey Area are generally of poor quality. Leaf litter is scarce within the Survey Area, and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however soils may be too stony to be suitable.

- The Long-tailed dunnart is known from the Weld Range recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex Ecologia (2009b). In the Survey Area, suitable habitat is in the Banded Ironstone Ridge habitats, and rocky Drainage Lines between ridges.

Conservation significant fauna assessed as Possibly occurring include Grey falcon (T), Western spiny-tailed skink (T), Malleefowl (T) and Peregrine falcon (other specially protected).

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Appendix A: Conservation and Declared Categories
Appendix B: PMST Search Results
Appendix C: Detailed flora and vegetation survey sites
Appendix D: Species by Site Matrix – Flora
Appendix E: Fauna Likelihood of Occurrence Assessment – Fauna

PROJECT TERMS

Abbreviation	Meaning
The Project	Beebyn 11 deposit at the Weld Range Iron Ore Project
Survey Area	The 1056 ha area that is the subject of this survey, also called Beebyn 11 and is a section of the Weld Range Project.

UNITS OF MEASURE

Unit	Measure
%	Percentage
°C	Degrees Celsius
ha	Hectare
km	Kilometre
m	Metre
mm	Millimetre

LIST OF ABBREVIATIONS

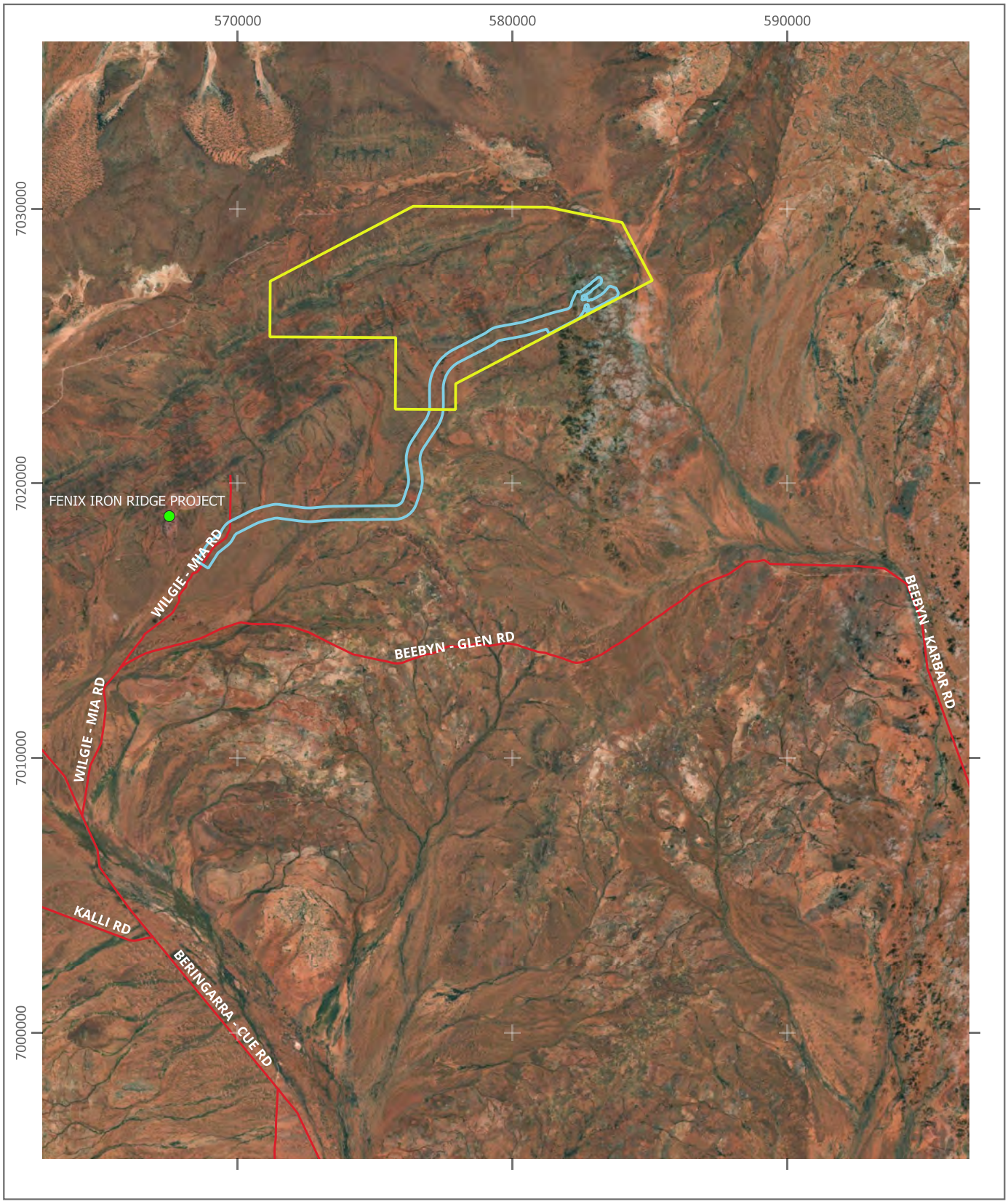
Abbreviation	Meaning
APM	Animal Plant Mineral Pty Ltd
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
BIF	Banded Iron Formation
BoM	Bureau of Meteorology
CD	Conservation Dependent
DBCA	Department of Biological Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of Energy and the Environment
DWER	Department of Water and Environment Regulation
DPIRD	Department of Primary Industries and Regional Development
EN	Endangered
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Areas
GDE	Groundwater Dependent Ecosystems

Abbreviation	Meaning
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessment
MI	Migratory
MNES	Matters of National Environmental Significance
NDVI	Normalised Difference Vegetation Index
OS	Other Specifically Protected
PEC	Priority Ecological Community
P	Priority
PMST	Protected Matters Search Tool
SMC	Sinosteel Midwest Corporation Limited
TEC	Threatened Ecological Community
T	Threatened
VU	Vulnerable
WA	Western Australia
WONS	Weeds of National Significance

1 INTRODUCTION

1.1 PROJECT AND LOCATION

Animal Plant Mineral Pty Ltd (**APM**) was commissioned by Sinosteel Midwest Corporation Limited (**SMC**) to undertake a Detailed flora and vegetation and Basic terrestrial fauna survey for the Beebyn 11 deposit within the Weld Range Iron Ore Project, located 72 kilometres (**km**) west southwest of Meekatharra and 60 km northwest of Cue in the Midwest region of Western Australia (**WA**). The area under investigation is referred to herein as Beebyn 11 or as the Survey Area. The Survey Area totals 1056 hectares (**ha**) and occurs partially within M 51/869 (Figure 1-1).



Author: VM Approved: EH Date: 26/03/2024

Project Location

Prepared for:

SMC

Figure 1-1

Scale: @ A4
1: 200,000

0 2 4 km

Coordinate System: GDA 2020
Zone 50 Projection: Transverse Mercator

Legend

- Survey Area
- Tenement M51/869-1
- Main Roads



1.2 SCOPE OF WORK

The scope of work includes a Detailed flora and vegetation and Basic terrestrial fauna survey. Survey data accompanies this report in a format suitable for submission to the Index of Biodiversity Surveys for Assessment (**IBSA**) online portal.

1.2.1 Flora and Vegetation

The flora and vegetation survey was conducted in accordance with the Environmental Protection Authority's (**EPA**) *Technical Guidance – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (2016) at a Detailed level of assessment.
The aims of the desktop study were to:

- Establish vegetation associations previously determined for the site;
- Identify threatened (**T**) and priority (**P**) flora and ecological communities (**PEC**s and **TEC**s) previously recorded on site;
- Identify weed species previously determined as present on site, in particular any Declared weeds; and
- Identify potentially suitable habitat for conservation significant flora known from the region, using publicly available regional datasets such as geological, land system, surface water and Groundwater Dependent Ecosystems (**GDE**) mapping products.

The aims of the field survey were to:

- Describe and map the vegetation types present and provide comparisons to locally described types;
- Compile an inventory of flora taxa encountered; and
- Identify conservation significant features of the flora and vegetation.

1.2.2 Terrestrial Fauna

The scope of work was to conduct a basic terrestrial fauna survey in accordance with the EPA's fauna guidelines: *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (2020).
The aims of the desktop study were to:

- Identify T and P Fauna species previously determined as present on-site;
- Identify habitat types previously determined as present on-site regarded as suitable for T and P fauna; and
- Identify introduced species previously determined as present on-site.

The aims of the field survey were to describe habitat availability for Conservation Significant fauna and the quality or condition of available habitats.

2 BACKGROUND AND SUPPORTING INFORMATION

2.1 RELEVANT LEGISLATION AND GUIDANCE

2.1.1 Commonwealth Government EPBC Act

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) is administered by the Department of Climate Change, Energy, the Environment and Water (**DCCEEW**). It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined in the EPBC Act as Matters of National Environmental Significance (**MNES**).

If a project has the potential to significantly impact on MNES it is to be referred to the DCCEEW for determination on whether the matter is a 'controlled action' and therefore requiring assessment.

The EPBC Act provides for the identification and listing of species under several categories listed in Appendix A. The EPBC Act also provides for the development of conservation advice and recovery plans, development of a register of critical habitat, recognition of key threatening processes and the development of threat abatement plans.

2.1.2 Western Australia BC Act

The *Biodiversity Conservation Act 2016* (**BC Act**) provides a statutory basis for the listing of T species, specially protected species, extinct species, TECs, collapsed ecological communities, critical habitat and key threatening processes in WA. The BC Act provides for the listing of T flora and fauna species and ecological communities under specified conservation categories listed in Appendix A. Species and communities listed under the BC Act are protected and require authorisation by the Minister to take or disturb.

Species may also be listed as being of special conservation interest if they have a naturally low population, restricted natural range, are subject to or recovering from a significant population decline or reduction of range or are of special interest to science. Species of special conservation interest, migratory species and species subject to international agreements are known as Specially Protected Species in the BC Act.

2.1.3 Western Australia Priority species and communities

Flora and fauna species and communities are listed by the Department of Biodiversity, Conservation and Attractions (**DBCA**) as P when they are considered to have a greater level of significance than other native species and communities. This generally occurs where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to T species and communities categories. Whilst P species and communities are not specifically listed in the BC Act, all flora and fauna are protected in WA following the provisions in Part 10 of the BC Act. This protection applies even when a species is not listed as T or specially protected. The categories covering P species and communities are listed in Appendix A.

2.1.4 BAM Act

Plants may be 'Declared' by the Agriculture Protection Board under the *Biosecurity and Agriculture Management Act 2007* (WA) (**BAM Act**). Declared Plants are gazetted under three categories (C1-C3) which define the action required. Details of the definitions of these categories are provided in Appendix A. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties.

2.1.5 Weeds of National Significance

The DCCEEW, along with the State and Territory governments, has endorsed 32 Weeds of National Significance (**WONS**). Four major criteria were used in determining WONS:

- The invasiveness of a weed species;
- A weed's impact;
- The potential for spread of a weed; and
- Socio-economic and environmental values.

Each WONS has a national strategy and a national coordinator, responsible for implementing the strategy. WONS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts (DAWE 2020).

2.1.6 Guidelines

The terrestrial biological assessment was conducted in accordance with the above Commonwealth and State legislation, as well as EPA requirements for environmental surveys as outlined below:

- *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020); and
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016).

Relevant guidance for the preparation of spatial datasets to accompany this report are:

- Guidelines for biological survey and mapped data (Department of the Environment and Energy (**DEE**) 2018); and
- Instructions for the preparation of data packages for IBSA (EPA 2021).

2.2 LAND USE

The Survey Area lies within the Beebyn pastoral lease (N049894).

Active mining operations occur within the Fenix Iron Ridge Project, with the main mining and processing area 16 km to the southwest.

Exploration activity occurs at Mount Ridley's Weld Range West Project Madoonga and Wilgie Mia Formations 40 km to the southwest.

The Wilgie Mia Aboriginal Ochre Mine lies north of the road alignment included in the Survey Area. A 2000 ha area including the Ochre Mine was included on the National Heritage List on the 24 February 2011.

2.3 CLIMATE

The Weld Range is in the Midwest Region of WA, approximately 72 km west south-west of Meekatharra. The region experiences hot, dry summers and mild winters. Rainfall occurs predominantly between January and July. The nearest Bureau of Meteorology (**BoM**) weather station with a long historical record is at Meekatharra Airport (BoM Site Number: 007045), approximately 77 km east northeast of the Survey Area. Meekatharra Airport has recorded rainfall from 1944 (80 years), and temperature from 1950 (74 years). The average climate data recorded for the region over these periods is shown in Figure 2-1. Monthly mean maximum temperature ranges from 38.4°C in January to 19.3°C in July. Monthly mean rainfall ranges from 36.1 mm in February to 4.9 mm in September, with a mean annual rainfall of 233.8 mm (BoM 2023).

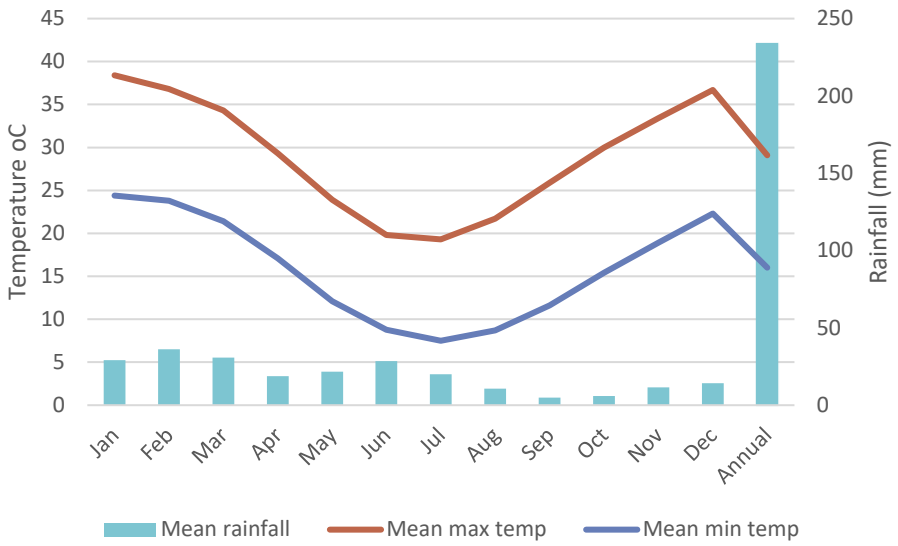


Figure 2-1. Temperature and rainfall averages for Meekatharra Airport weather station (Station No. 007045) (BoM 2023)

2.4 BIOGEOGRAPHIC REGIONALISATION

The Interim Biogeographic Regionalisation for Australia (**IBRA**, version 7) classifies the Australian continent into regions (bioregions) of similar geology, landform, vegetation, fauna, and climate characteristics (Thackway and Cresswell 1995). The mapping completed by Beard (1975) provides the basis for the IBRA bioregions. IBRA mapping (Version 7), places the Project within the Murchison Bioregion.

The Murchison Bioregion has low hills and mesas separated by flat colluvium and alluvial plains. Vegetation is predominantly low mulga woodlands. Other vegetation types include saltbush shrubland on calcareous soils, saline areas with samphire, and hummock grassland on red sandplain (Bastin *et al.* 2008).

The Murchison Bioregion is further subdivided into the Eastern Murchison (MUR1) and Western Murchison (MUR2) Sub-regions. The Project lies entirely within the Western Murchison Sub-region of the Murchison Bioregion.

The Western Murchison is the Murchison Terrains part of the Yilgarn Craton, and contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. The region is made up of mulga low woodlands (usually with bunch grasses and often rich in ephemerals) on outcrop, and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan washplains that dominate and characterise the subregion) mantling granitic and greenstone strata. Surfaces associated with the occluded drainage occur throughout, with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and halosarcia low shrublands on saline alluvia.

2.5 LAND SYSTEMS, GEOLOGY AND SOILS

Land Systems of the Murchison region are described by Curry *et al.* (1994). Mapping of Land Systems is available from Department of Primary Industry and Regional Development (**DPIRD**, 2022). The Survey Area falls within five soil landscape systems, as listed in Table 2-1 and illustrated in Figure 2-2.

Table 2-1. Land Systems

Land System	Geology	Description
Jundee	Cemented Quaternary alluvium derived mainly from greenstone	Hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga shrublands.
Violet	Archaean greenstone, Upper Proterozoic basalt, Tertiary laterite and veneers of Quaternary alluvium and colluvium.	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.
Weld	Archaean metamorphic rocks, mainly metasedimentary types; hematitic jaspilite, banded ironstone with quartzite wacke and schistose hornblende.	Rugged ranges and ridges of banded ironstone and quartzite, supporting acacia shrublands.

Wiluna	Archaean amphibolite, basalt and schistose rocks with Tertiary laterite capping; Quaternary colluvium on slopes and Quaternary alluvium on lowlands.	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs.
Yarrameedie	Archaean metamorphic rocks with Quaternary colluvium	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld land system) supporting sparse mulga shrublands.

The topography of the area is dominated by the Weld Range – a long band of steep ridges that run southwest to northeast and extend for 60 km and are 3-5 km wide. The range rises up to 250 metres (**m**) above the surrounding plains. The slope angles around the Weld Range vary from less than 5% to greater than 90%. Away from the ridges the topography is very flat.

There are some deeply incised valleys with drainage channels within Weld Range, however the land to the north has only a few well-defined channels and is characterised by numerous mud flats and salt pans.

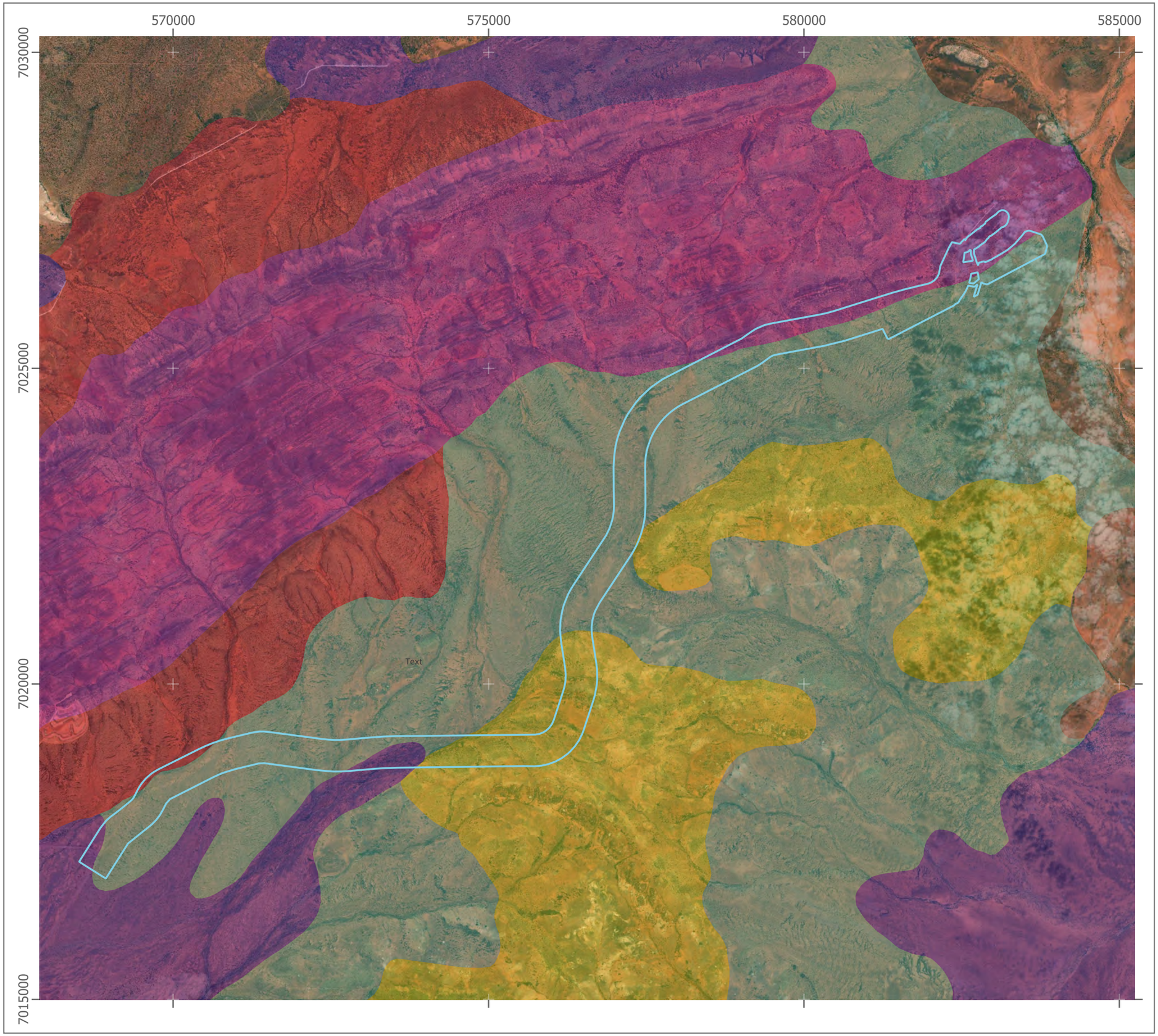
The Weld Range greenstone belt is predominantly composed of metabasites showing mainly doleritic and minor basaltic and gabbroic textures (Duuring *et al.* 2012). Exposures of these lithologies occur between the ridges which are defined by weathered, steeply dipping beds of resistant banded iron formation (**BIF**) which form less than 10% of the thickness of the sequence. Poorly exposed, very fine-grained clastic metasediments are only a very minor part of the sequence. Metamorphism is relatively low grade, varying from lowermost greenschist facies in the north to approximately greenschist-amphibolite transition facies in the south.

High grade iron mineralisation in the Weld Range area occurs as a series of outcrops of massive goethite-haematite lodes.

Geomorphology of the Weld Land System is of erosional surfaces; mountain ranges of strike belts and ridges with peaks 200 m or more above the new plateau plains; lower, rounded hill spurs flanking major ranges; steep hillslopes with extensive loose mantling and rock outcrop; lateritised ridges with caves; valley floors and undulating interfluves often intensely dissected by narrow rectangular drainage tracts with incised channels; sheds most colluvium and drainage to pediment Yarrameedie land system.

Geomorphology of the Violet system is of erosional surfaces; remnants of old plateau as gravelly sand plains above gently undulating outcrops of laterite and weathered greenstones; broad, lower stony plains on greenstone or red-brown hardpan, often densely mantled by pebbles of mixed lithology and with sluggish, occasionally channelled, drainage floors; relief mostly < 10 m.

Soil landscapes are mapped by Tille (2006) with the Survey Area occurring in the Upper Murchinson zone. These soils are described as hardpan wash plains (with stony plains, sandplains, hills and mesas) on granite and gneiss of the Yilgarn Craton (Narryer Terrane and Murchison Domain). Red-brown hardpan shallow loams and Red shallow loams with Red loamy earths and Red deep and some Red shallow sands and Red deep sandy duplexes. Vegetation is of Mulga shrublands (with some halophytic shrublands).



Legend

Land Systems

- Jundee Land System
- Violet Land System
- Weld Land System
- Wiluna Land System
- Yarrameedie Land System

Scale: 1: 60,000 @ A3

0 1 2 km

Coordinate System: GDA 2020 MGA 50
Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

Land Systems

Prepared for:

SMC

Figure: 2-2

2.6 REGIONAL VEGETATION

Vegetation communities and land systems of the Weld Range were described by Speck and Mabbut *et al.* (1963) respectively as part of a regional survey of the Wiluna to Meekatharra area.

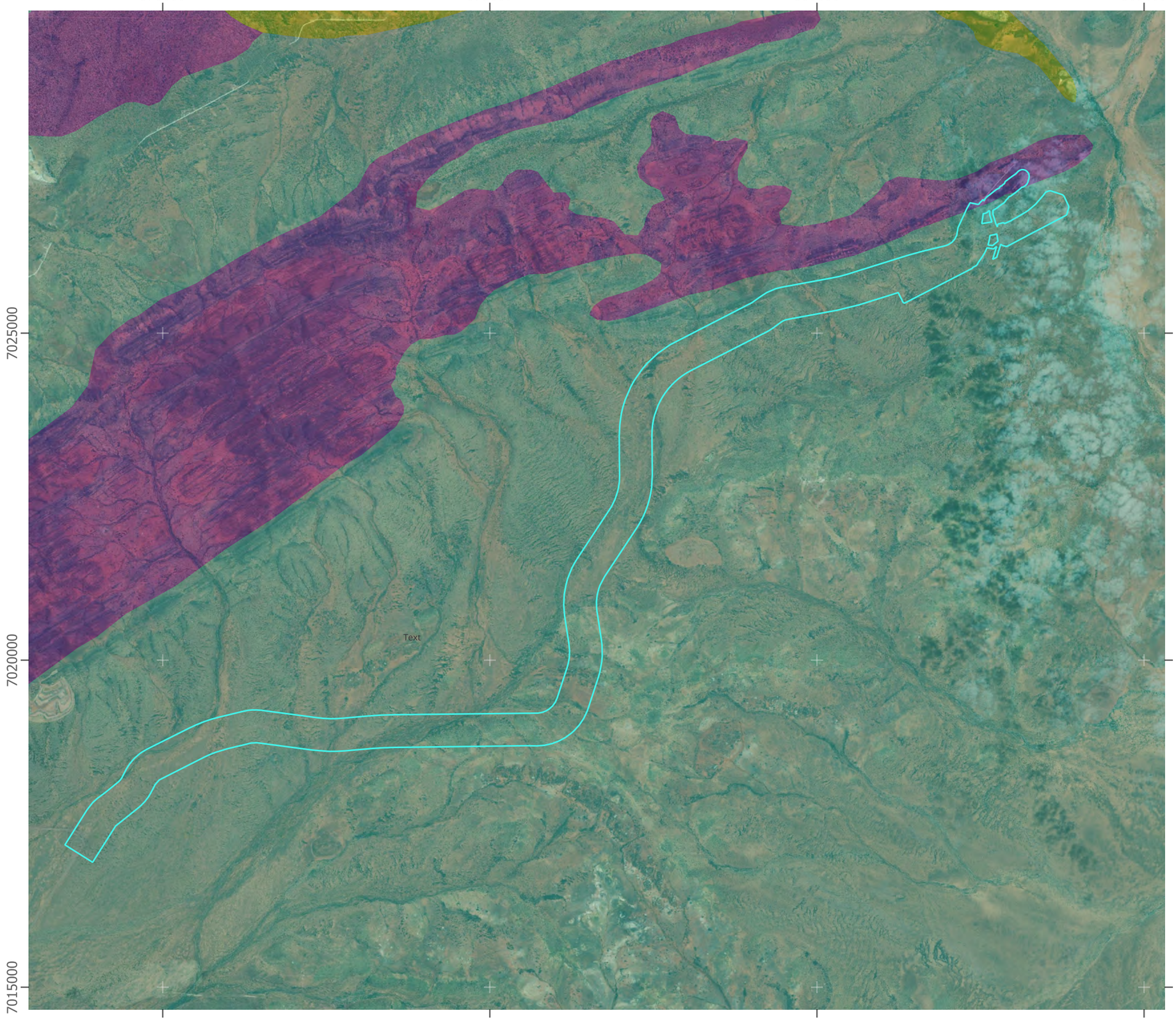
The vegetation communities of the area were mapped by Beard (1976) in his regional survey of the Murchison at a scale of 1: 1 000 000, describing the region as providing optimum conditions for the presence of mulga (*Acacia aneura*) woodlands. The Survey Area is located within the Murchison Botanical District of the Eremaean Botanical Province and contains two pre-European Beard vegetation associations of the Upper Murchison System as shown in Figure 2-3 (DPIRD 2019). The remaining extent of these vegetation associations is outlined in the most recent DBCA Statewide Vegetation Statistics table dated 2018 and summarised in Table 2-2 below.

Table 2-2 Pre-European Beard Vegetation Associations

Unit	Vegetation Description	Pre-European Extent (ha)	Current Extent (ha)	Pre-European Extent Remaining (%)	Current Extent within DBCA Managed Lands (%)
18	Low woodland, open low woodland or sparse woodland of *Acacia aneura* (Mulga) and associated species.	19,890,667	19,842,830	99.76	2.13
202	Scrub, open scrub or sparse scrub of Acacia spp. Melaleuca spp.	448,529	448,344	99.96	0.39

Beard vegetation associations that occur within the Survey Area have over 99% pre-European Vegetation extent remaining.

A finer-scale survey of the vegetation was undertaken by Curry *et al.* (1994), using the land systems of Mabbut *et al.* as part of their regional survey of rangelands within the Murchison River Catchment. The vegetation communities of the greenstone ranges of Weld Range (the Weld Land System) were surveyed between 1985 and 1988 and were reported to be dominated by Acacia species and rocky hill mixed shrublands, stony mulga mixed shrublands, and creekline shrublands.



Legend

- Survey Area

Pre-European Beard Vegetation Associations

- 8
- 15
- 48

Scale: 1: 60,000 @ A3

0 1 2 km

Coordinate System: GDA 2020 MGA Zone 50

Projection: Transverse Mercator

Author: VM | Approved: EH | Date: 26/03/2024

Pre-European Beard Vegetation Associations

Prepared for: SINOSTEEL SMC

Figure: 2-3

2.7 SIGNIFICANT AREAS

2.7.1 Conservation Estate

The Western Australian Conservation Estate includes land and waters vested in the Conservation and Parks Commission under the *Conservation and Land Management Act 1984*. The Conservation Estate is managed by the Parks and Wildlife Service of DBCA to protect WA's biodiversity, and includes National Parks, Nature Reserves, Conservation Reserves, and other areas managed primarily for biodiversity conservation (DEE 2016).

A search of the Collaborative Australian Protected Area Database returned no conservation estates located within 50 km of the Survey Area. The nearest gazetted terrestrial conservation estate is Lakeside National Park and Lakeside Conservation Park 82 km and 75 km south of the Survey Area respectively.

2.7.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (**ESA**) are areas that are defined by the Department of Water and Environment Regulation (**DWER**) (2019) as:

- A declared World Heritage property as defined in s.13 of the EPBC Act;
- An area that is included on the Register of the National Estate, because of its natural heritage value under the *Australian Heritage Council Act 2003*;
- A defined wetland and the area within 50 m of the wetland;
- The area covered by vegetation within 50 m of T flora, to the extent to which the vegetation is continuous with the vegetation in which the T flora is located;
- The area covered by a TEC;
- A Bush Forever site;
- Areas covered by the Gnangara Mound Crown Land Policy and Western Swamp Tortoise Policy;
- Areas covered by lakes, wetlands, and fringing vegetation of the Swan Coastal Plain Lakes Policy, including Southwest Agricultural Zone Wetlands Policy and Swan and Canning Rivers Policy; and
- Protected wetlands as defined in the *Environmental Protection (Southwest Agricultural Zone Wetlands) Policy 1998*.

Environmentally Sensitive Areas are available on the DWER (2021) clearing regulations spatial layer. There are no ESAs within the Survey Area.

The Australian Wetlands Database includes nationally significant wetlands (as listed in the directory of important wetlands), wetlands listed under the Ramsar convention, wetlands that are representative, rare or unique, or wetlands that are considered of international importance (DEE 2021). The nearest wetlands listed in the Directory of Important Wetlands to the Survey Area is Lake Annean, 35 km east. Lake Annean is a large saline brackish lake and marsh with numerous islands and peninsulas which is a significant breeding area for gull-billed terns and whiskered terns and other waterbirds.

2.7.3 National Heritage List

Wilgie Mia, a 2000 ha area immediately north of the road alignment, is listed under the EPBC Act as a National Heritage Place.

3 METHODOLOGY

3.1 DESKTOP STUDY

The desktop study provides background information on the known attributes of flora, vegetation, and fauna of the Survey Area, and in the local surrounding area.

3.1.1 Database Searches

A search for EPBC Act MNES was undertaken using the DCCEEW Protected Matters Search Tool (**PMST**). The PMST identifies EPBC listed flora and fauna species and communities based on predicted distributions of the species and/or their habitat, in conjunction with species records. The PMST may predict the occurrence of a species or community in an area where there are no documented records, or documented records are historic. For this search, the Survey Area was imported into the PMST viewer as the feature area and a buffer of 30 km applied. The conservation codes are described in Appendix A. The results of the PMST search are included in Appendix B.

The DBCA maintains databases for records of T and P species and communities. A request was made for a search of DBCA databases for T and P flora and fauna and the presence of TECs or PECs. A 30 km buffer was applied to the search results.

Flora and Fauna Inventory, including records for Introduced flora and fauna from within 30 km, were obtained from the Dandjoo Biodiversity Data Repository hosted by the DBCA Biodiversity Office (DBCA 2023a).

Table 3-1 lists the database searches conducted for the desktop study.

Table 3-1. Database Searches

Attribute	Search Area	Database	Location
Threatened and Priority Ecological Communities	30 km radius	DBCA	Figure 4-2; Section 4.1.1
	30 km radius	PMST	Appendix B
Significant Communities	Feature Area	GDE Atlas	Section 4.1.2
Threatened Flora	30 km radius	DBCA	Figure 4-1; Section 4.1.1
	30 km radius	PMST	Appendix B
Introduced Flora	30 km radius	Dandjoo	Section 4.1.3
Threatened Fauna	30 km radius	DBCA	Figure 5-1; Section 5.1.1
	30 km radius	PMST	Appendix B
Introduced Fauna	30 km radius	Dandjoo	Section 5.1.2

3.1.2 Literature Review

The Weld Range Project has been assessed by the EPA at the level of Public Environmental Review. A Scoping Document was agreed on the 4th November 2008, the EPA report on Assessment published on the 18th June 2012 and the project approved through Ministerial Statement 908 on 29th August 2012.

The project as approved in 2012 had a land disturbance area of 3589 ha, so baseline studies performed for the Project included the extent of tenement M 51/869-I and a much larger surrounding area, covering 53 km length of the Weld Range at up to 15 km width. Within this area flora, vegetation and fauna surveys were conducted to describe baseline conditions.

Table 3-2 describes the studies and reports generated for the Weld Range Project, and a summary of the findings.

Table 3-2. Weld Range biological surveys and reports

Reference	Description	Outcomes
Markey and Dillon 2008	Conducted in late August 2005. Flora and vegetation survey with assessment of distribution in relation to environmental factors.	Eight floristic community types (six types, two of these subdivided into two subtypes each) were identified and described for the Weld Range, with the primary division in the classification separating a dolerite-associated floristic community from those on BIF. Floristic communities occurring on BIF were found to be associated with topographic relief, underlying geology and soil chemistry. There did not appear to be any restricted communities within the landform, but some communities may be geographically restricted to the Weld Range, and all communities on the Weld Range are closely associated with topography and substrate.
Ecologia (2009a)	Summarises the 22 flora surveys conducted in three seasons: • Spring phase – November 2006; • Autumn phase – April 2007; and • Winter phases – July 2008 and June 2009	Quadrat based survey established 239 sites and transect based survey conducted 1053 traverses. Resulted in the description of 17 vegetation types and mapping of 14 units as units 1a, 1b, 2a and 2b were unable to be clearly distinguished on the ground or on aerial imagery. Vegetation was primarily in Good condition (77%), with 14% in Very Good condition and 9% in Poor condition. Disturbances were heavy grazing pressure by livestock and feral goats, clearing for pastoral and mining exploration activity, and low weeds. 25 Conservation significant flora.
Ecologia (2009b)	Level 2 Survey conducted in four phases: • Spring – September 2006 • Autumn – March 2007 • Autumn – April 2007 • Spring – September 2007 Infrastructure area Level 1 survey: • September 2008 • August 2009	Total survey effort consisted of 231 person days. Ten main fauna habitats were identified within the Project area. These include acacia sandplain, banded ironstone ridge, drainage lines, eucalypt sandplain, granite outcrops, lateritic breakaway, mulga drainage line, mulga woodland on hill slopes, rocky rise (ironstone) and rocky rise (quartz). Seven additional habitats of low spatial extent were also described as large rocky breakaway, massive breakaway complex, chenopod floodplain, dense eucalypt woodland, mulga woodlands and soft wandrie country, limestone bore and spinifex.
Ecologia (2009c)	Summarises studies conducted for Short Range Endemic (**SRE**) and T and P invertebrates. Madoonga, Beebyn and Hampton Hill were surveyed from August 2006 to November 2006, while Weld Range North was surveyed five months later from April 2007 to August 2007.	Systematic pitfall trapping and opportunistic foraging at 29 sites at Weld Range South and a further 15 sites were selected at Weld Range North (i.e. total 44 sites).

3.1.3 Likelihood of Occurrence

Threatened and Priority flora, fauna and communities returned from the database searches and literature review were assessed for their likelihood of occurrence within the Survey Area using the likelihood of occurrence criteria listed in Table 3-3.

Table 3-3. Likelihood of occurrence criteria

Likelihood of occurrence	Criteria
Present	Identified from database records or field survey as occurring within the Survey Area, and conditions are remain suitable for persistence.
Likely	Suitable habitat is present in the Survey Area and the species has previously been recorded within 15 km within recent times.
Possible	Suitable habitat is present within the Survey Area and the species has previously been recorded between 15 – 30 km of the Survey Area
Unlikely	No suitable habitat is present in the Survey Area, or records are historic and the species is no longer considered to occur in the region.

3.2 FIELD SURVEY

3.2.1 Survey Personnel and Timing and Conditions

The survey was carried out from the 15th to 17th of November by Dr Eleanor Hoy with the assistance of a field technician. Dr Hoy has 15 years industry experience and is the Biological Sciences Manager at APM.

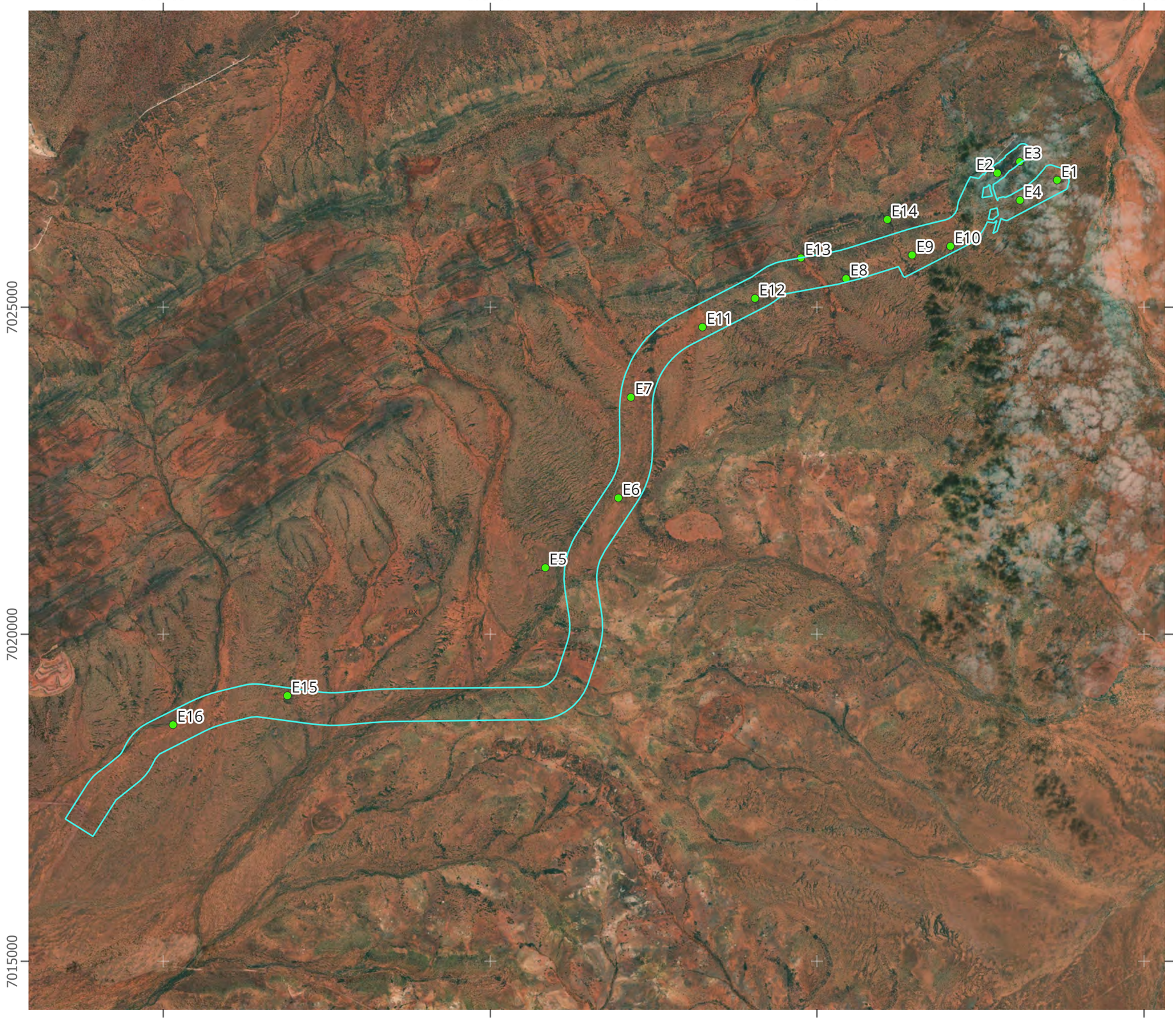
The total annual rainfall prior to survey (1st January 2023 to 15th November 2023) averaged at 213.8 mm compared to the long-term average of 206.4 mm (BoM 2023). This is due to a very large rainfall in March 2023, with a monthly total of 124.4 mm. Winter and spring rainfall was very low with 14.2 mm falling between May and October, compared to a long-term average of 91.5 mm for the same period.

The Survey Area is within the Eremaean botanical province. Recommended timing for flora and vegetation survey is 6-8 weeks post wet season (March – June) for Primary survey, and a Dry season survey (after winter rainfall if available) for Supplementary survey (EPA 2016). The timing of the field survey is outside of the period recommended for flora and vegetation survey in the region.

Due to the large rainfall in March, survey conditions were good. The Normalised Difference Vegetation Index (**NDVI**) for Beebyn Station, which shows how green the property is at any given time, is reported by DPIRD (2023a). In November 2023 the value was near to the 90th percentile for the property. Whilst soils were dry, the vegetation was in good condition, and annual/herbaceous flora contributed 29% of the total species richness.

3.2.2 Flora and Vegetation

A Detailed survey was conducted for flora and vegetation. Vegetation was sampled using 16 quadrats of 20 x 20 m (Figure 3-1). Quadrats are vegetation survey plots which are accurately measured out as 20 x 20 m (or an area equivalent to 2500 m^2) and marked at each corner using a handheld Global Positioning System (**GPS**) unit.



Legend

- Survey Area
- Flora quadrats

Scale: 1: 60000 @ A3

0 1 2 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

Flora Survey Sites

Prepared for:

SMC

Figure: 3-1

Field data at each survey site was recorded on a pro-forma data sheet and included the parameters listed in Table 3-4. The attributes of Detailed survey sites are provided in Appendix C.

Table 3-4. Parameters recorded at each Detailed site

Variable	Parameters
Collection attributes	Personnel/recorder; date, quadrat dimensions and marking method, site code and georeferenced photographs of the quadrat.
Physical features	Landform, slope, aspect, soil attributes, ground surface cover, litter, rock type and physical attributes.
Location	Coordinates recorded using a hand-held GPS (Garmin) to accuracy approximately ± 5 m.
Vegetation	Dominant growth form, height, cover, and species for the three traditional strata (upper, mid and ground) compatible with NVIS Level V (ESCAVI 2003).
Vegetation condition	Vegetation condition was assessed using the condition rating scale devised by Trudgen (1988).
Disturbance	Level and nature of disturbances (*e.g.* weed presence, fire, and time since last fire, impacts from grazing, vegetation clearing, erosion).
Flora	List of all species within the quadrat including weeds and listing species average height and cover.

A flora inventory was compiled from taxa listed in Detailed survey sites and from opportunistic floristic collections throughout the Survey Area, with at least one collection made for every taxon encountered. Specimens were identified by an experienced botanical taxonomist in the Western Australia Herbarium (**WAH**) using published reference material. The nomenclature applied is consistent with Florabase (WAH 1998-).

The conservation status of all recorded flora was determined from the T and P Flora List (DBCA 2023c), and the EPBC Act List of T Flora (DCCEEW 2023a). The Western Australian Organisms List database was consulted to determine if any are BAM Act Declared Plants (DPIRD 2023b), and the Weeds of National Significance list to determine any WONS (DAWE 2020).

The vegetation types were described based on their structure and species composition, as defined by quadrat data, and field observations. Vegetation was mapped in the field using handheld GPS units and aerial photographs, then digitised using GIS software. Vegetation is described at the association level (ESCAVI 2003) and referred to as Vegetation Types (EPA 2016).

Vegetation Condition was assigned using the scale developed for the Eremaean and Northern Botanical Provinces adapted from Trudgen (1988) as recommended in EPA (2016). Table 3-5 lists the six potential categories.

Table 3-5. Vegetation Condition Scale

Vegetation Condition	Eremaean and Northern Botanical Provinces adapted from Trudgen (1988)
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, 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 present including very aggressive species.
Completely Degraded	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

Data analysis was applied through the preparation of a species by site matrix using the complete suite of species recorded. The Primer 7 (Clarke and Gorley, 2015), software was used to perform floristic composition vegetation classification. Two transformation types were applied, a presence/absence and a square root transformation applied to the projected foliage cover value. Resemblance matrices were constructed for each transformed data set using the Bray Curtis similarity measure. Cluster analysis was performed for each transformed data set using group averages. The SIMPROF routine was used to test the hypothesis that the species and/or abundances are different at each group of sites using 999 permutations and a significance level of 5%.

The analysis applying the square root transformation was found to be more consistent with the previous survey conducted by Ecologia (2009a) where the main vegetation community was subdivided into subcommunities based upon vegetation density.

The completeness of the survey was tested using a species accumulation curve and applying the Michaelis-Menton model to estimate the species richness of the Survey Area.

3.2.3 Fauna

Fauna habitat assessments were performed at flora quadrat locations. Descriptive data was recorded including soil type, landform, presence of microhabitats, disturbances and images were recorded.

3.2.4 Constraints

Several limitations may arise during field survey EPA (2016). These potential survey limitations are listed below in Table 3-6 with comments on the constraint to the outcomes of the survey.

Table 3-6. Survey Constraints

Factor	Impact of survey outcomes
Access problems	Moderate constraint. A 5 km section (25%) of the Access Road is not along existing tracks and was not visited. This area has not previously been surveyed.
Experience levels	Not a constraint. The personnel were suitably qualified.
Scope: Flora and vegetation	Not a constraint. Survey was carried out at a Detailed level of assessment. No Targeted searches for conservation significant flora were conducted.
Scope: Fauna	Not a constraint. The survey was carried out at a Basic level of assessment. With the large survey effort conducted in 2007/08 this level of assessment is suitable to assess habitat availability and quality and inform any requirements for further Targeted survey.
Timing, weather, season, cycle	Minor constraint. The Survey Area is within the Eremaean Botanical district. Rainfall in the calendar year prior to survey was average, however winter and spring rainfall was below average. The Flora and Vegetation survey was conducted outside of the recommended survey period (EPA 2016). The large rainfall in March was sufficient to provide stored soil water into the late spring as seen by NDVI values near the 90th percentile (DPIRD 2023a).
Sources of information	Not a constraint. Previous biological reports and database records are available for the locality and region.
Completeness: Flora and vegetation	Minor constraint. Due to low rainfall preceding the survey, the presence of annual species was restricted to areas receiving runoff and/or with higher moisture retention, and modelling indicated the survey captured 77% of the species richness of the area. Nine specimens were unable to be identified to species level, including one specimen that may constitute a significant range extension for a P3 species. Compared to previous survey conducted by Markey and Dillon (2008) the richness per quadrat was lower than expected, however it was within the range recorded by Ecologia (2009a) for the same vegetation types. Annual/herbaceous species contributed 29% of the total species richness and the NDVI was in the 90th percentile for the property. No species of conservation significant flora that have been previously recorded or are considered likely to occur are annual/herbaceous species.
Completeness: Fauna	Not a constraint. The scope was completed.

4 FLORA AND VEGETATION RESULTS

4.1 DESKTOP STUDY

4.1.1 Significant Flora

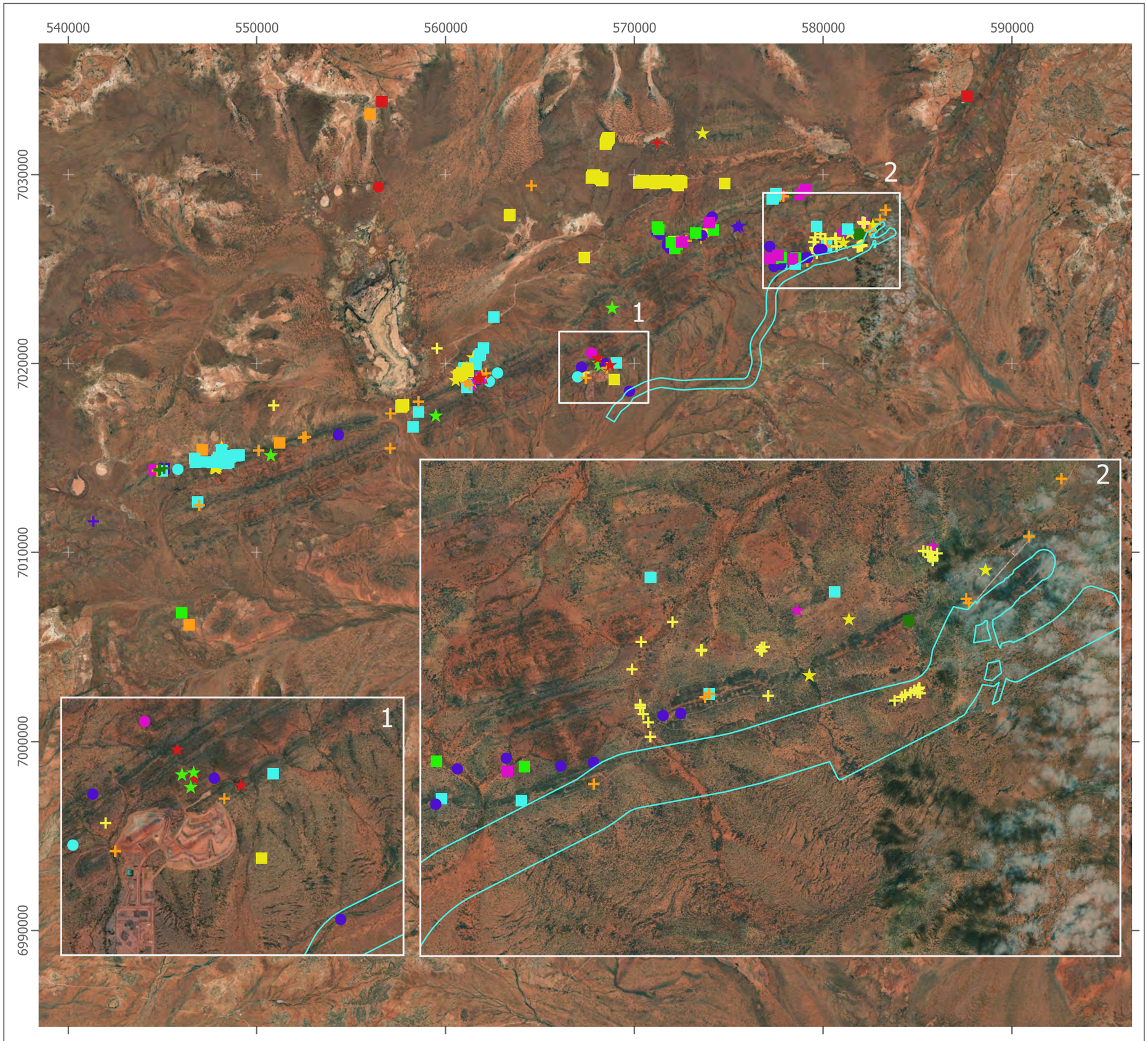
No T Flora listed under the BC Act and/or EPBC Act have been previously recorded within the Survey Area, or within 30 km. No T species were returned from the PMST or literature review.

The DBCA database contained two P species that have previously been recorded in the Survey Area. The P3 *Prostanthera petrophila* and P4 *Dodonaea amplisemina* have been recorded within the Fenix Access Road. Additionally, five P1, seventeen P3, and four P4 species have records within 30 km of the Survey Area.

The Literature review identified one additional P species occurring within the Survey Area – *Acacia speckii* (P4); and seven additional P species that have been recorded at the Weld Range. These are *Indigofera gilesii* P3, *Euphorbia sarcostemmoides* P1, *Goodenia lyrata* P3, *Eremophila arachnoides* subsp. *Arachnoides* P3, *Mirbelia stipitata* P3, *Ptilotus luteolus* P3, and *Tecticornia cymbiformis* P3.

P flora returned from the DBCA database with records within 30 km of the Survey Area are shown in Figure 4-1. Records identified in the literature review are also shown.

An assessment of the likelihood of occurrence of these 34 species within the Survey Area was performed using the criteria listed in Table 3-3. The results of the assessment are listed in Table 4-1.



Legend

- Survey Area

Priority 1
- Acacia dilloniorum
- Beyeria lapidicola
- Eremophila rhegos
- Euphorbia sarcostemmoides
- Stenanthemum mediale
- Stenanthemum patens

Priority 3
- Acacia burrowsiana
- Acacia speckii
- Calytrix verruculosa
- Drosera eremaea
- Eremophila fasciata
- Eremophila shonae subsp. diffusa
- Eremophila simulans subsp. megacalyx
- Hemigenia tysonii
- Hemigenia virescens
- Homalocalyx echinulatus
- Lysiandra baeckeoides
- Micromyrtus placoides
- Petrophile pauciflora
- Prostanthera ferricola
- Prostanthera petrophila
- Ptilotus beardii
- Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)
- Verticordia jamiesonii

Priority 4
- Dodonaea amplisemina
- Goodenia berringbinensis
- Grevillea inconspicua
- Hemigenia exilis

Scale: 1: 200000 @ A3

0 5 10 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

Threatened and Priority Flora Records

Prepared for: SINOSTEEL SMC

Figure: 4-1

Table 4-1. Threatened and Priority Flora Likelihood of Occurrence

Species	P	Preferred Habitat	Likelihood of Occurrence
Acacia burrowsiana	3	Red-brown loams with ironstone rubble on surface, calcrete soils, laterite, quartz. Flats adjacent to watercourses, crests of low rises, breakaways.	Likely. Suitable habitat present in 3a and 3b
Acacia dilloniorum	1	Foot slopes and gullies of dolerite hills and mid-slopes of the Weld Range on red-brown silty clay loam.	Likely. Suitable habitat in the upper 3b areas
Acacia speckii	4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises. It has been observed to occur across the mid-sloped rocky hills and near drainage lines of Weld Range.	Present. Suitable habitat in the upper 3b areas
Beyeria lapidicola	1	Callitris-Acacia woodlands or mulga woodland in sandy loams or on banded ironstone hills.	Likely. Suitable habitat in 2a and 3b.
Calytrix verruculosa	3	Sandy clay. Plains.	Possible. Suitable habitat in 3b.
Dodonaea amplisemina	4	Open shrublands with Acacia, Eremophila and other low shrubs on red-brown sandy clay soils over basalt or banded ironstone.	Present. Suitable habitat in 3b.
Drosera eremaea	3	Heavy red loam. Seepage areas amongst granite outcrops.	Unlikely. No suitable habitat.
Eremophila arachnoides subsp. *Arachnoides*	3	Open shrublands or mulga woodland in shallow loams over limestone, but locally on gently undulating terrain, low in the landscape, on red-brown loamy soil with some calcrete pebbles or on calcrete outcrops.	Possible. Some small calcrete patches in the easternmost extent of 3b.
Eremophila fasciata	3	Hillside, gullies. Brown / red ironstone gravel.	Possible. Suitable habitat 3b
Eremophila rhegos	1	Skeletal stony loam over granite.	Unlikely. No suitable habitat.
Eremophila shonae subsp. *Diffusa*	3	Stony yellow or red sandy soils.	Possible. Suitable habitat in 3b.
Eremophila simulans subsp. *Megacalyx*	3	Rangeland plain. Road verge with red, sandy gravel laterite.	Possible. Suitable habitat in 3a.
Euphorbia sarcostemmoides	1	Sandstone ridges, quartzite hills, and banded ironstone with red brown shallow sandy loam soils. However, at Weld range it has been observed on flat plains.	Likely. Suitable habitat in 2a, 3a and 3b.
Goodenia berringbinensis	4	Red sandy loam along watercourses, lakes, drainage lines, dams and claypans.	Unlikely. Drainage limited to rocky gullies.
Goodenia lyrata	3	Mulga woodlands on red sandy loam often in or near claypans	Unlikely. No claypans present.
Grevillea inconspicua	4	Drainage lines and on rocky outcrops tending to favour loamy soils. It is also found to occur on moderately inclined midslopes with fragments of banded ironstone and chert.	Likely. Suitable habitat in 2a and 3b.
Hemigenia exilis	4	Laterite. Breakaways, slopes.	Unlikely. No suitable habitat.
Hemigenia tysonii	3	Red sand, sandy clay and lateritic sand on flats, as well as on sand dunes and hills. It is also found on ridgelines with laterite, dolerite, conglomerate and chert.	Unlikely. No suitable habitat.
Hemigenia virescens	3	Hillsides, in rangelands, in low and high shrublands and on sandy banks. Soil types are commonly yellow-red sandy clay, brown ironstone gravel and brown rocky sand.	Likely. Suitable habitat in 3b.

Homalocalyx echinulatus	3	Gently inclined slopes with fragments of banded ironstone. It has also been recorded to occur on stony plateaus, breakaways and rangelands.	Likely. Suitable habitat in 3b.
Indigofera gilesii subsp. *Gilesi*	3	Pebbly loams and hill slopes amongst boulders and outcrops, banded iron hills, granite and sandstone, creeklines and sand plains. The substrate is often ironstone gravel amongst brown/red loam.	Possible. Suitable habitat in 2a, 3a and 3b.
Lysiandra baeckeoides	3	Ironstone ridges/ breakaways with dry, orange sandy clay soils. At Weld Range it has been recorded on gently inclined lower hillslopes to flats of banded ironstone with red brown soils.	Possible. Suitable habitat in 2a and upper 3b.
Micromyrtus placoides	3	Red-orange or orange-yellow sandy clay, coarse gravel, banded ironstone, laterite, quartz and basalt. Landforms can be gently undulating plains, dry creek beds, hillcrests or ridges of brown loam, dolerite, ironstone or granite.	Likely. Broad habitat suitability. All habitats suitable.
Mirbelia stipitata	3	Plains on red sandy loam.	Possible. Plains suitable.
Petrophile pauciflora	3	Decaying and dissected granite breakaways.	Unlikely. No suitable habitat.
Prostanthera ferricola	3	Sparse *Acacia aneura* shrublands on gently inclined upper slopes and crests of banded ironstone formations. It is occasionally found in gullies or on quartz.	Possible. Suitable habitat in 2a
Prostanthera petrophila	3	Lateritic soils, ironstone slopes and foothills on red-orange sandy clay with ferrous stones and boulders.	Present. Suitable habitat in 2a and upper 3a and 3b
Ptilotus beardii	3	Red/orange/brown sandy-clayey soils, saline flats, flood plains and low breakaways.	Possible. Suitable habitat in 3a and 3b.
Ptilotus luteolus	3	Rocky hill slopes and crests, often in red sandy soils. It has also been found on low sandstone (sandy siltstone) and rises in red powdery loam.	Possible. Suitable habitat in 2a.
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	3	Red sand plains in open Acacia – Eremophila woodlands but has been found on moderately rocky hill crests and slopes on the Weld Range.	Likely. Suitable habitat in 2a.
Stenanthemum mediale	1	Red clayey sand.	Likely. Suitable habitat in 3 and 3b.
Stenanthemum patens	1	Rocky basalt and banded ironstone hillsides as well as on sandy loam and clay slopes	Possible. Suitable habitat in 3a and 3b.
Tecticornia cymbiformis	3	Saline areas along floodplains, creeklines, lakes or sloping areas leading to saline habitats. It can be found on red-brown sandy clays	Unlikely. No suitable habitat.
Verticordia jamiesonii	3	Quartzite or laterite breakaways, hill slopes, ridgelines, or on weathered granite within pockets of small sandy clay in depressions	Likely. Suitable habitat in 2a and 3b.

4.1.2 Significant Vegetation

There are no TECs listed under the BC Act or EPBC Act known to occur within the Survey Area. The Survey Area is partially within the Weld Range P1 Ecological Community (Figure 4-2).

The Weld Range and other Banded Iron Formation Ranges are important landforms in the Murchison region. Although representing a very small proportion of the total area of the Murchison Bioregion, their unique geology, soils and relative isolation have produced distinctive vegetation communities, many of which have restricted distributions in the region. Many of the BIF ranges support threatened, and in some instances locally endemic, species. Consequently, they are considered to have very significant biodiversity values.

Vegetation types of the Weld Range have been described by Dillon and Markey (2006) and Ecologia (2009a). Community characteristics are listed in Table 4-2.



Author: VM Approved: EH Date: 26/03/2024

Threatened and Priority Ecological Communities

Prepared for:

SINOSTEEL SMC

Figure 4-2

Scale: @ A4
1: 150,000

0 2.5 5 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Legend

Weld Range BIF Priority 1



Table 4-2. Characteristics of vegetation described for the Weld Range

Landscape position	Code	Description	Species richness
Dillon and Markey (2006)			
Hillslopes with moderately inclined gradients, very rocky terrain and outcropping of BIF. This vegetation type occurred across the topographical profile of the range, from the lower slopes to hill tops, but was located mostly on the mid – upper slopes.	1a	Open shrubland of *Acacia aneura*, *A. ramulosa* var *linophylla*, and / or *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) over a sparse shrub cover of *Eremophila glutinosa*, *Eremophila latrobei* subsp. *Latrobei* and *Santalum spicatum*	All taxa 32.7±1.0 Annuals 19.3±2.7
This community occurs mostly on rocky, gentle – moderate inclines, on higher slopes than type 1a.	1b	Open shrublands and sparse shrublands of *Acacia aneura*, *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), and *Grevillea berryana* over *Eremophila georgei*, *E. latrobei* subsp. *Latrobei, E. glutinosa* and, *Thryptomene decussata. Ptilotus schwartzii, Ptilotus obovatus, Grevillea berryana, Eremophila georgei and Thysanotus manglesianus, Prostanthera petrophila* and *Cheilanthes sieberi* subsp. *Sieberi*	All taxa 39.2±5.9 Annuals 23.6±5.0
Outcrops and rocklands of BIF on moderate – steep hillslopes. Crevices and fissures formed in exposed outcrops of bedrock	2	Sparse to open shrublands of *Acacia aneura* and *A. incurvaneura* over *Thryptomene decussata*, *Philotheca brucei* subsp. *Brucei, Eremophila* spp. *Micromyrtus* *sulphurea*, and *Dodonaea pachyneura* over *Cheilanthes adiantoides, Stylidium longibracteatum, Ptilotus obovatus* subsp. *Obovatus* and *Harnieria kempeana* subsp. *Muelleri*	All taxa 43.9±6.4 Annuals 25.4±7.2
Lower hillslopes	3	Open shrubland of *Acacia aneura* over isolated shrub species such as *Solanum ashbyae* and *Tribulus suberosus* and *Cheilanthes sieberi* subsp. *Pseudovellea*	All taxa 20.5±3.5 Annuals 15.0±2.8
Upper slope on steep, rocky hillslopes with relatively high levels of exposed bedrock with fractured rocky substrates	4	Scattered *Acacia pruinocarpa* over open shrublands of *Acacia aneura* with *Philotheca brucei* subsp. *Brucei* and *Eremophila* spp, and *Abutilon oxycarpum, Dodonaea pachyneura* and *Enneapogon caerulescens*	All taxa 32.7±7.2 Annuals 22.0±6.9

Landscape position	Code	Description	Species richness
Mostly on lower slopes and outwashes of ironstone colluvium	5a	Open tall shrublands of *Acacia pruinocarpa, Acacia aptaneura* and *Acacia ramulosa* var. *linophylla* with *Acacia ceasaneura*.	All taxa 27.9±5.2 Annuals 17.2±4.5
Moderately inclined lower hillslopes and outwash plains.	5b	Sparse open shrubland of *Acacia aneura*, *Acacia aptaneura, A. effusifolia* over sparse shrubs of *Senna glaucifolia* and *Tribulus suberosus*. With *Hibiscus sturtii, Enneapogon caerulescens* and *Sida* sp. Dark green fruits (S. van Leeuwen 2260).	All taxa 36.2±3.4 Annuals 21.8±5.1
Dolerite substrates including a hillcrest of exposed volcanic rocks, mid –lower slopes, footslopes and a colluvial fan	6	Sparse to open shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia aneura* and *Acacia speckii* over sparse mid-stratum of *Eremophila macmillaniana, Eremophila mackinlayi* subsp. *Spathulata* and *Senna glaucifolia* with *Sida* sp. Dark green fruits (S. van Leeuwen 2260), *Maireana georgei* and *Euploca ovalifolium*	All taxa 49.8±3.7 Annuals 30.3±4.2
Ecologia (2009a)			
BIF mid to upper slopes and outcropping	1a	*Acacia aneura* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *A. ramulosa* var. *linophylla* and *Thryptomene decussata* open mid shrubland over mixed *Eremophila* spp. Low shrubland.	13±3.52
BIF upper slopes and outcropping	1b	*Acacia aneura* low open woodland over *Acacia cockertoniana* open mid shrubland over mixed mid shrubland over *Ptilotus obovatus* low shrubland.	14±2.89
Ridge tops of BIF ranges	2a	Scattered *Acacia pruinocarpa* trees over *A. aneura* mid sparse shrubland / scattered shrubs over *Ptilotus obovatus* low shrubland with *Cymbopogon ambiguus* tussock grasses.	11±3.30
Mid to upper slopes and broad ridge tops of BIF ranges and ridge tops of breakaways	2b	*Acacia aneura* sparse shrubland over mixed sparse mid shrubland over *Micromyrtus sulphurea* and *Ptilotus obovatus* low open shrubland	17±3.86

Landscape position	Code	Description	Species richness
Sandy outwash and gravelly plains and footslopes of BIF ranges	3a	+/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. Open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	16±3.42
Drainage lines and low-lying areas on sandy outwash plains	3b	+/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. Closed shrubland over *Ptilotus obovatus* open low shrubland.	17±5.26
Sandy plains	3c	Scattered *Eucalyptus* mallees / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *Forrestii* shrubland over *Ptilotus obovatus* open low shrubland.	19±1.26
Gravelly plains and low hills	3d	*Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *Simulans* and *Aluta aspera* subsp. *Hesperia* low open shrubland.	9±2.65
Undulating scree plains and mid to low slopes of granite and dolerite	4a	*Acacia* sp. Weld Range and *A. incurvaneura* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. Open mid shrubland over *Ptilotus obovatus* open low shrubland.	15±3.75
Minor drainage areas, creek lines and midslope of low dolerite and granite hills	4b	*Acacia* sp. Weld Range and *Acacia speckii* (P4) shrubland over mixed *Senna* spp sparse shrubland over *Grevillea inconspicua* (P4) and *Dodonaea amplisemina*. (P4) open shrubland over *Cymbopogon ambiguus* sparse tussock grassland	17±5.77
Ridge tops and upper slopes of BIF ridges, low lying semi-saline flats, riparian areas and ironstone scree flat plains.	5a	*Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.	16±5.56
Flat plain adjoining seasonally inundated wetland	5b	+/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.	16±3.61
Mainly occurring in and around seasonally inundated areas and salt affected drainage lines	6a	Scattered *Acacia* spp. Shrubs over mixed *Senna* spp. Open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. Chenopod shrubland	20±4.43

Landscape position	Code	Description	Species richness
Undulating plains with a surface layer of gypsum and calcrete	6b	Scattered mixed *Acacia* spp. Over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.	13±3.12
Seasonally inundated salt pan	6c	*Eremophila maculata* subsp. *Brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.	6.0±1.0
Seasonally inundated claypan	7a	*Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.	18±2.08
Fringe of seasonally inundated wetland	7b	*Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Duma florulenta* low sparse shrubland over mixed low tussock grasses.	19±2.89

Other significant vegetation that has the potential to occur in the Survey Area is GDE.

The Bureau of Meteorology (**BoM**) GDE Atlas provides information to support the recognition and identification of GDEs in natural resource management, including water planning and environmental impact assessment. It indicates where ecosystems potentially interact with groundwater, and some of the characteristics of those ecosystems that may be useful in determining water requirements.

The GDE Atlas shows general areas where groundwater interaction may occur. It does not imply that an entire mapped ecosystem is using groundwater, but rather groundwater interaction may be occurring somewhere within the mapped ecosystem.

For WA, the Atlas contains information about two types of ecosystems:

- Aquatic ecosystems that rely on the surface expression of groundwater–this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs; and
- The terrestrial GDE layer expresses the potential for groundwater and mapped vegetation communities across Australia to interact. It shows the vegetation communities that interact with groundwater from the water table or in the capillary zone.

The closest aquatic system is Lake Annean, 35 km east of the Survey Area. The Atlas identifies moderate potential terrestrial GDE intersecting the Survey Area. The feature is described as 'Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains, supporting groved mulga and bowgada; within Sandplains and hardpan wash plains with outgoing drainage and salt lakes, broken by ridges of metamorphic rocks and granite'.

Ecologia (2009a) assessed the likelihood of GDE at Weld Range and identified vegetation types 7a and 7b as potentially groundwater dependent. Communities 7a and 7b do not occur within the Beebyn deposit area and reported that no species known to be phreatophytic have been recorded in the communities present within the Beebyn deposit area.

4.1.3 Introduced Flora Species

Dandjoo returned nine introduced flora species. Six introduced flora species have been recorded locally by previous surveys. Table 4-3 lists these introduced flora species.

Table 4-3. Introduced Flora Records within 30 km of the Survey Area

Species	Common Name
Cenchrus ciliaris	Buffel grass
Cleretum papulosum subsp. *papulosum*	-
Cucumis myriocarpus	Prickly paddy-melon
Cuscuta epithymum	Lesser dodder
Hypochaeris glabra	Smooth Cats-ear
Lysimachia arvensis	Pimpernel
Pentameris airoides subsp. *airoides*	False hairgrass
Rostraria pumila	Tiny bristle-grass
Sisymbrium erysimoides	Smooth mustard
Solanum nigrum	Black berry nightshade
Sonchus oleraceus	Common sowthistle

No Declared pests under the BAM Act or WONS have been recorded within 30 km of the Survey Area.

4.2 FIELD SURVEY

4.2.1 Flora

A total of 77 species of flora were recorded within the Survey Area, comprising all native species. Nine specimens were unable to be identified to species level due to a lack of diagnostic material.

The *Fabaceae* (pea family, 15 species), *Poaceae* (grass family, 10 species) and *Scrophulariaceae* (figwort family, 10 species) were the most species-rich families recorded. Twenty-one families represented by 40 genera were recorded across the Survey Area.

The complete list of plant species recorded within the Survey Area is presented in Appendix D. The mean species richness was 14.75 species per quadrat. The average species diversity recorded per quadrat is lower than other surveys conducted in the nearby area. Dillon and Markey (2008) recorded a floristic richness of between 20.5 and 49.8, with the proportion of annual flora ranging from 58-73% of total species richness (Section 4.1.2). Ecologia (2009a) reported 19.7% annuals and 80.4% perennials.

The number of annuals present at the time of survey was 22 or 29%, which is higher than recorded by Ecologia (2009a) but lower than recorded by Markey and Dillon (2008).

A species accumulation curve (Appendix D) was performed, returning a modelled Michaelis-Menton species richness of 100, indicating that the floristic survey was approximately 77% complete.

Floristic groups identified in the cluster analysis (Appendix D) were organised into vegetation types and are discussed in the following section.

4.2.2 Vegetation Types

Three vegetation types are described for the Survey Area, as summarised in Table 4-4 and detailed below.

Table 4-4. Vegetation Types

Code	Landform	Vegetation Description	ha	%
2a	BIF outcrops	Scattered low *Acacia aneura, Psydrax latifolia* and *Acacia pruinocarpa* over *Eremophila latrobei* subsp. *latrobei*, *Thryptomene decussata* and *Philotheca brucei* mid sparse shrubland with *Ptilotus obovatus Dodonaea pachyneura* and *Dysphania rhadinostachya* low sparse shrubland.	14.6	1.4
3a	Gravelly plains	*Acacia aneura, A. ramulosa subsp. linophylla and Acacia mulganeura tall sparse shrubland over Eremophila punicea, Eremophila forrestii subsp. forrestii and Eremophila margarethae mid sparse shrubland with Ptilotus obovatus, Eragrostis eriopoda and ?Swainsona purpurea scattered low groundcover.*	469.3	44.4
3b	Sandy outwash plains	*Acacia aneura*, *Acacia pruinocarpa* and *Acacia ramulosa* var *linophylla* low open woodland over *Eremophila forrestii* ssp *forrestii*, *Eremophila latrobei* and *Grevillea obliquistigma* mid open shrubland and *Ptilotus obovatus*, *Sida calyxhymenia* and *Abutilon cryptopetalum* sparse low shrubs.	541.8	51.2
D	-	Disturbed – clear of vegetation	30.4	3.0

Vegetation types are described below and are compared to those previously recorded for the Weld Range using structural comparison and common species assemblages. Where communities share a high level of similarity, the vegetation code previously applied has been used here and a discussion of similarity presented.

Disturbed areas constitute 3% of the Survey Area. These areas are composed of two types of areas, those maintained in a state that is clear of vegetation for exploration and station tracks; and drill pads for exploration activities, some of which have been rehabilitated but for which regeneration has not yet successfully established.

Distribution of vegetation types at a scale of 1:30,000 (inset 1), 1:40,000 (inset 2) and 1:60,000 (inset 3) is shown in Figure 4-3. The dendrogram resulting from the cluster analysis is shown in Appendix C, followed by the site data sheets and photos.

570000
575000
580000
585000
590000
595000
600000
7025000
7020000
7015000
7010000
7005000
7000000
1
2
3
1
2
3

Legend

Vegetation Types

- 2a
- 3a
- 3b
- Disturbed

Scale: @ A3 1: 120,000
Inset 1 scale 1:25,000
Inset 2 scale 1:40,000
Inset 3 scale 1: 60,000

0 2.5 5 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Animal Plant Mineral Pty Ltd

Author: VM | Approved: EH | Date: 26/03/2024

Vegetation Types

Prepared for:

SMC

Figure: 4-3

Landform: BIF Outcrops **Vegetation Type: 2a**

Scattered low *Acacia aneura, Psydrax latifolia* and *Acacia pruinocarpa* over *Eremophila latrobei* subsp. *latrobei*, *Thryptomene decussata* and *Philotheca brucei* mid sparse shrubland with *Ptilotus obovatus Dodonaea pachyneura* and *Dysphania rhadinostachya* low sparse shrubland.

This vegetation type occurs on outcrops and rocklands of BIF on moderate to steep hillslopes. Crevices and fissures formed in exposed outcrops of bedrock are present. Soil is a light red sandy clay loam occurring in crevices and cracks.

This vegetation type has been allocated the numeral 2 to reflect the synonymy with vegetation types described by Markey and Dillon (2008), who identified the presence of *Dodonaea pachyneura* and *Philotheca brucei* to be important indicators in determining this vegetation type and *Ptilotus obovatus* as also being common. It is also the same as Ecologia (2009a) vegetation type 2a that has *Acacia pruinocarpa* in the upper strata.

This vegetation type was not differentiated in the cluster analysis (Appendix C) but has been distinguished here in line with the previous vegetation surveys and the suitability of habitat features for specific conservation significant flora.

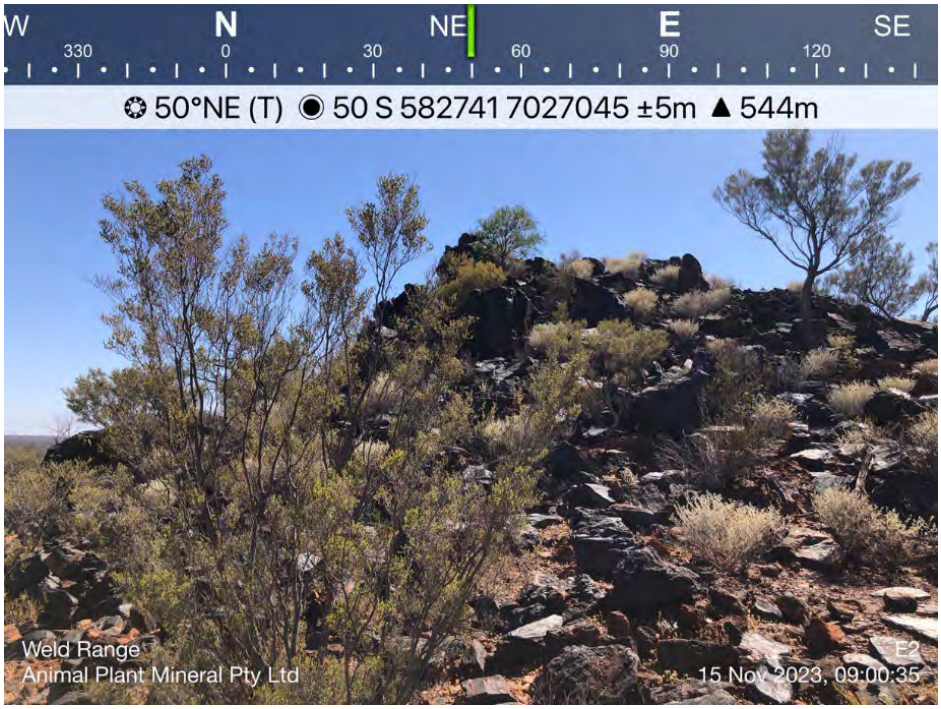


Plate 4-1. 2a BIF Outcrops

Detailed sites: E2 Total richness: 16 species. Introduced/exotic flora: None recorded

Condition: Good. Species richness is roughly one third of that recorded by Markey and Dillon (2008) who recorded 43.9±6.4 species per quadrat, of which 25.4±7.2 were annuals. Ecologia (2009a) recorded 11±3.3 species in this vegetation type. Evidence of moderate grazing is present (predominantly goats and euro) and frequent clearing for mining exploration activities is present. The low species count is in some part due to seasonal timing however 18% of recorded species were annuals and therefore season

is unlikely to be the sole explanation. This part of the range is low and, on the periphery of the BIF outcropping and of very narrow and limited extent.

Conservation significant flora: none recorded in current survey. *Verticordia jamiesonii* (P3) recorded within this vegetation in DBCA database, in a location that is currently disturbed.

Landform: Gravelly plains **Vegetation Type: 3a**

Acacia aneura, A. ramulosa subsp. *linophylla* and *Acacia mulganeura* tall sparse shrubland over *Eremophila punicea, Eremophila forrestii* subsp. *forrestii* and *Eremophila margarethae* mid sparse shrubland with *Ptilotus obovatus, Eragrostis eriopoda* and *?Swainsona purpurea* scattered low groundcover.

Occurs on sandy outwash and gravelly plains and footslopes of BIF ranges, on gentle mid and lower slopes on soils of red to red-brown clay loam to sandy clay loam with ironstone gravel to small stones at the surface. This vegetation type is labelled 3a by Ecologia (2009a). Vegetation types 3a and 3b have similar floristic assemblages, but the density of vegetation in 3b is higher. This is a component of the vegetation type 5a described by Markey and Dillon (2008).

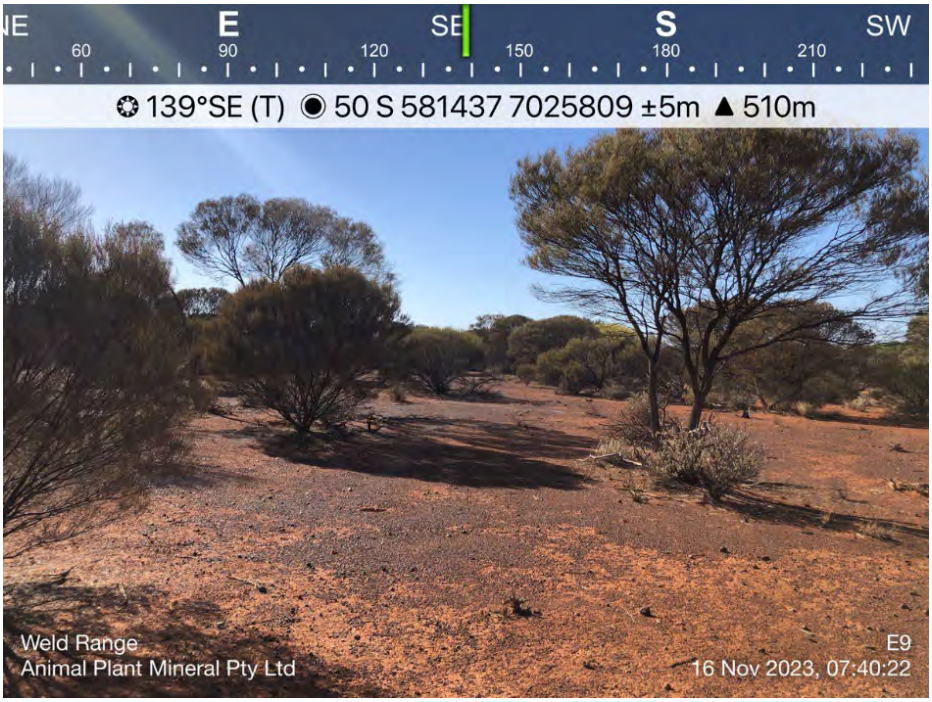


Plate 4-3. 3a Gravelly plains

Detailed sites: E5, E6, E7, E9, E11 and E16.

Total species richness: 34 Average species richness: 11.8

Introduced/exotic flora: None recorded

Conservation significant flora: None recorded in current survey, or in previous surveys.

Condition: Good. Species richness in community 5a described by Markey and Dillon (2008) was 27.9±5.2

for all species, of which annuals were 17.2±4.5. Ecologia (2009a) recorded an average species richness of 16±3.42 in community 3a. During the current survey species richness was lower than expected, in part due to seasonal conditions. However, there is also evidence of grazing and of historic overgrazing leading to soil compaction and sheetwash erosion and a vegetation cover lower than expected in many areas of this vegetation type.

Landform: Sandy outwash plains **Vegetation Type: 3b**

Acacia aneura, *Acacia pruinocarpa* and *Acacia ramulosa* var *linophylla* tall sparse shrubs over *Eremophila forrestii* ssp *forrestii*, *Eremophila latrobei* and *Grevillea obliquistigma* mid open shrubland and *Ptilotus obovatus*, *Sida calyxhymenia* and *Abutilon cryptopetalum* sparse low shrubs.

This vegetation type occurs on the lower slopes and outwashes of ironstone colluvium. Drainage lines and low-lying areas on sandy outwash plains.

This vegetation type is the same as Ecologia (2009a) vegetation type 3b that has *Acacia pruinocarpa* in the upper strata. This is a component of the vegetation type 5a described by Markey and Dillon (2008). The species composition is similar to 3a but with a denser upper and mid shrub layer.

Quadrats E04 and E08 were separated on the cluster analysis. This is due to the similarity with 3a and the density of vegetation in these sites being somewhere midway between the 3a and 3b types. They have been included here as aerial imagery identifies them to have greater similarity to 3b. E03 was also separated however the difference is as a result of poor condition in this location.

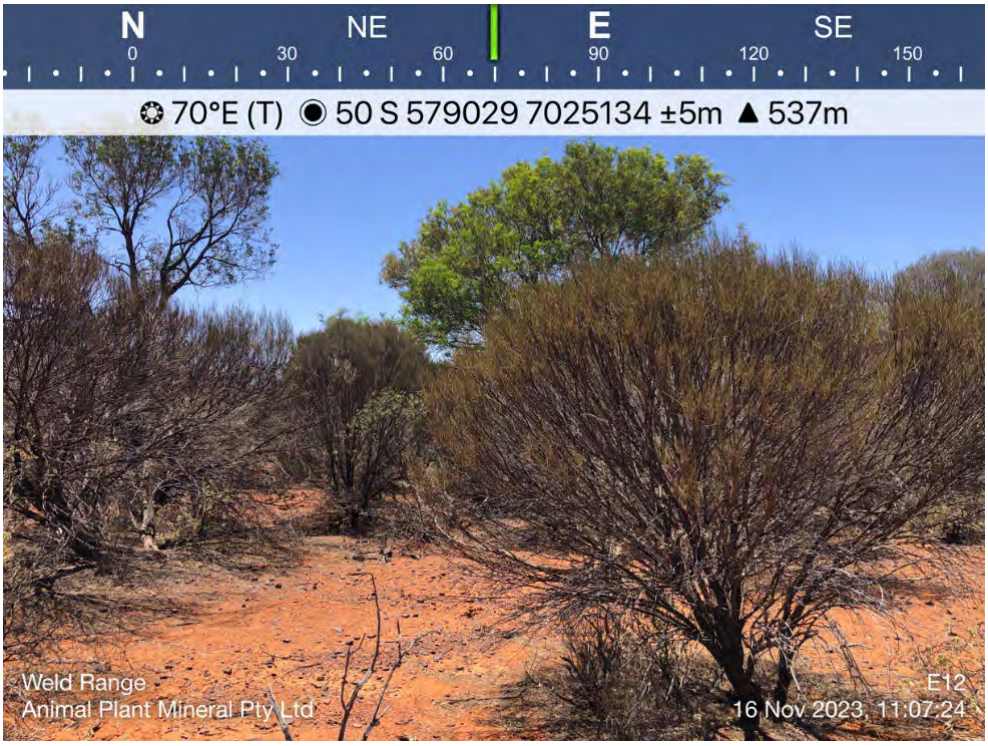


Plate 4-2. 3b Sandy outwash plains

Detailed sites: E01, E03, E04, E08, E10, E12, E13, E14, E15.

Total richness: 58 species. Average richness: 16.5 species Introduced/exotic taxa: none recorded

Condition: Good. Species richness is 84% of that recorded by Markey and Dillon (2008) who recorded 20.5±3.5 species per quadrat, of which 15.0±2.8 were annuals. Species richness is within the range reported by Ecologia (2009a), who reported a species richness of 17±5.26. Evidence of heavy grazing is

present (predominantly goats and euro) and frequent clearing for pastoral station and mining exploration activities is present. Evidence of soil compaction and sheet erosion is present.

Conservation significant species: A single individual was recorded that has the potential to be *Hibiscus krichauffianus* (P1), however definitive determination was not possible from the material available. *Prostanthera petrophila* (P3) and *Acacia speckii* (P3) were recorded in this vegetation type by Ecologia (2009a). *Beyeria lapidicola* (P1) was recorded in this vegetation type on the DBCA database in a location that is currently cleared.

4.2.3 Vegetation Condition

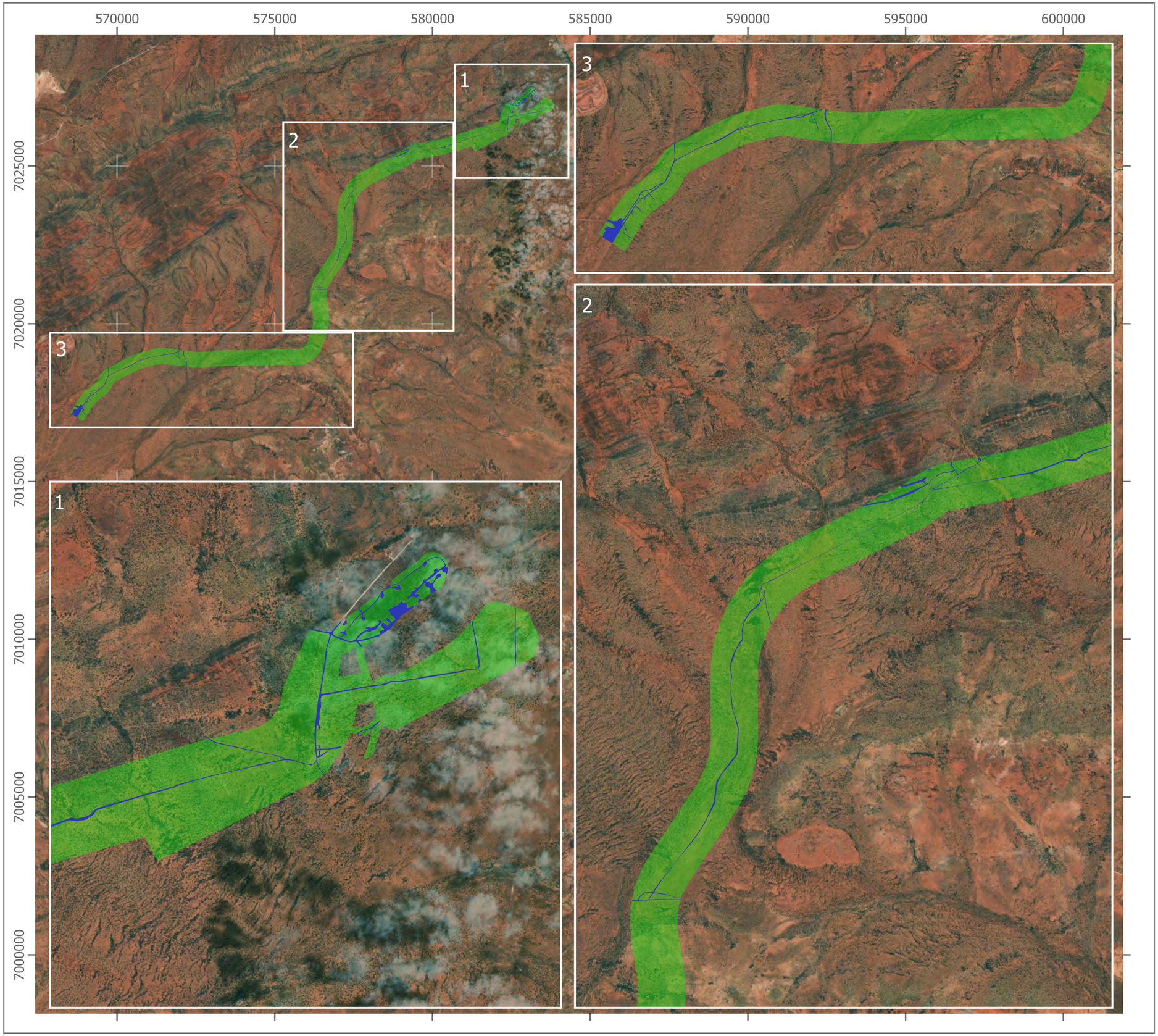
Vegetation condition across the Survey Area was within the categories Good and Completely Degraded, with most of the Survey Area in Good condition (Table 4-5; Figure 4-4).

Table 4-5. Vegetation condition within the Survey Area

Vegetation Condition	Area (ha)	Area (%)
Good	1024.6	97.0
Completely Degraded	31.2	3.0

The primary sources of disturbance on-site are moderate to heavy grazing impact from goats and euro but historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. A lower vegetation cover than expected is present, particularly in the groundcover. Whilst seasonal conditions were not optimal for annual and ephemeral species, the large rainfall in March should have promoted high growth and the senesced plants would still be visible. No sheep were seen to be currently stocked on Beebyn Station, however they may have been present earlier in the year, or the poor condition may be a consequence of historic grazing that has not yet recovered due to the degradation of the soil profile.

The other major disturbance is the clearing of vegetation for station tracks, exploration tracks and drill pads. Some of these areas have been rehabilitated or regrowth has occurred due to long periods without use. Regeneration is limited to a few shrubs of a few species and therefore remains in a degraded condition.



Legend

Vegetation Condition

- Good
- Completely Degraded

Scale: @ A3 1: 120,000
Inset 1 - 1:25,000
Inset 2 - 1:40,000
Inset 3 - 1:60,000

0 2.5 5 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Animal Plant Mineral Pty Ltd

Author: VM Approved: EH Date: 26/03/2024

Vegetation Condition

Prepared for:

SMC

Figure: 4-4

4.2.4 Significant Flora

No species listed as T under the EPBC Act or BC Act were recorded during the survey.

One specimen that has the potential to be the P3 *Hibiscus krichauffianus* was recorded during the survey. Insufficient material was available to definitively determine the species, due to seasonal conditions.

Hibiscus krichauffianus is a low or ascending shrub, 0.2-0.7 m high. Flowers are purple-pink and occur in March or October. Preferred habitat is red sandy soils.

The species is common in the central parts of Australia and the Queensland mid coast. Distribution within WA is sparse (ALA 2024), with the closest record in the Tallering Subregion, and most records are from the Pilbara. The species has not previously been recorded in the Murchison Region.

Four P flora have previously been recorded in the Survey Area, and another ten are considered Likely to occur based on the location of known populations and the availability of suitable habitat. Targeted search to confirm the presence and abundance of these species was not conducted throughout the Survey Area due to the seasonal conditions. Table 4-6 lists the species known or likely to occur and the known periods of fertility.

Table 4-6. Known periods of fertility

Species	P	Likelihood of Occurrence	Period of fertility
Acacia burrowsiana	3	Likely. Suitable habitat present in 3a and 3b	Flowering Oct - Nov
Acacia dilloniorum	1	Likely. Suitable habitat in the upper 3b areas	Flowers Aug.; mature pods late Oct.
Acacia speckii	4	Present. Suitable habitat in the upper 3b areas	Mature pods present on a specimen collected in September
Beyeria lapidicola	1	Likely. Suitable habitat in 2a and 3b.	Fruits present on holotype collected in August
Dodonaea amplisemina	4	Present. Suitable habitat in 3b.	Flowers recorded in August. Fruits begin to mature from late August to October.
Euphorbia sarcostemmoides	1	Likely. Suitable habitat in 2a, 3a and 3b.	Not available for WA. Fruits present on holotype collected in August in Northern Territory.
Grevillea inconspicua	4	Likely. Suitable habitat in 2a and 3b.	Flowers June to August
Hemigenia virescens	3	Likely. Suitable habitat in 3b.	Flowers recorded July and August
Hibiscus krichauffianus	3	Possible. Suitable habitat in 3b.	Flowers in March or October
Homalocalyx echinulatus	3	Likely. Suitable habitat in 3b.	Flowers June to September
Micromyrtus placoides	3	Likely. Broad habitat suitability. All habitats suitable.	Flowers recorded in August and September
Prostanthera petrophila	3	Present. Suitable habitat in 2a and upper 3a and 3b	Flowers in August

Species	P	Likelihood of Occurrence	Period of fertility
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	3	Likely. Suitable habitat in 2a.	Flowers in June
Stenanthemum mediale	1	Likely. Suitable habitat in 3 and 3b.	Flowers April to August
Verticordia jamiesonii	3	Likely. Suitable habitat in 2a and 3b.	Flowers September to October

4.2.5 Significant Vegetation

Approximately half the Survey Area is within the Weld Range PEC. Vegetation types recorded during the survey are consistent with vegetation types described previously for the Weld Range PEC by Markey and Dillon (2008) and Ecologia (2009a). Markey and Dillon (2008) did not map the extent of each vegetation type. Ecologia (2009a) mapped vegetation types across a large area, both within and outside of the PEC, but not containing the entire PEC.

The proportion of these vegetation types within the Survey Area compared to that mapped over the broader Weld Range PEC as surveyed by Ecologia (2009a) is listed in Table 4-7.

Table 4-7. Proportion of Survey Area in PEC

Veg Type	Survey Area in PEC (ha)	Total mapped by Ecologia (2009a) in PEC	Proportion (%)
2a	14.6	1360.0	1.1
3a	51.6	462.0	11.2
3b	135.2	666.0	20.3
Total	**201.4**	**2488.0**	

The Survey Area contains less than 20% of the mapped distribution of these vegetation types within the Weld Range PEC. The Weld Range PEC is 20,073 ha and therefore the undisturbed parts of the Survey Area constitute 1.0% of the Weld Range PEC.

4.2.6 Introduced Flora

No introduced flora were recorded in the Survey Area.

5 TERRESTRIAL VERTEBRATE FAUNA RESULTS

5.1 DESKTOP STUDY

5.1.1 Significant Fauna

The DBCA database returned nine species of significant fauna that have previously been recorded within 30 km of the Survey Area. Of these, one is Conservation Dependent (**CD**), one is listed as Endangered (**EN**), three are listed as Vulnerable (**VU**), three are considered P in WA and one as Other Specifically Protected (**OS**). This includes five species that are known only from fossil records at Wilgie Mia and the locality is no longer within the current known range of the species. Record locations of significant fauna in relation to the Survey Area are shown in Figure 5-1.

Database records for one species of P fauna occurs within the Survey Area. Ten records of *Idiosoma clypeatum* recorded in 2010 are within the pit boundary and haul road. Another 38 records of this species occur within 500 m of the Survey Area, predominantly north of the Haul Road to the Fenix Iron Ridge Project.

The PMST returned 13 additional species, six T, five MI and two that are both T and MI. These are species that do not have DBCA records within 30 km but where modelling has identified that suitable habitat is known to occur or may occur.

The literature review returned one additional conservation significant species recorded during the Ecologia (2009b) survey of the greater Weld Range area *Antechinomys longicaudata* (Long-tailed Dunnart) P4, additional locations of *Lerista eupoda* (West Coast mulga slider) P1, and a nearby long inactive malleefowl mound. These record locations are outside the Survey Area.

Database search results of T, P and MI fauna within 30 km of the Survey Area are listed in Table 5-1, with the outcome of the likelihood of occurrence assessment. The complete assessment including the preferred habitat relative to those available in the Survey Area and a summary of records in the local area is included in Appendix E. Seven T and P species are assessed as present, likely to occur or possibly occurring. These species are discussed in detail in relation to the Survey Area in section 5.2.2.

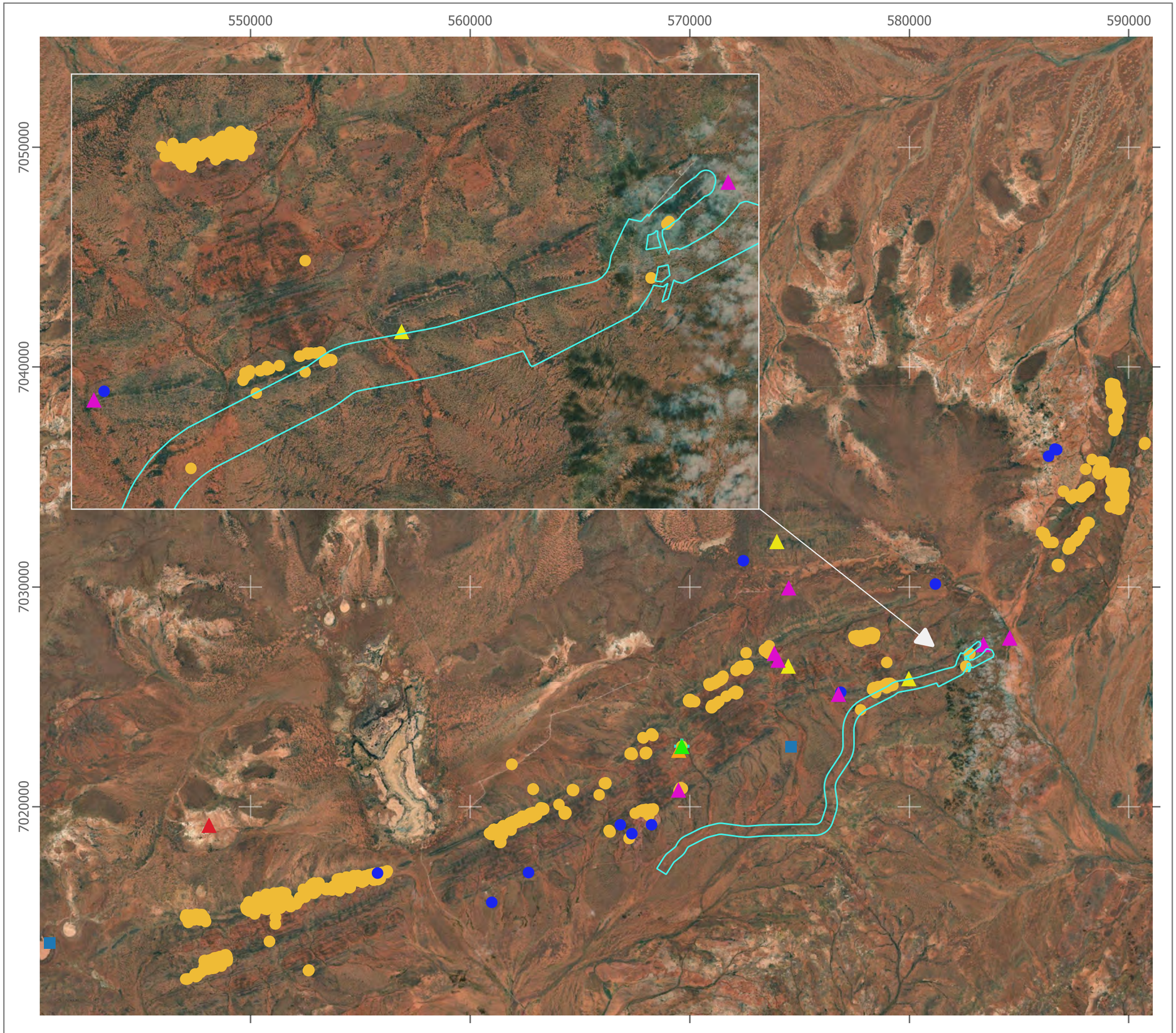
5.1.2 Introduced Fauna

No introduced fauna were returned from the Dandjoo database.

Seven species of introduced mammal were recorded at Weld Range by Ecologia (2009b), being:

- Dog (*Canis lupus familiaris*);
- European Red Fox (*Vulpes vulpes*);
- Feral Cat (*Felis catus*);
- Rabbit (*Oryctolagus cuniculus*);
- House Mouse (*Mus musculus*);
- Goat (*Capra hircus*); and
- Cow (*Bos taurus*).

Large numbers of feral goats were observed across the range, with high grazing pressure evident on the native vegetation.



Legend

Survey Area

Threatened
- Aphelocephala leucopsis (VU)
- Leporillus conditor (VU)
- Macroderma gigas (VU)
- Macrotis lagotis (VU)
- Malleefowl mound (VU)
- Petrogale lateralis lateralis (EN)
- Pseudomys gouldii (VU)

Priority
- Dasycercus blythi (P4)
- Idiosoma clypeatum (P3)
- Lerista eupoda (P1)
- Sminthopsis longicaudata (P4)

Migratory and Other
- Falco peregrinus (OS)

Scale: 1: 175,000 @ A3 0 5 10 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

Significant Fauna Database Records

Prepared for: SINOSTEEL SMC

Figure: 5-1

Table 5-1. Significant fauna database records and likelihood of occurrence

	Species	Common Name	Cons. Code		Assessment of Occurrence
			BC Act	EPBC Act	
birds	*Aphelocephala leucopsis*	Southern whiteface	-	VU	Likely. All habitats are suitable.
	Apus pacificus	Fork-tailed swift	MI	MI	Likely. All habitats are suitable.
	Calidris acuminata	Sharp-tailed sandpiper	MI	VU, MI	Unlikely. No suitable habitat.
	Calidris ferruginea	Curlew sandpiper	CR	CR, MI	Unlikely. No suitable habitat.
	Calidris melanotos	Pectoral sandpiper	MI	MI	Unlikely. No suitable habitat.
	Falco hypoleucos	Grey falcon	VU	VU	Possible. Suitable foraging habitat. No suitable nesting habitat.
	Falco peregrinus	Peregrine falcon	OS	-	Possible. Foraging habitat present.
	Leipoa ocellata	Malleefowl	VU	VU	Possible. Inactive mounds have been recorded.
	Motacilla cinerea	Grey wagtail	MI	MI	Unlikely. No suitable habitat.
	Motacilla flava	Yellow wagtail	MI	MI	Unlikely. No suitable habitat.
	Pezoporus occidentalis	Night parrot	CR	EN	Unlikely. No suitable habitat.
mammals	*Antechinomys longicaudata*	Long-tailed dunnart	P4		Likely. Suitable habitat in the Banded Ironstone Formation.
	Dasycercus blythi	Brush-tailed mulgara	P4	-	Unlikely. The local record is a fossilised specimen.
	Leporillus conditor	Greater stick-nest rat	CD	VU	Unlikely. The local record is a fossilised specimen.
	Macroderma gigas	Ghost bat	VU	VU	Unlikely. The local record is a fossilised specimen.
	Macrotis lagotis	Bilby	VU	VU	Unlikely. The local record has a low level of certainty and was recorded in 1984.
	Petrogale lateralis lateralis	Black-flanked rock-wallaby	EN	EN	Unlikely. The local record is a fossilised specimen.

	Species	Common Name	Cons. Code		Assessment of Occurrence
			BC Act	EPBC Act	
	Pseudomys gouldii	Gould's mouse, Shark Bay mouse	VU	VU	Unlikely. The local record is a fossilised specimen.
reptiles	*Egernia stokesii badia*	Western spiny-tailed skink	VU	EN	Possible. No granite outcrops are present but suitable habitat may be present in the BIF outcrops.
	Lerista eupoda	West Coast mulga slider	P1		Likely. Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.
invertebrates	*Idiosoma clypeatum*	Northern shield-backed trapdoor spider	P3	-	Present. Suitable habitat in the Mulga Woodland on Hill Slope habitat.
	Idiosoma nigrum	Shield-backed trapdoor spider	EN	VU	Unlikely. All specimens in the Murchison region determined to be *I. clypeatum*

5.2 FIELD SURVEY

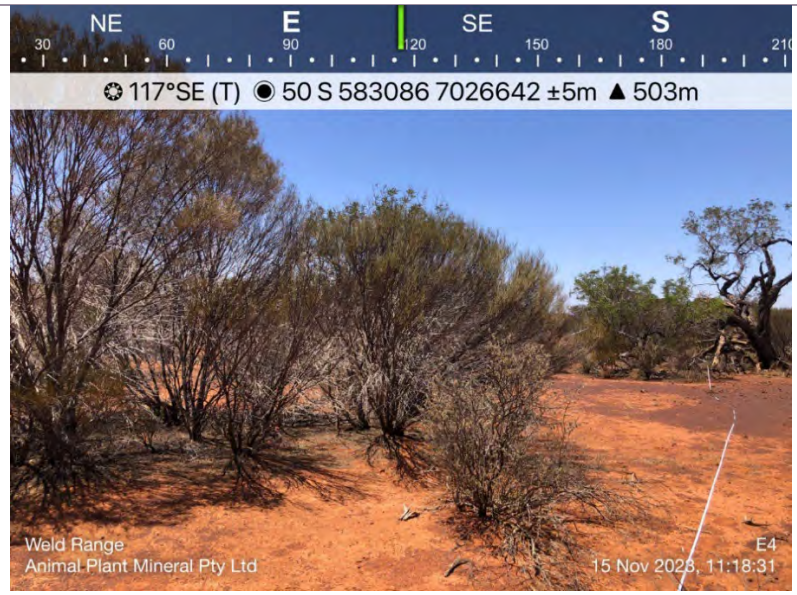
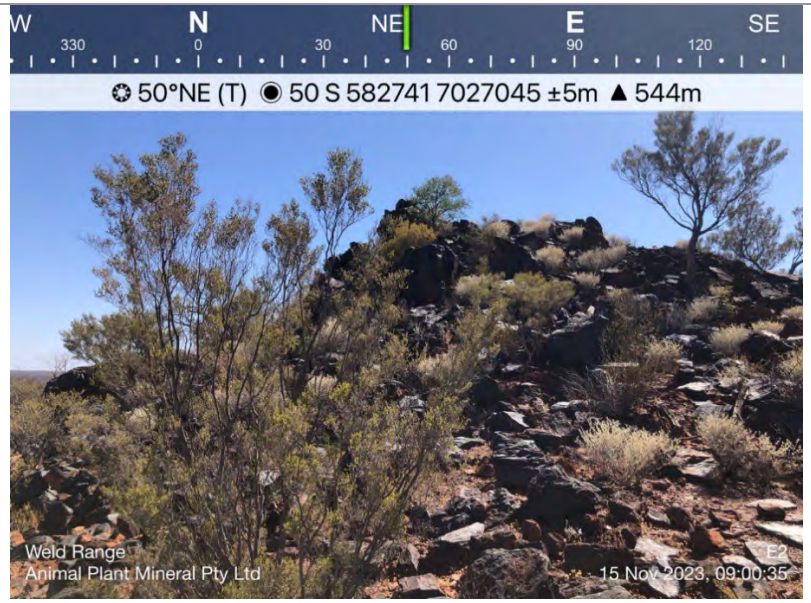
5.2.1 Fauna Habitats

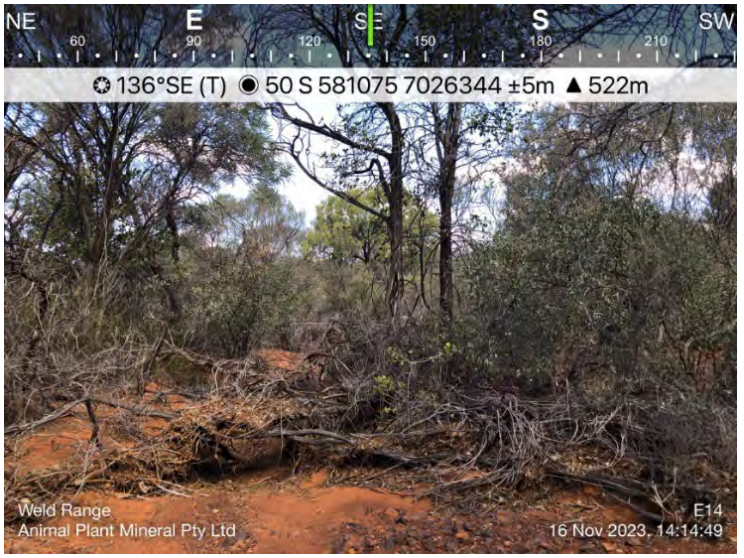
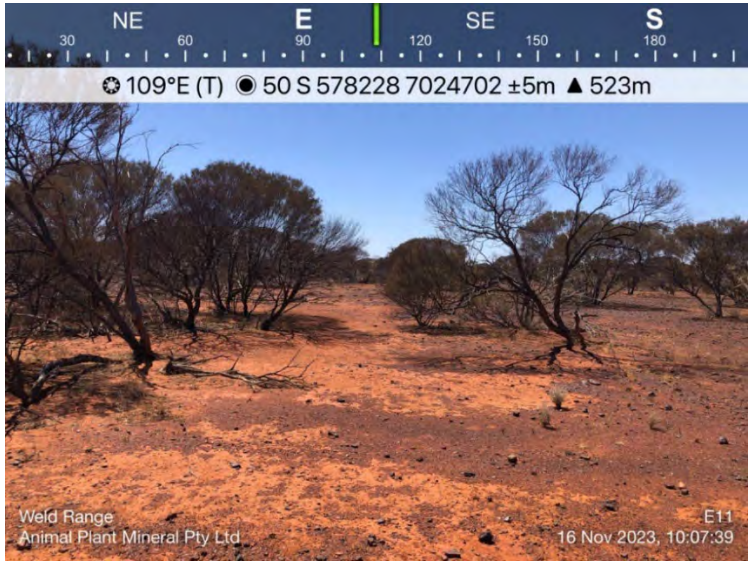
Four fauna habitats are described for the Survey Area and are summarised in Table 5-2 and described below.

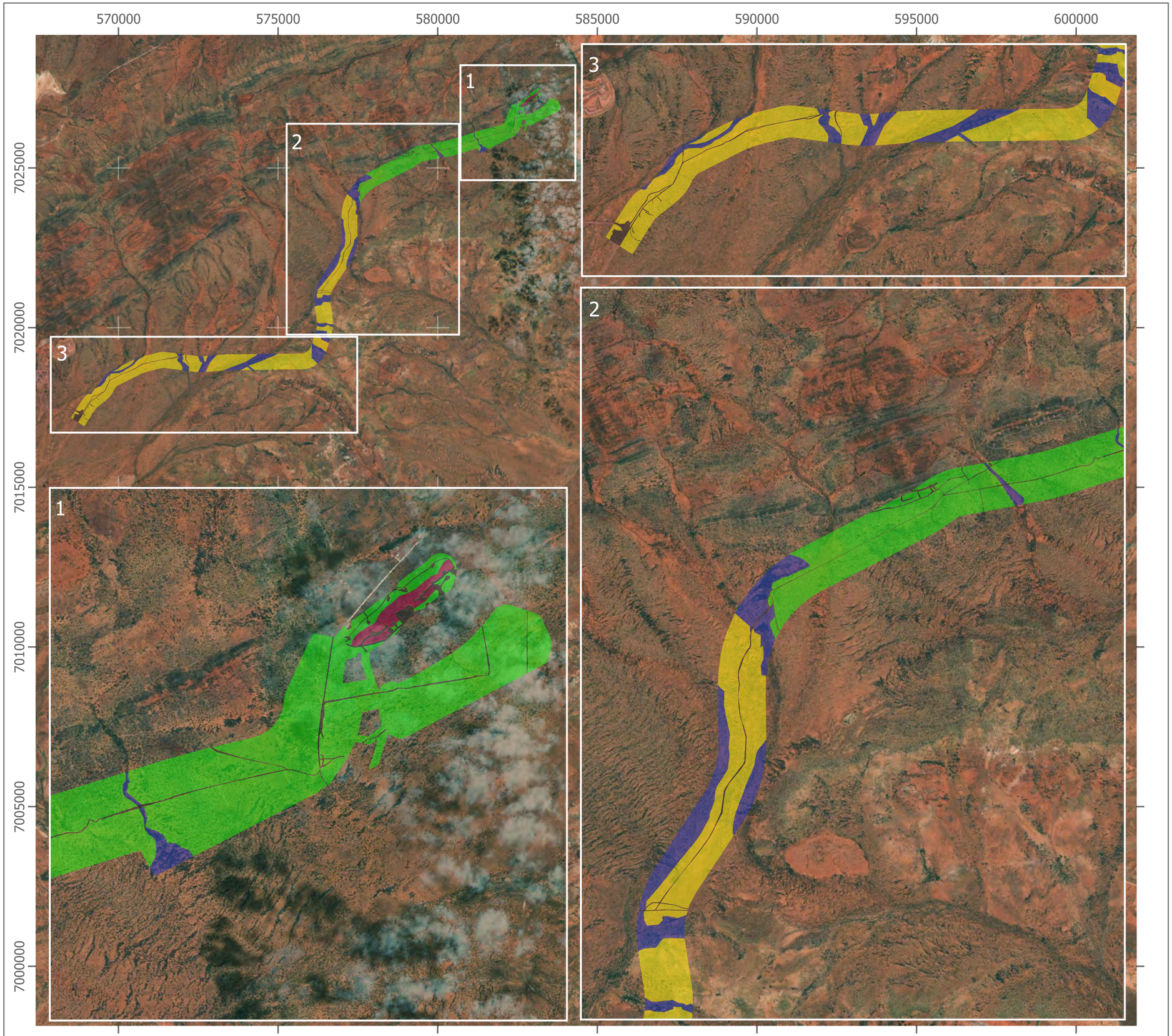
Table 5-2. Fauna Habitats within the Survey Area

Name	Area (ha)	Proportion (%)
Acacia Sand Plains	500.5	47.4
Banded Ironstone Ridge	6.1	0.6
Drainage Line	186.1	17.6
Mulga Woodland on Hill Slope	333.0	31.5
Disturbed	30.5	2.9

The distribution of fauna habitats is shown in Figure 5-2.

Acacia sand plains	Occasional *Acacia pruinocarpa* low trees with *A. aneura* (mulga) and *Acacia ramulosa* var. *linopylla* tall shrubs, over medium to low mixed shrubs predominantly of *Eremophila* spp., over sparse grasses and perennial herbs, on a sandy to lightly rocky clay loam.	
Banded Ironstone Ridge	Occasional *Acacia pruinocarpa* low trees and/or *Acacia aneura* (mulga) tall shrubs, over medium to low mixed shrubs, over sparse grasses, on an ironstone and clayey loam.	

Drainage line	Open *Acacia pruinocarpa* and *Acacia aneura* low trees over low to medium mixed shrubs, over sparse to dense grasses on a stony sandy and clayey soil.	
Mulga woodland on hill slope	Open *Acacia pruinocarpa* low trees over *Acacia aneura* high shrubs, over mixed medium shrubs, over sparse grasses and herbs on a sandy or stony clay loam.	



Legend

Fauna Habitat

- Acacia Sand Plains
- Banded Ironstone Ridge
- Disturbed
- Drainage Line
- Mulga Woodland on Hill Slope

Scale: 1: 120,000 @ A3

0 2.5 5 km

Coordinate System: GDA 2020 MGA Zone 50
Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

Fauna Habitat

Prepared for:

SMC

Figure: 5-2

5.2.2 Conservation Significant Fauna

5.2.2.1 Southern whiteface

Southern whiteface occur across most of mainland Australia south of the tropics, from the north- eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (Schodde and Mason 1999). Two subspecies are recognised under the 2023 EPBC Act listing: *A. l. leucopsis* (South-east southern whiteface), the nominate subspecies found throughout south-eastern and central Australia; and *A. l. castaneiventris* (South-west southern whiteface) found in central and southern WA.

As the species is not listed as T in WA, no location records were included in the DBCA database search. Record locations shown in Figure 5-1 were extracted from the Atlas of Living Australia (**ALA** 2024), originating from the Birds Australia database. Ecologia (2009b) recorded the species at the Weld Range project, however as the species was not listed as conservation significant at the time, the specific location is not reported, and may not have been within the current Survey Area.

Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter 2002). Southern whitefaces are considered sedentary; however, atlas records indicate that individuals may move into wetter areas outside of their normal range during drought years (Higgins and Peter 2002). Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter (Higgins and Peter 2002). Although the species typically forages in small groups of 2–8 individuals, birds may congregate in larger flocks during the non-breeding season, with as many as 70 birds recorded in foraging parties in winter (Higgins and Peter 2002). The species often participates in mixed species feeding flocks, particularly with other whiteface and thornbill species.

Breeding takes place from July to October throughout most of the species' range, however, the timing of breeding can be affected by rainfall in arid regions (Higgins and Peter 2002). Birds may breed outside of their usual season following sufficient rainfall or may not breed at all during drought. Birds build large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes (Higgins and Peter 2002).

Habitat critical to the survival of the Southern whiteface (DCCEEW 2023) includes areas of:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat;
- living and dead trees with hollows and crevices which are essential for roosting and nesting.

The Survey Area contains some large trees that may be suitable for development of hollows, however the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats and clearing for mining exploration activity. The understory is sparse and the litter layer sparse to absent, but thicker in narrow bands around the Drainage Lines. Due to the poor condition of the understory, the Survey Area is unlikely to host habitat critical to the survival of the Southern whiteface, however, this would need to be confirmed by targeted survey for the presence of birds.

5.2.2.2 Grey falcon

The Grey falcon occurs in most of the drier parts of Australia (Schoenjahn 2018). Its distribution is centred on inland drainage systems where there is an average annual rainfall of less than 500 mm. Its main habitat is timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined watercourses. It generally occurs at low densities across inland Australia (BirdLife International 2019).

The Grey falcon hunts far out into tussock grassland and open woodland. It nests in old nests made by other birds, usually in the tallest trees along watercourses, particularly river red gum (TSSC 2020). Prey species include doves, pigeons, small parrots and cockatoos, and finches, but a variety of other bird prey species have been recorded, as well as mammals and lizards (TSSC 2020).

Local records are more than 50 km away. All habitats in the Survey Area are suitable foraging habitat for this species. No trees suitable for nesting are present in the Survey Area, however there may be occasional tall trees of species other than red gum present in the drainage features within foraging range of the Survey Area.

5.2.2.3 Malleefowl

The Survey Area is on the northernmost extent of Malleefowl distribution at this longitude in WA, and the ALA lists the closest records over 50 km to the south. Ecologia (2009b) reported the presence of old, inactive mounds within the Weld Range habitats, but noted that better, unburnt habitat was present in areas outside of their study boundaries, and conclude it was not expected to be resident at Weld Range but may persist in surrounding areas.

Malleefowl are generalist feeders consisting of the seeds, flowers and fruits of shrubs (especially legumes), herbs, invertebrates, tubers and fungi. Malleefowl diet is characteristically variable and different foods are important at different times and locations (Benshemesh 2007). A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007). Soils in the Survey Area have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, however there is a possibility of Malleefowl occurring in small patches of higher quality habitat in or near the larger drainage features low in the plains.

5.2.2.4 Long-tailed dunnart

Long-tailed dunnart is known from remote and disparate locations throughout the arid zone and in association with rocky habitats. While records of this species are few and far between, it has been found to be reasonably abundant when a known population is sampled. Due to the highly patchy nature of Long-tailed dunnart records and the distance between populations the dispersal ability of this species is potentially very poor.

Its long tail is muscular at the base and is highly mobile, allowing the dunnart to move with agility in rocky habitats utilising the long tail and striated foot-pads to assist with climbing. They feed on a variety of invertebrates.

Breeding occurs in October and November and the female can bear up to six young. Young disperse in March-April in the Murchison area (Western Australian Museum Collections 2023).

At the Weld Range the species has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex Ecologia (2009b). In the Survey Area, suitable habitat is in the Banded Ironstone Ridge habitats, and rocky Drainage Lines between ridges.

5.2.2.5 Western spiny-tailed skink

Egernia stokesii badia was widely distributed up until the 1960s through semi-arid areas of southwestern WA from Minnivale (150 km ENE of Perth) north to Mullewa and east to Perenjori and south of Yalgoo but excluding coastal areas. There are two forms of *E. stokesii badia*: a reddish-brown form in the northern and central wheatbelt; and a wholly black form in the Murchison Region (Ecologia 2010). Surveys for the black form between 2006 and 2009 identified 96 locations in the Murchison Region (Ecologia 2010) and the area of occupancy is approximately 4,000 km^2 in extent (Department of Environment and Conservation 2012).

The Survey Areas occur in the Murchison Region where the wholly black form is distributed. Habitat differences are apparent between the forms, where the Wheatbelt reddish-brown form inhabits hollow logs and the Murchison wholly black form inhabits crevices, predominantly in areas of granite outcropping. Whilst there is no granite outcropping in the Survey Area, habitat suitability is poorly known (Department of Sustainability, Environment, Water, Population and Communities [**DSEWPAC**] 2011) and may be present in the BIF outcropping.

E. stokesii badia is one of the larger subspecies of *Egernia stokesii*, growing to 194 mm (snout to vent length). Its skin is coloured with heavily keeled scales. It has a short, flattish, distinctively spiny tail (Chapple 2003; Wilson and Swan 2023) which it uses as anchorage within crevices when defending itself (Chapple 2003).

E. stokesii badia live in spatially and temporally stable groups of up to 17 individuals and has a distinctive behaviour of depositing faecal droppings outside of refuges in a pile or cluster (How *et al*. 2003) referred to as a communal toilet area, scat piling, or latrine.

Whilst granite outcropping with crevices is generally the observed habitat, it is possible the Banded Ironstone Ridge contains suitable crevices.

5.2.2.6 West Coast mulga slider

The West Coast mulga slider is restricted to the arid southern interior between Cue and Meekatharra. Suitable habitat has been described as occurring in open mulga on red loams and sandy loams (Smith 1996).

Local records are in lower slopes/upper plain habitats, often near drainage lines.

The *Lerista* genus are burrowing species that thrive in arid conditions. More commonly, and as is the case for *L eupoda*, they are unspecialised inhabitants of leaf litter. In the case of *L eupoda*, the species appears more restricted to the open mulga areas on loamy soils (Wilson and Swan 2023).

They tend to be most easily located in groves of Acacia where they emerge from just under the surface to fossick in the leaf litter for invertebrate prey. In cooler months they are most easily located in the more exposed litter layers close to the surface, retreating deeper under the soil within thicker Acacia groves as temperatures increase and humidity decreases. They are prone to desiccation, hence their

fossorial / semi-subterranean habit. In addition to leaf litter habitat, they are often found in the detrital layers of rotting logs, in abandoned termitaria and in abandoned stick-ant nests (Bush *et al.,* 2007).

Suitability of habitat within the Survey Area is limited by the sparse presence of litter. Higher litter loads are present near to and within drainage features but are of limited extent.

5.2.2.7 Northern shield-backed trapdoor spider

Northern shield-backed trapdoor spider has a widespread distribution in WA's inland arid zone, principally throughout the Yalgoo and Murchison Bioregions where it is the only known species in the nigrum-group (excluding a population of *I. formosum* from the southern Yalgoo). It extends from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie.

This distribution seems to be strongly correlated with annual rainfall of less than 250 mm (Rix *et al.* 2018).

Idiosoma clypeatum was for a long time misidentified as *I. nigrum*, and the 2013 threatened species assessment of *I. nigrum* prepared under the EPBC Act conflated the identification of these two species. Specimens collected at the Weld Range by Ecologia (2009b) were identified as *I. nigrum* at the time but have since been reassigned to *I. clypeatum* (Rix *et al.* 2018). Ellis (2015) summarises aspects of the biology of this species based on observations at the Weld Range where burrows are adorned with a 'moustache-like' arrangement of twig-lines. Males have been collected wandering in search of females in late autumn, winter and spring, with a peak of activity in winter.

Database records indicate the species occurs most frequently in the mid to lower slopes of the Weld Range, including within the Survey Area and immediate surrounds. Targeted searches for shield-backed trapdoor spider were conducted in 2009 and targeted search is appropriate within the Survey Area to determine the current status of species presence.

6 CONCLUSIONS

6.1 FLORA

The flora and vegetation survey recorded a total of 77 taxa within the Survey Area. The average species diversity recorded per quadrat (14.75) is less than that reported by Markey and Dillon (20.5 - 49.8) but comparable with that of Ecologia (2009a) for the same vegetation types.

Modelled species richness indicated that the floristic survey was approximately 77% complete. Season of survey and seasonal conditions are a minor constraint for the completeness of the survey, and it is expected that a higher species richness in annual/ephemeral taxa would be recorded during the recommended survey period following average or above average rainfall. This is only a minor constraint as the local area is well surveyed (Markey and Dillon 2008, Ecologia 2009a) and conditions were sufficient to describe vegetation types, which are dominated by perennial vegetation in this bioregion. Whilst occurring outside of the recommended survey period, the remotely captured NDVI index indicates that greenness in the Beebyn Station was near to the 90th percentile in November 2023, compared to long term datasets (DPIRD 2023a).

The flora and vegetation of the Survey Area is generally typical of the Weld Range, of the Land Systems present in the Survey Area and of the adjacent lands surrounding the Survey Area.

6.2 FLORA OF CONSERVATION SIGNIFICANCE

No T flora was recorded in the Survey Area. One specimen that may be a P3 species was recorded.

Hibiscus ?*krichauffianus* was recorded at one location, quadrat E14, at 0.01% cover. Insufficient material was available to definitively determine the species, due to seasonal conditions. If confirmed, this would be a significant range extension for the species. Whilst occurring in the broadly distributed vegetation type 3b, the specific location was limited to a narrow drainage gully.

An additional four species were determined as present based upon historic survey records and ten assessed as Likely to occur based upon the proximity of known locations and the availability of suitable habitat. Targeted search for these species would be required to determine the currency and abundance of presence within the Survey Area. Periods of fertility for these species, and therefore suitable timing for targeted search is in winter and early spring.

6.3 INTRODUCED FLORA

No weeds Declared under the BAM Act or classed as WoNS were recorded in the Survey Area or are known to occur in the local area.

6.4 VEGETATION OF CONSERVATION SIGNIFICANCE

Approximately half the Survey Area is within the Weld Range PEC. Vegetation types recorded during the survey are consistent with vegetation types described previously for the Weld Range PEC by Markey and Dillon (2008) and Ecologia (2009a).

The amount of each vegetation type within the Survey Area as a proportion of that mapped within the Weld Range PEC by Ecologia (2009a) is 1.1% of 2a, 11.2% of 3a, and 20.3% of 3b.

Regional Vegetation Associations within the Survey Area as described by Beard (1975) have over 99% pre-European Vegetation extent remaining.

6.5 FAUNA OF CONSERVATION SIGNIFICANCE

The Southern whiteface has recently been determined as a T species under the EPBC Act. The species was previously widespread across temperate mainland Australia, but has suffered sharp declines in population numbers, chiefly due to habitat loss and degradation. The species is not currently listed as Threatened under the BC Act. Southern whiteface has been recorded in the Weld Range and in the surrounding landscapes. The habitats available in the Survey Area are highly likely to be part of the species historic range. The current quality of available habitat is low due to a loss of undergrowth due to heavy grazing pressure from native animals, station stocking and feral goats. Land clearing for station tracks and mining exploration has also impacted the quality of the habitat. Due to the low quality of the understory, it is unlikely that the Survey Area constitutes Critical habitat (DCCEEW 2023), however determination of current use by the species is required to unequivocally verify this. Optimal survey period is July to October during the breeding season; however, the species is sedentary (outside of drought periods) and therefore can be surveyed in any season.

Suitable foraging habitat for the Grey falcon is present within the Survey Area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Occurrence records are more than 50 km away and whilst Grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species.

The Survey Area is likely part of the historic range of the malleefowl, as evidenced by the presence of long inactive mounds recorded during baseline surveys. Mounds may last decades after abandonment, and the presence of inactive mounds is not a reliable indication of current presence. Malleefowl males begin nest construction in autumn and breeding between September and January. Survey for active mounds, is therefore possible from late autumn through to mid-summer.

Presence of the Long-tailed dunnart was confirmed in the Weld Range by the Ecologia (2009b) baseline surveys, including within the Survey Area. Suitable habitat occurs in the Banded Ironstone Ridges and the small gullies that occur between the ridges. There are no seasonal restrictions on the survey of mammals in the Eremean climatic district (EPA 2020).

The Western spiny-tailed skink has not previously been recorded in BIF; however, the species is poorly known (DSEWPAC 2011), and crevices are present in the Banded Ironstone Ridge habitat. The species is sedentary and searching crevice habitats for skinks and their distinctive latrine piles can be conducted in any season however, animals are likely to be least active in winter and most active in spring (DSEWPA 2011).

The West Coast mulga slider has been recorded in Weld Range including locations close to the Survey Area. Whilst the Survey Area is likely to be within the species broader area of occupation, the habitats within the Survey Area are generally of poor quality. Leaf litter is scarce within the Survey Area, and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable. Survey period for reptiles in the Eremean climatic district is September to April.

The Northern shield-backed trapdoor spider is known to occur in the Weld Range including within the Survey Area. The species present in the Weld Range was previously determined to be the T species *I. nigrum*, however taxonomic revision of the group led to a reassignment to *I. clypeatum* and a reduction in conservation ranking to P. Targeted survey can occur in any season as the spiders are sedentary and the burrow entrances are detectable. Suitable habitat occurs in the Mulga Woodland on Hill Slope habitat. Geographic isolation of the Northern shield-backed trapdoor spider in the region means spiders can be assigned to a species through burrow detection and without harvesting individuals.

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APPENDICES

APPENDIX A: CONSERVATION AND DECLARED CATEGORIES

Conservation categories for threatened species and communities protected under Federal legislation are defined under the *Environment Protection and Biodiversity Conservation Act 1999* and the *Environment Protection and Biodiversity Conservation Regulations 2000* are listed in Tables A.1. and A.2.

Table A.1: Categories and definitions for threatened flora and fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

Conservation Category	Definition
Extinct	Taxa with no reasonable doubt that the last member of the species has died.
Extinct in the wild	Taxa known to survive only in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriated seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CR)	Taxa facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (E)	Taxa are not critically endangered; and are facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (V)	Taxa are not critically endangered or endangered; and are facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation dependent (CD)	Taxa are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or the following subparagraphs are satisfied: i) the taxa is a species of fish; ii) the taxa is the focus of a management plan that provides management actions necessary to stop the decline of, and support the recovery of, the taxa so that its chances of long term survival in nature are maximized; iii) the management plan is in force under a law of the Commonwealth or of a State or Territory; and iv) Cessation of the management plan would adversely affect the conservation status of the taxa. Fish includes all taxa of bony fish, sharks, rays, crustaceans, molluscs and other marine organisms, but does not include marine mammals/reptiles.

Table A.2: Definitions for Threatened Ecological Communities under the *Environment Protection and Biodiversity Conservation Act 1999*.

Conservation Category	Definition
Critically endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

For Section 182 of the EPBC Act and 179 of the EPBC Act Threatened Ecological Communities and Native species are in the Critically Endangered, Endangered or Vulnerable category if they meet any of the criteria for the category mentioned in Table A.3:

Table A.3: Criteria for listing Threatened Species and Threatened Ecological Communities under the *Environment Protection and Biodiversity Conservation Regulations 2000*

Threatened Species				
Item	Criterion	Category		
		Critically Endangered	Endangered	Vulnerable
1	It has undergone, is suspected to have undergone, or is likely to undergo in the immediate future:	A very severe reduction in numbers	A severe reduction in numbers	A substantial reduction in numbers
2	Its geographic distribution is precarious for the survival of the species and is:	Very restricted	Restricted	limited
3	The estimated total number of mature individuals is: And: (a) Evidence suggests that the number will continue to decline at: or (b) The number is likely to continue to decline and its geographic distribution is:	Very low A very high rate Precarious for its survival	Low A high rate Precarious for its survival	limited A substantial rate Precarious for its survival
4	The estimated total number of mature individuals is:	Extremely low	Very low	low
5	The probability of its extinction in the wild is at least:	50% in the immediate future	20% in the near future	10% in the medium term future
Threatened Ecological Communities				
Item	Criterion	Category		
		Critically Endangered	Endangered	Vulnerable
1	Its decline in geographic distribution is:	Very severe	Severe	substantial
2	Its geographic distribution is: And the nature of its distribution makes it likely that the action of a threating process could cause it to be lost in:	Very restricted The immediate future	restricted The near future	limited The medium term future
3	For a population of a native species that is likely to play a major role in the community, there is a: To the extent that restoration of the community is not likely to be possible in:	Very severe decline The immediate future	Severe decline The near future	Substantial decline The medium term future
4	The reduction in its integrity across most of its geographic distribution is: As indicated by degradation of the community or its habitat, or disruption of important community processes, that is:	Very severe Very severe	severe severe	substantial substantial

5	The rate of continuing detrimental change is: As indicated by	Very severe	severe	substantial
	(a) A rate of continuing decline in its geographic distribution, or a population of a native species that is believed to play a major role in the community, that is: or	Very severe	severe	serious
	(b) Intensification, across most of its geographic distribution, in degradation, or disruption of important community processes, that is:	Very severe	severe	serious
6	A quantitative analysis shows that its probability of extinction, or extreme degradation over all its geographic distribution, is:	At least 50% in the immediate future	At least 20% in the near future	At least 10% in the medium term future

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories for Introduced Flora - Appendix A

In Western Australia, the *Biodiversity Conservation Act 2016* (BC Act) provides for the statutory listing of Threatened Ecological Communities, under the categories listed in Table A.4.

Table A.4: Definitions and criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities. Department of Environment and Conservation (2013).

PD : Presumed Totally Destroyed
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats **or** B) All occurrences recorded within the last 50 years have since been destroyed.
CR : Critically Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
En : Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately

20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);
ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;
iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

VU : Vulnerable

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.
An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):
A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

In Western Australia, possible Threatened Ecological Communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (Table A.4).

Table A.5: Definitions and criteria for Priority Ecological Communities Department of Environment and Conservation (2013).

P1: Priority One – Poorly-known ecological communities
Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two – Poorly-known ecological communities
Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three – Poorly-known ecological communities
(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four
Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5: Priority Five – Conservation dependent ecological communities
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

In Western Australia, the Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Categories of Threatened, Extinct and Specially Protected fauna and flora are listed in Table A.6.

The definition of flora includes algae, fungi and lichens. The definition of Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Table A.6: Conservation codes for Western Australian flora and fauna under the *Biodiversity Conservation Act 2016* (DBCA 2019).

Code	Conservation Category	Definition
Threatened species		
Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act). Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.		
CR	Critically Endangered	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	Endangered	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora
VU	Vulnerable	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct species		
Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.		

EX	Extinct	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	Extinct in the Wild	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species		
Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.		
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
CD	Species of special conservation interest (conservation dependent fauna)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	Other Specially protected species	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Table A.7: Priority species under Western Australian *Biodiversity Conservation Act 2016*.

P1: Priority One – Poorly known taxa
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2: Priority Two – Poorly known taxa
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3: Priority Three – Poorly known taxa
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4: Priority Four: Rare, near threatened and other taxa in need of monitoring
((a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

The management of introduced species in Western Australia is regulated through the *Biosecurity and Agriculture Management Act 2007* (BAM Act). The BAM Act seeks to establish a biosecurity regulatory scheme to prevent serious animal and plant pests from entering the State and becoming established, and to minimise the spread and impact of any that are already present within the State.

The list of declared pests is provided under the BAM Act. Declared animal and plant pests fall into three categories as Gazetted under the *Biosecurity and Agriculture Management Regulations 2013*. These categories are outlined in Table A.7.

Table A.8: Declared pests control categories as gazetted under the *Biosecurity and Agriculture Management Regulations 2013.*

Category	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

References

Department of Biodiversity Conservation and Attractions (2019) Conservation Codes for Western Australian Flora and Fauna. Last updated 3 January 2019. Accessed 25/04/20. https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation%20code%20definitions.pdf

Department of Environment and Conservation (2013). Definitions, categories and criteria for threatened and priority ecological communities. Accessed 25/04/20 https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/definitions_categories_and_criteria_for_threatened_and_priority_ecological_communities.pdf

APPENDIX B: PMST SEARCH RESULTS

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 24-Jan-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	10
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat likely to occur within area	In buffer area only
SPIDER			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Idiosoma nigrum](#)			
Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
[Apus pacificus](#)			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In buffer area only
Migratory Terrestrial Species			
[Motacilla cinerea](#)			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
[Motacilla flava](#)			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#)			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#)			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#)			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#)			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Oakajee Rail Development	2010/5500	Controlled Action	Post-Approval	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Jack Hills Expansion Project	2011/5853	Not Controlled Action	Completed	In buffer area only
Weld Range Iron Ore Project	2011/6030	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX C: DETAILED FLORA AND VEGETATION SURVEY SITES

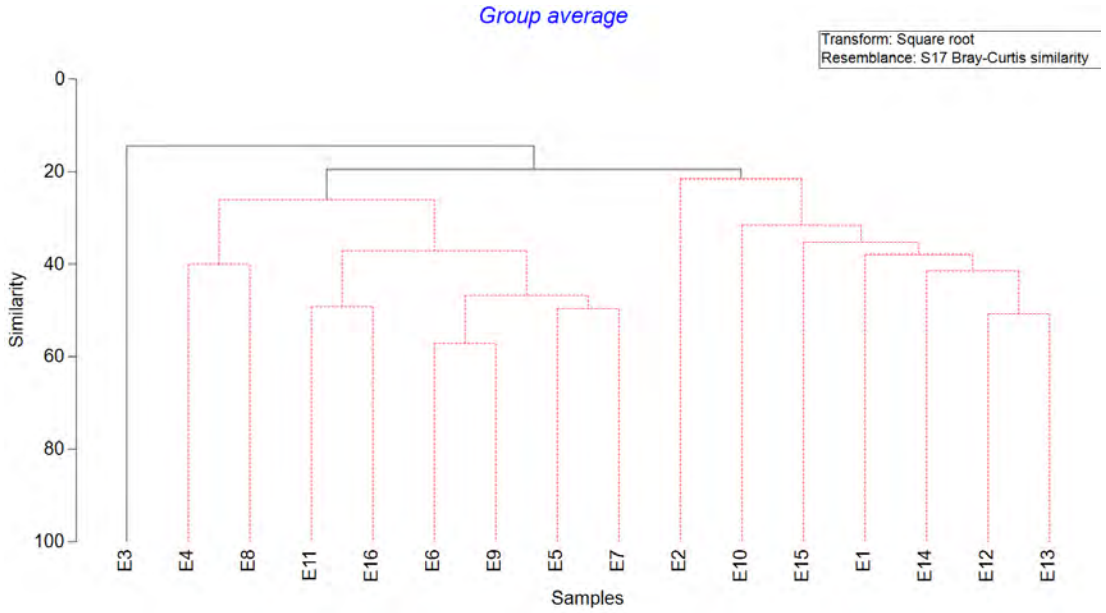


Figure C-1. Dendogram resulting from the cluster analysis of detailed vegetation sites

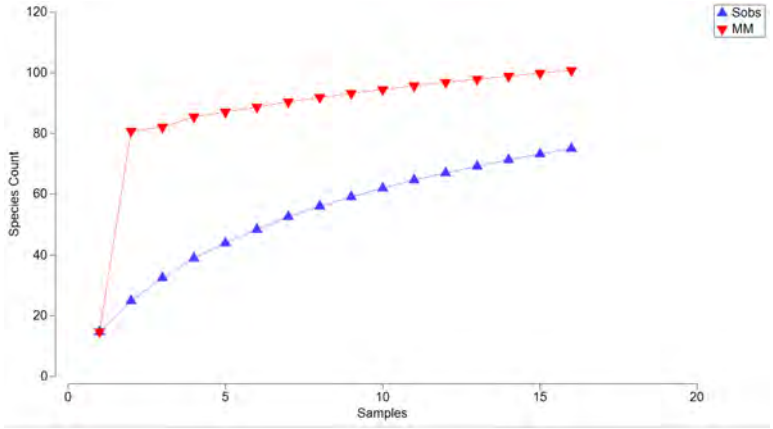
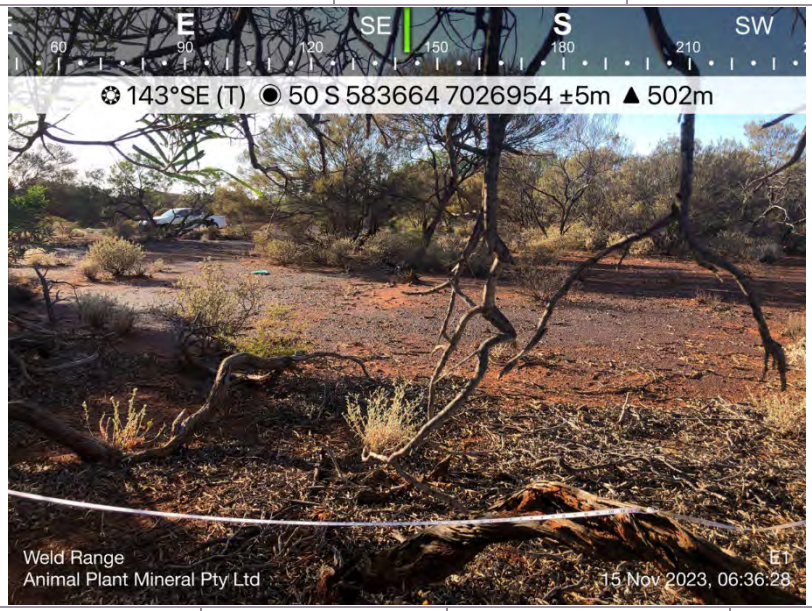


Figure C-2. Species accumulation curve. Sobs=Sample observations; MM= Michaelis Menton modelled richness

Site: E1	**WP-NW-(E)** 583661	**(N)** 7026955
Date: 15/11/2023	**WP-NE-(E)** 583679	**(N)** 7026952
Botanist: EH	**WP-SE-(E)** 583679	**(N)** 7026937
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 583660	**(N)** 7026936



Seasonal Conditions:	Dry - rain 2 days ago <5mm. Soil is dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red
Surface Rocks Size/Shape:	2-5cm	**Surface Rock Cover (%):**	1%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle slope to south, range to north		
Vegetation Description	A. aneura low open woodland, E. forrestii mid open shrubland, sparse tussock grasses		
Condition	Good		
Disturbances	Grazing, cow and goat high intensity, occasional tracks and fences		

Strata	Height (m)	Cover (%)	Species
Overstorey	4.5	10	*A.aneura, Acacia craspedocarpa*
Midstorey	1.1	10	*E. forrestii ssp. forrestii, Exocarpos aphyllus*
Understorey	0.3	0.1	

Conservation Significant Flora: none

Site: E2	**WP-NW-(E)** 582754	**(N)** 7027066
Date: 15/11/2023	**WP-NE-(E)** 582767	**(N)** 7027053
Botanist: EH	**WP-SE-(E)** 582758	**(N)** 7027036
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 582744	**(N)** 7027050



Seasonal Conditions:	Dry - recent low rain Dry soil	**Age Since Last Fire:**	>10 years
Soil Type:	Sandy clay loam	**Soil Colour:**	Light red
Surface Rocks Size/Shape:	40-100cm/blocky	**Surface Rock Cover (%):**	95%
Rock Type:	Ironstone		
Landform	Crest of BIF ridge		
Slope aspect	Crest		
Vegetation Description	Sparse tall shrubland A. aneura. Open low shrubland		
Condition	Good		
Disturbances	Moderate to heavy goat grazing, frequent tracks and clearing		

Strata	Height (m)	Cover (%)	Species
Overstorey	3.5	0.5	*A. aneura, A. pruinocarpa*
Midstorey	2.2	5	*A. aneura, Thyrptomene decussata*
Understorey	0.6	20	*Ptilotus obovatus, Dodonaea pachyneura*

Conservation Significant Flora: none

Site: E3	**WP-NW-(E)** 583087	**(N)** 7027232
Date: 15/11/2023	**WP-NE-(E)** 583105	**(N)** 7027240
Botanist: EH	**WP-SE-(E)** 583109	**(N)** 7027221
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 583090	**(N)** 7027213

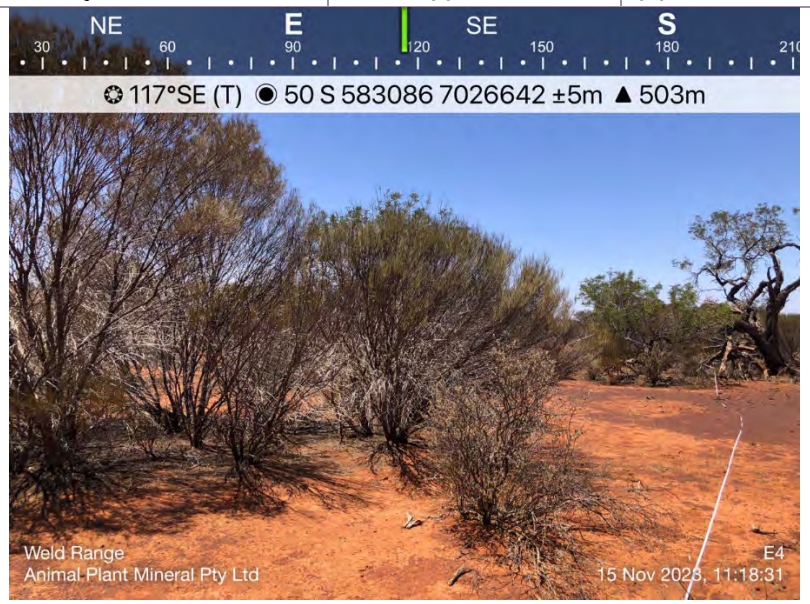


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Sandy clay loam	**Soil Colour:**	Light red
Surface Rocks Size/Shape:	20-50cm blocky	**Surface Rock Cover (%):**	70%
Rock Type:	Ironstone		
Landform	Midslope		
Slope aspect	South		
Vegetation Description	Tall open shrubland, sparse mid shrubland		
Condition	Good		
Disturbances	Moderate to heavy goat grazing, exploration clearing frequent		

Strata	Height (m)	Cover (%)	Species
Overstorey	2.7	5	*A.aneura*
Midstorey	1.1	1	*Eremophila latrobei ssp. latrobei*
Understorey	0.3	2	*Maireana villosa, Ptilotus obovatus, Aristida holathera*

Conservation Significant Flora: none

Site: E4	**WP-NW-(E)** 583087	**(N)** 7026640
Date: 15/11/2023	**WP-NE-(E)** 583104	**(N)** 7026650
Botanist: EH	**WP-SE-(E)** 583115	**(N)** 7026630
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 583096	**(N)** 7026624



Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	1-2cm	**Surface Rock Cover (%):**	1%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Isolated snakewood, low woodland, A. aneura tall open shrubland		
Condition	Good		
Disturbances	Heavy grazing, occasional tracks, many senesced shrubs		

Strata	Height (m)	Cover (%)	Species
Overstorey	10	1	*Acacia pruinocarpa*
Midstorey	3	15	*Acacia aneura, A sibina*
Understorey	1	1	*Eremophila forrestii ssp. forrestii*

Conservation Significant Flora: none

Site: E5	**WP-NW-(E)** 575901	**(N)** 7021026
Date: 15/11/2023	**WP-NE-(E)** 575856	**(N)** 7021028
Botanist: EH	**WP-SE-(E)** 575855	**(N)** 7021008
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 575833	**(N)** 7021009

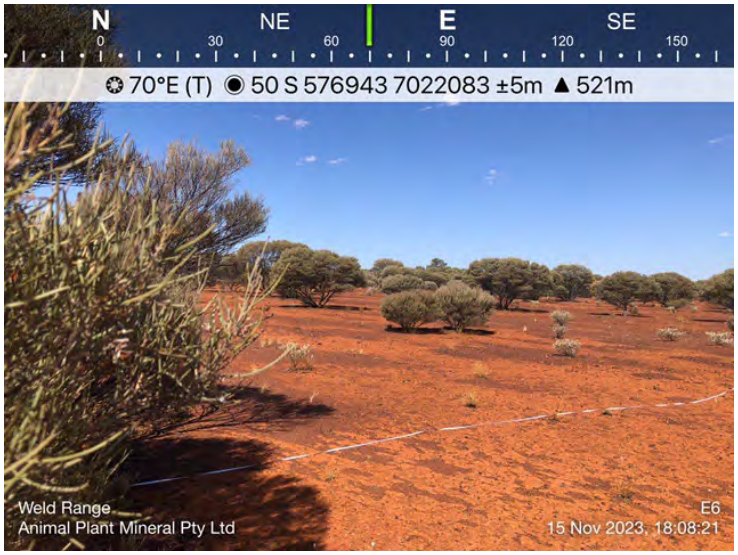


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-5cm angular	**Surface Rock Cover (%):**	25%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Tall sparse shrubland, low sparse shrubland, isolated tussock grasses		
Condition	Good		
Disturbances	Occasional tracks, moderate grazing, sheet erosion		

Strata	Height (m)	Cover (%)	Species
Overstorey	2.5	5	*A.aneura*
Midstory	0.4	1	*Eremophila punicea*
Understorey	0.15	0.1	*Aristida holathera*

Conservation Significant Flora: none

Site: E6	**WP-NW-(E)** 576962	**(N)** 7022100
Date: 15/11/2023	**WP-NE-(E)** 576977	**(N)** 7022085
Botanist: EH	**WP-SE-(E)** 576963	**(N)** 7022069
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 576948	**(N)** 7022082



Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-5cm	**Surface Rock Cover (%):**	20%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Sparse tall shrubland, sparse low shrubland, isolated tussock grasses		
Condition	Good		
Disturbances	Moderate to high grazing intensity, sheet erosion		

Strata	Height (m)	Cover (%)	Species
Overstorey	2.5	2	*A. aneura, A. sclerosperma, A. aneura wider leaf*
Midstory	0.45	0.5	*Eremophila punicea*
Understorey	0.2	0.2	*Aristida holathera, Ptilotus schwartzii*

Conservation Significant Flora: none

Site: E7	**WP-NW-(E)** 577136	**(N)** 7023624
Date: 15/11/2023	**WP-NE-(E)** 577158	**(N)** 7023640
Botanist: EH	**WP-SE-(E)** 577169	**(N)** 7023623
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 577156	**(N)** 7023605

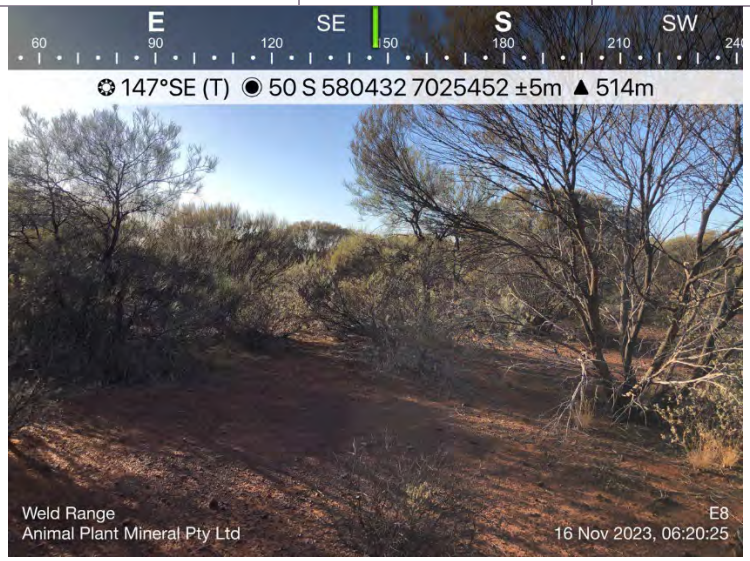


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-7cm blocky	**Surface Rock Cover (%):**	25%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Sparse mid shrubland, sparse low shrub		
Condition	Good		
Disturbances	Moderate to heavy grazing. Sheet erosion, occasional tracks.		

Strata	Height (m)	Cover (%)	Species
Overstorey	0	0	*Acacia aneura Acacia mulganeura*
Midstorey	1.6	1	*Eremophila punicea, E. latrobei subsp. latrobei*
Understorey	0.3	0.5	*Ptilotus obovatus, Aristida holathera, Swainsona purpurea*

Conservation Significant Flora: none

Site: E8	**WP-NW-(E)** 580433	**(N)** 7025448
Date: 16/11/2023	**WP-NE-(E)** 580452	**(N)** 7025448
Botanist: EH	**WP-SE-(E)** 580448	**(N)** 7025428
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 580430	**(N)** 7025433

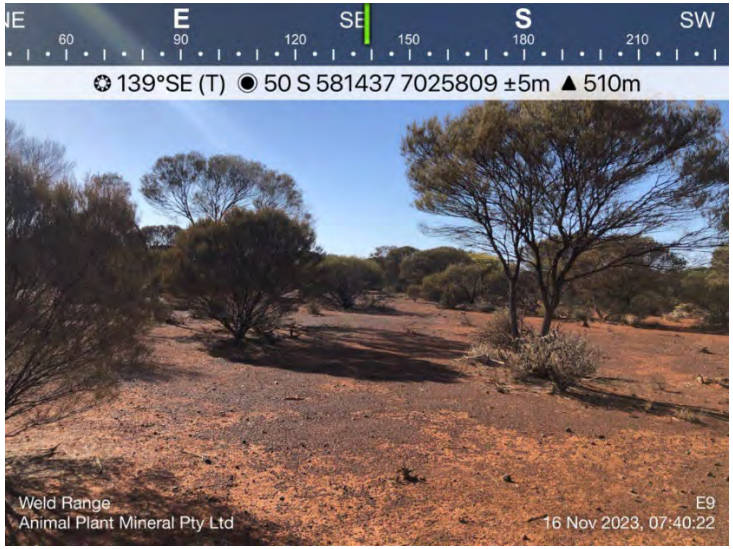


Seasonal Conditions:	Dry - recent low rain Dry soil	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-5cm blocky	**Surface Rock Cover (%):**	5%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Tall open shrubland A.aneura, G.striata, A. silvery. Mid shrubland A. assimilis, Eremophila forrestii, Isolated tussock grasses		
Condition	Good		
Disturbances	Moderate grazing, occasional tracks		

Strata	Height (m)	Cover (%)	Species
Overstorey	4	10	*A. aneura, G. obliquistigma*
Midstorey	2.2	5	*A.assimilis, E. forrestii*
Understorey	0.6	20	*Ptilotus calostachyus, Eriachne pulchella, Eragrostis eriopoda*

Conservation Significant Flora: none

Site: E9	**WP-NW-(E)** 581443	**(N)** 7025809
Date: 16/11/2023	**WP-NE-(E)** 581463	**(N)** 7025806
Botanist: EH	**WP-SE-(E)** 581463	**(N)** 7025783
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 581440	**(N)** 7025785

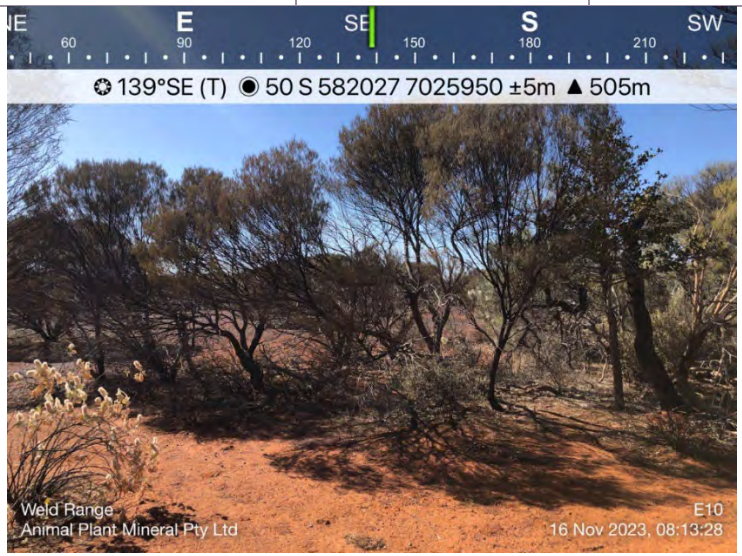


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-5cm blocky	**Surface Rock Cover (%):**	2%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Sparse tall shrubland, sparse low shrubland, isolated tussock grasses		
Condition	Good		
Disturbances	Moderate grazing, occasional tracks		

Strata	Height (m)	Cover (%)	Species
Overstorey	4	5	*A. aneura*
Midstorey	0.4	2.5	*E. forestii subsp. forestii, E. punicea*
Understorey	0.3	1	*Ptilotus obovatus, Marieana villosa, ?Swainsona purpurea*

Conservation Significant Flora: none

Site: E10	**WP-NW-(E)** 582029	**(N)** 7025941
Date: 16/11/2023	**WP-NE-(E)** 582055	**(N)** 7025936
Botanist: EH	**WP-SE-(E)** 582047	**(N)** 7025919
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 582029	**(N)** 7025919

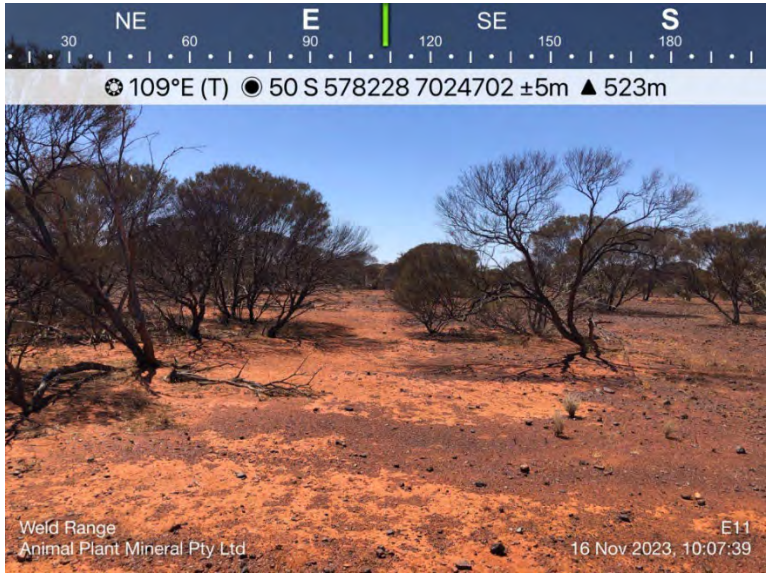


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-3cm	**Surface Rock Cover (%):**	1%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle to south		
Vegetation Description	Tall open shrubland, Mid sparse shrubland, Isolated tussock grasses		
Condition	Good		
Disturbances	Heavy grazing, occasional tracks		

Strata	Height (m)	Cover (%)	Species
Overstorey	3	40	*A. aneura, Grevillea obliquistigma, Acacia ramulosa var linophylla*
Midstory	1	10	*Ptilotus obovatus, E. forrestii, Rhagodia eremaea*
Understorey	0.3	1	*Eragrostis eriopoda , Ptilotus calostachyus, Eriachne pulchella*

Conservation Significant Flora: none

Site: E11	**WP-NW-(E)** 578232	**(N)** 7024708
Date: 16/11/2023	**WP-NE-(E)** 578255	**(N)** 7024714
Botanist: EH	**WP-SE-(E)** 578264	**(N)** 7024688
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 578248	**(N)** 7024673

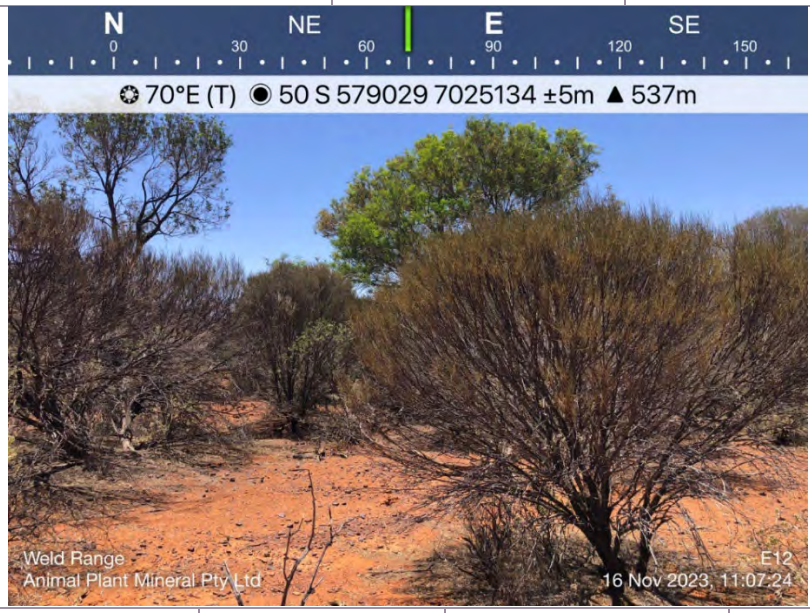


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	3-10cm blocky	**Surface Rock Cover (%):**	5%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gentle southerly slope		
Vegetation Description	Tall sparse shrubland, Mid sparse shrubland, Isolated tussock grasses		
Condition	Good		
Disturbances	Heavy grazing occasional tracks		

Strata	Height (m)	Cover (%)	Species
Overstorey	3.5	6	*A. aneura, A ramulosa var linophylla*
Midstorey	0.9	0.5	*Eremophila forrestii subsp. forrestii, E. georgei, Psydrax l*
Understorey	0.3	0.5	*?Swainsona atropurpurea, Eragrostis eriopoda, Ptilotus exaltatus*

Conservation Significant Flora: none

Site: E12	**WP-NW-(E)** 579038	**(N)** 7025138
Date: 16/11/2023	**WP-NE-(E)** 579051	**(N)** 7025147
Botanist: EH	**WP-SE-(E)** 579064	**(N)** 7025136
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 579048	**(N)** 7025125



Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam with gravel	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-10cm	**Surface Rock Cover (%):**	5%
Rock Type:	Ironstone		
Landform	Upper plain/lower slope		
Slope aspect	Gentle southerly slope		
Vegetation Description	Isolated low trees, tall open shrubland, mid open shrubland		
Condition	Good		
Disturbances	Heavy grazing		

Strata	Height (m)	Cover (%)	Species
Overstorey	10	2	*Acacia pruinocarpa*
Midstorey	2.5	12	*Acacia ramulosa var linophylla, A. aneura*
Understorey	1.2	15	*Eremophila forrestii subsp forrestii*

Conservation Significant Flora: none

Site: E13	**WP-NW-(E)** 579751	**(N)** 7025768
Date: 16/11/2023	**WP-NE-(E)** 579768	**(N)** 7025761
Botanist: EH	**WP-SE-(E)** 579752	**(N)** 7025741
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 579738	**(N)** 7025755



Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Sandy gravel/clay loam	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	5-20cm blocky ironstones, rounded granite	**Surface Rock Cover (%):**	30%
Rock Type:	Ironstone and granite		
Landform	Ephemeral creek		
Slope aspect	Gentle slope to south		
Vegetation Description	Low open woodland, mid shrubland, isolated tussock grassland		
Condition	Good		
Disturbances	Moderate to heavy grazing, frequent clearing		

Strata	Height (m)	Cover (%)	Species
Overstorey	6	15	*A. aneura, A. ramulosa var linophylla, A. pruinocarpa*
Midstorey	1.5	20	*E. forrestii ssp. forrestii, E. latrobei ssp. latrobei, E. eriocalyx*
Understorey	0.4	10	*Aristida contorta, Cymbopogon ambiguus, Euploca ovalifolia*

Conservation Significant Flora: none

Site: E14	**WP-NW-(E)** 581063	**(N)** 7026343
Date: 16/11/2023	**WP-NE-(E)** 581076	**(N)** 7026352
Botanist: EH	**WP-SE-(E)** 581083	**(N)** 7026339
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 581076	**(N)** 7026330

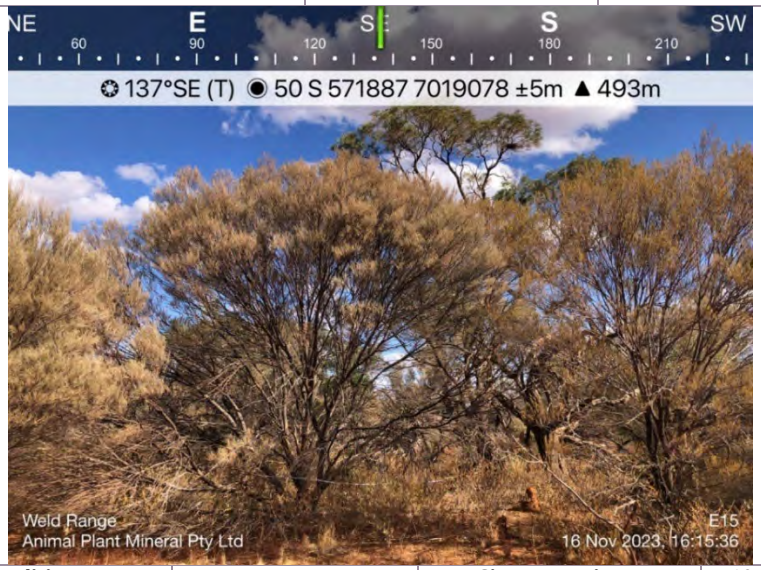


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Sandy gravel/clay loam	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	5-20cm	**Surface Rock Cover (%):**	30%
Rock Type:	Ironstone		
Landform	Ephemeral creek		
Slope aspect	Gentle slope to south		
Vegetation Description	Low open woodland, mid shrubland, isolated tussock grasses		
Condition	Good		
Disturbances	Moderate to heavy grazing, frequent clearing		

Strata	Height (m)	Cover (%)	Species
Overstorey	6	15	*A. aneura, A. pruinocarpa, A. mulganeura*
Midstorey	1.5	20	*E. latrobeissp. latrobei, E. forrestii ssp. forrestii, E. georgei*
Understorey	0.4	<1	*Gastrolobium laytonii, Cymbopogon ambiguus,Eragrostis eriopoda*

Conservation Significant Flora: *Hibiscus ?krichauffianus* (P3)

Site: E15	**WP-NW-(E)** 571896	**(N)** 7019071
Date: 16/11/2023	**WP-NE-(E)** 571912	**(N)** 7019071
Botanist: EH	**WP-SE-(E)** 571915	**(N)** 7019052
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 571891	**(N)** 7019052

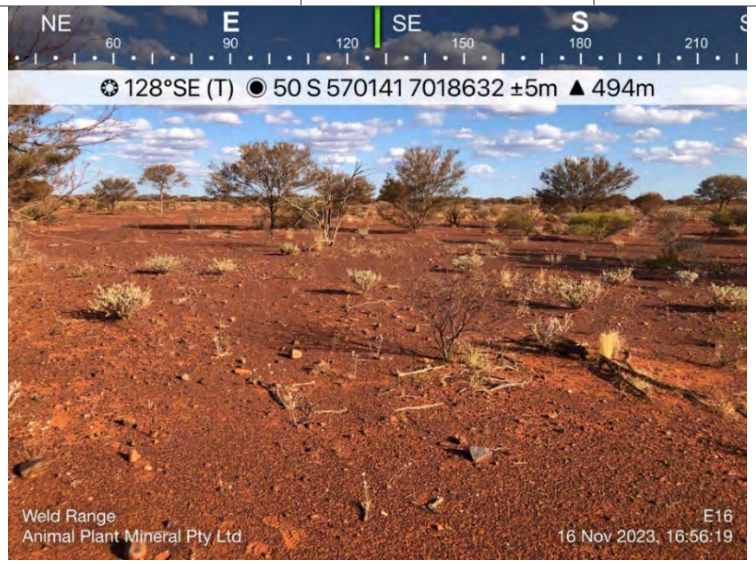


Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-10cm blocky	**Surface Rock Cover (%):**	3%
Rock Type:	Ironstone		
Landform	Drainage or plain		
Slope aspect	Very gently to south		
Vegetation Description	Isolated mid trees, tall open shrubland, mid open shrubland		
Condition	Good		
Disturbances	Moderate grazing		

Strata	Height (m)	Cover (%)	Species
Overstorey	15	5	*Acacia pruinocarpa*
Midstorey	4	20	*A.aneura*
Understorey	1	20	*Eremophila latrobei, E. georgei, Sida calyxhymenia*

Conservation Significant Flora: none

Site: E16	**WP-NW-(E)** 570143	**(N)** 7018629
Date: 16/11/2023	**WP-NE-(E)** 570169	**(N)** 7028626
Botanist: EH	**WP-SE-(E)** 570165	**(N)** 7018601
Site Type / Size: Quadrat, 20 x 20 m	**WP-SW-(E)** 570150	**(N)** 7018605



Seasonal Conditions:	Dry	**Age Since Last Fire:**	>10 years
Soil Type:	Clay loam	**Soil Colour:**	Red brown
Surface Rocks Size/Shape:	2-10cm blocky	**Surface Rock Cover (%):**	2%
Rock Type:	Ironstone		
Landform	Plain		
Slope aspect	Very gently to south		
Vegetation Description	Sparse tall shrubland, sparse mid shrubland, isolated tussock grasses		
Condition	Good		
Disturbances			

Strata	Height (m)	Cover (%)	Species
Overstorey	3	3	A.*aneura*
Midstorey	0.4	1	*E. punicea*
Understorey	0.5	0.5	*Eragrostis eriopoda*

Conservation Significant Flora: none

APPENDIX D: SPECIES BY SITE MATRIX - FLORA

Biological Survey - Beebyn 11 - Weld Range
Appendix D - Flora Species by Site

Species	Status	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	Op Col
Acanthaceae																		
Harnieria kempeana	NT				0.1													
Amaranthaceae																		
Ptilotus roei	NT							0.01	0.1			0.1					0.05	
Ptilotus exaltatus	NT											0.5		0.1			0.1	x
Ptilotus ?calostachyus	NT					0.01												
Ptilotus obovatus	NT	1	10	0.3				0.2		1	1	0.1	1	1		2		
Ptilotus rotundifolius	NT			0.1							0.1							
Ptilotus schwartzii	NT			0.05			0.1		1	0.1	0.1				0.1			x
Apocynaceae																		
Cynanchum floribundum	NT										0.01			0.1		0.1		
Asteraceae																		
Cephalipterum drummondii	NT								0.01					0.4				x
Pluchea dentex	NT													0.1			0.1	x
Boraginaceae																		
Euploca ovalifolia	NT													2				
Brassicaceae																		
Lepidium oxytrichum	NT			0.01														
Stenopetalum filifolium	NT							0.1			0.1			1				
Chenopodiaceae																		
Dysphania rhadinostachya	NT		0.5															
Enchylaena tomentosa	NT											0.02				0.5		
Eriochiton sclerolaenoides	NT				0.01	0.1	0.1			0.05	0.01	0.1				1.1		
Maireana villosa	NT	0.1	0.01	1	0.1					0.6		0.02						x
Rhagodia eremaea	NT										8							x
Sclerolaena densiflora	NT					0.01												
Convolvulaceae																		
Duperreya commixta	NT												0.01		0.01			
Fabaceae																		
?Swainsona purpurea	NT					0.1	0.1	0.1	0.1	0.1		0.5		0.3				
Acacia aneura	NT	0.1	0.5		8	0.6	2	0.5	5	5	24	4	5.1	10	3.2	10	3	
Acacia craspedocarpa	NT	2											0.1					

Acacia mulganeura	NT							0.5					0.5		5			
Acacia pruinocarpa	NT	4	0.1		1									5	6	5		
Acacia pteraneura	NT	4																
Acacia ramulosa var linophylla	NT										5	2	6	5	0.2		0.5	x
Acacia rhodophloia	NT																	x
Acacia sclerosperma	NT						0.3											
Acacia sibina	NT				6	0.5			15									x
Acacia tetragonophylla	NT	0.1	0.1													0.2		
Gastrolobium laytonii	NT														3			
Senna artemisioides ssp helmsii	NT																0.1	
Senna artemisioides ssp sturtii	NT												1					x
Senna glutinosa ssp chatelainiar	NT		0.5										0.7					
Goodeniaceae																		
Goodenia mimuloides	NT		0.1		0.1													
Goodenia tenuiloba	NT											0.01		0.1				
Lamiaceae																		
Dicrastylis ?sessilifolia	NT		0.1															
Teucrium teucriiflorum	NT			0.01					0.01							1		
Malvaceae																		
Abutilon cryptopetalum	NT	0.1		0.1							0.1			0.1		1		
Hibiscus ?krichauffianus	P3														0.01			
Sida calyxhymenia	NT	0.11														5	0.01	x
Sida ectogama	NT				0.01							0.01						
Sida sp	NT	0.01		0.01	0.05						0.01							
Myrtaceae																		
Thryptomene decussata	NT		4.5															
Poaceae																		
Aristida contorta	NT													5				
Aristida holathera	NT			0.2		0.1	0.1	0.1		0.01		0.02						
Cymbopogon ambiguus	NT													2	0.2			
Eragrostis eriopoda	NT	0.1			0.01	0.01	0.01	0.1	1	0.1	0.1	0.5		0.1	0.2		0.3	
Eragrotis sp														0.1		0.1		
Eriachne ?mucronata	NT		0.1												0.1	0.1	0.1	

Eriachne pulchella	NT	0.01							0.1	0.01	0.1					0.1	0.1	
Monachather paradoxus	NT	0.05			0.01							0.02		0.2				
Paspalidium clementii	NT		0.01															
Thyridolepis multiculmis	NT															0.2		
Proteaceae																		
Grevillea obliquistigma	NT								5		10							
Pteridaceae																		
?Cheilanthes	NT			0.01												0.1		
Rubiaceae																		
Psydrax latifolia	NT	0.1	0.1	0.3							1		2.1	1	6	0.4		
Psydrax suaveolens	NT	0.01							0.5		0.1	0.1	0.02	0.1				
Rutaceae																		
Philotheca brucei	NT		1															
Santalaceae																		
Exocarpos aphyllus	NT	0.5																
Santalum spicatum	NT														2			
Sapindaceae																		
Dodonaea pachyneura	NT		1															
Scrophulariaceae																		
Eremophila compacta	NT										0.5							
Eremophila eriocalyx	NT													1				
Eremophila foliosissima	NT					0.1												
Eremophila forrestii ssp forrestii	NT	8							15	1		0.52	10	15	5	0.5		
Eremophila georgei	NT										0.2	0.02		0.1	0.1	5		x
Eremophila glutinosa	NT	0.3											0.2					
Eremophila latrobei subsp. latro	NT	0.2	5	0.5		0.1		0.05			0.5		0.1	1	5.1	5.5		
Eremophila margarethae	NT					0.3												
Eremophila punicea	NT					1	0.5	0.3		0.5							1	
Eremophila serrulata	NT	0.1											3	0.5				
Solanaceae																		
Solanum lasiophyllum	Mixed											0.01					0.1	x
Indet. climber																0.1		

APPENDIX E: FAUNA LIKELIHOOD OF OCCURRENCE ASSESSMENT - FAUNA

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
-- Birds --					
Aphelocephala leucopsis	Southern whiteface	-	VU	Most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (DCCEEW 2023b). Open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter 2002).	Likely. 10 records within 15 km between 2001 and 2009. All habitats are suitable; however habitat quality is low due to lack of groundcover.
Apus pacificus	Fork-tailed Swift	MI	MI	Broadly distributed aerial species that is not specifically limited to any particular habitat type. Aerial: over open country, from semi-arid deserts to coasts, islands; sometimes over forests, cities (Pizzey and Knight, 2012). Occurs over dry or open habitats comprising of riparian woodland, low scrub, heathland, or saltmarsh, also grasslands and sandplains with spinifex (Morcombe, 2011).	Likely. Listed by the PMST as Likely to occur, but no records available within 30 km. This species is distributed across Australia. It is an aerial species that rarely comes to land. Individuals would not be specifically dependant on any habitats present in the Survey Area.
Calidris acuminata	Sharp-tailed Sandpiper	MI	VU, MI	Scarce to moderately common (much more plentiful near coasts than in interior) (Johnstone and Storr, 1998). Tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; floodwaters, irrigated pastures and crops; sewage ponds, saltfields. Widespread summer migrant to coastal and inland Australia (Pizzey and Knight, 2012).	Unlikely. No suitable habitat. No records in the local area. PMST considers the species May occur.
Calidris ferruginea	Curlew Sandpiper	CR	CR, MI	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater	Unlikely. No suitable habitat.

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone and Storr, 1998) Tidal mudflats; saltmarsh, saltfields; fresh, brackish or saline wetlands; sewage ponds (Pizzey and Knight, 2012).	No records in the local area. PMST considers the species May occur.
Calidris melanotos	Pectoral Sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also, samphire flats around estuaries and saltlakes (Johnstone and Storr, 1998). Shallow fresh waters, often with low grass or other herbage; swamp margins, flooded pastures, sewage ponds, occasionally tidal areas, saltmarshes (Pizzey and Knight, 2012).	Unlikely. No suitable habitat. No records in the local area. PMST considers the species May occur.
Falco hypoleucos	Grey Falcon	VU	VU	Mainly lightly wooded and coastal riverine flats (Johnstone and Storr, 1998). Lightly treed and inland plains; gibber deserts, sandridges, pastoral lands, timbered watercourses; seldom in driest deserts (Pizzey and Knight, 2012).	Possible. The Survey Area contains potentially suitable foraging habitat. No suitable nesting habitat is present or nearby. Listed by EPBC as May Occur in the feature area. No records occur on the DBCA database within 30 km, the ALA lists a few records within 50 km however they are undated and of low spatial accuracy.
Falco peregrinus	Peregrine Falcon	OS	-	Mainly about cliffs along coasts, rivers and ranges, and about wooded watercourses and lakes (Johnstone and Storr, 1998). Cliffs, gorges, timbered watercourses, environs of rivers, wetlands, plains, open woodlands, pylons, spires, buildings (Pizzey and Knight, 2012).	Possible. Habitats in the Weld Range are suitable. Two local records from 1979 and 2001. Foraging habitat present.
Leipoa ocellata	Malleefowl	VU	VU	Semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding.	Possible. PMST considers likely to occur, however species records are 50 km or more to the south, and groundcover/litter is sparse with clay soils so habitat

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants (Benshemesh, 2007).	quality poor for nest construction. Ecologia (2009) reported old inactive mounds present.
Motacilla cinerea	Grey Wagtail	MI	MI	Mainly banks and rocks in fast-running fresh water habitats; rivers, creeks, streams and around waterfalls, both in forest and open country; but occurs almost anywhere during migration. Flits from rock to rock, and often enters water after insects (or performs flycatcher sallies after them) (Johnstone and Storr, 2004). In Australia, near running water in disused quarries; sandy, rocky streams in escarpments and rainforests; sewage ponds, ploughed fields, airfields (Pizzey and Knight, 2012).	Unlikely. No suitable habitat. No records in the local area. PMST considers the species May occur.
Motacilla flava	Yellow Wagtail	MI	MI	Damp short-grass flats: rice stubbles and edge of swamps, sewage ponds, bore overflows, grazed or mowed grass and irrigated areas (Johnstone and Storr, 2004).	Unlikely. No suitable habitat. No records in the local area. PMST considers the species May occur.
Pezoporus occidentalis	Night Parrot	CR	EN	Treeless or sparsely wooded spinifex *Triodia* spp. near water (including artesian bores) (Johnstone and Storr, 1998). Seeding spinifex on stony rises, breakaway country, sandy lowlands; shrubby glasswort, chenopods; succulents on flats around salt lakes; flooded claypans saltbush, bluebush, bassia associations (Pizzey and Knight, 2012).	Unlikely. No local records. Habitat modelling includes the Survey Area at the extremity of the species potential extent and PMST list as May occur. Foraging resources are limited, no spinifex mounds are present.
-- Mammals --					
Antechinomys longicaudata	Long-tailed Dunnart	P4		A specialist rock dwelling species (Freeland *et al.* 1988). It prefers exposed rock and stony soils with hummock grasses	Present. Suitable habitat in the Banded Ironstone Ridge habitat and Drainage Lines between ridges.

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				and shrubs, on flat-topped hills, lateritic plateaus, sandstone ranges and breakaways.	
Dasycercus blythi	Brush-tailed Mulgara	P4	-	Inhabits spinifex grasslands and burrows on the flats between low sand dunes (Van Dyck and Strahan, 2008).	Unlikely. No suitable habitat. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984).
Leporillus conditor	greater stick-nest rat	CD	VU	The Northern Quoll will usually den in hollow tree trunks (Hill and Ward, 2010) or in small caves and crevices in rocky outcrops.	Unlikely. The species is conservation dependent in WA. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984)..
Macroderma gigas	Ghost Bat	VU	VU	Their distribution is influenced by the availability of suitable caves and mines for roost sites (Churchill 2008). They prey on large insects, frogs, birds, lizards and small mammals including other bats. They swoop on their prey killing with powerful bites, then fly to a feeding site to eat (Australian Museum 2023).	Unlikely. The database record is a fossilised bat and a scat (Baynes 1984) of unreported age. The species is not known to persist in the Murchison.
Macrotis lagotis	Bilby	VU	VU	Occupy a variety of inland habitats including grass and stony downs country on cracking clays, desert sandplains and dune fields of laterite with hummock grassland and massive red earths with *Acacia* shrubland (Van Dyck and Strahan, 2008).	Unlikely. The local record has a low level of certainty and was recorded in 1984. Modelled current species distribution does not predict it to occur in the Survey Area (DCCEEW 2024b).
Petrogale lateralis lateralis	black-flanked rock-wallaby	EN	EN	Occur where suitable shelter and food co-exist. During the daytime they shelter under deep shade in rocky areas such as caves, cliffs, screes and rockpiles, and emerge at dusk to feed on grasses, forbs, shrubs and occasionally seeds and fruits. Feeding occurs as near to shelter as possible, especially where exotic predators are present (TSSC 2016).	Unlikely. Habitat at the Weld Range is likely suitable, however modelling of the current range of the species does not include the Survey Area. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984), and presence in the region is historic only.
Pseudomys gouldii	Gould's mouse, Shark Bay mouse	VU	VU	Current distribution restricted to offshore islands.	Unlikely. The current range of the species does not include the Survey Area. The local record is a fossilised specimen described from Wilgie Mia

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
					(Baynes 1984), and presence in the region is historic only.
-- Reptiles --					
Egernia stokesii badia	Western Spiny-tailed Skink	VU	EN	In the Murchison the black form inhabits rock crevices, predominantly in granite whalebacks and outcrops (Ecologia 2010).	Possible. Modelled as likely to occur in the buffer area only. Records 40 km to the west from 2006 and 2010. No granite outcrops are present but suitable habitat may be present in the BIF outcrops.
Lerista eupoda	West Coast mulga slider	P1		Restricted to the arid southern interior between Cue and Meekatharra, in open mulga on red loams and sandy loams (Smith 1996). Local records are in lower slopes/upper plain habitats, often near drainage lines.	Likely. Multiple records from nearby and suitable habitat is present in the lower slopes/upper plains habitat.
-- Invertebrates --					
Idiosoma clypeatum	northern shield-backed trapdoor spider	P3	-	Widespread in the Murchison and Yalgoo regions,	Present. The distribution of the population occurs across the length of the Weld Range, with the majority of individuals being concentrated at the northern end of the range.
Idiosoma nigrum	Shield-backed Trapdoor Spider		VU	Has a restricted distribution in the central and central-western Wheatbelt bioregion of south-western Australia (Rix et al 2018). Generally found in microhabitats associated with low-lying woodlands or bush vegetation (Main 2003).	Unlikely. The PMST considers that the species is known to occur in the feature area, however Rix et al (2018) taxonomic revision determine all specimens in the Murchison region to be *I. clypeatum*

Completed by: Animal Plant Mineral Pty Ltd

ABN:	86 886 455 949
Tel:	(08) 6507 5175
Address:	PO Box 410 Bassendean, Western Australia 6054
Website:	www.animalplantmineral.com.au

For further information on this report please contact:

Dr Mitchell Ladyman

Tel: 0437 307 008

Email: mitch@animalplantmineral.com.au

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ecologia Environment

463 Scarborough Beach Rd

OSBORNE PARK WA 6017

Phone: 08 6168 7200

Email: *admin@ecologia.com.au*

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EXECUTIVE SUMMARY

ecologia Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a detailed flora and vegetation survey and a Level 1 fauna and fauna habitat assessment, including a targeted survey for the Priority 3 listed *Idiosoma clypeatum* (northern shield-backed trapdoor spider), and a stygofauna survey to support environmental approvals for the proposed Iron Ridge Project over tenement M20/118 (the 'study area') located approximately 55 km northwest of Cue in the Murchison region. The current survey was conducted between the 2nd and 6th September 2019 and expands on a reconnaissance flora and fauna habitat survey conducted by *ecologia* in July 2019.

Flora and Vegetation

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded from 24 sampling sites and additional opportunistic records within the study area. No EPBC Act (1999) or BC Act (2016) listed Threatened species were recorded, however, eight state listed Priority species were recorded, including *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4). Of these species, *A. dilloniorum*, *S. patens*, *M. placoides*, *P. petrophila*, *A. speckii*, and *D. amplisemina* have been recorded from the proposed infrastructure development envelope. Three introduced plant species were recorded from the study area: *Cuscuta planifolia*, *Lysimachia arvensis*, and *Rostraria pumila*. No Weeds of National Significance (WONS) or Declared Pests were recorded.

Hierarchical cluster analysis was conducted using floristic data collected from 24 sampling sites surveyed within the study area. Based on this analysis, ten vegetation types were described and delineated. None of the vegetation types were assessed as corresponding to any National or State listed TEC, nor were any considered to be regionally significant based on available data. However, most vegetation types are associated with the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)', the spatial extent of which is defined by the DBCA and includes a 500 m administrative buffer. Within the study area, 263.80 ha of vegetation occurs within the DBCA defined PEC boundary, of which 78.4 ha is within the proposed project infrastructure envelope, representing 0.3% of the total extent of the PEC. Five vegetation types may also be considered locally significant on the basis of supporting populations of Priority 1 listed species, having high overall species diversity, or being locally restricted.

Vegetation condition across most of the study area was assessed as Very Good to Excellent, with no or minimal weed invasion in most areas and only minor grazing impacts.

Vertebrate Fauna

A Level 1 vertebrate fauna and fauna habitat assessment of the study area, including targeted searches for conservation significant fauna, was undertaken concurrently with detailed flora and vegetation survey. Fauna habitat assessments were undertaken at 12 sites to obtain representative examples of fauna habitats present. Four broad fauna habitats were identified, described and mapped within the study area. Habitats were generally assessed to be in Very Good to Excellent condition. The landforms, land systems and habitat types identified during the survey are considered locally common and the survey did not identify any restricted conservation significant vertebrate fauna habitat, or habitats that were restricted to the survey area itself.

Acacia sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* dominated shrubland on mid and lower slopes provides suitable habitat for the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum*) while mulga (*Acacia aneura*) woodland over ironstone ridge crests and slopes provides suitable habitat for the Priority 4 (BC Act) long-tailed dunnart (*Sminthopsis*

longicauda). The thick leaf litter associated with the minor drainage line supporting dense shrubs habitat provides shelter for the Priority 1 (BC Act) west coast mulga slider (*Lerista eupoda*).

Fifteen vertebrate fauna species were recorded during the survey including 13 bird, one mammal and one reptile species. These represent the potential vertebrate fauna of the survey area; however, species other than those recorded are likely to occur.

Five northern shield-backed trapdoor spider (*Idiosoma clypeatum* (Priority 3 BC Act)) burrows were recorded within the *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes habitat type under acacias that exhibit narrow phyllodes. The Iron Ridge study area only contains a small area of suitable habitat (4.29% of the total study area) for this species. Survey effort within suitable habitat for this species was considered adequate.

Previous survey within the Weld Range have recorded the long-tailed dunnart (*Sminthopsis longicauda* (Priority 4 (BC Act)) which has been given a likelihood of occurrence rating of 'Likely (1)' within the mulga woodland over ironstone ridge crests and slopes habitat type. The peregrine falcon has also been recorded on multiple occasion within the Weld Range and has been given a likelihood of occurrence rating of 'Likely (1)'. This species may overfly all habitat types without utilising any part of the study area in particular.

Seventeen species of conservation significance were deemed unlikely to occur due to the lack of suitable habitat including four species of mammal, 12 birds and one reptile.

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ACRONYMS

BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
BOM	Bureau of Meteorology
CALM	Department of Conservation and Land Management (now DBCA and DWER)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFWA	Department of Agriculture and Food Western Australia (now DPIRD)
DBCA	Department of Biodiversity, Conservation and Attractions (previously DPaW)
DEC	Department of Environment and Conservation (now DBCA)
DWER	Department of Water and Environmental Regulation
DoEE	Department of the Environment and Energy (previously DSEWPaC)
DPaW	Department of Parks and Wildlife (now DBCA)
DPIRD	Department of Primary Industry and Regional Development
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DoEE)
EPA	Environment Protection Authority
EP Act	*Environment Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESCAVI	Executive Steering Committee for Australian Vegetation Information
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
NVIS	National Vegetation Information System
PEC	Priority Ecological Community
SAC	Species accumulation curve
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora List database
TPFR	Threatened and Priority Flora Report form
WA	Western Australia
WAH	Western Australian Herbarium
WAHERB	Western Australian Herbarium Specimen Database
WAOL	Western Australian Organism List
WC Act	*Wildlife Conservation Act 1950*
WONS	Weeds of National Significance

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

ecologia Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a detailed flora and vegetation survey, a Level 1 fauna and fauna habitat assessment including a targeted survey for the Priority 3 listed northern shield-backed trapdoor spider (*Idiosoma clypeatum*) and a stygofauna survey to support environmental approvals for the proposed Iron Ridge Project over tenement M20/118 (the 'study area'). The study area is located approximately 55 km northwest of Cue in the Murchison region (Figure 1.1). The current survey was undertaken between 2nd and 6th September 2019 which followed a reconnaissance flora, vegetation, and fauna habitat survey of the study area conducted by *ecologia* in July 2019. Biological surveys have previously been completed over an 83 ha area in the north-east of the study area (Figure 1.1) (Biologic Environmental 2009; Woodman Environmental 2009, 2012); this area was not surveyed by *ecologia*.

1.2 SURVEY OBJECTIVES

The Environmental Protection Authority's (EPA) environmental objectives for the factors *Flora and Vegetation* (Environmental Protection Authority 2016a) are: "To protect flora and vegetation so that biological diversity and ecological integrity are maintained." In the context, 'ecological integrity' is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements. The primary objective of this flora and fauna assessment was to provide sufficient information for the EPA to assess the impact of any proposed development on the flora, vegetation and fauna of the study area, thereby ensuring that the EPA's objectives can be met. To this end, the following were provided as part of this assessment:

- A desktop study to evaluate biological values of the study area and surrounds, including a review of existing environmental values, threatened and priority flora, fauna and community databases, and other relevant available literature;
- A single-phase Detailed flora and vegetation survey, including a quadrat-based survey and conservation significant flora searches;
- A Level 1 vertebrate fauna and fauna habitat survey to outline vertebrate fauna present, fauna habitats, significant fauna features and conservation significant fauna;
- A plant species inventory for the study area;
- An inventory and a map of conservation significant flora and fauna species recorded within the study area, and the local and regional distribution of these species where data are available;
- An inventory and a map of Weeds of National Significance (WONS) and Declared Organisms within the study area;
- Description and mapping of vegetation types within the study area;
- Description and mapping of fauna habitat types within the study area;
- A two-phase stygofauna survey of three water bores;
- An assessment of local and regional vegetation significance; and
- Assessment and mapping of the vegetation condition within the study area.

1.3 LEGISLATIVE AND REGULATORY FRAMEWORK

The survey was designed and conducted to comply with the following guidance documents:

- Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority 2016a);
- Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority 2016c);

- Environmental Factor Guideline: Terrestrial Fauna (Environmental Protection Authority 2016b);
- Technical Guidance: Sampling methods for terrestrial vertebrate fauna (Environmental Protection Authority 2016d); and
- Technical Guidance: Terrestrial Fauna Surveys (Environmental Protection Authority 2016e).

565000 566000 567000 568000 569000 570000

7020000 7019000 7018000 7017000

NANNINE
PORLELL
TUCKANARRA
REEDY
BIG BELL
CUDDINGWARRA
CUE
DAY DAWN
MAINLAND
AUSTIN

Study area (surveyed by ecologia 2019)
Study area (surveyed by Biologic 2009 and Woodman 2009, 2012)
Proposed infrastructure
Town

ecologia ENVIRONMENT

Project: 1796
Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:15,000 @A3

Figure 1.1: Study area and proposed mining related infrastructure.

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

2 METHODOLOGY

2.1 DESKTOP STUDY

The methodology adopted for the desktop study was consistent with that recommended by Environmental Protection Authority (2016c). A review of background environmental information for the study area was undertaken, including climate (BoM), biogeography (IBRA 7) (Department of Sustainability Environment Water Population and Communities 2012a), land systems (Curry *et al.* 1994), soils (Northcote *et al.* 1960-1968; Tille 2006), and pre-European vegetation (Shepherd *et al.* 2001).

Searches of the databases listed in Table 2.1 and a review of other relevant surveys were conducted to construct a list of conservation significant species and ecological communities previously recorded within or in the vicinity of the study area. The criteria listed in Table 2.2 were then applied to determine the likelihood of occurrence of significant species and communities occurring within the study area given the likely landforms and broad habitats present.

Table 2.1: Databases queried for the desktop study

Database	Search details
EPBC Act Protected Matters database	Records of matters of national significance under the EPBC Act within a 40 km search buffer
DBCA Threatened and Priority Ecological Communities Database	All TECs and PECs within a 40 km search buffer
DBCA Threatened and Priority Flora Database (TPFL) and Western Australian Herbarium Specimen Database (WAHERB)	Conservation significant plant species within a 40 km search buffer
DBCA Threatened and Priority Fauna	Conservation significant fauna species within a 50 km search buffer
DBCA NatureMap database	All flora and fauna species records within a 40 km search buffer

Table 2.2: Criteria used to assess the likelihood of occurrence of conservation significant species and communities

Rating	Criterion
Recorded	The species/community has been recorded within the study area previously or during the current survey.
Likely (1)	The species/community may occur within the study area as suitable habitat is known to be present and there are existing records very close to the study area (within ca. 10 km).
Possible (2)	The species/community may occur within the study area as there are existing records in the vicinity of the study area, and suitable habitat is likely to be present; OR The species/community may occur within the study area as there is insufficient information available to exclude the possibility of occurrence.
Unlikely (3)	The species/community is unlikely to occur within the study area as suitable habitat is not present or is not likely to be present; OR Suitable habitat is present within the study area, but the taxon/community has not been recorded despite reasonable survey effort.
Does not occur	The community is an existing regionally mapped vegetation association (e.g. Shepherd et al. 2011) or land system which does not occur within the study area.

2.2 FLORA AND VEGETATION

2.2.1 Survey Timing and Methodology

An initial reconnaissance flora and vegetation survey of the study area was undertaken over three days between July 3 and 5, 2019 by *ecologia* botanists to provide structural vegetation description mapping for the area and to determine the presence of Priority flora species or suitable habitat for these species. The reconnaissance survey focused on areas proposed for workshop facilities, offices, access roads and other mining related infrastructure to assist Fenix in identifying potential ecological risks and areas to be avoided to allow for planning of the site layout.

The detailed flora and vegetation survey was conducted over five days by *ecologia* botanists between September 2 and 6, 2019. Survey methodologies were in accordance with the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority 2016c). The survey was conducted primarily by sampling vascular plant species within bounded quadrats (50m x 50m in dimension), supplemented by a series of traverses, along which changes in vegetation type and disturbance were periodically noted, supplemented opportunistically records. Opportunistic floristic records collected during traverses are a more time efficient approach to maximising the floristic inventory and increasing the probability of locating taxa of potential significance. However, sampling standardised quadrats allows the vegetation and floristic composition to be consistently recorded and characterised. Both methods contributed to the delineation of vegetation types and a floristic inventory of the study area.

Woodman Environmental Consulting conducted a flora and vegetation survey (Woodman Environmental 2009) and systematic targeted conservation significant flora survey (Woodman Environmental 2012) of a section of the study area (Figure 1.1). However, this area was not surveyed by *ecologia*.

2.2.2 Quadrat Sampling

A total of twenty-four (24) sampling sites (17 quadrats and seven relevés) were surveyed and sampled within the study area during the detailed survey. Site locations were selected using a combination of aerial photography, topographic features, landforms, and field observations to represent the geomorphological and floristic variation found within the study area. Sites were located to avoid transition zones between plant communities and were preferentially placed in areas of intact mature vegetation and minimal disturbance. Where possible, at least three sites were sampled within each vegetation type; however, as final vegetation types are determined post-survey, this is not always feasible. Vegetation types may also have fewer than three sites if they represent relatively small continuous areas. All quadrats had a north-south orientation and were 50 m x 50 m in dimension. In instances where installation of quadrats 50 m x 50 m in dimension was not feasible (e.g. narrow creeks, steep gorges, edges of water bodies), relevés were assessed. In this context, a relevé is an unbounded area, with a size approximate to that of a 50 m x 50 m quadrat, in which floristic data are recorded.

The following parameters were recorded from each site: site number and location; photograph from the north-west corner; size and shape of quadrat, including a GPS coordinate of each corner; dominant growth form, height, cover and up to three species for the three traditional strata (upper, mid and ground) compatible with NVIS Level V (Executive Steering Committee for Australian Vegetation Information 2003); a comprehensive species list (including weeds) and the stratum and estimated percent foliage cover of each; landform and soil type; vegetation condition (Table 2.3) and description of disturbance; and additional information to assist vegetation classification, including slope, aspect, rock type and abundance, litter, and fire history.

2.2.3 Conservation Significant Species

Threatened and Priority flora species identified during the desktop study were targeted during both field surveys, utilising known locations and habitat preferences. The surveys involved searches for species within potential suitable habitat made during traverses walked between sites. Where conservation significant species were observed the following parameters were recorded: recorder and date; location (for individual or localised plants) or population boundary (for more extensive populations, time permitting); number of plants (count, for individual or localised plants) or estimated number of plants for more extensive populations; reproductive state; vegetation type; and landform.

Representative voucher specimens for new populations, where discernible, were collected for submission to the Western Australian Herbarium. Copies of Threatened and Priority flora Report Forms were forwarded to the Species and Communities Branch (DBCA) and included in Appendix I.

2.2.4 Specimen Identification and Vouchering

Plant specimen identification was undertaken with reference to current taxonomic literature and herbarium reference specimens. Scientific names used in this report follow the species concepts currently adopted by the Western Australian Herbarium. Specimens that were believed to differ significantly from typical material were indicated with 'affinity' (aff.). Specimens that could not be adequately identified to genus or species level due to the absence of reproductive material required for positive identification were indicated with a question mark but were not considered to be otherwise anomalous. Atypical specimens were submitted to the Western Australian Herbarium for identification or confirmation.

2.2.5 Species Accumulation Curve Analysis

Sampling adequacy was assessed by extrapolating species accumulation curves (SAC). SACs display the rate at which new species are found within the study area in relation to sampling effort and can be extrapolated to provide an estimate of species richness. As sampling effort increases, the rate at which new species are recorded is reduced until ultimately the number of species recorded reaches the number present. At the point where there is a minimal increase in species richness with continued sampling effort, the sample size is considered adequate. Four incidence-based coverage estimators (Chao 2, bootstrap, jackknife 1 and jackknife 2) were used to extrapolate species richness for the study area. Analysis was performed using the *vegan* package (Oksanen *et al.* 2017) of R 3.5.2 (R Core Team 2016) on combined floristic data from both phases, using 9,999 permutations.

2.2.6 Floristic Classification

Floristic classification using multivariate clustering methods provides an objective and repeatable means of delineating vegetation types within a given geographic area and provides insight into the relationship between types. This classification method is based on the complete plant community at sampled sites rather than just dominant species. It is preferred over structural classification for detailed surveys as it is repeatable, can be more readily placed into a regional context, and is more suitable for the identification of significant vegetation (Environmental Protection Authority 2016c).

All analyses were conducted using the R statistical software package (R Core Team 2016). The Bray-Curtis coefficient was used to calculate a site association matrix from transformed (square root) species percent cover data, and a dendrogram was constructed using hierarchical agglomerative clustering using unweighted arithmetic average clustering (UPGMA). Transformation is used in this case to downplay the relative influence of dominant species while increasing the signal of less abundant species. Similarity Profile Analysis (SIMPROF) was then used as a hypothesis testing-based approach for assessing multivariate group structure, which detects groups of homogenous objects (sampling sites) with respect to a set of descriptors (species). SIMPROF provides a means of stopping unwarranted over-interpretation of group substructure. When no significant group structure is

detected by the test there is no justification for further interpretation of substructure, and sites at this point may be considered homogenous (i.e. vegetation types). The *simprof* function from the *clustsig* package (Whitaker and Christman 2014) was used to determine statistically different clusters of sites ($\alpha = 0.01$), with 9,999 permuted similarity profiles. Some groups identified by SIMPROF can be too fine to meaningfully interpret; in such cases group supersets may be interpreted as vegetation types.

Specimens that could not be positively identified to species level were excluded from the analysis if there was potential for confusion with other similar taxa. Conversely, taxa that could not be fully identified, but were not considered to correspond to any other taxon in the data set, were retained. Infraspecific taxa belonging to the same species were amalgamated if specimens could not be consistently identified to the same level. As all quadrats were assessed during the same survey and season, annual species were retained as they can be important for discriminating types.

2.2.7 Vegetation Characterisation

The vegetation types determined by SIMPROF were characterised by the constancy of shared taxa and any diagnostic species. Indicator species analysis using the *indicspecies* package (De Caceres and Legendre 2009) was used to identify diagnostic species for vegetation types. Species with high indicator values are those that occur in all (or most) sites assigned to a vegetation type, but also occur in no (or few) sites outside of that type.

Local scale vegetation types were given descriptions consistent with NVIS Level V – Association (Executive Steering Committee for Australian Vegetation Information 2003), which includes the structural features and dominant or diagnostic species of the type. Plant communities are naturally variable across wide geographic areas, and vegetation types here are delineated based on the overall floristic similarity of sites with various spatial coverage. Therefore, species used in descriptions are those that are most characteristic of the vegetation type but were not necessarily recorded at all sites. Species that are recorded as sometimes dominant in a vegetation type are indicated in the description by "+/-" (Executive Steering Committee for Australian Vegetation Information 2003). The mapping codes used correspond to the most dominant structural formation class (NVIS) present within the type (e.g. SH for shrublands, HG for hummock grasslands etc.).

2.2.8 Vegetation Mapping

Preliminary vegetation mapping of study area was undertaken in the field using aerial imagery and data gathered from ground-truthed sites and other field observations. Vegetation types were determined post-survey using the floristic classification methods described above and applied to these ground-truthed areas. Vegetation type boundaries were then refined using aerial imagery in ESRI ArcMap v.10.3. Given the large size of the study area, extrapolative mapping was undertaken in areas that could not be ground-truthed. Extrapolative mapping was based on observed similarities in spectral and structural features between ground-truthed sites and unvisited areas, with consideration given to vegetation types recorded at surrounding sites.

The Floristic Community Type descriptions and mapping of Woodman Environmental (2009) were used to inform the extrapolation of the vegetation types over the north-eastern section of the study area (Figure 1.1).

2.2.9 Assessment of Vegetation Significance

Plant communities recorded within the study area were assessed, where relevant data were available, for national, state, regional and local significance. National significance refers to those features of the environment which are recognised under the EPBC Act as Threatened Ecological Communities (TECs). State significance refers to features of the environment which are recognised by DBCA as Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs). For this assessment, spatial data from the DBCA Threatened and Priority Ecological Communities Database were used to assess

the presence of TECs and PECs within the study area. A list of TECs and PECs for the Pilbara IBRA bioregion (Department Biodiversity Conservation and Attractions 2017) was also reviewed to assess the potential presence of communities not identified in the database search.

Regional significance addresses the representation of habitats at a biogeographic regional level. Plant communities that are restricted or uncommon in a bioregional context are considered regionally significant. Plant communities acting as a refuge for Threatened flora species may also be considered regionally significant. Regional significance was assessed using two sources of information that cover the whole of the Pilbara IBRA bioregion: the land systems of Van Vreeswyk *et al.* (2004) and vegetation mapping of Shepherd *et al.* (2001).

Locally significant vegetation may include plant communities that are locally restricted, contain comparatively high structural or species diversity, or contain DBCA listed Priority flora species that are restricted to these plant communities. The local significance of vegetation types within the study area were assessed in relation to species diversity, conservation significant species recorded within them and to their local extent in relation to existing vegetation mapping surrounding the study area (if available).

Table 2.3: EPA Vegetation Condition Scale (EPA 2016c).

Vegetation condition	Criterion (Eremaean and Northern Botanical Provinces)
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, 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 present including very aggressive species.
Completely Degraded	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.

2.3 VERTEBRATE FAUNA

A Level 1 vertebrate fauna and fauna habitat assessment was undertaken concurrently with the flora and vegetation between September 2nd and 6th 2019. The survey methods adopted accorded with the Technical Guideline for sampling terrestrial vertebrate fauna for conducting a Level 1 fauna and fauna habitat assessment published by the Environmental Protection Authority (2016d). Low-intensity fauna sampling was also undertaken to detect vertebrate fauna of conservation significance within the study area.

2.3.1 Habitat Descriptions and Mapping

A fauna habitat type broadly describes an area of fauna habitat that is distinguishable by its vegetation, soil characteristics and land features, and is likely to host a different fauna assemblage to that found in other fauna habitats. Habitat delineation and mapping was based upon interpretation of aerial photography and landforms, habitat site assessments, soil descriptions, and the complementary detailed vegetation descriptions and mapping undertaken for this report (see Section 4.1). Particular

attention was given to the likelihood that certain species of conservation significance may be present only in particular habitat types.

Habitat assessments were conducted at 12 fauna survey site locations (HA01 – HA12) considered representative of each habitat type (Table 4.5). For each fauna survey site, the following parameters were recorded:

- broad habitat type;
- digital photographs;
- landform type;
- soil colour, type and characteristics;
- type and extent of non-vegetative surface cover;
- type of vegetation in lower, middle and upper strata;
- observable fire history and evidence of any disturbance;
- presence and extent of leaf litter and coarse woody debris;
- presence of, or distance to, water sources;
- presence of significant microhabitats such as tree hollows and rocky outcrops; and
- notes on suitability for hosting conservation significant fauna.

A habitat condition rating was assigned to each habitat delineated based upon the habitat condition criteria described in Table 2.4.

Table 2.4: Habitat Condition Assessment

Habitat Condition	Criteria
Excellent	Pristine or nearly so, no obvious sign of damage caused by modern humans or introduced fauna (cattle, feral cat, dog and rabbit). No signs of recent, extensive fires.
Very Good	Some relatively slight signs of damage caused by the activities of modern humans. e.g. damage to tree trunks by repeated fires, no significant signs of introduced fauna or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of modern humans, including some obvious impact to vegetation structure such as that caused by low levels of grazing or by selective logging. Some tracks or secondary evidence of introduced fauna. Some signs of recent fires.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of modern humans such as partial clearing or very frequent fires. Presence of introduced fauna.
Very Poor	Severely impacted by grazing, introduced fauna, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management.
Completely Degraded	Areas that are completely or almost completely without vegetation communities and are heavily impacted by extensive fires and/or introduced species e.g. cow paddock

2.3.2 Fauna Records

At each of the 12 fauna survey sites established for the habitat assessments (HA01 – HA12) (Figure 4.9) all fauna observed were recorded. At each site the following actions were undertaken:

- fixed-time bird surveys of 10 minutes;
- targeted searches involving direct observation of animals focussing on conservation significant species, as well as detection of secondary evidence including tracks, scats, remains and other traces; and
- hand searching for cryptic species including raking leaf litter, searching beneath the bark of dead trees, breaking open old logs, stumps and dead free-standing trees, investigating burrows and over-turning logs and stones.

Opportunistic fauna observations were made at all times during the survey to provide additional data to supplement the site survey results. Tracks, diggings, scats, burrows and nests were recorded wherever where secondary evidence was available.

2.3.3 Targeted Conservation Significant Fauna Surveying

Prior to undertaking the field survey, a desktop assessment of the preferred habitats of the conservation significant species potentially occurring in the study area was undertaken and used to assess the likelihood of occurrence of conservation significant species (Section 3.8). These results were ground-truthed during the field survey and, based on the actual habitats present, searches were undertaken to determine the presence of potential conservation significant species occurring.

Targeted searches were undertaken for the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum)* within suitable habitat. A total of ten hours was spent searching for burrows within suitable habitat and adjacent to known burrow locations.

2.3.4 Stygofauna

Stygofauna are small groundwater, generally invertebrate fauna that live permanently underground in a range of groundwater habitats including voids and spaces between sand grains to pools and streams in caves. *ecologia* conducted the initial phase of a two-phase stygofauna survey that conformed with the requirements of a pilot study as outlined in EPA Factor Guideline: *Subterranean Fauna* and EPA Technical Guidance: *Sampling Methods for Subterranean fauna*.

Sampling was conducted concurrently with the Level 1 survey using haul nets of appropriate diameter (depending on water bore diameter). The net is lowered slowly into the bore using a rope and reel to ensure that the net does not fall freely to the bottom of bore. A minimum of three hauls are performed with a 150µm mesh net and further three hauls are performed with a 50µm mesh net. All samples are washed in 50µm sieve and preserved in a vial with 100% ethanol. All vials are labelled with date, bore name and replicate number. Samples are kept in cool, dark place and transported back to Perth for sorting and identification. Specimens are sent to WAM taxonomic specialist for identification.

The second phase of the survey will be conducted six months after the first phase (March 2020) and the results will be outlined in a standalone report.

2.4 ANIMAL ETHICS

The fauna survey was conducted as per *ecologia*'s Animal Ethics Code of Practice, which conforms to Section 5 of the *Australian code of practice for the care and use of animals for scientific purposes* (NHMRC 2004). In all cases, fauna species were identified in the field, and not captured or collected during the survey.

2.5 STUDY TEAM AND LICENCES

The flora and vegetation assessment was planned, coordinated, executed and reported by those summarised below in Table 2.5.

Table 2.5: Study team and licences

Project Staff			
Name	**Qualification**	**Role**	Project role
Shaun Grein	B.App. Sc (Biology); Grad. Dip. Nat. Resources; MBA	Managing Director/Principal Scientist	Project management, reporting, QA
Andrew Craigie	BSc (Hons.), PhD (Botany)	Principal Botanist	Field survey, specimen identification, data analysis, reporting
Tim McCabe	BSc EnvBiol, Dip ProjMgt, Cert III Vert Pest Mgt	Senior Zoologist	Field survey, reporting
Rob Sellers	BSc (Hons.)	Botanist	Desktop assessment
Licences - "Flora Taking (Biological Assessment) Licence"			
Andrew Craigie		Licence No: FB62000084	Valid until: 30/04/2022

2.6 LIMITATIONS AND CONSTRAINTS

2.6.1 Flora Survey Limitations and Constraints

An assessment of survey-specific issues and limitations (Environmental Protection Authority 2016c) is detailed in Table 2.6.

Table 2.6: Flora and vegetation survey limitations.

Constraint	Constraint	Comment
Availability of contextual information at a regional and local scale	Nil	Broad scale vegetation, soil, and geology mapping data were available for the study area, in addition to Threatened and Priority Flora database records, and conservation significant vegetation community records. This information was adequate to provide appropriate contextual information for the current survey.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	Nil	The botanist undertaking the field work and specimen identification for the survey has extensive experience conducting flora and vegetation surveys in the Murchison region.
Proportion of flora recorded and/or collected, any identification issues	Minor	Representative specimens of all taxa identified in the field were collected for confirmation. Some of these could not be confidently identified to species level due to a lack of required reproductive material available the time of the survey. However, a small number of unidentified samples is unlikely to have had any significant impact on the classification of plant communities, and none of these specimens were considered to correspond to any conservation significant species.
Was the appropriate area fully surveyed (effort and extent)	Nil	Twenty-four sampling sites (quadrats and relevés) were surveyed and sampled across the entirety of the study area. This is considered adequate for this level of survey.
Access restrictions within the survey area	Nil	The entirety of the study area was accessible by walking from existing roads and tracks.
Survey timing, rainfall, season of survey	Nil	The survey was conducted in September 2019. Seasonal conditions were considered to be adequate for a primary season flora and vegetation survey.
Disturbance that may have affected the results of survey such as fire, flood or clearing	Nil	There were no natural or human interventions that constrained the survey of the study area.

2.6.2 Fauna Survey Limitations and Constraints

According to Environmental Protection Authority (2016d), terrestrial fauna surveys may be limited by several aspects. An assessment of these aspects regarding this study is detailed in Table 2.7.

Table 2.7: Fauna survey limitations

Aspect	Constraint	Comment
Competency/experience of the consultant carrying out the survey.	Nil	The Senior Zoologist undertaking the fauna survey has more than 12 years of experience in conducting terrestrial vertebrate fauna surveys in Western Australia.
Scope (what faunal groups were sampled and were some sampling methods not able to be employed because of constraints such as weather conditions).	Nil	The fauna survey focussed on the fauna taxa of conservation significance that may have the potential to occur in the study area. The scope was well defined. Fauna and their habitats were surveyed using standardised and well-established techniques. All relevant databases were reviewed.
Proportion of fauna identified, recorded and/or collected.	Low	A desktop study adequately gathered background information on the study area. The fauna and fauna habitat field survey verified the desktop results and characterised habitats and terrestrial fauna likely to be present. The fauna survey focussed on the fauna taxa of conservation significance that may have the potential to occur in the study area. All fauna taxa observed were identified and considered adequate for a Level 1 survey.
Sources of information (previously available information as distinct from new data).	Nil	Database records, including conservation significant species, were available for the area and considered adequate to provide appropriate contextual information for the study.
The proportion of the task achieved and further work which might be needed.	Nil	Planned survey works were conducted and completed. No further work is required to complete the survey scope.
Timing/weather/season/cycle.	Nil	The survey was conducted during an appropriate time/season.
Disturbances which affected results of the survey (e.g. fire, flood, accidental human intervention).	Nil	There were no natural or human interventions that constrained the survey of the study area.
Intensity (in retrospect was the intensity adequate).	Nil	Given the access to available information from the area, the survey intensity was considered adequate and is appropriate for a Level 1 fauna assessment.
Completeness (e.g. was relevant area fully surveyed).	Nil	The Level 1 survey was considered complete. Database searches of relevant databases was undertaken, and a large proportion of the study area was sampled on foot.
Resources (e.g. degree of expertise available in animal identification to taxon level).	Nil	Resources were adequate to carry out the survey and survey participants were competent in the identification of species and likelihood of occurrence. Database searches and literature reviews were used to prepare for the survey and used for the confirmation of any species.
Remoteness and/or access problems.	Nil	The study area was easily accessible by vehicle and on foot.
Availability of contextual (e.g. biogeographic) information on the region.	Nil	The data available was adequate for the level of survey work undertaken during this assessment.
Efficacy of sampling methods (i.e. any groups not sampled by survey methods).	Nil	A comprehensive desktop study adequately gathered background information on the study area. A Level 1 survey verified the desktop results and characterised habitats.

3 DESKTOP STUDY

3.1 CLIMATE

The Western Murchison IBRA subregion is located in the northern end of the Yilgarn Craton, which experiences an arid (desert) climate with bimodal rainfall tending to semi-desert Mediterranean in the south-west corner (Curry *et al.* 1994). Rainfall occurs either in rare widespread major falls (due to cyclones near the Pilbara coast between November and April) or as sharply isolated minor falls of highly variable intensity (due to thunderstorms occurring in the summer months driven by convectional activity). Day time temperatures range from 14 to 22°C in winter to 29 to 38°C in summer. Frosts occur occasionally in the mid-winter months throughout the region.

Rainfall data from the nearest long-term Bureau of Meteorology (BOM) weather station were obtained from Beebyn (Station No. 7001) (BOM 2018) approximately 23.9 km from the centre of the study area. The nearest long-term temperature data were obtained from Meekatharra Airport weather station (Station No. 7045) 93.5 km from the centre of the study area. Mean rainfall and 2018/2019 rainfall as well as and mean maximum and minimum temperatures are displayed in Figure 3.1.

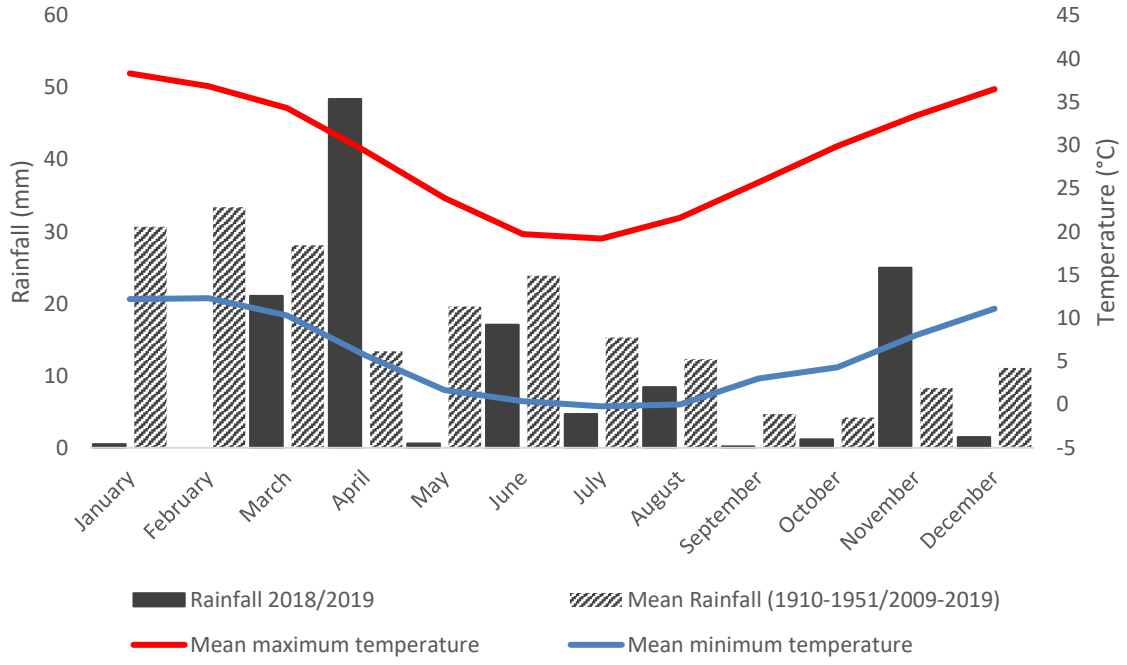


Figure 3.1: Rainfall data from the Beebyn BOM weather station (7001) and temperature data from Meekatharra Airport BOM weather station (7045)

3.2 IBRA 7 BIOGEOGRAPHIC SUBREGIONS

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics (Department of Sustainability ENvironment Water Population and Communities 2012b). The study area is situated within the Murchison region according to IBRA 7 (Department of Sustainability ENvironment Water Population and Communities 2012b), which is further divided into two subregions: Eastern Murchison and Western Murchison. The study area is situated within the Western Murchison subregion (Figure 3.2).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling

granitic and greenstone strata (Desmond *et al.* 2001). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and *Halosarcia* low shrublands on saline alluvia.

3.3 LAND SYSTEMS, GEOLOGY, AND SOILS

Curry *et al.* (1994) undertook a regional inventory of the Murchison rangelands to document the land systems present and their condition. The Murchison Regional Inventory (MRI) covered 88,360 km^2, bounded by Mt Magnet and Meekatharra in east and the catchments of the Greenough and Wooramel rivers in the west. The extent of each land system occurring within the Murchison Regional Inventory varies significantly, with almost half the area comprised of just eight land systems: Yanganoo, Kalli, Koonmarra, Challenge, Sherwood, Belele, Mindura and Narryer (Curry *et al.* 1994).

Four land systems occur within the study area (Violet, Jundee, Weld and Yarrameedie), of which the Yarrameedie land system accounts for over 68.93% its total area (Table 3.1, Figure 3.3). The underlying geology, geomorphology and soils of each land system associated with the study area is detailed in Table 3.2. Two soil types of the Atlas of Australia Soils (Northcote et al. 1960-1968) are associated with the study area (Table 3.3, Figure 3.4).

Table 3.1: Land systems associated with the study area (Curry *et al.* 1994)

Land system	Land type	Description	Total extent (ha)	Extent within study area (ha)
Violet	Stony plains with acacia shrublands and halophytic shrublands	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and patchy halophytic shrublands.	584,970	0.76
Jundee	Wash plains on hardpan with mulga shrublands	Hardpan plains with ironstone gravel mantles and occasional sandy banks supporting mulga shrublands.	661,728	39.32
Weld	Hills and ranges with acacia shrublands	Rugged ranges and ridges of banded ironstone and quartzite, supporting acacia shrublands.	37,235	126.18
Yarrameedie	Stony plains with acacia shrublands	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld land system) supporting sparse mulga shrublands.	68,323	368.82

Table 3.2: Geomorphology and soils of land systems associated with the study area (Curry *et al.* 1994)

Land system	Geomorphology	Soils
Violet	Erosional surfaces; remnants of old plateau as gravelly sand plains above gently undulating outcrops of laterite and weathered greenstones; broad, lower stony plains on greenstone or red-brown hardpan, often densely mantled by pebbles of mixed lithology and with sluggish, occasionally channelled, drainage floors; relief mostly < 10 m.	Dark red gravely loamy sands; dark red gravely clayey sands or fine loams with abundant laterite and ironstone inclusions; Shallow red earths, clay loams or fine sandy loams; red earths, reddish brown sandy clay loams or fine sandy loams.
Jundee	Depositional surfaces carrying sheet drainage; broad plains with variable, but frequently dense, mantles of gravel and pebbles and occasional small groves and sandy banks; higher marginal stony plains on weathered greenstones; drainage tracts receiving more concentrated flow and with some gutters and channels. Relief mostly < 10 m.	Soils are red earths with ironstone gravel; hardpan loams; dark red hardpan sandy clay loams or shallow red earths.

Land system	Geomorphology	Soils
Weld	Erosional surfaces; mountain ranges of strike belts and ridges with peaks 200 m or more above the new plateau plains; lower, rounded hill spurs flanking major ranges; steep hillslopes with extensive loose mantling and rock outcrop; lateritised ridges with caves; valley floors and undulating interfluves often intensely dissected by narrow rectangular drainage tracts with incised channels; sheds most colluvium and drainage to pediment Yarrameedie land system.	Soils are skeletal lithosols confined to pockets of dark red loamy or clayey sands; reddish-brown or dark red shallow earths; red earthy sands.
Yarrameedie	Erosional surfaces; piedmont slopes and plains; mainly 2 to 4 km wide, parallel with major ranges, heavily mantled by mixed pebbles and gravels; higher parts consist of spurs and stony interfluvial slopes dissected by often fairly closely spaced parallel incised drainage lines leading to narrow drainage floors, spreading into minor alluvial tracts downslope; overall relief mainly 5 to 20 m.	Soils are dark red earthy sands, shallow or red earths or occasional duplexes; dark red or reddish-brown earthy sands to hardpan clay loams.

Table 3.3: Soil units associated with the study area (Northcote et al. 1960-1968)

Soil unit	Description	Area (ha)
Fa7	Greenstone hills and low ranges with some slate and basalt: dominant soils are shallow stony earthy loams (Um5.51) on the steep slopes while (Um5.3) and (Uc5.21) overlying red-brown hardpan occur on the stony pediments	521.58
My50	Broad plains with a scatter of surface gravels: chief soils are shallow neutral red earths (Gn2. 12) and shallow earthy loams (Um5.3) in intimate micro-association. They are underlain by a red-brown hardpan at depths of 6-30in.	13.50

3.4 CONSERVATION RESERVES AND NATIONALLY IMPORTANT WETLANDS

The Department of the Environment and Energy's (DoEE) Protected Matters Search Tool (Department of the Environment and Energy 2018) and the DBCA's managed lands and waters database were interrogated for Ramsar Wetlands, Nationally Important Wetlands, and DBCA managed waters occurring near the study area. The closest reserves to the study area include ex Lakeside former pastoral lease 51.5 km to the south (Figure 3.5). No Ramsar wetland occurs in the vicinity of study area.

552000
560000
568000
576000
584000
7024000
7016000
7008000

Study area
Proposed infrastructure
IBRA subregion
Eastern Murchison
Western Murchison

Project: 1796
Date: 13 August 2019
Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:100,000 @A3

Figure 3.2: IBRA 7 subregions (Department of Sustainability Environment Water Population and Communities 2012).

0 2.5 5
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

562000 564000 566000 568000 570000 572000

7022000 7020000 7018000 7016000

Weld

Yarrameedie

Violet

Jundee

Wiluna

Study area
Proposed infrastructure

Land system

Jundee Land System
Violet Land System
Weld Land System
Wiluna Land System
Yarrameedie Land System

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Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:30,000 @A3

Figure 3.3: Land systems associated with the study area (Curry et al. 1994).

Service Layer Credits:

0 0.75 1.5
Kilometers

562000
564000
566000
568000
570000
572000
7022000
7020000
7018000
7016000

BE2

Fa8

Fa7

My50

Study area
Proposed infrastructure

Soil unit

BE2
Fa7
Fa8
My50

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Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:30,000 @A3

Figure 4.3: Soil units associated with the study area (Northcote et al. 1960-1968).

Service Layer Credits:

0 0.75 1.5
Kilometers

500000
520000
540000
560000
580000
600000
620000
640000

7040000
7020000
7000000
6980000
6960000

Study area
DBCA managed lands and waters
ex Lakeside

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Date: 13 August 2019
Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:400,000 @A3

Figure 3.5: Conservation reserves and nationally important wetlands.

0 10 20
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.5 FLORA AND VEGETATION

3.5.1 Floristic Diversity

A total of 281 vascular plant taxa (including species, infraspecific taxa, and phrase name taxa) have been recorded from the vicinity of the study area (NatureMap, Appendix B), representing 49 families and 134 genera. The most diverse families are the Asteraceae (44 taxa), Fabaceae (31 taxa), Chenopodiaceae (22 taxa) and Poaceae (21 taxa). The most diverse genera are *Acacia* (23), *Eremophila* (17), *Ptilotus* (11) and *Rhodanthe* (8).

3.5.2 Conservation Significant Species

The TPFL and WAHERB database searches identified 30 conservation significant plant taxa within the 50 km search area, including eight Priority 1 taxa, one Priority 2 taxon, sixteen Priority 3 taxa and five Priority 4 taxa (Table 3.4). The likelihood for each taxon to occur within the study area was assessed (Table 3.4) using the criteria outlined in Table 2.2 (Section 2.1). To assist in this assessment, habitat preferences were sourced, where available, from relevant taxonomic literature, FloraBase records (Western Australian Herbarium 1998–2018), Threatened species profiles (SPRATs) (Threatened Species Scientific Committee 2016), or specimen data from the Australasian Virtual Herbarium (AVH) database (CHAH 2017). Herbarium catalogue numbers are provided if habitat information was derived from specimen data. Data from the reconnaissance level flora survey conducted by *ecologia* in July 2019 was also used.

Five conservation significant plant species were recorded from the study area by *ecologia* during a July 2019 reconnaissance survey (Figure 3.6). In addition to these, based on the proximity of previous records and the potential presence of suitable habitat, five species were considered likely to occur and 10 species possibly occur within the study area (Table 3.4). Eight taxa were considered unlikely to occur due to the probable absence of suitable habitat within the study area.

3.5.3 Introduced Species

A search of the NatureMap database identified seven introduced (weed) species within 40 km of the study area (Table 3.5), none of which are classified as WONS or Declared Pests according to the Western Australian Organism List (WAOL). All species are listed on WOAL as ‘Permitted s11’, except for *Rumex vesicarius* which is unlisted (Table 3.5).

Table 3.4: Conservation significant plant taxa recorded within 50 km of the study area and their likelihood of occurrence.

Taxon	Status	Habitat	Flowering	Likelihood of occurrence	Post-survey likelihood of occurrence
Acacia burrowsiana	P3	Red-brown loams with ironstone rubble on surface, calcrete soils, laterite, quartz. Flats adjacent to watercourses, crests of low rises, breakaways.	Unknown	Likely (1)	Unlikely (3)
Acacia dilloniorum	P1	Grows in red clay-loam or red-brown silty clay-loam on the middle and upper slopes and crests of low ranges mostly associated with outcropping basalt, in tall open shrubland.	August	Recorded	Recorded
Acacia speckii	P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Unknown	Recorded	Recorded
Bergia auriculata	P2	Clay soils. Mud flats.	Unknown	Unlikely (3)	Unlikely (3)
Beyeria lapidicola	P1	*Callitris-Acacia* woodlands or mulga woodland in sandy loams or on *banded ironstone hills.*	July to September	Likely (1)	Unlikely (3)
Calytrix verruculosa	P3	Sandy clay.	August or October	Possible (2)	Unlikely (3)
Dicrastylis sp. Cue (A.A. Mitchell 764)	P1	Drainage area, near granite	September to October	Unlikely (3)	Unlikely (3)
Dodonaea amplisemina	P4	Red-brown sandy clay on basalt and gabbro and banded ironstone or on dolerite and quartzite. Rocky hills.	August	Recorded	Recorded
Drosera eremaea	P1	Grows in shallow soils on the aprons of granite outcrops in winter, wet depressions in arid areas.	-	Unlikely (3)	Unlikely (3)
Eremophila fasciata	P3	Hills to the south-east of Meekatharra, amongst rocks and under shrubs in *Acacia* shrublands.	August	Possible (2)	Unlikely (3)
Eremophila rhegos	P1	Skeletal stony loam over granite.	September	Likely (1)	Unlikely (3)
Eremophila simulans subsp. *megacalyx*	P3	Unknown	August to September	Possible (2)	Unlikely (3)
Goodenia berringbinensis	P4	Red sandy loam. Along watercourses.	June to October	Possible (2)	Possible (2)
Goodenia grandiflora	P1	Sandy, gravelly soils. Rocky slopes & breakaways.	May to December	Possible (2)	Possible (2)
Grevillea inconspicua	P4	Loam, gravel. Along drainage lines on rocky outcrops, creeklines.	June to August	Recorded	Recorded
Hemigenia exilis	P4	Laterite. Breakaways, slopes.	April or September to November	Likely (1)	Unlikely (3)
Hemigenia tysonii	P3	Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.	May or July to December	Unlikely (3)	Unlikely (3)
Hemigenia virescens	P3	Hillsides, in rangelands, in low and high shrublands and on sandy banks. Soil types are commonly yellow-red sandy clay, brown ironstone gravel and brown rocky sand.	July to August	Likely (1)	Recorded
Hibiscus krichauffianus	P3	Red sandy soils.	March or October	Unlikely (3)	Unlikely (3)

Taxon	Status	Habitat	Flowering	Likelihood of occurrence	Post-survey likelihood of occurrence
Homalocalyx echinulatus	P3	Laterite. Breakaways, sandstone hills.	June to September	Unlikely (3)	Unlikely (3)
Micromyrtus placoides	P3	Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating plains, dry creek beds, hillcrests, ridges.	July to September	Recorded	Recorded
Petrophile pauciflora	P3	Decaying & dissected granite breakaways.	September	Unlikely (3)	Unlikely (3)
Phyllanthus baeckeoides	P3	Red lateritic & sandy clay soils. Granite outcrops.	July to September	Unlikely (3)	Unlikely (3)
Prostanthera ferricola	P3	Shallow red-brown skeletal sandy loam on banded ironstone, laterite, basalt or quartz. Gently inclined mid to upper slopes of hills, rocky crests, outcrops.	July to September	Recorded	Unlikely (3)
Prostanthera petrophila	P3	Lateritic soils, ironstone slopes and foothills on red-orange sandy clay with ferrous stones and boulders.	August	Possible (2)	Recorded
Ptilotus beardii	P3	Clayey soils. Saline flats, low breakaways.	August to October	Possible (2)	Unlikely (3)
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Footslopes, plains, rocky banded ironstone outcrops.	June	Possible (2)	Unlikely (3)
Stenanthemum mediale	P1	Red clayey sand.	April to August	Possible (2)	Unlikely (3)
Stenanthemum patens	P1	Basalt and banded ironstone hillsides as well as on sandy loam and clay slopes.	August to September	Recorded	Recorded
Verticordia jamiesonii	P3	Quartzite or laterite breakaways, hill slopes, ridgelines, or on weathered granite within pockets of small sandy clay in depressions.	September to October	Possible (2)	Unlikely (3)

Table 3.5: Introduced plant species recorded within 40 km of the study area (NatureMap).

Taxon	Common name	WAOL category	Ecological impact	Invasiveness
Cleretum papulosum subsp. *papulosum*		Permitted - s11	Unrated	Unrated
Hypochaeris glabra	Smooth catsear	Permitted - s11	Low	Rapid
Lysimachia arvensis	Pimpernel	Permitted - s11	Unrated	Unrated
Pentameris airoides	False hairgrass	Permitted - s11	Unrated	Unrated
Rostraria pumila	Rough cat's tail, hairgrass	Permitted - s11	Unrated	Unrated
Rumex vesicarius	Ruby dock	Not listed	Unrated	Unrated
Sisymbrium erysimoides	Smooth mustard	Permitted - s11	Low	Unknown

500000 520000 540000 560000 580000 600000 620000

7060000 7040000 7020000 7000000 6980000

ING RANGE

569 m

728 m

569 m

575 m

Great Northern Hwy

Reedy

Walter Padbury Park

95

Great Northern Hwy

Weld Range

Study area

Priority 1

- *Acacia dilloniorum*
- *Beyeria lapidicola*
- *Dicrastylis* sp. Cue (A.A. Mitchell 764)
- *Drosera eremaea*
- *Eremophila rhegos*
- *Goodenia grandiflora*
- *Stenanthemum mediale*
- *Stenanthemum patens*

Priority 2

- *Bergia auriculata*

Priority 3

- *Acacia burrowsiana*
- *Calytrix verruculosa*
- *Eremophila fasciata*
- *Eremophila simulans* subsp. *megacalyx*
- *Hemigenia tysonii*
- *Hemigenia virescens*
- *Hibiscus krichauffianus*
- *Homalocalyx echinulatus*
- *Micromyrtus placoides*
- *Petrophile pauciflora*
- *Phyllanthus baeckeoides*
- *Prostanthera ferricola*
- *Prostanthera petrophila*
- *Ptilotus beardii*
- *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94)
- *Verticordia jamiesonii*

Priority 4

- *Acacia speckii*
- *Dodonaea amplisemina*
- *Goodenia berringbinensis*
- *Grevillea inconspicua*
- *Hemigenia exilis*

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Projection: Transverse Mercator
Absolute Scale: 1:350,000 @A3

Figure 3.6: DBCA Priority Flora records within 50 km of the study area.

0 10 20
Kilometers

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

3.5.4 Pre-European Vegetation

Shepherd *et al.* (2001) mapped the extent of pre-European vegetation of Western Australia with updates reflecting National Vegetation Information System (NVIS) standards. Two vegetation associations are associated with the study area: 18 and 202 (Table 3.6, Figure 3.7). The widespread vegetation association 18 is dominated by mulga (*Acacia aneura* and close relatives) low woodlands over *Eremophila fraseri* and *E. foliosissima* tall open shrublands and comprises the vast majority of the study area. Vegetation association 202, comprising mulga and *Acacia quadrimarginea*, is somewhat more restricted regionally and only makes up 0.6% of the study area. Markey and Dillon (2008) noted, however, that *A. quadrimarginea* has not been recorded from either the Weld Range or Jack Hills. The pre-European and current extent of each vegetation association is available from the Statewide Vegetation Statistics dataset (Government of Western Australia 2018). Vegetation associations below 30% of their pre-European extent within a bioregion are classed as 'Critical Assets' according to the National Objectives and Targets for Biodiversity Conservation 2001-2005 (Department of Environment and Heritage 2001), as this is the threshold below which species loss appears to accelerate exponentially (Environmental Protection Authority 2000). The current extent of both vegetation associations is well above the 30% threshold, and none are considered restricted from a bioregional context (Table 3.6).

Table 3.6: Pre-European vegetation associated with the study area

Vegetation association	Description (NVIS V)	Pre-European extent (ha)	Current extent (ha)	Percent remaining	Percent current extent protected (IUCN I - IV) for conservation	Extent within study area (ha)
18	*Acacia aneura* low woodland over *Eremophila fraseri*, *Eremophila foliosissima* tall open shrubland	19,892,306	19,843,149	99.75	2.13	499.73 (0.003%)
202	*Acacia aneura* and *Acacia quadrimarginea* tall open shrubland	448,529	448,343	99.96	0.39	35.34 (0.008%)

In a floristic survey of the Weld Range, primarily targeted crests, slopes and outwashes of the Weld land system, Markey and Dillon (2008) described eight floristic community type for the Weld Range. This survey:

- Community type 1a: *Acacia aneura*, *A. ramulosa* var *linophylla*, and/or *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) over a sparse shrub cover of *Eremophila* spp.
- Community type 1b: Open shrublands and sparse shrublands of *Acacia aneura* (cf. var. *microphylla*, *aneura* and *argentea*), *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), and *Grevillea berryana* over a shrub layer of various species of *Eremophila* (*E. georgei*, *E. latrobei* subsp. *latrobei* and *E. glutinosa*)
- Community type 2: Sparse – open shrublands of *Acacia aneura* cf. var. *microcarpa* and / or *A. aneura* cf. var. *aneura* over the mid-stratum shrub layer which includes species such as *Thryptomene decussata*, *Philotheca brucei* subsp. *brucei* and numerous species of *Eremophila*
- Community type 3: Open shrubland of *Acacia aneura* over isolated shrub species such as *Solanum ashbyae* and *Tribulus suberosus*.
- Community type 4: Open shrublands of *Acacia aneura* and emergent trees of *Acacia pruinocarpa* over shrublands of *Philotheca brucei* subsp. *brucei* and *Eremophila* spp.

- Community type 5a: Isolated, emergent trees of *Acacia pruinocarpa* above *Acacia aneura*/ *Acacia ramulosa* var. *linophylla* over an open mid-stratum of shrubs.
- Community type 5b: Sparse open Acacia shrubland (*A. aneura* cf. var. *tenuis*, *A. aneura* cf. var. *aneura* and/or *Acacia coolgardiensis* subsp. *effusa*) over sparse layer of shrubs of *Senna* spp. and *Tribulus suberosus*.
- Community type 6: Sparse – open shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia aneura* and *Acacia speckii* over sparse mid-stratum of *Eremophila macmillaniana*, *Eremophila mackinlayi* subsp. *spathulata* and *Senna* spp.

564000 567000 570000 573000

7020000

7017000

182

202

18

Study area

Proposed infrastructure

Vegetation association

18 - Low woodland; mulga (Acacia aneura)

182 - Low woodland; mulga & bowgada (Acacia ramulosa)

202 - Shrublands; mulga & Acacia quadrimarginea scrub

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Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:30,000 @A3

Figure 3.7: Pre-European vegetation associations (Shepherd et al. 2001).

Service Layer Credits:

0 0.75 1.5
Kilometers

3.6 SIGNIFICANT ECOLOGICAL COMMUNITIES

No state (DBCA) or Commonwealth (EPBC Act) listed TECs have been recorded within the study area. Seven Priority Ecological Communities (PECs) have been recorded within 50 km of the study area. These include three Priority 1 and four Priority 3 communities (Table 3.7; Figure 3.8). Four of these represent entire land systems (Austin, Breberle, Trillbar and Yagahong) that no not occur within or in the immediate vicinity of the study area. Both the 'Lake Austin calcrete groundwater assemblage' and 'Taincrow calcrete groundwater assemblage' have been recorded within 50 km of the study area in calcrete substrate; however, these assemblages are specific to the area in which they were recorded. The Priority 1 PEC 'Weld Range Vegetation Complexes (Banded Iron Formation)' occurs over 263.80 ha (49.3%) of the study area according to the spatial extent defined by DBCA, including a 500 m administrative buffer.

Table 3.7: Threatened and Priority Ecological communities recorded within 50 km of study area and their likelihood of occurrence within the study area.

Community	Status	Description	Distance from study area (km)	Likelihood of occurrence
Austin Land System	P3	Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean below greenstone hill systems.	39.88	Does not occur
Breberle Land System	P3	Level saline drainage plains adjacent to ephemeral lakes, claypans and swampy drainage foci with sandy margins and occasional sand dunes; supports tall Acacia shrublands and other fringing shrublands with zonations of perennial grasses and halophytes.	15.78	Does not occur
Lake Austin calcrete groundwater assemblage type on Murchison palaeodrainage on Austin Downs Station	P1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	42.44	Does not occur
Taincrow calcrete groundwater assemblage type on Murchison palaeodrainage on Taincrow Station	P1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	34.83	Does not occur
Trillbar Land System	P3	Gently sloping stony plains with low rises of metamorphic rocks and gilgaied drainage foci; supports more or less saline shrublands of snakewood, mulga, bluebush and samphire with patches of tussock grassland	33.75	Does not occur
Weld Range vegetation complexes (banded ironstone formation)	P1	NA	0.00	Recorded
Yagahong Land System	P3	Rough greenstone ridges, hills and cobble-strewn footslopes supporting mulga shrublands	23.63	Does not occur

3.7 OTHER SIGNIFICANT ECOSYSTEMS

Twenty-seven ecosystems at risk have been identified as occurring within the Western Murchison subregion (Desmond *et al.* 2001):

- Subterranean fauna of the Murchison Basin. Calcrete formations north east of Cue;
- Mount Narryer and Jack Hills vegetation complexes;
- Stony bluebush mixed shrubland (SBMS) of the Sandstone-Yalgoo-Paynes Find area;
- Hardpan plain mulga shrubland with scattered chenopods (HMCS) of the Sandstone-Yalgoo-Paynes Find area;
- Melaleuca wetlands and spinifex areas of the Lake System on Muggon Station;
- Alluvial plain snakewood chenopod shrubland (ASWS) of the Sandstone- Yalgoo-Paynes Find area;
- Breakaway footslope chenopod low shrubland of the Sandstone-Yalgoo- Paynes Find area;
- Shrubland communities of lake frontages, Murchison area. Polelle Station good condition;
- Floodplains of the Carnarvon Basin, Wooramel and Gascoyne Rivers;
- Assemblages of the inland Granites (Murchison);
- Hardpan mulga (*Acacia aneura*) shrublands HPMS; Murchison River catchment;
- Bluebush (*Maireana* spp.) shrublands BLUS; Murchison River catchment;
- Mixed halophytic shrublands MXHS; Murchison River catchment;
- Stony mulga (*Acacia aneura*) mixed shrubland SMMS; Murchison River catchment;
- Saltbush (*Atriplex* spp.) shrublands SALS; Murchison River catchment;
- Stony snakewood (*Acacia xiphophylla*) shrublands SSWS; Murchison River catchment;
- Calcrete shrubby grasslands CSHG; Murchison River catchment;
- Non-calcareous shrubby grasslands NCSG; Murchison River catchment;
- Creekline grassy shrublands CRGS; Murchison River catchment;
- Calcrete Eucalypt woodlands of Murchison River catchment;
- Assemblages of specific lake communities e.g. Lake Austin, Lake Annean;
- *Eucalyptus camaldulensis* woodlands that are Major Mitchell nesting sites on Berringarrah and Milly Milly Stations along the Murchison River;
- Aquatic fauna assemblages of Fish Holes on Doolgunna Station. Possibly have endemic fish and turtles;
- Assemblages of the perched lake at Weld Range;
- Marloo land system Mitchell Grass floodplain, top end type Mia Mia Station;
- Merbla land system Unique treeless grassland;
- CWR Mammals. Extant species include *Dasycercus cristicauda*, Species extinct in subregion include *Macrotis lagotis, Pseudomys chapmanii*.

550000

600000

7050000

7000000

6950000

Breberle LS

Weld Range BIF

Yagahong LS

Trillbar LS

Taincrow Calcrete

Lake Austin Calcrete

AustinLS

Study area

DBCA search buffer (50 km).

Community

- Lake Austin calcrete groundwater assemblage type on Murchison palaeodrainage on Austin Downs Station (Priority 1)
- Taincrow calcrete groundwater assemblage type on Murchison palaeodrainage on Taincrow Station (Priority 1)
- AustinLS (Priority 3)
- Breberle Land System (Priority 3)
- Trillbar Land System (Priority 3)
- Yagahong Land System (Priority 3)
- Weld Range vegetation complexes (banded ironstone formation) (Priority 1)

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Date: 18 February 2019
Author: RS
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:407,354 @A3

Figure 3.8: DBCA Priority Ecological Communities (50 km buffer).

0 10 20
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.8 TERRESTRIAL FAUNA

3.8.1 Vertebrate Fauna Assemblage

A total of 199 vertebrate fauna species have been recorded from within 40 km of the study area according to NatureMap database searches (Appendix B) including 122 birds, 42 reptiles, 28 mammals, two fish and two amphibians (Table 3.8). One hundred and three bird species have been recorded within 50 km of the study area according to Birdlife Birdata (Appendix B).

Previous Level 2 vertebrate fauna surveys conducted within the immediate vicinity of the study area by *ecologia* (2009) recorded a total of 141 vertebrate species (Table 3.8).

Table 3.8: Summary of fauna records

Database	Mammals	Birds	Reptiles	Amphibians	Fish
NatureMap (all taxa)	28	122	42	5	2
DCBA Threatened and Priority Fauna	4	13	2		
Birdlife Birdata		103			
ecologia (2009) Level 2 survey Weld Range	16	80	44	1	

3.8.2 Fauna of Conservation Significance

Nineteen vertebrate fauna species and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the study area including four mammals, 13 birds and two reptiles (Table 3.8). Eight Threatened and eight migratory species were identified from the EPBC Act Protected Matters Search Tool (Appendix C) along with 12 listed marine species. Species listed as Marine or species not known to inhabit terrestrial environments have been excluded from further discussion in this report. Significant fauna locations provided in DCBA database search results in relation to the study area, are presented in Figure 3.9.

An assessment of the likelihood of occurrence for relevant conservation significant fauna species recorded based on the desktop assessment was undertaken (Table 3.9). For the relevant species, the likelihood of occurrence was determined by investigating the following:

- Fauna habitats likely to exist within the study area based on the desktop study;
- Distance of previously recorded conservation significant species based on publicly available records;
- Frequency of occurrence of conservation significant species records; and
- Time passed since conservation significant species were recorded.

Each relevant conservation or biologically significant species assessed as potentially occurring within the study area was assigned a likelihood of occurrence rating (Table 3.9) based on the four categories described in (Table 2.2).

The west coast mulga slider (*Lerista eupoda* (P1 BC Act)) has previously been recorded on two occasions within the study area.

The northern shield-backed trapdoor spider (*Idiosoma clypeatum* (P3 BC Act)) (formerly recognised as *I. nigrum*) has been recorded on multiple occasions adjacent the study area in tenement M20/118 and intensive targeted surveys for this species have been conducted within the Weld Range. Rix *et al.* (2018) conducted a conservation systematics review of the genus *Idiosoma* and concluded that the *Idiosoma* populations recorded through the Murchison bioregion and northern sections of the Yalgoo bioregion are *Idiosoma clypeatum*. Based on this classification and species distribution, it can be concluded that the species of trapdoor spider within the Weld Range is *Idiosoma clypeatum* and targeted surveys conducted in the past for *Idiosoma nigrum* are relevant for this species.

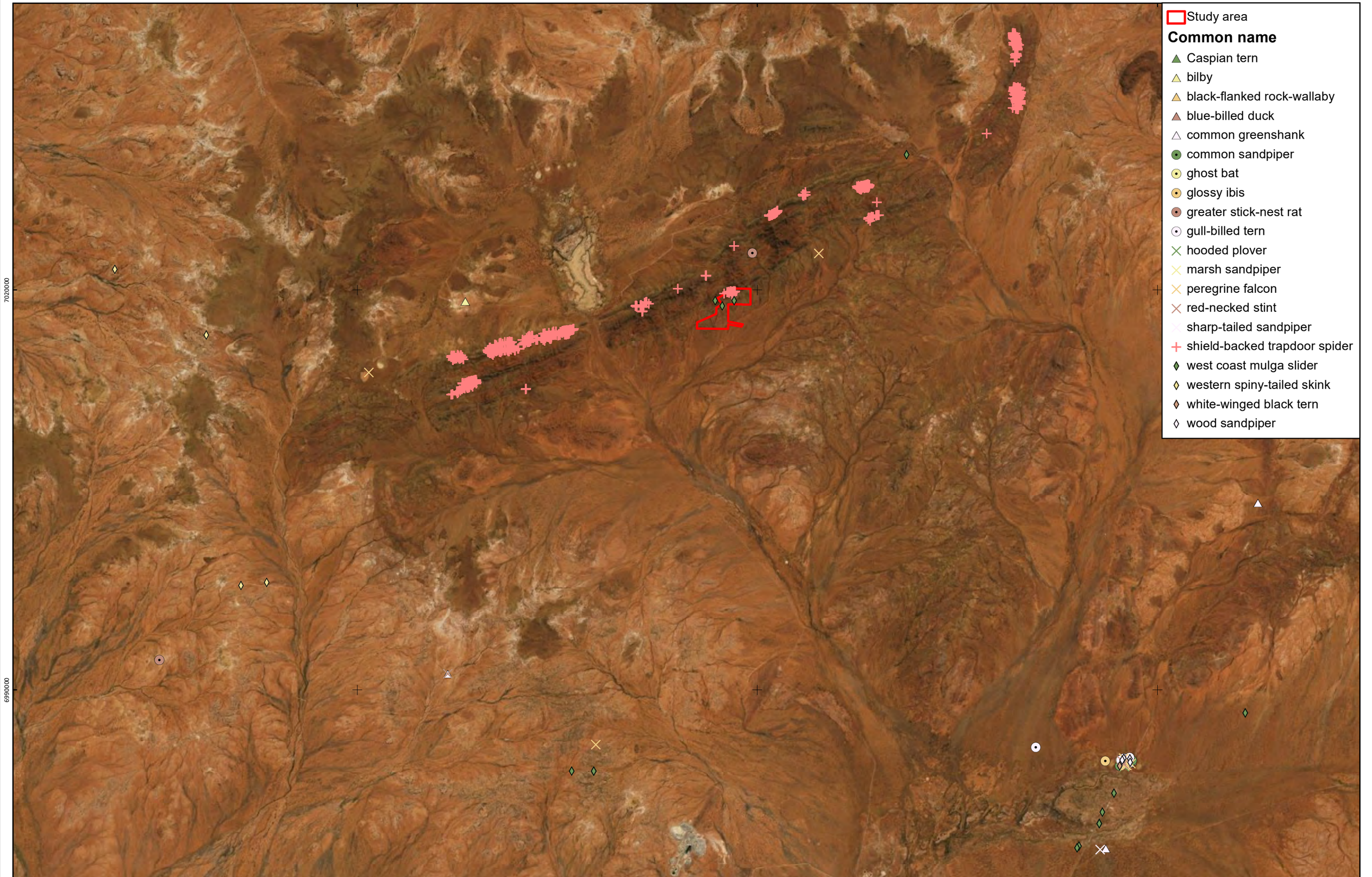
Over 1800 trapdoor spider burrows have been identified from database searches, the majority of which are from the Weld Range. Targeted surveys previously conducted by Bamford Consulting Ecologists (2009) and (Biologic 2012a) within tenement M20/118 recorded 135 burrows and 105 burrows respectively. The majority of burrows recorded were found on slopes with a southern aspect under narrow phyllode acacias in a mix of clay and rocky substrates.

Estimated population sizes within tenement M20/118 vary between the two data sets (3,059 for the Bamford data and 4,135 for the Biologic data) (Biologic 2012a). After analysing datasets within similar plant communities within and surrounding M20/118, Biologic (2012a) estimated the population size of *I. clypeatum* to be 14,907 individuals. It was estimated that 27% of this population is within tenement M20/118.

A Level 2 vertebrate fauna assessment conducted by *ecologia* (2009) in the vicinity of the study area recorded three species of conservation significance including the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)), peregrine falcon (*Falco peregrinus* (OS BC Act)) and west coast mulga slider (*Lerista eupoda* (P1 BC Act)).

Table 3.9: Conservation significant fauna likelihood of occurrence

Common name	Scientific name	EPBC status	WA status	Number of records	Latest record	Comments	Likelihood of occurrence pre-survey	Likelihood of occurrence post-survey
Mammals								
Bilby	*Macrotis lagotis*	VU	VU	1	1984	No suitable habitat present	Unlikely	Unlikely
Black-flanked rock-wallaby	*Petrogale lateralis lateralis*	EN	EN	1	?	No suitable habitat present	Unlikely	Unlikely
Ghost bat	*Macroderma gigas*	VU	VU	1	?	No suitable habitat present	Unlikely	Unlikely
Greater stick-nest rat	*Leporillus conditor*	VU	CD	2	2012	No suitable habitat present	Unlikely	Unlikely
Long-tailed dunnart	*Sminthopsis longicaudata*		P4		2009	Records in vicinity, suitable habitat present	Likely	Likely
Birds								
Blue-billed duck	*Oxyura australis*		P4	1	2000	No suitable habitat present	Unlikely	Unlikely
Caspian tern	*Hydroprogne caspia*	MI	IA	1	2013	No suitable habitat present	Unlikely	Unlikely
Common greenshank	*Tringa nebularia*	MI	IA	18	2013	No suitable habitat present	Unlikely	Unlikely
Common sandpiper	*Actitis hypoleucos*	MI	IA	3	2015	No suitable habitat present	Unlikely	Unlikely
Glossy ibis	*Plegadis falcinellus*	MI	IA	4	2005	No suitable habitat present	Unlikely	Unlikely
Gull-billed tern	*Gelochelidon nilotica*	MI	IA	4	2001	No suitable habitat present	Unlikely	Unlikely
Hooded plover	*Thinornis rubricollis*		P4	2	2015	No suitable habitat present	Unlikely	Unlikely
Marsh sandpiper	*Tringa stagnatilis*	MI	IA	4	2013	No suitable habitat present	Unlikely	Unlikely
Peregrine falcon	*Falco peregrinus*		OS	9	2017	Records in vicinity, has the potential to overfly the study area	Likely	Likely
Red-necked stint	*Calidris ruficollis*	MI	IA	3	2012	No suitable habitat present	Unlikely	Unlikely
Sharp-tailed sandpiper	*Calidris acuminata*	MI	IA	1	2007	No suitable habitat present	Unlikely	Unlikely
White-winged black tern	*Chlidonias leucopterus*	MI	IA	2	2015	No suitable habitat present	Unlikely	Unlikely
Wood sandpiper	*Tringa glareola*	MI	IA	4	2005	No suitable habitat present	Unlikely	Unlikely
Reptiles								
West coast mulga slider	*Lerista eupoda*		P1	21	2014	Previously recorded within the study area	Recorded	Recorded
Western spiny-tailed skink	*Egernia stokesii badia*	EN	VU	4	2010	Records in vicinity, some suitable habitat present	Possible	Unlikely
Invertebrate								
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*		P3	1894	2016	Recorded within the study area	Recorded	Recorded



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Project: 1796
Date: 11/11/2019
Author: TM
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:250,000 @A3

Figure 3.9: Conservation significant fauna within 50 km of study area (DBCA).

0 5 10
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.9 PREVIOUS BIOLOGICAL SURVEYS NEAR THE STUDY AREA

Several recent flora and fauna assessments have been conducted int the vicinity of the study area, the significant conservation features of which are summarised in Table 3.10:

- Flora and Vegetation of the banded iron formations of the Yilgarn Craton: the Weld Range (Markey and Dillon 2008);
- Atlas Iron Ltd: Weld Range Level 1 Targeted Fauna Survey 2009 (Biologic Environmental 2009);
- Conservation significant flora from Twenty flora surveys (Level 1 and targeted) conducted by *ecologia* between 2006 and 2008 have been summarised in Sinosteel Midwest Corporation LTD: Weld Range Iron Ore Project, Rare Flora Management Plan (*ecologia* 2012);
- Atlas Iron Ltd: Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012 (Woodman Environmental 2012);
- Atlas Iron Ltd: Weld Range *Idiosoma nigrum* Survey 2012 (Biologic 2012a);
- Atlas Iron Ltd: Weld Range DSO Project, Flora and Vegetation Assessment 2012 (Woodman Environmental 2012);
- Weld Range Vertebrate Fauna Assessment. Unpublished Report for Sinosteel-Midwest Management (*ecologia* 2009).

Table 3.10: Summary of significant features identified during biological surveys relevant to the study area

Survey	Location	Conservation significant species recorded	TEC/PEC
Flora and Vegetation of the banded iron formations of the Yilgarn Craton: the Weld Range (Markey and Dillon 2008)	Weld Range	*Dodonaea amplisemina* (P3) *Micromyrtus placoides* (P1) *Phyllanthus baeckeoides* (P1) *Prostanthera petrophila* (P1) *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) *Stenanthemum patens* (P1) *Acacia speckii* (P3) *Prostanthera ferricola* (P3)	
Atlas Iron Ltd: Weld Range Level I Targeted Fauna Survey (*ecologia* Environment 2009)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	*Lerista eupoda* (P1) *Pseudantechinus woolleyae* (locally significant)	None
Sinosteel Midwest Corporation Ltd: Weld Range Iron Ore Project, Rare Flora Management Plan 2012 (*ecologia* 2012)	ca. 60 km north-east of Cue within Sinosteel Midwest Corporation tenements E 20/457, E 20/492, E 20/635, M 20/311, M 20/419, M 51/869, E 20/457, E 20/492, E 20/635, M 20/311, M 20/419 (adjacent to north-east boundary of current study area).	*Acacia* sp. Wilgie Mia (D. Coultas & G. Woodman AW03-Opp 1) (P1) [now *Acacia dilloniorum*] *Beyeria lapidicola* (P1) *Euphorbia sarcostemmoides* (P1) *Sauropus* sp. Woolgorong (P1) *Stenanthemum patens* (P1) *Acacia burrowsiana* (P3) *Eremophila arachnoides* subsp. *arachnoides* (P3) *Goodenia lyrata* (P3) *Hemigenia tysonii* (P3) *Homalocalyx echinulatus* (P3) *Indigofera gilesii* subsp. *gilesii* (P3) *Micromyrtus placoides* (P3) *Mirbelia stipitata* (P3) *Prostanthera ferricola* (P3) *Prostanthera petrophila* (P3) *Ptilotus beardii* (P3) *Ptilotus luteolus* (P3) *Tecticornia cymbiformis* (P3) *Verticordia jamiesonii* (P3) *Acacia speckii* (P4) *Dodonaea amplisemina* (P4) *Goodenia berringbinensis* (P4) *Grevillea inconspicua* (P4)	None

Survey	Location	Conservation significant species recorded	TEC/PEC
Atlas Iron Ltd: Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012 (Woodman Environmental 2012)	ca. 60 km north-east of Cue within tenement M20/118 (overlapping with current study area).	*Acacia* sp. Wilgie Mia (D. Coultas & G. Woodman AW03-Opp 1) (P1) [now *Acacia dilloniorum*] *Stenanthemum patens* (P1) *Micromyrtus placoides* (P3) *Prostanthera petrophila* (P3) *Acacia speckii* (P4) *Dodonaea amplisemina* (P4) *Grevillea inconspicua* (P4)	None
Atlas Iron Ltd: Weld Range *Idiosoma nigrum* Survey 2012 (Biologic 2012a)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	*Idiosoma nigrum* (P3)	None
Atlas Iron Ltd: Weld Range DSO Project, Flora and Vegetation Assessment 2012 (Woodman Environmental 2012)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	*Micromyrtus placoides* (P1) *Prostanthera petrophila* (P1) *Stenanthemum patens* (P1) *Acacia speckii* (P3) *Dodonaea amplisemina* (P3) *Grevillea inconspicua* (P4).	Weld Range Vegetation Complexes (Banded Iron Formation)
Weld Range Vertebrate Fauna Assessment Unpublished Report for Sinosteel-Midwest Management (*ecologia* 2009)	ca. 60 km north-east of Cue within Sinosteel's main ore bodies within the Weld Range	Long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)) peregrine falcon (Falco peregrinus (OS BC Act)) West coast mulga slider (*Lerista eupoda* (P1 BC Act))	None

4 FIELD SURVEY RESULTS

4.1 FLORA AND VEGETATION

4.1.1 Floristic Diversity

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded during the current survey (Appendix E). The most dominant families in terms of species richness were the Asteraceae (26 taxa), Fabaceae (25), Poaceae (11), Scrophulariaceae (11), Chenopodiaceae (10), and Amaranthaceae (9). At the generic level, the most dominant groups were *Acacia* (16 taxa), *Eremophila* (11), *Ptilotus* (9), *Goodenia* (6), and *Rhodanthe* (6) (Appendix E). Most genera (68) were represented by only one taxon. A large proportion (ca. 44%) of species recorded were annual or short-lived perennial species. Only a small proportion of collected specimens (ca. 1.9% of specimens) could not be confidently identified to species level due to the absence of reproductive material required for positive identification. These identifications (indicated by "?" or "indet.") are included in the species inventory for the study area but are not included in the statistics described above unless they were unlikely to be confused with any other recorded taxon.

The extrapolated species richness of the study area using the bootstrap, Chao, jackknife 1 and jackknife 2 estimators was 168, 210, 215, and 215 taxa respectively. The total number of taxa recorded from quadrats was 153 taxa, representing between 71% and 91% of the extrapolated species richness. Predicted species accumulation curves of the four estimators showed accumulation of new species not tending towards zero (asymptote) by 25 sites (Figure 4.1). Additional site-based survey effort may therefore have resulted in a larger number of species recorded within sites; however, an additional 17 taxa were recorded opportunistically. For the purposes of this survey, sampling effort was considered adequate.

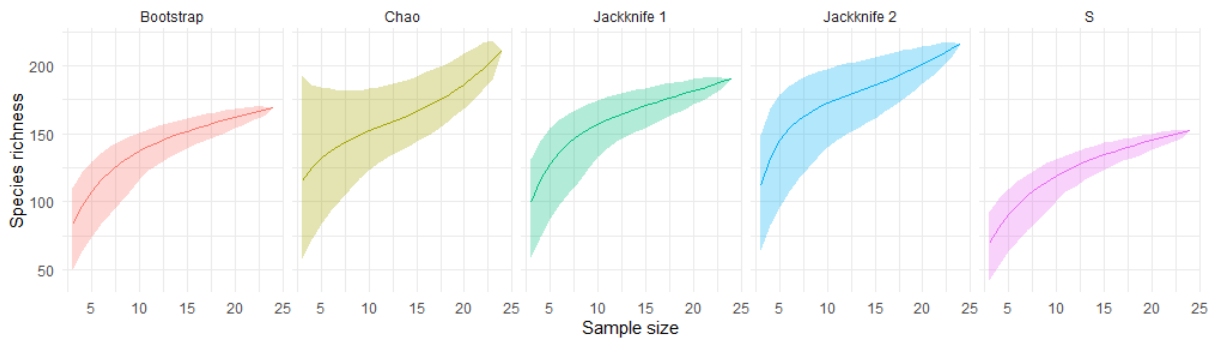


Figure 4.1: Predicted species accumulation curves for four estimators (bootstrap, Chao, jackknife 1 and jackknife 2) and observed species richness (S) with upper and lower 95% confidence intervals.

4.1.2 Significant Flora

Conservation Significant Flora

No EPBC Act or BC Act listed Threatened flora species were recorded within the study area during the current survey. Eight DBCA listed Priority Flora species were recorded: *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4) (Table 4.1). Records from the current survey and from the targeted survey conducted by Woodman Environmental (2012) are shown in Figure 4.3 and those from the current survey are listed in Appendix E. Priority species were primarily recorded from the banded ironstone and dolerite ranges in the northern section of the study area, although several records (*Dodonaea amplisemina* and *Grevillea inconspicua*) were from a stony creek line and stony flats (*Hemigenia virescens*) to the south of the range (Figure 4.3). The results outlined below include the records from the Woodman Environmental survey (2012).

Acacia dilloniorum (Fabaceae) (Figure 4.2, Figure 4.3) has been recorded from 110 locations (total of 584 individuals) within the study area on lower and middle slopes of dolerite hills in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*, and *Acacia pteraneura* tall sparse shrubland. There are an additional 5,580 recorded individuals of this species occurring outside of the study area within the desktop study area. It is endemic to the Weld Range.

Stenanthemum patens (Rhamnaceae) (Figure 4.2, Figure 4.3) has been recorded from a 11 locations (14 individuals) within the study area on a steep rocky banded ironstone slope in *Acacia rhodophloia*, *Acacia incurvaneura*, and *Thryptomene decussata* tall sparse shrubland. There are an additional 377 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a restricted distribution in the Eastern and Western Murchison IBRA subregions, primarily occurring at to highly disjunct localities at Weld Range and near Leonora.

Hemigenia virescens (Lamiaceae) (Figure 4.2, Figure 4.3) has been recorded from four locations (total of 37 individuals) within the study area on stony flats to the south of the banded ironstone ranges in *Acacia ramulosa* var. *linophylla*, *Acacia incurvaneura*, and *Acacia incurvaneura* × *mulganeura* tall sparse shrubland. There are an additional four recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution in the northern Murchison and southern Gascoyne.

Micromyrtus placoides (Myrtaceae) (Figure 4.2, Figure 4.3) has been recorded from 79 locations (4,625 individuals) within the study area on gentle to moderate slopes of banded ironstone ranges primarily in *Acacia incurvaneura*, *Acacia mulganeura*, and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 28 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution primarily in the western Murchison, although it has been recorded from the Yalgoo IBRA bioregion.

Prostanthera petrophila (Lamiaceae) (Figure 4.2, Figure 4.3) has been recorded from 20 locations (total of 119 individuals) within the study area on moderate to steep slopes of banded ironstone ranges in *Acacia rhodophloia*, *Acacia incurvaneura*, and *Thryptomene decussata* tall sparse shrubland, and in *Acacia incurvaneura*, *Acacia mulganeura*, and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 943 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution at a few localities primarily in the western Murchison, although it has been recorded from the Yalgoo IBRA bioregion.

Acacia speckii (Fabaceae) (Figure 4.2, Figure 4.3) has been recorded from 156 locations (total of 559 individuals) within the study area on middle and upper slopes of low dolerite hills in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii*, and *Acacia pteraneura* tall sparse shrubland. There are an additional 166 recorded individuals of this species occurring outside of the study area within

the desktop study area. It has relatively widespread distribution in the western Murchison and central Yalgoo IBRA bioregions.

Dodonaea amplisemina (Sapindaceae) (Figure 4.2, Figure 4.3) has been recorded from 85 locations (total of 430 individuals) within the study area on lower and middle slopes of low dolerite hills and along stony creek lines in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), and *Acacia pteraneura* tall sparse shrubland, and in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 121 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively widespread distribution in the western Murchison and central Yalgoo IBRA bioregions.

Grevillea inconspicua (Proteaceae) (Figure 4.2, Figure 4.3) has been recorded from 15 locations (total of 35 individuals) within the study area along stony creek lines in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 70 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively widespread distribution in the western and eastern Murchison IBRA bioregion.

Atypical Specimens and Range Extensions

Although several specimens were unable to be identified to species level, none of these were believed to represent Threatened or Priority flora species, nor were any considered to be anomalous (i.e. potentially new species). There were no species recorded that were considered representative of the range of the species (i.e. at the limits of their distributional range, newly recorded bioregional range extensions, or isolated outliers).



Figure 4.2: Photos of Priority Flora species recorded within the study area

Top left to right: *Acacia dilloniorum* phyllodes and flower; *Acacia speckii* phyllodes and pods; *Dodonaea amplisemina* leaves and fruit; *Grevillea inconspicua* leaves and fruit. Bottom left to right: *Hemigenia virescens* leaves and flower; *Micromyrtus placoides* leaves and flowers; *Prostanthera petrophila* leaves and fruit; *Stenanthemum patens* leaves and flowers.

Table 4.1: Summary of conservation significant species recorded within the study area

Taxon	Description and habitat	Vegetation type(s)	Number of point locations (number of individuals) within study area[1]	Estimate of total known local individuals[1]	Individuals recorded within proposed infrastructure envelope	IBRA subregion distribution
Priority 1						
Acacia dilloniorum	Intricately branched shrub with spinescent branchlets to ca. 1.8 m. Red clay loam or red-brown silty clay loam on middle and upper slopes and crests of low dolerite ranges.	SH02, SH07	110 (584)	6,164	21	Western Murchison (MUR)
Stenanthemum patens	Low rounded shrub to ca. 0.5 m. Red-brown clay loam on slopes of low hills of dolerite and banded ironstone.	SH02, SH04, SH05, SH07	11 (14)	391	1	Eastern Murchison (MUR), Western Murchison (MUR)
Priority 3						
Hemigenia virescens	Low rounded shrub to ca. 0.6 m. Red-brown clay loam on flats, sand and lateritic gravel.	SH08	4 (37)	41	0	Augustus (GAS), Western Murchison (MUR)
Micromyrtus placoides	Shrub to ca. 2.3 m. Red-orange sandy clay to clay loam, gravel, banded ironstone, laterite, quartz, dolerite; gently undulating plains, dry creek beds, hillcrests, ridges.	SH05, SH07, SH08	79 (4625)	4,653	3,864	Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
Prostanthera petrophila	Low spreading shrub to ca. 1.5 m. Lateritic soils.	SH05, SH07, SH08	20 (119)	1,062	63	Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
Priority 4						
Acacia speckii	Rounded shrub or tree to 3 m. Rocky soils over granite, dolerite.	SH02, SH03, SH07	156 (559)	725	21	Augustus (GAS), Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
Dodonaea amplisemina	Low shrub to ca. 1 m. Red-brown sandy clay or clay loam on basalt, banded ironstone, quartzite; rocky hills and drainage lines.	SH02, SH03, SH04, SH07	85 (430)	551	10	Augustus (GAS), Avon Wheatbelt P1 (AVW), Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
Grevillea inconspicua	Intricately branched spreading shrub to ca. 2 m. Loam gravel; rocky drainage lines, creeks, outcrops.	SH02, SH03, SH04	15 (35)	105	0	Eastern Murchison (MUR), Western Murchison (MUR)

[1]Records from the current survey, Woodman Environmental (2012), and current DBCA Threatened and Priority Flora database searches. Records with no abundance data were assumed to have one individual.

564000 565000 566000 567000 568000 569000 570000 571000

7021000 7020000 7019000 7018000 7017000

Study area
Study area (surveyed by Woodman 2012)
Proposed infrastructure

Priority 1
- *Acacia dilloniorum*
- *Stenanthemum patens*

Priority 3
- *Hemigenia virescens*
- *Micromyrtus placoides*
- *Prostanthera petrophila*

Priority 4
- *Acacia speckii*
- *Dodonaea amplisemina*
- *Grevillea inconspicua*

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Project: 1796
Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:20,000 @A3

Figure 4.3: Distribution of Priority Flora species recorded within the study area (ecologia 2019 and Woodman 2012 records).

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 0.5 1
Kilometers

4.1.3 Introduced Flora

Three introduced plant species (weeds) were recorded during the survey (Table 4.2): *Cuscuta planifolia* (small-seeded dodder), *Lysimachia arvensis* (pimpernel), and *Rostraria pumila* (rough cat's tail). None of these are WONS or listed as a Declared Pests on the Western Australian Organism List (Department of Agriculture and Food Western Australia 2016): all species are listed as Permitted - s11 by DAFWA. Ecological impact and invasiveness ratings (see Appendix A for definitions) have been determined for introduced species in the Midwest region (Department of Parks and Wildlife 2013), which are listed for these species in Table 4.2. Each of these species were recorded from very few locations within the study area and were in very low abundance.

Table 4.2: Summary of introduced species recorded within the study area

Species	Common name	Family	WAOL rating	Ecological Impact	Invasiveness
Cuscuta planiflora	Small-seeded dodder	Convolvulaceae	Permitted - s11	Unknown	Rapid
Lysimachia arvensis	Pimpernel	Primulaceae	Permitted - s11	Low	Rapid
Rostraria pumila	Rough cat's tail, hairgrass	Poaceae	Permitted - s11	Unknown	Unknown

4.1.4 Vegetation Types

A Similarity Profile Analysis was conducted on floristic data collected from 24 sampling sites surveyed within the study area. SIMPROF identified ten significantly different groups (Figure 4.4) within which sites may be considered homogenous with respect to overall species composition; these clusters informed the description of ten vegetation types (Table 4.3), which were mapped across the area by extrapolation from aerial imagery and ground-truthed sites (Figure 4.5). The species assemblages associated with each vegetation type are shown in a constancy table in Appendix F. The vegetation types identified tended to correlate strongly with soil types, topographic features, and landforms present within the study area.

The floristic richness of sampled sites ranged from 15 to 63 taxa per site. The least diverse sites were associated with stony plains to the south of the BIF ranges (i.e. vegetation types SH01 and SH08, mean 19.5 and 21 taxa respectively), while the most diverse sites were associated with minor creeks to the south of the range (vegetation types SH03 and SH04, mean 53 and 54.3 taxa respectively).

Minor creeks, drainage lines, and floodplains

Four vegetation types were described from minor stony creeks and drainage lines. Two tall shrubland types (SH03 and SH04) associated with the prominent creeks were primarily dominated by *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland, and exhibited a comparatively high level of species diversity (Table 4.3). Two low woodland types (W01 and W02) occurring along minor drainage lines and associated floodplains are typically dominated by *Acacia pruinocarpa* low open woodland and various mulga species (*Acacia pteraneura*, *A. incurvaneura*, *A. mulganeura*) in the tall shrub layer (Table 4.3). These vegetation types account for 19.6% (104.76 ha) of the study area.

Stony and gravely plains

Three vegetation types (SH01, SH06 and SH08) were described from stony clay-loam plains to the south of the BIF ranges. SH01 is floristically distinct from all other clusters (Figure 4.4) and restricted to small calcrete patches. It was dominated by *Acacia ramulosa* subsp. *ramulosa* and *Acacia tetragonophylla* tall sparse shrubland over *Ptilotus obovatus*, *Scaevola spinescens*, and *Senna artemisioides* subsp. ×*artemisioides* low sparse shrubland (Table 4.3). SH06 and SH08 are more widespread occurring extensively on plains with ironstone and banded ironstone gravel, and typically dominated by mulga species (*A. incurvaneura*, *A. fuscaneura*, *A. incurvaneura* × *A. mulganeura*) and *A. ramulosa* subsp.

linophylla in the tall shrub layer over *Eremophila* low shrubs (Table 4.3). These vegetation types account for 70.3% (376.58 ha) of the study area.

Dolerite and banded ironstone hills and outcrops

Three vegetation types (SH02, SH05, and SH07) were described from dolerite hills and BIF ranges and crests in the northern section of the study area. SH02 is restricted to the lower and middle slopes of dolerite hills in far north of the study area and is dominated by *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland. SH05 is restricted to the steep middle and upper slopes and crests of BIF ranges in the far north of the study area and is dominated by *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland. SH07 is restricted to the gentler lower and middle slopes surrounding vegetation type SH05 and was dominated by *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland. These vegetation types accounts for 10.1% (54.22 ha) of the study area.

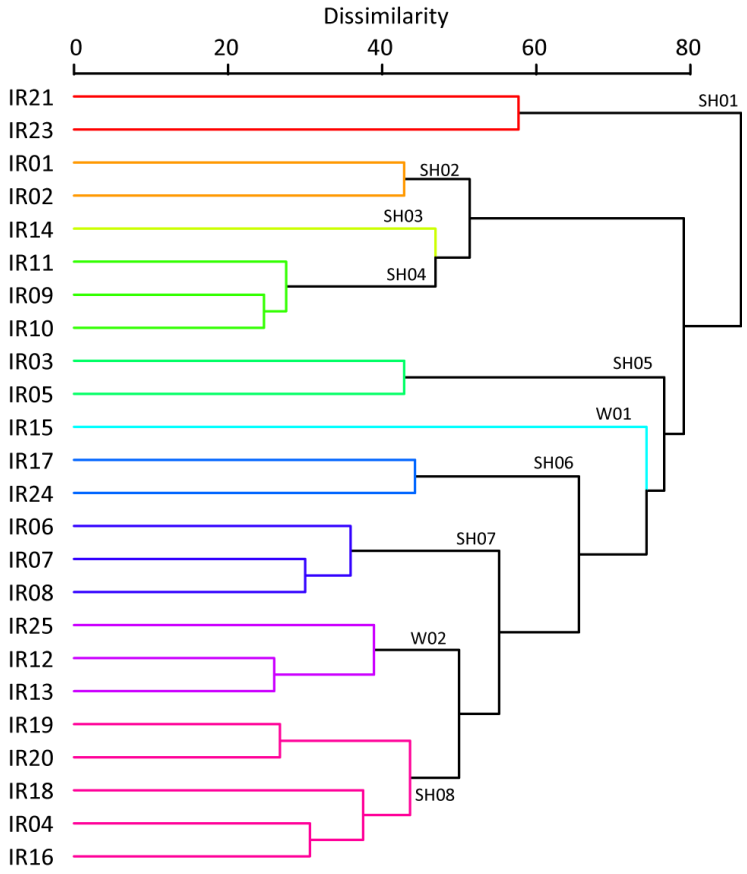


Figure 4.4: UPGMA dendrogram summarising floristic relationships among quadrats and vegetation types.

Coloured branches indicate significantly different clusters based on similarity profile analysis (α = 0.01). Described vegetation types are indicated on branches.

4.1.5 Vegetation Condition

Vegetation condition at all sampling sites was assessed as 'Very Good' or 'Excellent' according to the EPA Vegetation Condition Scale. Excluding cleared vehicle tracks and graded grid lines, vegetation across the entire study area showed either no obvious evidence of disturbance or only minor weed invasion or grazing by cattle and goats. Vegetation condition mapping of the study area (Figure 4.6) was primarily extrapolated from site-based vegetation condition assessments. Because of this, a broader category of 'Very Good to Excellent' was used as vegetation tends to vary somewhat over larger areas with respect to the presence or absence of disturbance factors such as grazing and weeds.

Table 4.3: Summary of vegetation types within the study area

Code	Broad floristic formation (NVIS III)	Vegetation description (NVIS V)	Landform	Soil type and surface geology	Vegetation condition	Indicator species (indicator value ≥ 0.80, p < 0.05)	Mean quadrat/relevé species richness (range)	Extent within study area (ha) (%)	Representative sites
SH01	*Acacia* sparse shrubland	*Acacia ramulosa* var. *ramulosa*, *Acacia tetragonophylla* tall sparse shrubland; *Ptilotus obovatus*, *Scaevola spinescens*, *Senna artemisioides* subsp. ×*artemisioides* low sparse shrubland.	Plains	Red-brown clay loam; calcrete, BIF pebbles	Excellent	*Acacia craspedocarpa* (1.000)	19.5 (19–20)	0.53 (0.1%)	IR21, IR23, V10
SH02	*Acacia* sparse shrubland	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila mackinlayi* subsp. *spathulata*, *Senna artemisioides* subsp. ×*sturtii* low sparse shrubland.	Gentle to moderate dolerite slopes	Red-brown clay loam; dolerite, BIF	Excellent	*Acacia speckii* (1.000), *Goodenia berardiana* (0.866), *Eremophila macmillaniana* (0.816)	40.5 (40–41)	22.96 (4.29%)	IR01, IR02, V06
SH03	*Acacia* open shrubland	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) , *Acacia incurvaneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri*, *Ptilotus obovatus* low sparse shrubland.	Minor creeks	Red-brown clay loam; BIF pebbles	Excellent	–	63	17.97 (3.36%)	IR14, V11
SH04	*Acacia* sparse shrubland	*Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla tall sparse shrubland; *Eremophila mackinlayi* subsp. *spathulata*, *Ptilotus obovatus*, *Senna artemisioides* subsp. *helmsii* low sparse shrubland.	Minor creeks	Red-brown clay loam; dolerite, BIF pebbles	Very Good to Excellent	*Senecio* sp. (1.000), *Cymbopogon ambiguus* (0.913), *Lepidium oxytrichum* (0.816), *Phyllanthus maderaspatensis* (0.813)	54.3 (52–57)	5.5 (1.03%)	IR09, IR10, IR11, V05
SH05	*Acacia* sparse shrubland	*Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland; *Ptilotus obovatus*, *Dodonaea pachyneura*, *Eremophila latrobei* subsp. *latrobei* low sparse shrubland.	Steep banded ironstone slopes and crests	Red-brown clay loam; BIF	Excellent	*Acacia rhodophloia* (1.000), *Philotheca brucei* subsp. *brucei* (0.866), *Thryptomene decussata* (0.820)	29 (26–32)	7.89 (1.47%)	IR03, IR05, V04
SH06	*Acacia* sparse shrubland	*Acacia incurvaneura*, *Acacia fuscaneura*, *Acacia incurvaneura* × *mulganeura* tall sparse shrubland; *Eremophila georgei*, *Eremophila forrestii* subsp. *forrestii*, *Psydrax latifolia* low sparse shrubland.	Plains	Red-brown clay loam; BIF pebbles	Excellent	–	22 (19–25)	103.17 (19.28%)	IR17, IR24, V12

Code	Broad floristic formation (NVIS III)	Vegetation description (NVIS V)	Landform	Soil type and surface geology	Vegetation condition	Indicator species (indicator value ≥ 0.80, p < 0.05)	Mean quadrat/relevé species richness (range)	Extent within study area (ha) (%)	Representative sites
SH07	*Acacia* sparse shrubland	*Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila latrobei* subsp. *latrobei*, *Micromyrtus placoides* (P3) low sparse shrubland.	Gentle to moderate banded ironstone slopes	Red-brown clay loam; BIF pebbles	Excellent	*Micromyrtus placoides* (1.000)	27.6 (26–29)	55.94 (10.45%)	IR06, IR07, IR08, V03
SH08	*Acacia* sparse shrubland	*Acacia ramulosa var. linophylla, Acacia incurvaneura*, *Acacia incurvaneura* × *mulganeura* tall sparse shrubland; *Eremophila forrestii* subsp. *forrestii*, *Eremophila jucunda* subsp. *jucunda*, *Ptilotus schwartzii* low sparse shrubland.	Plains	Red-brown clay loam; BIF pebbles	Excellent	–	21 (15–25)	253.16 (47.31%)	IR04, IR16, IR18, IR19, IR20, V01, V07, V09, V14
W01	*Acacia* open woodland	*Acacia pruinocarpa* low open woodland; *Acacia pteraneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri, Ptilotus obovatus* low sparse shrubland.	Drainage lines, floodplains	Red-brown clay loam; ironstone	Excellent	–	33	27.19 (5.08%)	IR15, V02
W02	*Acacia* open woodland	*Acacia pruinocarpa* low open woodland; *Acacia incurvaneura*, *Acacia fuscaneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei*, *Ptilotus obovatus* low sparse shrubland.	Drainage lines, floodplains	Red-brown clay loam; BIF pebbles	Very Good to Excellent	*Euphorbia drummondii* (1.000)	42.3 (38–45)	40.76 (7.62%)	IR12, IR13, IR14, IR25, V08, V13

4.1.6 Significant Vegetation

Threatened and Priority Ecological Communities

No state (DBCA) or Commonwealth (EPBC Act) listed TECs have been recorded within or in the vicinity of the study area, and none of the vegetation types described here were assessed as corresponding to any known TEC.

The Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)' includes any vegetation associated with the Weld Range and occurs over the northern part of the study area. The study area includes 263.8 ha of the PEC as defined by DBCA, including a 500 m administrative buffer, which represents ca. 1% of the total extent of the PEC. The proposed infrastructure includes 78.48 ha (0.3%) of the DBCA defined PEC (Table 4.4, Figure 4.7).

Within the study area, vegetation type SH07 is considered to approximate the southern edge of the Weld Range, south of which are primarily foot-slopes and stony plains (primarily consisting of vegetation type SH06 and SH08). Vegetation occurring within this boundary is therefore considered to correspond closely to the PEC. Six vegetation types occur within this boundary: SH02 (22.9 ha), SH03 (2.55 ha), SH04 (1.70 ha), SH05 (7.89 ha), SH07 (55.94 ha), and W01 (0.17 ha), totalling 91.22 ha, including 30.28 ha associated with the proposed infrastructure boundary (Table 4.4, Figure 4.7).

Vegetation of potential local significance

Vegetation types SH02, SH04, SH05, and SH07 may be considered locally significant as they support the Priority 1 species *Acacia dilloniorum* and *Stenanthemum patens*. Vegetation types SH03 and SH04 may be considered locally significant as they support a comparatively high level of plant species diversity. Vegetation type SH01 is highly restricted within the study area (0.53 ha, 0.1% of study area) and may therefore be considered locally significant. The extent of each of these vegetation types within the study area potentially impacted by the proposed infrastructure is outlined in Table 4.4.

Table 4.4: Area of potential impact to DBCA defined PEC and vegetation occurring on Weld Range.

Vegetation type	Total area mapped (ha)	Local significance	Total clearing area (proposed infrastructure) (ha)	Area impact to PEC (ha) (DBCA defined, including buffer)	Percent impact to PEC (ha) (DBCA defined, including buffer)	Area impact to range vegetation (ha) (range defined)
SH01	0.53	Locally restricted	0.03	–	–	–
SH02	22.96	Supports *Acacia dilloniorum* (P1) and *Stenanthemum patens* (P1)	0.36	0.36	0.001%	0.36
SH03	17.97	High species diversity	0.62	0.03	< 0.001 %	0.02
SH04	5.50	Supports *Stenanthemum patens* (P1), high species diversity	–	–	–	–
SH05	7.89	Supports *Stenanthemum patens* (P1)	2.84	2.84	0.011%	2.84
SH06	103.17	–	5.58	–	–	–
SH07	55.94	Supports *Acacia dilloniorum* (P1) and *Stenanthemum patens* (P1)	26.89	26.89	0.102%	26.89
SH08	253.16	–	66.31	41.35	0.157%	–
W01	27.19	–	4.36	4.36	0.017%	0.17
W02	40.76	–	8.72	2.64	0.010%	–
TOTAL	**535.07**		**115.71**	**78.48**	**0.298%**	**30.29**

565000 566000 567000 568000 569000 570000

7020000 7019000 7018000 7017000

IR01 IR02 IR05 IR11 V06 IR08 IR07 V05 V04 IR03 IR06 V03 IR09 V02 V01 IR15 IR10 IR20 IR25 IR19 IR18 IR14 V07 V08 V11 V09 V10 IR21 V12 IR13 IR12 V13 IR16 IR17 V14 IR24 IR04 IR23

SH01 SH02 SH03 SH04 SH05 SH06 SH07 SH08 W01 W02

Study area (Woodman 2009)
Study area
Proposed infrastructure
■ Quadrat/relevé
▲ Vegetation description

Vegetation type

SH01: Acacia ramulosa var. ramulosa, Acacia tetragonophylla tall sparse shrubland; Ptilotus obovatus, Scaevola spinescens, Senna artemisioides subsp. ×artemisioides low sparse shrubland.
SH02: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland; Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii low sparse shrubland.
SH03: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia incurvaneura, Acacia ramulosa var. linophylla tall open shrubland; Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus low sparse shrubland.
SH04: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla tall sparse shrubland; Eremophila mackinlayi subsp. spathulata, Ptilotus obovatus, Senna artemisioides subsp. helmsii low sparse shrubland.
SH05: Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata tall sparse shrubland; Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei low sparse shrubland.
SH06: Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura tall sparse shrubland; Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia low sparse shrubland.
SH07: Acacia incurvaneura, Acacia mulganeura, Acacia ramulosa var. linophylla tall sparse shrubland; Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland.
SH08: Acacia ramulosa var. linophylla, Acacia incurvaneura, Acacia incurvaneura × mulganeura tall sparse shrubland; Eremophila forrestii subsp. forrestii, Eremophila jucunda subsp. jucunda, Ptilotus schwartzii low sparse shrubland.
W01: Acacia pruinocarpa low open woodland; Acacia pteraneura, Acacia ramulosa var. linophylla tall open shrubland; Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus low sparse shrubland.
W02: Acacia pruinocarpa low open woodland; Acacia incurvaneura, Acacia fuscaneura, Acacia ramulosa var. linophylla tall open shrubland; Eremophila forrestii subsp. forrestii, Eremophila georgei, Ptilotus obovatus low sparse shrubland.

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Project: 1796
Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:15,000 @A3

Figure 4.5: Vegetation types associated with the study area.

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

565000 566000 567000 568000 569000 570000

7020000

7019000

7018000

7017000

Study area

Proposed infrastructure

Vegetation condition

Very Good to Excellent

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Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:15,000 @A3

Figure 4.6: Vegetation condition* of the study area.
*Mapping excludes minor unsealed tracks.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 0.5 1
Kilometers

564000 565000 566000 567000 568000 569000 570000 571000

7020000 7019000 7018000 7017000 7016000

Priority 1 PEC ‘Weld Range vegetation complexes (banded ironstone formation)’

Study area

Proposed infrastructure

Vegetation type associated with banded ironstone ranges and dolerite hills

SH02: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland; Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii low sparse shrubland.

SH03: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia incurvaneura, Acacia ramulosa var. linophylla tall open shrubland; Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus low sparse shrubland.

SH04: Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla tall sparse shrubland; Eremophila mackinlayi subsp. spathulata, Ptilotus obovatus, Senna artemisioides subsp. helmsii low sparse shrubland.

SH05: Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata tall sparse shrubland; Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei low sparse shrubland.

SH07: Acacia incurvaneura, Acacia mulganeura, Acacia ramulosa var. linophylla tall sparse shrubland; Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland.

W01: Acacia pruinocarpa low open woodland; Acacia pteraneura, Acacia ramulosa var. linophylla tall open shrubland; Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus low sparse shrubland.

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Project: 1796
Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:20,000 @A3

Figure 4.7: Extent of the Priority 1 PEC ‘Weld Range vegetation complexes (banded ironstone formation)’ and vegetation types associated with banded ironstone ranges and dolerite hills.

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4.2 VERTEBRATE FAUNA

4.2.1 Broad Fauna Habitats

Fauna habitat assessments of the study area were undertaken to describe and map broad fauna habitat types that have the potential of supporting conservation significant fauna species. After assessing the various vegetation types, soil units, and landforms, four broad fauna habitat types were identified and described within the study area (Table 4.5). To remain consistent with previous fauna habitat assessments conducted in the study area, *ecologia* used the same habitat types described by Biologic (2012b). Habitat assessments were undertaken at 12 sites (HA01 to HA12) (Figure 4.9) to describe habitats and identify areas considered most likely to support conservation significant fauna species. Data from individual site assessments are presented in Appendix J. Representative photos of each habitat type are presented in Figure 4.8 and habitat mapping is provided in Figure 4.9.

From a local perspective, habitat features that are disjunct and provide sources of shelter, food and mesic qualities required for restricted species may be considered important. Rocky habitats associated with the Mulga Woodland over ironstone ridge crests and slopes provides habitat for the long-tailed dunnart and minor drainage line supporting dense shrubs provides habitat for the west coast mulga slider.

The threatening processes considered to potentially affect vertebrate fauna biodiversity within the study area include:

- impacts of introduced predators and grazing introduced herbivores;
- weed invasion along roadside and drainage areas; and
- clearing of native vegetation.

Table 4.5: Fauna habitat types within the study area

Habitat type	Area (ha)	% study area	Condition
Acacia sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes	22.95	4.29%	Excellent
Mulga woodland over ironstone ridge crests and slopes	58.82	10.99%	Excellent
Mixed *Acacia* shrublands over stony lower slopes and stony plains	407.54	76.16%	Excellent
Minor drainage line supporting dense shrubs	45.76	8.55%	Excellent
Total	433	100%	

4.2.1.1 *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes

Occurring predominantly on the lower slopes and valleys on the northern margins of the study area, this habitat type is confined to the Weld Range where it is considered widespread. Associated soils include basalt-like rocks, on stony slopes and loams on valley floors. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider.

4.2.1.2 Mulga woodland over ironstone ridge crests and slopes

Widespread across the Weld Range, this habitat type is dominated by *Acacia aneura* shrublands over rocky banded ironstone ridges and slopes. Ironstone outcropping and abundant mantels of pebbles, cobbles and small boulders providing cracks and crevices provides suitable habitat for occupation by lizards and small mammals. Conservation significant fauna known to occupy this habitat type includes the long-tailed dunnart and the locally significant Woolley's pseudantichinus.

4.2.1.3 Mixed *Acacia* shrublands over stony lower slopes and stony plains

This habitat type is comprised of mixed shrublands dominated by *Acacia aneura, A. pruinocarpa, A. ramulosa* var. *linophylla* over scattered shrubs and herbs. This habitat type extends from the lower slopes of the Weld range onto adjacent ironstone gravels and clay loams plains and is considered widespread in a regional context.

4.2.1.4 Minor drainage line supporting dense shrubs

Minor drainage lines extending east from the Weld Range into the mixed *Acacia* shrublands support dense this habitat of fringing vegetation of *Acacia* species, *Psydrax latifolia* and *Santalum spicatum* over herbs. A stony creek bed is present in some areas with leaf litter and woody debris present under surrounding vegetation. This habitat type is considered widespread and provides potential suitable habitat for the Priority 1 listed west coast mulga slider.



***Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes**



Mulga woodland over ironstone ridge crests and slopes



Mixed *Acacia* shrublands over stony lower slopes and stony plains



Minor drainage line supporting dense shrubs

Figure 4.8: Representative photographs of habitat types within the study area.

565500 567000 568500 570000

7020000

7018500

7017000

Study area
Proposed infrastructure
Habitat assessment site

Fauna habitat

Acacia sp. Weld Range (A. Markey & S. Dillon 2994) and Acacia speckii shrubland on mid and lower slopes
Minor drainage line supporting dense shrubs
Mixed Acacia Shrublands over stony plains
Mulga Woodland over ironstone ridge crests and slopes

HA01
HA02
HA03
HA04
HA05
HA06
HA07
HA08
HA09
HA10
HA11
HA12

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Project: 1796
Date: 17 October 2019
Author: TM
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:12,669 @A3

Figure 4.9: Fauna habitat mapping and assessment sites.

0 0.325 0.65
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4.2.2 Terrestrial Vertebrate Fauna

Fifteen vertebrate fauna species were recorded during the survey including 13 bird, one mammal and one reptile species (Table 4.6). No vertebrate species of conservation significance were recorded during the level one survey. One introduced species was recorded. Dingo/wild dog tracks were recorded in a drainage line.

Table 4.6: Vertebrate species recorded

Common name	Species
Mammals	
Dingo/wild dog	*Canis familiaris*
Birds	
Red-capped robin	*Petroica goodenovii*
Little crow	*Corvus bennetti*
Pied butcherbird	*Cracticus nigrogularis*
Splendid fairy wren	*Malurus splendens*
Chestnut-rumped thornbill	*Acanthiza uropygialis*
Redthroat	*Pyrrholaemus brunneus*
White-browed babbler	*Pomatostomus superciliosus*
Crested bellbird	*Oreoica gutturalis*
Little woodswallow	*Artamus minor*
Willie wagtail	*Rhipidura leucophrys*
Black-faced woodswallow	*Artamus cinereus*
Rufous whistler	*Pachycephala rufiventris*
Spotted nightjar	*Eurostopodus argus*
Reptiles	
Ring-tailed dragon	*Ctenophorus caudicinctus*
Total	15

4.2.3 Conservation Significant Fauna

Conservation significant fauna are species that have been adequately surveyed and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. The likelihood of occurrence assessment (Section 3.8.2) identified a number of fauna taxa of listed conservation significance which may have the potential to occur within the study area. Following the Level 1 fauna assessment, one invertebrate species of conservation significance, the northern shield-back trapdoor spider (*Idiosoma clypeatum* (P3 BC Act)), was recorded at five locations. The west coast mulga slider (*Lerista eupoda* (P1 BC Act)) has previously been recorded within the study area.

Previous fauna surveys conducted in the immediate vicinity have recorded two species of conservation significance including the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)) and the peregrine falcon (*Falco peregrinus* (OS BC Act)). As a consequence, both the long-tailed dunnart and the peregrine falcon were assessed as 'Likely (1)' to occur in the study area. Four species of mammal, 12 species of bird (primarily migratory wading birds) and one reptile were deemed 'Unlikely (3)' to occur within the study area. Conservation significant vertebrate species recorded or assessed as having a

likelihood of occurrence rating of 'Likely (1)' or 'Possible (2)' within the study area, are summarised below. Species assessed as 'Unlikely (3)' are not discussed further.

Table 4.7: Locations of conservation significant fauna.

Common name	Species name	Evidence	Easting	Northing
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*	Active burrow	568395.78	7020076.6
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*	Active burrow	568408.1	7020078.7
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*	Active burrow	568413.43	7020072.2
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*	Inactive burrow	568409.03	7020067.3
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*	Inactive burrow	568810.61	7020051.7

4.2.3.1 Conservation significant species recorded within the study area

Northern shield-backed trapdoor spider (*Idiosoma clypeatum*) (Priority 3 BC Act)

Idiosoma clypeatum is one of seven highly automorphic species in the polyphyletic 'sigillate complex' and has a widespread distribution in Western Australia's arid zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the nigrum-group (Rix *et al.* 2018). Their range extends from near Paynes Find, to Karara in the south and north to Coolcalalaya Homestead, Jack Hills and Yeelirrie (Rix *et al.* 2018). *Idiosoma clypeatum* was historically misidentified as *Idiosoma nigrum* and is distinguished from all other species of the *nigrum*-group by the presence of well-defined lateral sclerotic strips on the male abdomen and by the very heavily sclerotised, leathery, 'shield-like' morphology of the female abdomen (Rix *et al.* 2018). Males grow to 17.3 mm (total length) while females are slightly larger with a total length of 21.8 mm and burrows are characteristically adorned with a 'moustache-like' arrangement of twig-lines (Rix *et al.* 2018). Wandering males in search of females have been collected in late autumn, winter and spring and work completed on the biology of this species by Ellis RJ (2015) was completed at the Weld range.

DBCA database search results identified 1894 records of *Idiosoma clypeatum* within 100 km of the study area (Figure 3.9). Intensive targeted surveys for this species were undertaken immediately adjacent to the study area within tenement M20/118 with 239 burrows recorded. A total of five burrows were recorded during the recent reconnaissance and Level 1 survey in the north-western corner of the study area (Figure 4.10, Figure 4.11) under narrow phyllode acacias within the *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes habitat type on a slope with a southern aspect.



Figure 4.10: *Idiosoma clypeatum* habitat and burrows

West coast mulga slider (*Lerista eupoda*) (Priority 1 BC Act)

This small (85 mm snout vent length) elongated smooth fossorial lizard is known to inhabit open mulga on red loams and sandy loams (Cogger 2018). This species has a pale brown above with a broad dark brownish-black vertebral stripe from nape to base of tail and a broad dark brown upper lateral stripe from nostril to base of tail (Cogger 2018). Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range within leaf litter fringing drainage lines.

This species has previously been recorded twice within the study area according to DBCA search results with a further 19 records are found within 100 km (Figure 3.9). Although no individuals were recorded during the current survey, minor drainage lines supporting dense shrubs provides suitable habitat for this species and it is considered likely that this species persists within the study area.

4.2.3.2 Conservation significant species with a likelihood of occurrence rating of 'Likely (1)'

Peregrine falcon (*Falco peregrinus*) (Other specially protected fauna BC Act)

The species is widespread in Australia but requires specific nesting sites. It does not build a nest but requires cliffs, rocky outcrops, or large tree hollows (Johnstone and Storr 1998). Suitable breeding habitat has the potential to occur in the study area in the form of rocky outcrops; however, due to its widespread movements, the species may also overfly all habitats of the study area intermittently. peregrine falcons feed almost entirely on birds, especially ducks, parrots and pigeons. With nine recent records in the vicinity of the study area including records from surveys in adjacent tenements (Figure 3.9), this species was given a likelihood of occurrence rating of 'Likely (1)'.

Long-tailed dunnart (*Sminthopsis longicaudata*) (Priority 4 BC Act)

The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes (van Dyck and Strahan 2008). It was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats especially banded iron formation ranges within the Midwest (van Dyck and Strahan 2008). Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory) (Burbidge *et al.* 2008).

Although DBCA database searches yielded no records of this species within 100 km of the study area, individuals have been recorded on five occasions within the Weld Range (*ecologia* 2009). Long-tailed dunnarts have been recorded in habitats consisting of BIF ridge crests, slopes and in minor drainage lines. Suitable habitat is present within the study area and the long-tailed dunnart has been assessed as having a likelihood of occurrence rating of 'Likely (1)'.

566000
567000
568000
569000
570000
7020000
7019000
7018000

Study area
Proposed infrastructure
Northern shield-backed trapdoor spider burrow

ecologia ENVIRONMENT

Project: 1796
Date: 17 October 2019
Author: TM
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:12,000 @A3

Figure 4.11: Locations of conservation significant fauna recorded.

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

5 DISCUSSION

5.1 FLORISTIC DIVERSITY

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded during the survey. The most dominant families in terms of species richness were the Asteraceae (26 taxa), Fabaceae (25), Poaceae (11), Scrophulariaceae (11), Chenopodiaceae (10), and Amaranthaceae (9). At the generic level, the most dominant groups were *Acacia (*16 taxa), *Eremophila* (11), *Ptilotus* (9), *Goodenia* (6), and *Rhodanthe* (6). The composition of the flora is typical of the Weld Range more broadly (Markey and Dillon 2008) and of the landforms present within the study area, which is also generally characteristic of the Murchison IBRA region. No species records represented bioregional range extensions, no taxa were endemic to the study area, and no taxa were potentially new species or otherwise anomalous.

Although there are few plant taxa endemic to the Weld Range, it is acknowledged as a refugia for conservation significant species (Markey and Dillon 2008). No EPBC Act (1999) listed Threatened Flora species or BC Act listed Threatened Flora species were recorded within the study area during the current survey. Eight state listed Priority flora species were recorded: *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4). Priority species were primarily recorded from rocky substrates of the banded ironstone ranges in the northern section of the study area, although several records were made from the minor stony creek (*Dodonaea amplisemina* and *Grevillea inconspicua*) and stony flats (*Hemigenia virescens*) to the south of the ranges. The expected impact of the proposed clearing on these species is minimal in most cases (< 100 individuals), but the impact is expected to be greater for *Micromyrtus placoides* (ca. 3,864 individuals).

A number of Priority species were assessed during the desktop assessment as potentially occurring within the study area based on proximity and potential presence of suitable habitat. Post-field survey, many of these were reassessed as 'unlikely' to occur as suitable habitat was not present or they were sufficiently surveyed for and not recorded. Two species (*Goodenia berringbinensis* and *Goodenia grandiflora*) that were not recorded are still considered to potentially occur within the study area as these are annual or ephemeral taxa that were difficult to detect at the time of the field survey.

Three introduced plant species (*Cuscuta planifolia*, *Lysimachia arvensis*, and *Rostraria pumila*) were recorded within the study area, none of which were WONS or Declared Pests (DAFWA 2016). All of these species were recorded infrequently and in very low abundance, primarily along creek banks in riparian habitats, and are not currently problematic. These species recorded are widely naturalised across the Murchison region, and their presence within the study area is not considered unusual.

5.2 VEGETATION

Hierarchical cluster analysis was conducted using floristic data collected from 24 sampling sites surveyed within the study area. Based on this classification, 10 vegetation types were described and mapped. The vegetation types identified tended to correlate strongly with the geological substrates and topographic features present within the study area.

Four vegetation types were described from minor stony creeks and drainage lines. Dominant vegetation in these types typically included *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland occurring in more prominent creek lines (SH03 and SH04), and *Acacia pruinocarpa* low open woodlands over mulga tall open shrublands along minor drainage channels and associated floodplains (W01 and W02). The dominant understorey species of these types generally included *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei Eremophila mackinlayi* subsp. *spathulata*, *Harnieria kempeana* subsp. muelleri, and *Ptilotus obovatus*.

Three vegetation types were described from stony plains to the south of the BIF ranges. *Acacia ramulosa* subsp. *ramulosa* and *Acacia tetragonophylla* tall sparse shrubland (SH01) was floristically distinct and restricted to small calcrete patches in the southern section of the study area. The remaining types (SH06 and SH08) were more widespread across the study area, occurring on plains with ironstone and banded ironstone gravel, and were typically dominated by mulga species (*A. incurvaneura*, *A. fuscaneura*, *A. incurvaneura* × *A. mulganeura*) and *A. ramulosa* subsp. *linophylla* in the tall shrub layer and by *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei*, *Eremophila jucunda* subsp. *jucunda*, and *Ptilotus schwartzii* in the understorey.

Three vegetation types were described from dolerite slopes and BIF outcrops in the northern section of the study area. SH02 was restricted to the lower and middle slopes of dolerite hills in far north of the study area and was dominated by *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland. It also a supported a significant population of the Priority 1 species *Acacia dilloniorum*. SH05 was restricted to the steep middle and upper slopes and crests of BIF outcrops also in the far north of the study area and consisted of *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland. The only record of the Priority 1 species *Stenanthemum patens* within the study area was within the vegetation type. SH07 was restricted to the gentler lower and middle slopes surrounding vegetation type SH05 and was dominated by *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland, and supported a large population of the Priority 3 species *Micromyrtus placoides*.

5.2.1 Listed Plant Communities

TECs listed under the EPBC Act are regarded as nationally significant. None of the vegetation types described here were assessed as corresponding to any nationally listed TEC. State listed TECs and PECs are regarded as being of State significance. None of the vegetation types described here correspond to any State listed TEC, although vegetation across part of the study area coincides with the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)'.

The spatial extent of this PEC is defined by DBCA and includes a 500 m administrative buffer. Vegetation type SH01 excepted, all of the vegetation types described either partially or completely occur within the PEC boundary. Within the study area, a total of 263.8 ha of vegetation occurs within the DBCA defined PEC boundary (representing approximately 1% of the total PEC area). This includes 78.48 ha within the proposed project infrastructure footprint, which accounts for 0.3% of the total PEC area.

5.2.2 Vegetation of Regional Significance

Regional significance addresses the representation of habitats at a biogeographic regional level. Plant communities that are restricted or uncommon in a regional context are considered regionally significant. Plant communities acting as a refuge Threatened Flora species may also be considered regionally significant. For the purposes of this assessment, this does not include TECs or PECs as these are addressed above.

None of the vegetation associations mapped by Shepherd *et al.* (2001) within the study area are restricted within the Murchison IBRA bioregion, and are not considered to be regionally significant. Moreover, none of the land systems described and mapped by Curry *et al.* (1994) that occur within the study area are considered restricted. None of the vegetation types described here are known to support Threatened Flora species, and none of the Ecosystems at Risk described for the Western Murchison IBRA subregion (Desmond *et al.* 2001) correspond to the vegetation types described here.

5.2.3 Vegetation of Local Significance

Locally significant vegetation may include plant communities that are locally restricted, contain comparatively high structural or species diversity, or support Priority species that are restricted to these plant communities. Based on these criteria, vegetation types SH02, SH04, SH05 and SH07 may

be considered locally significant as they support the Priority 1 species *Acacia dilloniorum* and *Stenanthemum patens*. These species were not recorded from any other vegetation types. Vegetation types SH03 and SH04 may be also considered locally significant as they support comparatively high levels of plant species diversity. With the exception of SH07, the impact to these vegetation types is expected to be negligible. The expected impact of the proposed clearing on SH07 is 26.89 ha (48% of its total mapped area); however, this vegetation type is expected to be more widespread outside of the study area. Vegetation type SH01 is highly restricted within the study area, occurring only on low calcrete rises in the southern section of the study area, and appears to be locally uncommon based on interrogation of aerial imagery outside of the study area. The potential impact to this vegetation type is negligible (0.03 ha, 2% of its total mapped area).

5.3 VERTEBRATE FAUNA

5.3.1 Broad fauna habitats

Four broad fauna habitats were identified, described and mapped within the study area:

- *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes
- Mulga woodland over ironstone ridge crests and slopes
- Mixed *Acacia* shrublands over stony lower slopes and stony plains
- Minor drainage line supporting dense shrubs

Habitats were assessed to be in Very Good to Excellent condition. The landforms, land systems and habitat types identified during the survey are considered locally common and the survey did not identify any restricted conservation significant vertebrate fauna habitat, or habitats that were restricted to the survey area itself. *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes provides habitat for the Priority 3 (BC Act) northern shield-backed trap-door spider especially on south facing slopes. Minor drainage line supporting dense shrubs provides suitable habitat in the form of thick leaf litter for the Priority 1 (BC Act) west coast mulga slider (*Lerista eupoda*). The rocky outcrop and bouldering habitat found within the mulga woodland over ironstone ridge crests and slopes is consistent with that preferred by the Priority 4 (BC Act) long-tailed dunnart.

5.3.2 Fauna assemblage

Fifteen vertebrate fauna species including 13 birds, one mammal and one reptile, were recorded during the survey. Species recorded during this survey represent the potential vertebrate fauna of the survey area; however, species other than those recorded are likely to occur.

5.3.3 Conservation significant fauna

Nineteen vertebrate fauna species and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the study area including four mammals, 13 birds and two reptiles.

One species of conservation significance was recorded during the survey. Five burrows belonging to the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum*) were recorded during the survey in the north-western corner of the study area. All burrows were recorded on a southern aspect slope, in a mix of clay and rocky substrates under narrow phyllode acacias. These conditions are consistent with previous records within the Weld Range. This species favours burrowing under acacias with narrow phyllodes which are used to construct the characteristic 'moustache-like' arrangement of twigs around the trapdoor of the burrow.

Biologic Environmental (2019) conducted a status review of the trapdoor spider *Idiosoma clypeatum* and an assessment of previously undertaken targeted surveys and potential future survey works within tenement M20/118. It was concluded that Priority 3 species (BC Act) require further survey although the extent of previous survey work was regarded as adequate for impact assessment requirements (Biologic Environmental (2019). In the current survey, areas of suitable habitat were adequately traversed to identify and quantify burrows.

Previous surveys in the immediate vicinity of the study area recorded two species of conservation significance; the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)) and peregrine falcon (*Falco peregrinus* (OS BC Act)). Suitable habitat for these species is present within the study area. Consequently both the long-tailed dunnart and peregrine falcon were assigned a likelihood of occurrence rating of 'Likely (1)'.

Seventeen species of conservation significance were assessed as unlikely to occur due to a lack of suitable habitat including four species of mammal, 12 birds and one reptile.

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7 APPENDICES

APPENDIX A DEFINITIONS

SIGNIFICANT FLORA

According to the *EPA Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), plant taxa (or records) may be considered significant for a number of reasons including, but not restricted to, the following:

- Being listed as a 'Threatened Species' under the *Biodiversity Conservation Act 2016* (WA) or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth);
- Being classified by the Department of Biodiversity, Conservation and Attractions (DBCA) as a 'Priority flora' species;
- Locally endemic species or those associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems);
- New species or those having anomalous features that indicate a potential new species;
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- Unusual species, including restricted subspecies, varieties or naturally occurring hybrids; and
- Being representative of taxonomic groups that no longer occur widely in the broader landscape (relictual species/populations).

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Cwlth)

At a Commonwealth level, Threatened flora species are protected under the EPBC Act, which lists species in accordance with the criteria of the International Union for Conservation of Nature (International Union for Conservation of Nature 2014), that is, 'Critically Endangered', 'Endangered', 'Vulnerable', 'Conservation Dependant', 'Extinct', or 'Extinct in the Wild' (category definitions can be seen below).

Biodiversity Conservation Act 2016 (Western Australia)

At a State level, Threatened flora species are protected under the BC Act. These are taxa which have been adequately surveyed and are deemed to be either rare, in danger of extinction, or otherwise in need of special protection in the wild and are gazetted as Threatened (Declared Rare) Flora. Threatened flora are further categorised by the Department of Biodiversity, Conservation and Attractions (DBCA) according to their level of threat using the International Union for Conservation of Nature (IUCN) red list criteria ((International Union for Conservation of Nature 2014) (see below).

Priority Flora (DBCA)

The DBCA maintains a list of Priority flora species, which are considered poorly known, uncommon or under threat but for which there is insufficient justification to be listed as Threatened, based on known distribution and population sizes. Priority flora species are assigned to one of four categories, described below. DBCA listed Priority flora species do not have any statutory protection.

Significant Vegetation

According to *EPA Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), vegetation may be considered significant for a number of reasons including, but not restricted to, the following:

- Being identified as a 'Threatened Ecological Community' under the *Biodiversity Conservation* (BC) *Act* 2016 (WA) or the *Environment Protection and Biodiversity Conservation* (EPBC) *Act* 1999 (Cwlth);
- Being classified as a 'Priority Ecological Communities' by DBCA;
- Having a restricted distribution;
- The degree of historical impact from threatening processes;
- Playing a role as a refuge;

- Providing an important function required to maintain ecological integrity of a significant ecosystem.

INTRODUCED FLORA

Weeds of National Significance (WONS)

At a national level, there are 32 weed species listed as Weeds of National Significance (WONS). The Commonwealth National Weeds Strategy: *A Strategic Approach to Weed Problems of National Significance* (DSEWPaC 2012) describes broad goals and objectives to manage these species.

Declared Pests

The purpose of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) is to prevent serious animal and plant pests and diseases from entering WA and becoming established, and to minimise the spread and impact of those that are already present. The BAM Act (and associated regulations) replaces the *Agriculture and Related Resources Protection Act 1976* (and associated regulations).

The BAM regulations were enacted on 1 May 2013, placing organisms into one of five legal status categories: Declared Pest - Prohibited, Declared Pest, Permitted, Permitted – Requires Permit, and Unlisted (Appendix A). The Western Australian Organism List (WAOL) (Department of Agriculture and Food Western Australia 2016) lists organisms in each of these categories. Unlisted organisms must not be imported (unless in accordance with an import permit and regulations). The BAM Act further categorises Declared Pests in one of three control categories: C1 Exclusion, C2 Eradication, and C3 Management (see below).

Environmental Weeds

At a regional level, DBCA rates weed species against four criteria based on the Weed Prioritisation Process (Department of Parks and Wildlife 2013): invasiveness, ecological impact, potential and current distribution, and feasibility of control. Currently, only species with a rating for both the ecological impact and invasiveness criteria are listed (see below).

SIGNIFICANT FAUNA

According to *EPA Factor Guideline: Terrestrial Fauna* (Environmental Protection Authority 2016b), terrestrial fauna may be considered significant for a number of reasons including, but not restricted to:

- Being identified as a Threatened or Priority species (Appendix A);
- Species with restricted distribution;
- Degree of historical impact from threatening processes; and
- Providing an important function required to maintain the ecological integrity of a significant ecosystem.

Additionally, as described in EPA Guidance (Environmental Protection Authority 2016e) terrestrial fauna may be considered significant for the following reasons:

- Species is protected by international agreement or treaty (i.e. migratory fauna);
- Species is a short-range endemic;
- Species has declining populations or distribution;
- Species is at the extreme of its range, or is part of an outlying population; and
- Species is undescribed.

Fauna habitats may be significant if they provide habitat important to the life history of a significant species, i.e. breeding, feeding and roosting or aggregation areas, or where they are unique or isolated habitats, for example wetlands, in the landscape or region (Environmental Protection Authority 2016b).

Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)

At the Commonwealth level, Threatened fauna are protected under Section 178 of the EPBC Act, which may list species as: extinct, extinct in the wild, critically endangered, endangered, vulnerable, and conservation dependent. In addition, under sections 209 and 248 of the Act, some migratory and marine species are protected under international agreements. EPBC Act conservation code definitions can be found below.

Biodiversity Conservation Act 2016 (WA)

At a state level, fauna species are protected under the BC Act. Threatened, Extinct and Specially Protected fauna are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such. BC Act conservation code definitions can be found below.

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act.

Specially protected fauna under section 13(1) of the BC Act are species that meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Priority Fauna (DBCA)

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority fauna lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations. Priority conservation code definitions can be found below.

Threatened Flora and Fauna Categories (EPBC Act)

Code	Definition
EX	**Extinct** Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
EW	**Extinct in the Wild** Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CR	**Critically Endangered** Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
EN	**Endangered** Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
VU	**Vulnerable** Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent** Taxa which at a particular time if, at that time, the species is the focus of a specific conservation programme, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Threatened Flora and Fauna Categories (BC Act)

Category	Code	Definition	Schedule
Critically Endangered	CR	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines." Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.	**Schedule 1**
Endangered	EN	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.	**Schedule 2**
Vulnerable	VU	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.	**Schedule 3**
Extinct species	EX	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.	**Schedule 4**
Extinct in the wild species	EW	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).	Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Migratory	MI	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	**Schedule 5**
Species of special conservation interest (conservation dependent fauna)	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	**Schedule 6**
Other specially protected species	OS	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	**Schedule 7**

Definition of codes for Priority Flora and Fauna (BC Act)

Code	Definition
P1: Priority One	**Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2: Priority Two	**Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3: Priority Three	**Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4: Priority Four	**Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Control categories for Declared Pests (Weeds)

Declared plant category	Description
C1 - Exclusion	Pests assigned to this category are not established in WA and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 - Eradication	Pests assigned to this category are present in WA in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 - Management	Pests assigned to this category are established in WA but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Categorisation of Environmental Weeds

Field	Description	Code
Ecological Impact	Impact of species within the Region, from low impact (causes minimal disruption to ecological processes or loss of biodiversity) to high (causes acute disruption of ecological processes, dominates and/or significantly alters vegetation structure, composition and function of ecosystems). Examples of impact attributes to consider: - changed fire regime - changed nutrient conditions - changed hydrological patterns - changed soil erosion patterns - changed geomorphological processes - changed biomass distribution - changed light distribution - loss of biodiversity - substantially reduces regeneration opportunities of native plants - allelopathic effects	Low (L) Medium (M) High (H) Unknown (U)
Invasiveness	Rate of spread of a weed in native vegetation, encompassing factors of establishment, reproduction and long distance dispersal (>100m). Examples of establishment factors include: - ability to outcompete (light, moisture, nutrients, rapid root growth) - sexual or asexual establishment - need for disturbance to establish Examples of reproduction factors include: - time to seeding - seed production - vegetative reproduction Examples of long distance dispersal mechanisms include: - wind - water - flying/ground animals - deliberate/accidental human spread - vehicles - produce contaminant	Slow (S) Moderate (M) Rapid (R) Unknown (U)

BAM Act Definitions (Declared Pests)

Legal status	Definition
Declared Pest, Prohibited - s12	Prohibited organisms are declared pests by virtue of section 22(1), and may only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest - s22(2)	Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia.
Permitted - s11	Permitted organisms must satisfy any applicable import requirements when imported. They may be subject to an import permit if they are potential carriers of high-risk organisms.
Permitted, Requires Permit - r73	Regulation 73 permitted organisms may only be imported subject to an import permit. These organisms may be subject to restriction under legislation other than the Biosecurity and Agriculture Management Act 2007. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Unlisted - s14	If you are considering importing an unlisted organism/s you will need to submit the name/s for assessment, as unlisted organisms are automatically prohibited entry into WA.
Control categories	Definition
C1 Exclusion	Organisms which should be excluded from part or all of Western Australia.
C2 Eradication	Organisms which should be eradicated from part or all of Western Australia.
C3 Management	Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
Unassigned	Unassigned: Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the Act.

Definition of codes for Threatened Ecological Communities

Code	Definition
PD: Presumed Totally Destroyed	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B) All occurrences recorded within the last 50 years have since been destroyed.
CR: Critically Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
EN: Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
VU: Vulnerable	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C): A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated. B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations. C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long-term future because of existing or impending threatening processes.

Definition of codes for Priority Ecological Communities

Code	Definition
P1: Priority One	Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two	Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three	(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5: Priority Five	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX B VASCULAR FLORA AND FAUNA RECORDS (NATUREMAP) AND BIRDLIFE BIRDATA

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 15/08/2019

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Vouchered Status Vouchered
Species Group Vascular Plants
Method 'By Line'
Vertices 26° 57' 60" S,117° 39' 47" E 26° 56' 22" S,117° 41' 60" E

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	4889	*Abutilon cryptopetalum*			
2.	43020	*Abutilon oxycarpum subsp. Prostrate (A.A. Mitchell PRP 1266)*			
3.	3217	*Acacia aneura (Mulga, Wanari)*			
4.	16112	*Acacia aulacophylla*			
5.	31072	*Acacia burrowsiana*		P3	
6.	36417	*Acacia caesaneura*			
7.	23977	*Acacia cockertoniana*			
8.	14088	*Acacia cyperophylla var. cyperophylla*			
9.	44474	*Acacia dilloniorum*		P1	Y
10.	32118	*Acacia effusifolia*			
11.	3330	*Acacia exocarpoides*			
12.	36781	*Acacia fuscaneura*			
13.	3355	*Acacia grasbyi (Miniritchie)*			
14.	36418	*Acacia incurvaneura*			
15.	36416	*Acacia mulganeura*			
16.	3500	*Acacia pruinocarpa (Gidgee)*			
17.	36800	*Acacia pteraneura*			
18.	19483	*Acacia ramulosa var. linophylla*			
19.	3519	*Acacia rhodophloia*			
20.	13078	*Acacia sclerosperma subsp. sclerosperma*			
21.	30373	*Acacia sp. Peak Hill (R. Gibson 0003)*			
22.	30391	*Acacia sp. Weld Range (A. Markey & S. Dillon 2994)*			
23.	14615	*Acacia speckii*		P4	
24.	29531	*Acacia thoma*			
25.	31511	*Acacia victoriae subsp. victoriae*			
26.	19901	*Actinobole oldfieldianum*			
27.	13904	*Allocasuarina acutivalvis subsp. acutivalvis*			
28.	19465	*Aluta aspera subsp. hesperia*			
29.	2660	*Amaranthus cuspidifolius*			
30.	2382	*Amyema nestor*			
31.	7836	*Angianthus tomentosus (Camel-grass)*			
32.	207	*Aristida contorta (Bunched Kerosene Grass)*			
33.	1266	*Arthropodium dyeri*			
34.	2450	*Atriplex amnicola (Swamp Saltbush)*			
35.	11516	*Atriplex nummularia subsp. spathulata (Old Man Saltbush)*			
36.	2481	*Atriplex vesicaria (Bladder Saltbush)*			
37.	17237	*Austrostipa elegantissima*			
38.	17246	*Austrostipa nitida*			
39.	17251	*Austrostipa scabra*			
40.	17255	*Austrostipa trichophylla*			
41.	34240	*Beyeria lapidicola*		P1	
42.	2770	*Boerhavia coccinea (Tar Vine, Wituka)*			
43.	247	*Bromus arenarius (Sand Brome)*			
44.	7413	*Brunonia australis (Native Cornflower)*			
45.	2853	*Calandrinia eremaea (Twining Purslane)*			
46.	2869	*Calandrinia schistorhiza*			
47.	31073	*Calandrinia sp. The Pink Hills (F. Obbens FO 19/06)*			
48.	14090	*Calocephalus beardii*			
49.	7891	*Calocephalus francisii (Fine-leaf Beauty-heads)*			
50.	7893	*Calocephalus knappii*			
51.	7895	*Calocephalus multiflorus (Yellow-top)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
52.	7903	*Calotis hispidula (Bindy Eye)*			
53.	7905	*Calotis multicaulis (Many-stemmed Burr-daisy)*			
54.	5438	*Calytrix amethystina*			
55.	5451	*Calytrix desolata*			
56.	5452	*Calytrix divergens*			
57.	7922	*Cephalipterum drummondii (Pompom Head)*			
58.	12796	*Cheilanthes adiantoides*			
59.	32	*Cheilanthes brownii*			
60.	34	*Cheilanthes distans (Bristly Cloak Fern)*			
61.	12815	*Cheilanthes sieberi subsp. pseudovellea*			
62.	12818	*Cheilanthes sieberi subsp. sieberi*			
63.	3756	*Chorizema genistoides*			
64.	7933	*Chthonocephalus pseudevax (Woolly Groundheads)*			
65.	12619	*Chthonocephalus viscosus*			
66.	20522	*Cleretum papulosum subsp. papulosum*	Y		
67.	17095	*Corymbia lenziana*			
68.	11709	*Crassula colorata var. acuminata*			
69.	20271	*Crassula extrorsa*			
70.	20268	*Crassula tetramera*			
71.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
72.	279	*Cymbopogon ambiguus (Scentgrass)*			
73.	31757	*Cynoglossum sp. Inland Ranges (C.A. Gardner 14499)*			
74.	5506	*Darwinia capitellata*			
75.	6218	*Daucus glochidiatus (Australian Carrot)*			
76.	12721	*Dielitzia tysonii*			
77.	2499	*Dissocarpus paradoxus (Curious Saltbush)*			
78.	4752	*Dodonaea adenophora*			
79.	31881	*Dodonaea amplisemina*		P4	
80.	4772	*Dodonaea pachyneura*			
81.	4773	*Dodonaea petiolaris*			
82.	31274	*Duperreya commixta*			
83.	2502	*Dysphania kalpari (Rat's Tail, Kalpari)*			
84.	33597	*Dysphania melanocarpa forma melanocarpa (Black Goosefoot)*			
85.	33483	*Dysphania saxatilis*			
86.	357	*Enneapogon caerulescens (Limestone Grass)*			
87.	369	*Eragrostis australasica (Canegrass)*			
88.	378	*Eragrostis dielsii (Mallee Lovegrass)*			
89.	379	*Eragrostis elongata (Clustered Lovegrass)*			
90.	7189	*Eremophila clarkei (Turpentine Bush)*			
91.	7205	*Eremophila exilifolia*			
92.	7207	*Eremophila foliosissima*			
93.	15052	*Eremophila forrestii subsp. forrestii*			
94.	7211	*Eremophila georgei*			
95.	16732	*Eremophila gilesii subsp. gilesii*			
96.	14191	*Eremophila glabra subsp. tomentosa*			
97.	7216	*Eremophila glutinosa*			
98.	17576	*Eremophila latrobei subsp. latrobei*			
99.	7234	*Eremophila longifolia (Berrigan, Tulypurpa)*			
100.	15158	*Eremophila mackinlayi subsp. spathulata*			
101.	7236	*Eremophila macmillaniana (Grey Turpentine Bush)*			
102.	18570	*Eremophila oppositifolia subsp. angustifolia*			
103.	7257	*Eremophila punicea (Crimson Eremophila)*			
104.	17166	*Eremophila simulans subsp. lapidensis*			
105.	17164	*Eremophila simulans subsp. simulans*			
106.	30347	*Eremophila sp. Weld Range (M.J. Greeve & J.D. Start D7 34)*			
107.	413	*Eriachne mucronata (Mountain Wanderrie Grass)*			
108.	16486	*Eriachne pulchella subsp. pulchella*			
109.	4335	*Erodium cygnorum (Blue Heronsbill)*			
110.	20300	*Eucalyptus eremicola subsp. peeneri*			
111.	5779	*Eucalyptus striaticalyx (Cue York Gum)*			
112.	35303	*Euphorbia australis var. subtomentosa*			
113.	4620	*Euphorbia boophthona (Gascoyne Spurge)*			
114.	4626	*Euphorbia drummondii (Caustic Weed, Piwi)*			
115.	42869	*Euphorbia porcata*			
116.	10977	*Exocarpos aphyllus (Leafless Ballart)*			
117.	12780	*Gilberta tenuifolia*			
118.	11008	*Gilruthia osbornii*			
119.	7989	*Gnephosis brevifolia (Short-leaved Gnephosis)*			
120.	8002	*Gnephosis tenuissima*			
121.	7495	*Goodenia berardiana*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
122.	12527	*Goodenia kingiana*			
123.	7531	*Goodenia occidentalis*			
124.	7556	*Goodenia tenuiloba*			
125.	1963	*Grevillea berryana*			
126.	1986	*Grevillea deflexa*			
127.	13430	*Grevillea hakeoides subsp. stenophylla*			
128.	2019	*Grevillea inconspicua (Cue Grevillea)*		P4	
129.	2047	*Grevillea nematophylla*			
130.	8553	*Gypsophila tubulosa*			
131.	2196	*Hakea preissii (Needle Tree, Dandjin)*			
132.	17556	*Hakea recurva subsp. arida*			
133.	6687	*Halgania cyanea (Rough Halgania)*			
134.	29840	*Halgania cyanea var. Allambi Stn (B.W. Strong 676)*			
135.	6176	*Haloragis odontocarpa (Mulga Nettle)*			
136.	6180	*Haloragis trigonocarpa*			
137.	17325	*Harnieria kempeana subsp. muelleri*			
138.	6713	*Heliotropium ovalifolium*			
139.	6853	*Hemigenia exilis*		P4	
140.	17397	*Hemigenia sp. Yalgoo (A.M. Ashby 2624)*			
141.	33760	*Hemigenia virescens*		P3	
142.	11188	*Hibiscus sturtii var. forrestii*			
143.	5809	*Homalocalyx echinulatus*		P3	
144.	11546	*Hydrocotyle pilifera var. glabrata*			
145.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
146.	48648	*Hysterobaeckea occlusa*			
147.	3982	*Indigofera monophylla*			
148.	8087	*Isoetopsis graminifolia (Cushion Grass)*			
149.	13284	*Lawrencella rosea*			
150.	4951	*Lawrencia chrysoderma*			
151.	12628	*Lemooria burkittii*			
152.	3033	*Lepidium oxytrichum*			
153.	7403	*Lobelia heterophylla (Wing-seeded Lobelia)*			
154.	7409	*Lobelia winfridae (Little Lobelia)*			
155.	2398	*Lysiana murrayi (Mistletoe, Parka-Parka)*			
156.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
157.	2544	*Maireana georgei (Satiny Bluebush)*			
158.	2551	*Maireana melanocoma (Pussy Bluebush)*			
159.	2560	*Maireana pyramidata (Sago Bush)*			
160.	2568	*Maireana trichoptera (Downy Bluebush)*			
161.	2571	*Maireana villosa*			
162.	12949	*Marsdenia australis*			
163.	30411	*Micromyrtus placoides*		P3	
164.	6003	*Micromyrtus sulphurea*			
165.	8105	*Millotia myosotidifolia*			
166.	8107	*Minuria cunninghamii (Bush Minuria)*			
167.	490	*Monachather paradoxus*			
168.	8116	*Myriocephalus guerinae*			
169.	14186	*Myriocephalus pygmaeus*			
170.	8121	*Myriocephalus rudallii*			
171.	494	*Neurachne minor*			
172.	6972	*Nicotiana cavicola (Talara)*			
173.	11331	*Nicotiana occidentalis subsp. obliqua*			
174.	11734	*Nicotiana rosulata subsp. rosulata*			
175.	12734	*Olearia humilis*			
176.	8151	*Olearia stuartii*			
177.	12670	*Parietaria cardiostegia*			
178.	10975	*Paspalidium basicladum*			
179.	40423	*Pentameris airoides (False Hairgrass)*	Y		
180.	18537	*Philotheca brucei subsp. brucei*			
181.	18508	*Philotheca sericea*			
182.	17626	*Phyllanthus erwinii*			
183.	19744	*Pittosporum angustifolium*			
184.	7299	*Plantago debilis*			
185.	17817	*Pluchea dunlopii*			
186.	8174	*Podolepis gardneri*			
187.	8184	*Podotheca gnaphalioides (Golden Long-heads)*			
188.	8188	*Pogonolepis stricta*			
189.	41365	*Polygala glaucifolia*			
190.	12707	*Prostanthera albiflora*			
191.	15822	*Prostanthera althoferi subsp. althoferi*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
192.	31783	*Prostanthera ferricola*		P3	
193.	12703	*Prostanthera petrophila*		P3	
194.	6926	*Prostanthera wilkieana*			
195.	18154	*Psydrax latifolia*			
196.	18210	*Psydrax rigidula*			
197.	18155	*Psydrax suaveolens*			
198.	2690	*Ptilotus aervoides*			
199.	2700	*Ptilotus beardii (Low Mulla Mulla)*		P3	
200.	48602	*Ptilotus eremita*			
201.	2721	*Ptilotus exaltatus (Tall Mulla Mulla)*			
202.	2729	*Ptilotus grandiflorus*			
203.	2731	*Ptilotus helipteroides (Hairy Mulla Mulla)*			
204.	2747	*Ptilotus obovatus (Cotton Bush)*			
205.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
206.	2754	*Ptilotus roei*			
207.	2755	*Ptilotus rotundifolius (Royal Mulla Mulla)*			
208.	2757	*Ptilotus schwartzii*			
209.	2581	*Rhagodia drummondii*			
210.	13306	*Rhodanthe battii*			
211.	13308	*Rhodanthe charsleyae*			
212.	13242	*Rhodanthe chlorocephala subsp. splendida*			
213.	13300	*Rhodanthe citrina*			
214.	13292	*Rhodanthe forrestii*			
215.	13294	*Rhodanthe laevis*			
216.	13238	*Rhodanthe maryonii*			
217.	13249	*Rhodanthe oppositifolia subsp. oppositifolia*			
218.	45148	*Roebuckiella ciliocarpa*			
219.	48889	*Roepera eichleri*			
220.	48897	*Roepera lobulata*			
221.	11151	*Rostraria pumila*	Y		
222.	2443	*Rumex vesicarius (Ruby Dock)*	Y		
223.	2357	*Santalum lanceolatum (Northern Sandalwood, Yarnguli)*			
224.	7644	*Scaevola spinescens (Currant Bush, Maroon)*			
225.	1002	*Schoenus nanus (Tiny Bog Rush)*			
226.	2607	*Sclerolaena densiflora*			
227.	2611	*Sclerolaena eriacantha (Tall Bindii)*			
228.	2612	*Sclerolaena eurotioides (Fluffy Bindii)*			
229.	2625	*Sclerolaena obliquicuspis (Limestone Bindii)*			
230.	2628	*Sclerolaena recurvicuspis*			
231.	8207	*Senecio glossanthus (Slender Groundsel)*			
232.	20161	*Senecio pinnatifolius*			
233.	12279	*Senna artemisioides subsp. helmsii*			
234.	17558	*Senna artemisioides subsp. x artemisioides*			
235.	12283	*Senna artemisioides subsp. x sturtii*			
236.	18449	*Senna glaucifolia*			
237.	14577	*Senna sp. Meekatharra (E. Bailey 1-26)*			
238.	31759	*Sida ectogama*			
239.	31854	*Sida sp. Excedentifolia (J.L. Egan 1925)*			
240.	31857	*Sida sp. Golden calyces glabrous (H.N. Foote 32)*			
241.	19712	*Sida sp. dark green fruits (S. van Leeuwen 2260)*			
242.	3069	*Sisymbrium erysimoides (Smooth Mustard)*	Y		
243.	6989	*Solanum ashbyae*			
244.	6999	*Solanum coactiliferum (Western Nightshade)*			
245.	7008	*Solanum ferocissimum*			
246.	19555	*Stackhousia muricata subsp. annual (W.R. Barker 2172)*			
247.	16196	*Stenanthemum mediale*		P1	
248.	19705	*Stenanthemum patens*		P1	
249.	16199	*Stenanthemum petraeum*			
250.	3074	*Stenopetalum anfractum*			
251.	3076	*Stenopetalum filifolium*			
252.	8236	*Streptoglossa cylindriceps*			
253.	7740	*Stylidium induratum (Desert Triggerplant)*			
254.	7754	*Stylidium longibracteatum (Long-bracted Trigger Plant)*			
255.	12355	*Swainsona affinis*			
256.	13339	*Synaptantha tillaeacea var. tillaeacea*			
257.	2641	*Tecticornia arborea (Bulli Bulli)*			
258.	46513	*Tecticornia doliiformis*			
259.	33239	*Tecticornia halocnemoides subsp. catenulata*			
260.	33319	*Tecticornia indica subsp. bidens*			
261.	2819	*Tetragonia cristata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
262.	48603	*Teucrium teucriiflorum*			
263.	6054	*Thryptomene decussata*			
264.	675	*Thyridolepis multiculmis (Soft Wanderrie Grass)*			
265.	46756	*Thysanotus exfimbriatus*			
266.	1338	*Thysanotus manglesianus (Fringed Lily)*			
267.	6268	*Trachymene cyanopetala*			
268.	6279	*Trachymene ornata (Spongefruit)*			
269.	19053	*Trachymene pilbarensis*			
270.	18072	*Tribulus suberosus*			
271.	33276	*Triglochin isingiana*			
272.	17877	*Triodia melvillei*			
273.	48319	*Tripogonella loliiformis*			
274.	7660	*Velleia glabrata (Pee the Bed)*			
275.	7661	*Velleia hispida (Hispid Velleia)*			
276.	7664	*Velleia rosea (Pink Velleia)*			
277.	6092	*Verticordia jamiesonii*		P3	
278.	48986	*Vincetoxicum lineare*			
279.	7386	*Wahlenbergia gracilenta (Annual Bluebell)*			
280.	7393	*Wahlenbergia tumidifructa*			
281.	13331	*Waitzia acuminata var. acuminata*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Tim McCabe on 15/10/2019

Origin	Native
Current Names Only	Yes
Core Datasets Only	Yes
Species Group	All Animals
Method	'By Circle'
Centre	117° 38' 14" E,26° 58' 02" S
Buffer	40km
Group By	Species Group

Species Group	Species	Records
Amphibian	5	31
Bird	122	1164
Fish	2	2
Invertebrate	12	1910
Mammal	28	164
Reptile	42	135
TOTAL	**211**	**3406**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25376	*Cyclorana platycephala (Water-holding Frog)*			
2.	25392	*Litoria rubella (Little Red Tree Frog)*			
3.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
4.	25428	*Neobatrachus wilsmorei (Plonking Frog)*			
5.	25434	*Pseudophryne occidentalis (Western Toadlet)*			
Bird					
6.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
7.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
8.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
9.	24264	*Acanthiza robustirostris (Slaty-backed Thornbill)*			
10.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
11.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
12.	25536	*Accipiter fasciatus (Brown Goshawk)*			
13.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
14.	24312	*Anas gracilis (Grey Teal)*			
15.	24316	*Anas superciliosa (Pacific Black Duck)*			
16.	25670	*Anthus australis (Australian Pipit)*			
17.	25528	*Aphelocephala leucopsis (Southern Whiteface)*			
18.	24285	*Aquila audax (Wedge-tailed Eagle)*			
19.	41324	*Ardea modesta (great egret, white egret)*			
20.	24341	*Ardea pacifica (White-necked Heron)*			
21.	24610	*Ardeotis australis (Australian Bustard)*			
22.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
23.	24355	*Artamus minor (Little Woodswallow)*			
24.	24356	*Artamus personatus (Masked Woodswallow)*			
25.		*Barnardius zonarius*			
26.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
27.	25715	*Cacatua roseicapilla (Galah)*			
28.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
29.	24269	*Calamanthus campestris (Rufous Fieldwren)*			
30.	34000	*Calamanthus campestris subsp. montanellus (Rufous Fieldwren, Western Fieldwren (western wheatbelt))*			
31.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
32.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
33.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
34.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
35.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
36.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
37.	24434	*Chrysococcyx osculans (Black-eared Cuckoo)*			
38.	25580	*Cinclosoma castaneothorax (Chestnut-breasted Quail-thrush)*			
39.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
40.	25581	*Climacteris affinis (White-browed Treecreeper)*			
41.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
42.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
43.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
44.	24416	*Corvus bennetti (Little Crow)*			
45.	25593	*Corvus orru (Torresian Crow)*			
46.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
47.	25595	*Cracticus tibicen (Australian Magpie)*			
48.	25596	*Cracticus torquatus (Grey Butcherbird)*			
49.	24322	*Cygnus atratus (Black Swan)*			
50.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
51.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
52.	24470	*Dromaius novaehollandiae (Emu)*			
53.		*Egretta novaehollandiae*			
54.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
55.		*Eolophus roseicapillus*			
56.	24568	*Epthianura aurifrons (Orange Chat)*			
57.	24570	*Epthianura tricolor (Crimson Chat)*			
58.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
59.	24368	*Eurostopodus argus (Spotted Nightjar)*			
60.	25621	*Falco berigora (Brown Falcon)*			
61.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
62.	25623	*Falco longipennis (Australian Hobby)*			
63.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
64.	25727	*Fulica atra (Eurasian Coot)*			
65.	24401	*Geopelia cuneata (Diamond Dove)*			
66.	25530	*Gerygone fusca (Western Gerygone)*			
67.	24443	*Grallina cyanoleuca (Magpie-lark)*			
68.	24295	*Haliastur sphenurus (Whistling Kite)*			
69.	24297	*Hamirostra melanosternon (Black-breasted Buzzard)*			
70.	25734	*Himantopus himantopus (Black-winged Stilt)*			
71.	24775	*Himantopus himantopus subsp. leucocephalus (Black-winged Stilt)*			
72.	24491	*Hirundo neoxena (Welcome Swallow)*			
73.	24367	*Lalage tricolor (White-winged Triller)*			
74.	25637	*Larus novaehollandiae (Silver Gull)*			
75.	25661	*Lichmera indistincta (Brown Honeyeater)*			
76.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
77.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
78.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
79.	25654	*Malurus splendens (Splendid Fairy-wren)*			
80.	24583	*Manorina flavigula (Yellow-throated Miner)*			
81.	47997	*Melanodryas cucullata (Hooded Robin)*			
82.	24736	*Melopsittacus undulatus (Budgerigar)*			
83.	25693	*Microeca fascinans (Jacky Winter)*			
84.	24737	*Neophema bourkii (Bourke's Parrot)*			
85.	24738	*Neophema elegans (Elegant Parrot)*			
86.		*Neopsephotus bourkii*			
87.	25747	*Ninox connivens (Barking Owl)*			
88.	24742	*Nymphicus hollandicus (Cockatiel)*			
89.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
90.	24618	*Oreoica gutturalis (Crested Bellbird)*			
91.	34011	*Oreoica gutturalis subsp. gutturalis (Crested Bellbird (southern))*			
92.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
93.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
94.	48061	*Petrochelidon nigricans (Tree Martin)*			
95.	24659	*Petroica goodenovii (Red-capped Robin)*			
96.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
97.	24409	*Phaps chalcoptera (Common Bronzewing)*			
98.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
99.	24748	*Platycercus varius (Mulga Parrot)*			
100.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
101.	24751	*Platycercus zonarius subsp. zonarius (Port Lincoln Parrot)*			
102.	25703	*Podargus strigoides (Tawny Frogmouth)*			
103.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
104.	25704	*Podiceps cristatus (Great Crested Grebe)*			
105.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
106.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
107.	34013	*Pomatostomus superciliosus subsp. ashbyi (White-browed Babbler (western wheatbelt))*			
108.	25706	*Pomatostomus temporalis (Grey-crowned Babbler)*			
109.	24390	*Psophodes occidentalis (Western Wedgebill, Chiming Wedgebill)*			
110.		*Ptilonorhynchus guttatus*			
111.	24757	*Ptilonorhynchus maculatus subsp. guttatus (Western Bowerbird)*			
112.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
113.	24278	*Pyrrholaemus brunneus (Redthroat)*			
114.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
115.	48096	*Rhipidura albiscapa (Grey Fantail)*			
116.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
117.	30948	*Smicrornis brevirostris (Weebill)*			
118.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
119.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
120.	30870	*Taeniopygia guttata (Zebra Finch)*			
121.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
122.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
123.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
124.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
125.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
126.	24851	*Turnix velox (Little Button-quail)*			
127.	24386	*Vanellus tricolor (Banded Lapwing)*			
Fish					
128.		*Craterocephalus cuneiceps*			
129.		*Leiopotherapon unicolor*			
Invertebrate					
130.		*Anidiops villosus*			
131.		*Cherax destructor*			
132.		*Cormocephalus turneri*			
133.	33917	*Idiosoma nigrum (Shield-backed Trapdoor Spider)*		T	
134.		*Indolpium sp.*			
135.		*Nomindra leeuweni*			
136.		*Phryganoporus candidus*			
137.		*Scolopendra laeta*			
138.		*Scolopendra morsitans*			
139.		*Storena sinuosa*			
140.		*Supunna funerea*			
141.		*Supunna picta*			
Mammal					
142.	24087	*Antechinomys laniger (Kultarr)*			
143.	24149	*Chaeropus ecaudatus (Pig-footed Bandicoot, kantjilpa)*		X	
144.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
145.	30903	*Dasycercus blythi (Brush-tailed Mulgara, Ampurta)*		P4	
146.	24125	*Lagorchestes hirsutus subsp. hirsutus (Rufous Hare-wallaby (south-western))*		X	
147.	24218	*Leporillus apicalis (Lesser Stick-nest Rat)*		X	
148.	24219	*Leporillus conditor (Greater Stick-nest Rat, Wopilkara)*		S	
149.	24180	*Macroderma gigas (Ghost Bat)*		T	
150.	24135	*Macropus robustus subsp. erubescens (Euro, Biggada)*			
151.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
152.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
153.	24224	*Notomys alexis (Spinifex Hopping-mouse)*			
154.	24227	*Notomys longicaudatus (Long-tailed Hopping-mouse, koolawa)*		X	
155.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
156.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
157.	34016	*Ovis aries (Sheep)*			
158.	24142	*Petrogale lateralis subsp. lateralis (Black-flanked Rock-wallaby, Black-footed Rock-wallaby)*		T	
159.	24106	*Pseudantechinus woolleyae (Woolley's Pseudantechinus)*			
160.	24236	*Pseudomys fieldi (Shark Bay Mouse, Djoongari)*		T	
161.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
162.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
163.	24109	*Sminthopsis dolichura (Little long-tailed Dunnart)*			
164.	24116	*Sminthopsis macroura (Stripe-faced Dunnart)*			
165.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
166.	24175	*Taphozous georgianus (Common Sheath-tailed Bat)*			
167.	24176	*Taphozous hilli (Hill's Sheathtail-bat)*			
168.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
169.	24205	*Vespadelus finlaysoni (Finlayson's Cave Bat)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Reptile					
170.	25318	*Antaresia perthensis (Pygmy Python)*			
171.	25339	*Chelodina steindachneri (Flat-shelled Turtle)*			
172.	25020	*Cryptoblepharus plagiocephalus*			
173.	25458	*Ctenophorus caudicinctus (Ring-tailed Dragon)*			
174.	24869	*Ctenophorus caudicinctus subsp. mensarum (Ring-tailed Dragon)*			
175.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
176.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
177.	24888	*Ctenophorus salinarum (Salt Pan Dragon)*			
178.	24889	*Ctenophorus scutulatus (Lozenge-marked Dragon)*			
179.	25052	*Ctenotus leonhardii*			
180.	25057	*Ctenotus nasutus*			
181.	25075	*Ctenotus severus*			
182.	25080	*Ctenotus uber subsp. uber (Spotted Ctenotus)*			
183.	24995	*Delma australis*			
184.	25092	*Egernia depressa (Southern Pygmy Spiny-tailed Skink)*			
185.	25107	*Egernia stokesii subsp. badia (Western Spiny-tailed Skink, Gidgee Skink)*		T	
186.	25109	*Eremiascincus richardsonii (Broad-banded Sand Swimmer)*			
187.	24958	*Gehyra punctata*			
188.	24959	*Gehyra variegata*			
189.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
190.	25125	*Lerista bipes*			
191.	25134	*Lerista eupoda (West Coast mulga slider, Good-legged Lerista)*		P1	
192.	25151	*Lerista macropisthopus subsp. fusciceps*			
193.	25157	*Lerista nichollsi*			
194.	42411	*Lerista timida*			
195.	25184	*Menetia greyii*			
196.	24904	*Moloch horridus (Thorny Devil)*			
197.	24971	*Nephrurus vertebralis*			
198.	24973	*Nephrurus wheeleri subsp. wheeleri*			
199.	24976	*Oedura marmorata (Marbled Velvet Gecko)*			
200.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
201.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
202.	25261	*Pseudechis australis (Mulga Snake)*			
203.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
204.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
205.	25264	*Pseudonaja nuchalis (Gwardar, Northern Brown Snake)*			
206.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			
207.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
208.	24946	*Strophurus strophurus*			
209.	25269	*Suta fasciata (Rosen's Snake)*			
210.	30814	*Tympanocryptis cephalus (Pebble Dragon)*			
211.	25524	*Varanus panoptes (Yellow-spotted Monitor)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Common Name	Scientific Name	Count	Reporting Rate
Emu	Dromaius novaehollandiae	24	28.57%
Pink-eared Duck	Malacorhynchus membranaceus	4	4.76%
Black Swan	Cygnus atratus	1	1.19%
Australian Shelduck	Tadorna tadornoides	4	4.76%
Pacific Black Duck	Anas superciliosa	4	4.76%
Grey Teal	Anas gracilis	5	5.95%
Australian Wood Duck	Chenonetta jubata	5	5.95%
Australasian Grebe	Tachybaptus novaehollandiae	5	5.95%
Hoary-headed Grebe	Poliocephalus poliocephalus	3	3.57%
Great Crested Grebe	Podiceps cristatus	1	1.19%
Common Bronzewing	Phaps chalcoptera	13	15.48%
Crested Pigeon	Ocyphaps lophotes	30	35.71%
Diamond Dove	Geopelia cuneata	10	11.90%
Horsfield's Bronze-Cuckoo	Chalcites basalis	3	3.57%
Black-eared Cuckoo	Chalcites osculans	5	5.95%
Pallid Cuckoo	Heteroscenes pallidus	1	1.19%
Spotted Nightjar	Eurostopodus argus	3	3.57%
Australian Owlet-nightjar	Aegotheles cristatus	8	9.52%
Black-tailed Native-hen	Tribonyx ventralis	3	3.57%
Eurasian Coot	Fulica atra	2	2.38%
Bush Stone-curlew	Burhinus grallarius	3	3.57%
Black-winged Stilt	Himantopus leucocephalus	4	4.76%
Red-capped Plover	Charadrius ruficapillus	4	4.76%
Black-fronted Dotterel	Elseyornis melanops	6	7.14%
Banded Lapwing	Vanellus tricolor	3	3.57%
Red-kneed Dotterel	Erythrogonys cinctus	3	3.57%
Australian Pelican	Pelecanus conspicillatus	1	1.19%
White-necked Heron	Ardea pacifica	1	1.19%
Great Egret	Ardea alba	1	1.19%
White-faced Heron	Egretta novaehollandiae	1	1.19%
Straw-necked Ibis	Threskiornis spinicollis	3	3.57%
Yellow-billed Spoonbill	Platalea flavipes	2	2.38%
Little Pied Cormorant	Microcarbo melanoleucos	1	1.19%
Little Black Cormorant	Phalacrocorax sulcirostris	1	1.19%
Black-breasted Buzzard	Hamirostra melanosternon	3	3.57%
Wedge-tailed Eagle	Aquila audax	26	30.95%
Collared Sparrowhawk	Accipiter cirrocephalus	2	2.38%
Whistling Kite	Haliastur sphenurus	8	9.52%
Sacred Kingfisher	Todiramphus sanctus	2	2.38%
Red-backed Kingfisher	Todiramphus pyrrhopygius	2	2.38%
Nankeen Kestrel	Falco cenchroides	15	17.86%
Australian Hobby	Falco longipennis	2	2.38%
Brown Falcon	Falco berigora	10	11.90%
Peregrine Falcon	Falco peregrinus	1	1.19%
Cockatiel	Nymphicus hollandicus	2	2.38%
Galah	Eolophus roseicapilla	21	25.00%
Mulga Parrot	Psephotellus varius	35	41.67%
Australian Ringneck	Barnardius zonarius	12	14.29%
Bourke's Parrot	Neopsephotus bourkii	11	13.10%

Elegant Parrot	Neophema elegans	2	2.38%
Budgerigar	Melopsittacus undulatus	7	8.33%
Western Bowerbird	Ptilonorhynchus guttatus	21	25.00%
White-browed Treecreeper	Climacteris affinis	1	1.19%
Variegated Fairy-wren	Malurus lamberti	4	4.76%
Splendid Fairy-wren	Malurus splendens	22	26.19%
White-winged Fairy-wren	Malurus leucopterus	3	3.57%
Brown Honeyeater	Lichmera indistincta	5	5.95%
Grey Honeyeater	Conopophila whitei	2	2.38%
Crimson Chat	Epthianura tricolor	4	4.76%
Orange Chat	Epthianura aurifrons	2	2.38%
Spiny-cheeked Honeyeater	Acanthagenys rufogularis	32	38.10%
Singing Honeyeater	Gavicalis virescens	43	51.19%
White-plumed Honeyeater	Ptilotula penicillata	13	15.48%
White-fronted Honeyeater	Purnella albifrons	1	1.19%
Yellow-throated Miner	Manorina flavigula	26	30.95%
Striated Pardalote	Pardalotus striatus	1	1.19%
Western Gerygone	Gerygone fusca	1	1.19%
Weebill	Smicrornis brevirostris	1	1.19%
Redthroat	Pyrrholaemus brunneus	21	25.00%
Southern Whiteface	Aphelocephala leucopsis	20	23.81%
Yellow-rumped Thornbill	Acanthiza chrysorrhoa	26	30.95%
Inland Thornbill	Acanthiza apicalis	14	16.67%
Slaty-backed Thornbill	Acanthiza robustirostris	9	10.71%
Chestnut-rumped Thornbill	Acanthiza uropygialis	38	45.24%
Grey-crowned Babbler	Pomatostomus temporalis	27	32.14%
White-browed Babbler	Pomatostomus superciliosus	12	14.29%
Ground Cuckoo-shrike	Coracina maxima	2	2.38%
Black-faced Cuckoo-shrike	Coracina novaehollandiae	14	16.67%
Chestnut-breasted Quail-thrush	Cinclosoma castaneothorax	12	14.29%
Rufous Whistler	Pachycephala rufiventris	33	39.29%
Grey Shrike-thrush	Colluricincla harmonica	28	33.33%
Crested Bellbird	Oreoica gutturalis	33	39.29%
Australian Magpie	Gymnorhina tibicen	17	20.24%
Pied Butcherbird	Cracticus nigrogularis	15	17.86%
Grey Butcherbird	Cracticus torquatus	29	34.52%
Masked Woodswallow	Artamus personatus	4	4.76%
Black-faced Woodswallow	Artamus cinereus	24	28.57%
Little Woodswallow	Artamus minor	13	15.48%
Willie Wagtail	Rhipidura leucophrys	37	44.05%
Grey Fantail	Rhipidura fuliginosa	3	3.57%
Torresian Crow	Corvus orru	8	9.52%
Little Crow	Corvus bennetti	13	15.48%
Magpie-lark	Grallina cyanoleuca	23	27.38%
Red-capped Robin	Petroica goodenovii	20	23.81%
Hooded Robin	Melanodryas cucullata	7	8.33%
Mistletoebird	Dicaeum hirundinaceum	4	4.76%
Zebra Finch	Taeniopygia guttata	35	41.67%
Australasian Pipit	Anthus novaeseelandiae	16	19.05%
Brown Songlark	Cincloramphus cruralis	1	1.19%

White-backed Swallow	Cheramoeca leucosterna	2	2.38%
Tree Martin	Petrochelidon nigricans	7	8.33%
Welcome Swallow	Hirundo neoxena	18	21.43%
Crow & Raven spp		4	4.76%

APPENDIX C EPBC PROTECTED MATTERS SEARCH TOOL

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

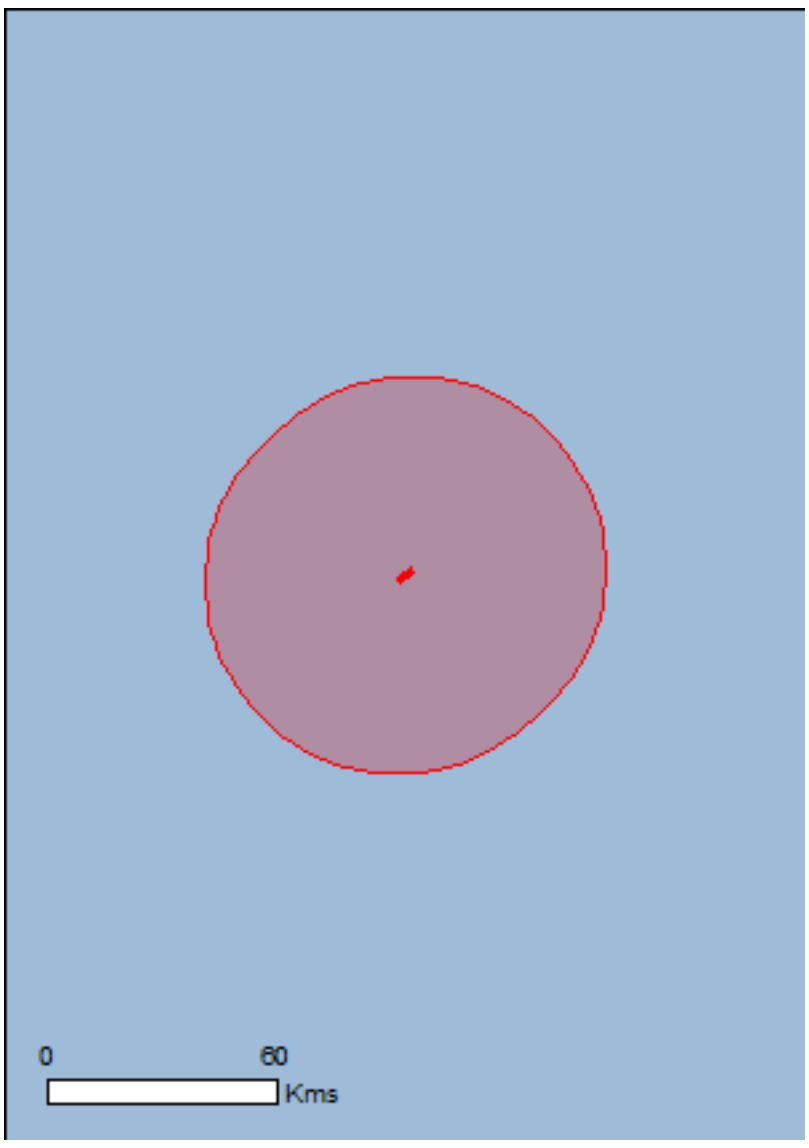
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/08/19 15:48:35

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

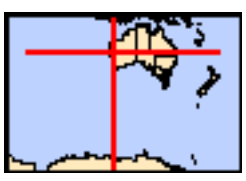
Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 50.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	10
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Leporillus conditor Wopilkara, Greater Stick-nest Rat [137]	Vulnerable	Species or species habitat may occur within area
Other		
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat known to occur within area
Plants		
Eremophila rostrata Beaked Eremophila [65124]	Critically Endangered	Species or species habitat may occur within area
Reptiles		
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur

Name	Status	Type of Presence within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-26.96667 117.66306,-26.93944 117.7

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX D PLANT SPECIES INVENTORY

Family	Name
Acanthaceae	*Harnieria kempeana* subsp. *muelleri*
Aizoaceae	*Trianthema glossostigmum*
Amaranthaceae	*Ptilotus aervoides*
	Ptilotus exaltatus
	Ptilotus gaudichaudii
	Ptilotus helipteroides
	Ptilotus obovatus
	Ptilotus polystachyus
	Ptilotus roei
	Ptilotus rotundifolius
	Ptilotus schwartzii
Apiaceae	*Daucus glochidiatus*
Apocynaceae	Apocynaceae sp. (indet.)
	Marsdenia australis
Araliaceae	*Trachymene cyanopetala*
	Trachymene ornata
	Trachymene pilbarensis
Asparagaceae	*Arthropodium dyeri*
	Thysanotus manglesianus
Asteraceae	?*Rhodanthe* sp. (indet.)
	Actinobole oldfieldianum
	Angianthus tomentosus
	Brachyscome ciliaris
	Calocephalus knappii
	Calotis hispidula
	Calotis porphyroglossa
	Cephalipterum drummondii
	Chthonocephalus viscosus
	Erymophyllum ramosum subsp. *ramosum*
	Gnephosis tenuissima
	Helipterum craspedioides
	Lawrencella davenportii
	Myriocephalus oldfieldii
	Myriocephalus rudallii
	Pluchea dentex
	Podolepis gardneri
	Rhodanthe battii
	Rhodanthe charsleyae
	Rhodanthe maryonii
	Rhodanthe polycephala
	Rhodanthe propinqua
	Roebuckiella ciliocarpa
	Senecio sp. (indet.)
	Trichanthodium skirrophorum
	Waitzia acuminata var. *acuminata*
Boraginaceae	*Heliotropium ovalifolium*
	Trichodesma zeylanicum
Brassicaceae	*Lepidium oxytrichum*
	Stenopetalum filifolium
	Stenopetalum lineare var. *lineare*
Campanulaceae	*Wahlenbergia tumidifructa*
Casuarinaceae	*Allocasuarina acutivalvis* subsp. *acutivalvis*
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*
	Dysphania saxatilis
	Enchylaena tomentosa var. *tomentosa*
	Maireana georgei
	Maireana melanocoma
	Maireana triptera
	Maireana villosa
	Rhagodia eremaea
	Salsola australis

Family	Name
	Sclerolaena densiflora
Convolvulaceae	*Convolvulus clementii*
	**Cuscuta planiflora*
	Duperreya commixta
Euphorbiaceae	*Euphorbia australis* var. *subtomentosa*
	Euphorbia boophthona
	Euphorbia drummondii
Fabaceae	*Acacia craspedocarpa*
	Acacia craspedocarpa (hybrid)
	Acacia dilloniorum (P1)
	Acacia exocarpoides
	Acacia fuscaneura
	Acacia incurvaneura
	Acacia incurvaneura × *mulganeura*
	Acacia mulganeura
	Acacia pruinocarpa
	Acacia pteraneura
	Acacia ramulosa var. *linophylla*
	Acacia ramulosa var. *ramulosa*
	Acacia rhodophloia
	Acacia sp. Weld Range (A. Markey & S. Dillon 2994)
	Acacia speckii (P4)
	Acacia tetragonophylla
	Chorizema genistoides
	Glycine canescens
	Indigofera monophylla sens. lat.
	Senna artemisioides subsp. ×*artemisioides*
	Senna artemisioides subsp. ×*sturtii*
	Senna artemisioides subsp. *filifolia*
	Senna artemisioides subsp. *helmsii*
	Senna sp. Meekatharra (E. Bailey 1-26)
	Swainsona kingii
Geraniaceae	*Erodium crinitum*
Goodeniaceae	*Brunonia australis*
	Goodenia berardiana
	Goodenia havilandii
	Goodenia macroplectra
	Goodenia mimuloides
	Goodenia quasilibera
	Goodenia tenuiloba
	Scaevola spinescens
Haloragaceae	*Haloragis trigonocarpa*
Lamiaceae	*Hemigenia virescens* (P3)
	Prostanthera althoferi subsp. *althoferi*
	Prostanthera petrophila (P3)
	Teucrium teucriiflorum
Malvaceae	*Abutilon oxycarpum*
	Brachychiton gregorii
	Hibiscus burtonii
	Hibiscus sp. Gardneri (A.L. Payne PRP 1435)
	Hibiscus sturtii var. *forrestii*
	Sida ectogama
	Sida sp. (indet.)
	Sida sp. dark green fruits (S. van Leeuwen 2260)
	Calandrinia ? *ptychosperma*
Montiaceae	*Calandrinia eremaea*
	Calandrinia stagnensis
Myrtaceae	*Aluta aspera* subsp. *hesperia*
	Calytrix desolata
	Micromyrtus placoides (P3)
	Thryptomene decussata

Family	Name
Phyllanthaceae	*Phyllanthus maderaspatensis*
Plantaginaceae	*Plantago drummondii*
Poaceae	*Aristida contorta*
	Austrostipa trichophylla
	Cymbopogon ambiguus
	Enneapogon caerulescens
	Eragrostis eriopoda
	Eriachne helmsii
	Eriachne pulchella subsp. *dominii*
	Eriachne pulchella subsp. *pulchella*
	Monachather paradoxus
	Paspalidium clementii
	**Rostraria pumila*
Primulaceae	**Lysimachia arvensis*
Proteaceae	*Grevillea berryana*
	Grevillea inconspicua (P4)
	Hakea lorea subsp. *lorea*
Pteridaceae	*Cheilanthes brownii*
	Cheilanthes sieberi subsp. *sieberi*
Rhamnaceae	*Stenanthemum patens* (P1)
	Stenanthemum petraeum
	Stenanthemum sp. (indet.)
Rubiaceae	*Psydrax latifolia*
	Psydrax rigidula
	Psydrax suaveolens
	Synaptantha tillaeacea var. *tillaeacea*
Rutaceae	*Philotheca brucei* subsp. *brucei*
Santalaceae	*Santalum lanceolatum*
	Dodonaea amplisemina (P4)
	Dodonaea pachyneura
Scrophulariaceae	*Eremophila exilifolia*
	Eremophila foliosissima
	Eremophila forrestii subsp. *forrestii*
	Eremophila fraseri
	Eremophila georgei
	Eremophila glutinosa
	Eremophila jucunda subsp. *jucunda*
	Eremophila latrobei subsp. *latrobei*
	Eremophila mackinlayi subsp. *spathulata*
	Eremophila macmillaniana
	Eremophila simulans
Solanaceae	*Nicotiana rosulata* subsp. *rosulata*
	Solanum ashbyae
	Solanum austropiceum
	Solanum cleistogamum
	Solanum lasiophyllum
Zygophyllaceae	*Roepera eichleri*
	Tribulus astrocarpus
	Tribulus suberosus

*Introduced.

APPENDIX E PRIORITY FLORA SPECIES RECORED WITHIN THE STUDY AREA

Name	WAConsStat	Abundance	DateObs	Easting	Northing
Acacia dilloniorum	P1	1	3/09/2019	568556.44	7020064.3
Acacia dilloniorum	P1	1	3/09/2019	568208.36	7019805.9
Acacia dilloniorum	P1	3	3/09/2019	568548.65	7020038.1
Acacia dilloniorum	P1	4	3/09/2019	568580.66	7020046.1
Acacia dilloniorum	P1	5	3/09/2019	568309.93	7019897.6
Acacia dilloniorum	P1	20	3/09/2019	568357.89	7019974.3
Acacia dilloniorum	P1	25	3/09/2019	568341.34	7019942.2
Acacia dilloniorum	P1	25	3/09/2019	568548.65	7020038.1
Acacia speckii	P4	1	3/09/2019	568378.39	7020074
Acacia speckii	P4	1	3/09/2019	568556.44	7020064.3
Acacia speckii	P4	1	3/09/2019	568590.46	7020039.3
Acacia speckii	P4	1	3/09/2019	568664.56	7019992.3
Acacia speckii	P4	4	3/09/2019	568572.62	7020045.6
Acacia speckii	P4	5	3/09/2019	568553.45	7020025.6
Acacia speckii	P4	10	3/09/2019	568427.83	7020019.6
Acacia speckii	P4	10	3/09/2019	568660.84	7020039.2
Acacia speckii	P4	14	3/09/2019	568378.39	7020074
Acacia speckii	P4	25	3/09/2019	568611.91	7020060
Acacia speckii	P4	1	4/07/2019	568575.5	7020046.7
Dodonaea amplisemina	P4	1	3/09/2019	568378.39	7020074
Dodonaea amplisemina	P4	1	3/09/2019	568556.44	7020064.3
Dodonaea amplisemina	P4	1	4/09/2019	568836.86	7019605.7
Dodonaea amplisemina	P4	1	4/09/2019	568800.3	7019220.1
Dodonaea amplisemina	P4	50	3/09/2019	568434.49	7019983.5
Dodonaea amplisemina	P4	1	3/09/2019	568318.18	7019900.7
Dodonaea amplisemina	P4	1	3/09/2019	568614.39	7020022
Dodonaea amplisemina	P4	1	3/09/2019	568727.47	7019788.1
Dodonaea amplisemina	P4	1	3/09/2019	568852.33	7019385.2
Dodonaea amplisemina	P4	2	3/09/2019	568580.66	7020046.1
Dodonaea amplisemina	P4	2	3/09/2019	568878.18	7019500.5
Dodonaea amplisemina	P4	3	3/09/2019	568572.62	7020045.6
Dodonaea amplisemina	P4	5	3/09/2019	568744.49	7019724
Dodonaea amplisemina	P4	5	3/09/2019	568823.72	7019615.9
Dodonaea amplisemina	P4	5	3/09/2019	568672.24	7020036.4
Dodonaea amplisemina	P4	10	3/09/2019	568728.71	7019778.6
Dodonaea amplisemina	P4	10	3/09/2019	568751.92	7019703.7
Dodonaea amplisemina	P4	10	3/09/2019	568773.63	7019679.3
Dodonaea amplisemina	P4	10	3/09/2019	568834.39	7019318.6
Dodonaea amplisemina	P4	20	3/09/2019	568866.17	7019573
Grevillea inconspicua	P4	0	4/09/2019	568836.86	7019605.7
Grevillea inconspicua	P4	1	3/09/2019	567613.99	7017093
Grevillea inconspicua	P4	3	3/09/2019	568751.92	7019703.7
Grevillea inconspicua	P4	5	3/09/2019	568786.02	7019657
Grevillea inconspicua	P4	5	3/09/2019	568834.39	7019318.6
Grevillea inconspicua	P4	5	3/09/2019	568788.27	7019651.1
Hemigenia virescens	P3	15	4/09/2019	569077.07	7019221.5
Hemigenia virescens	P3	2	3/09/2019	569042.62	7019166.1
Hemigenia virescens	P3	10	3/09/2019	568921.6	7019165.8
Hemigenia virescens	P3	10	3/09/2019	569077.27	7019167.5
Micromyrtus placoides	P3	20	3/09/2019	568584.15	7019775.8
Micromyrtus placoides	P3	50	3/09/2019	568904.19	7019936.8
Micromyrtus placoides	P3	100	3/09/2019	569038.72	7020028.1
Micromyrtus placoides	P3	10	3/09/2019	568618.55	7019568
Micromyrtus placoides	P3	20	3/09/2019	568545.59	7019822.1

Name	WAConsStat	Abundance	DateObs	Easting	Northing
Micromyrtus placoides	P3	20	3/09/2019	568541.21	7019838.4
Micromyrtus placoides	P3	20	3/09/2019	568550.74	7019583.3
Micromyrtus placoides	P3	100	3/09/2019	569006.95	7019990.6
Micromyrtus placoides	P3	100	3/09/2019	568391.88	7019560.4
Micromyrtus placoides	P3	200	3/09/2019	568587.01	7019736.5
Micromyrtus placoides	P3	200	3/09/2019	568314.23	7019557.5
Micromyrtus placoides	P3	20	4/07/2019	568542.06	7019703.4
Prostanthera petrophila	P3	1	3/09/2019	568934.67	7020061.1
Prostanthera petrophila	P3	50	3/09/2019	568538.28	7019774.9
Stenanthemum patens	P1	2	3/09/2019	568707.68	7019908.1

APPENDIX F SPECIES CONSTANCY WITHIN VEGETATION TYPES

Family	Species	Vegetation type[1]									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
Acanthaceae	*Harnieria kempeana* subsp. *muelleri*			100%		100%		33%		100%	
Aizoaceae	*Trianthema glossostigmum*						50%				
Amaranthaceae	*Ptilotus aervoides*		100%		100%						
	Ptilotus exaltatus			100%							
	Ptilotus gaudichaudii			100%			50%				
	Ptilotus helipteroides	50%	100%	100%	100%	50%		33%			33%
	Ptilotus obovatus	100%	100%	100%	100%	100%	50%	100%		100%	100%
	Ptilotus polystachyus		50%	100%	100%		50%	33%	80%	100%	100%
	Ptilotus roei		50%				100%		20%		33%
	Ptilotus schwartzii					100%	100%	100%	100%	100%	67%
Apiaceae	*Daucus glochidiatus*				33%						
Apocynaceae	*Marsdenia australis*	100%		100%	67%			33%		100%	100%
Araliaceae	*Trachymene cyanopetala*		50%		67%						
	Trachymene ornata		100%		100%	100%		100%			67%
Asparagaceae	*Arthropodium dyeri*							33%			
	Thysanotus manglesianus		50%		33%		50%	100%	80%		100%
Asteraceae	?*Rhodanthe* sp. (indet.)								20%	100%	33%
	Angianthus tomentosus			100%							
	Brachyscome ciliaris		50%		67%		50%		40%		33%
	Calocephalus knappii				67%		50%				100%
	Calotis hispidula		100%	100%	100%						67%
	Calotis porphyroglossa	50%		100%							100%
	Cephalipterum drummondii	100%	100%	100%	100%		50%				67%
	Chthonocephalus viscosus				33%		50%		20%		
	Erymophyllum ramosum subsp. *ramosum*					50%					
	Helipterum craspedioides		50%	100%	100%				20%		67%
	Lawrencella davenportii					50%		33%			33%
	Myriocephalus rudallii				33%						
	Pluchea dentex				67%						
	Podolepis gardneri	50%	100%	100%	100%						
	Rhodanthe battii			100%		50%					67%
	Rhodanthe charsleyae		50%		67%		50%				33%
	Rhodanthe maryonii		100%		100%	100%		33%			67%
	Rhodanthe polycephala			100%		100%		33%			
	Rhodanthe propinqua										67%
	Roebuckiella ciliocarpa		50%		67%			67%		100%	33%

Family	Species	Vegetation type[1]									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	Senecio sp. (indet.)				100%						
	Trichanthodium skirrophorum	50%									
	Waitzia acuminata var. *acuminata*			100%	67%	50%		67%	60%		33%
Boraginaceae	*Heliotropium ovalifolium*		100%		67%						
	Trichodesma zeylanicum			100%	100%						
Brassicaceae	*Lepidium oxytrichum*				100%	50%					
	Stenopetalum filifolium/lineare	50%	100%	100%	100%	100%	100%	100%	20%	100%	100%
Campanulaceae	*Wahlenbergia tumidifructa*			100%	67%						
Casuarinaceae	*Allocasuarina acutivalvis subsp. acutivalvis*					50%					
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*		50%	100%	100%	100%			20%	100%	67%
	Dysphania saxatilis							33%			
	Enchylaena tomentosa var. *tomentosa*			100%						100%	
	Maireana georgei	100%	50%	100%						100%	
	Maireana melanocoma	50%									
	Maireana triptera	50%									
	Maireana villosa			100%			100%		40%		100%
	Rhagodia eremaea			100%							
	Salsola australis	50%									
	Sclerolaena densiflora			100%							
Convolvulaceae	*Convolvulus clementii*			100%	33%						
	Cuscuta planiflora										33%
	Duperreya commixta			100%	67%						
Euphorbiaceae	*Euphorbia australis var. subtomentosa*		50%		67%						
	Euphorbia boophthona		100%	100%	100%					100%	67%
	Euphorbia drummondii										100%
Fabaceae	*Acacia* ? *incurvaneura* × *mulganeura*						100%	33%	100%		67%
	Acacia craspedocarpa	100%									
	Acacia dilloniorum		50%								
	Acacia exocarpoides					50%		100%	20%	100%	33%
	Acacia fuscaneura	50%			50%		50%				33%
	Acacia incurvaneura	50%		100%	50%	100%	50%	100%	100%		67%
	Acacia mulganeura							33%	20%		33%
	Acacia pruinocarpa			100%					20%	100%	100%
	Acacia pteraneura		50%						20%	100%	67%
	Acacia ramulosa var. *linophylla*		50%	100%	100%	50%		100%	100%	100%	100%
	Acacia ramulosa var. *ramulosa*	50%									

Family	Species	Vegetation type[1]									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	Acacia rhodophloia					100%					
	Acacia sp. Weld Range (A. Markey & S. Dillon 2994)		100%	100%	100%				20%		
	Acacia speckii		100%								
	Acacia tetragonophylla	100%					100%				33%
	Chorizema genistoides		50%								
	Glycine canescens			100%	67%						
	Indigofera monophylla sens. lat.		100%	100%	100%						
	Senna artemisioides subsp. ×*artemisioides*	100%		100%	100%						
	Senna artemisioides subsp. ×*sturtii*	100%	100%	100%	100%	50%		67%	20%	100%	67%
	Senna artemisioides subsp. *helmsii*		50%	100%	100%					100%	33%
	Senna sp. Meekatharra (E. Bailey 1-26)									100%	
	Swainsona kingii	50%		100%	33%						33%
Geraniaceae	*Erodium crinitum*		100%	100%	100%	100%	50%	67%	60%		100%
Goodeniaceae	*Goodenia berardiana*		100%		33%						
	Goodenia havilandii			100%				33%			
	Goodenia macroplectra								20%		
	Goodenia mimuloides		50%								
	Goodenia quasilibera						50%		40%		
	Goodenia tenuiloba		50%	100%	67%	100%	50%	100%	100%	100%	100%
	Scaevola spinescens	50%		100%							
Haloragaceae	*Haloragis trigonocarpa*		100%	100%	100%						
Lamiaceae	*Hemigenia virescens*								20%		
	Prostanthera althoferi subsp. *althoferi*		50%								
	Prostanthera petrophila					50%		33%			
	Teucrium teucriiflorum			100%			50%		20%	100%	33%
Malvaceae	*Abutilon oxycarpum*				67%						67%
	Brachychiton gregorii		50%								
	Hibiscus burtonii			100%					20%		33%
	Hibiscus sp. Gardneri (A.L. Payne PRP 1435)									100%	33%
	Hibiscus sturtii var. *forrestii*		50%	100%	67%						
	Sida ectogama			100%							
	Sida sp. (indet.)							33%			
	Sida sp. dark green fruits (S. van Leeuwen 2260)		50%		100%					100%	100%
Montiaceae	*Calandrinia ? ptychosperma*				33%						
	Calandrinia eremaea		100%	100%	100%	100%			20%		33%
Myrtaceae	*Micromyrtus placoides*							100%			

Family	Species	Vegetation type[1]									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	Thryptomene decussata					100%		100%			
Phyllanthaceae	*Phyllanthus maderaspatensis*		50%		100%						
Poaceae	*Aristida contorta*	50%	100%	100%	100%	50%	100%		20%		
	Austrostipa trichophylla				33%						
	Cymbopogon ambiguus			100%	100%						
	Enneapogon caerulescens	50%									
	Eragrostis eriopoda						100%		80%		33%
	Eriachne helmsii					50%				100%	67%
	Eriachne pulchella subsp. *dominii*					50%					
	Eriachne pulchella subsp. *pulchella*			100%							
	Monachather paradoxus			100%					40%		33%
	Paspalidium clementii				33%	100%					33%
	Rostraria pumila				33%						
Primulaceae	*Lysimachia arvensis*				33%						
Proteaceae	*Grevillea berryana*			100%		50%		100%	40%		67%
	Grevillea inconspicua				33%						
Pteridaceae	*Cheilanthes brownii*		100%		67%	50%					
	Cheilanthes sieberi subsp. *sieberi*				33%	50%		100%			67%
Rhamnaceae	*Stenanthemum patens*		50%								
	Stenanthemum petraeum							33%			
Rubiaceae	*Psydrax latifolia*				33%	50%	100%		60%	100%	67%
	Psydrax rigidula	50%		100%	33%	50%	50%	33%	40%	100%	67%
	Psydrax suaveolens					50%		100%	80%	100%	100%
	Synaptantha tillaeacea var. *tillaeacea*				67%						
Rutaceae	*Philotheca brucei* subsp. *brucei*					100%		33%			
Santalaceae	*Santalum lanceolatum*			100%	33%	50%					33%
	Dodonaea amplisemina		100%		100%						
	Dodonaea pachyneura					100%		100%			
Scrophulariaceae	*Eremophila foliosissima*						50%		40%		33%
	Eremophila forrestii subsp. *forrestii*		50%	100%			50%	33%	100%	100%	100%
	Eremophila fraseri	100%					100%				
	Eremophila georgei			100%	33%		100%	67%	80%	100%	100%
	Eremophila glutinosa		100%					100%	40%	100%	33%
	Eremophila jucunda subsp. *jucunda*	50%							60%		
	Eremophila latrobei subsp. *latrobei*					100%		100%	60%	100%	33%
	Eremophila mackinlayi subsp. *spathulata*		100%	100%	100%						

Family	Species	Vegetation type[1]									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	Eremophila macmillaniana		100%				50%				
	Eremophila simulans								20%		
Solanaceae	*Nicotiana rosulata* subsp. *rosulata*		50%		100%			67%	20%		100%
	Solanum ashbyae				33%			67%	40%	100%	33%
	Solanum austropiceum				33%						
	Solanum lasiophyllum	100%		100%	33%		100%		20%		33%
Zygophyllaceae	*Roepera eichleri*	100%	100%	100%	67%						
	Tribulus astrocarpus				33%						
	Tribulus suberosus		50%		67%						33%

[1]Values indicate the percentage of sampling sites in which the taxon was recorded.

APPENDIX G QUADRAT SITE DATA

IR01

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568378.39 mE 7020074 mN
Landform	Footslope	**Slope**	Moderate
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Basalt; Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Brachychiton gregorii	Tree (<10 m)	< 1
Acacia pteraneura	Shrub (>2 m)	5
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	< 1
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	5
Acacia speckii	Shrub (1-2 m)	5
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	1
Eremophila macmillaniana	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	1
Senna artemisioides subsp. *helmsii*	Shrub (1-2 m)	5
Dodonaea amplisemina	Shrub (0-1 m)	< 1
Eremophila glutinosa	Shrub (0-1 m)	1
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	1
Heliotropium ovalifolium	Shrub (0-1 m)	< 1
Hibiscus sturtii var. *forrestii*	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Prostanthera althoferi subsp. *althoferi*	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Tribulus suberosus	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Calandrinia eremaea	Herb	< 1
Calotis hispidula	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Cheilanthes brownii	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	1
Euphorbia australis var. *subtomentosa*	Herb	< 1
Euphorbia boophthona	Herb	< 1
Goodenia berardiana	Herb	1
Haloragis trigonocarpa	Herb	< 1
Maireana georgei	Herb	< 1

Name	Stratum	Percent cover (%)
Podolepis gardneri	Herb	< 1
Ptilotus aervoides	Herb	< 1
Ptilotus helipteroides	Herb	1
Ptilotus polystachyus	Herb	< 1
Ptilotus roei	Herb	< 1
Rhodanthe charsleyae	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roepera eichleri	Herb	< 1
Stenopetalum lineare var. *lineare*	Herb	1
Trachymene cyanopetala	Herb	< 1
Trachymene ornata	Herb	< 1

IR02

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568556.44 mE 7020064.29 mN
Landform	Midslope	**Slope**	Moderate
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Basalt; Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
Acacia speckii	Shrub (>2 m)	5
Acacia dilloniorum	Shrub (0-1 m)	5
Chorizema genistoides	Shrub (0-1 m)	< 1
Dodonaea amplisemina	Shrub (0-1 m)	< 1
Eremophila glutinosa	Shrub (0-1 m)	5
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	1
Eremophila macmillaniana	Shrub (0-1 m)	< 1
Heliotropium ovalifolium	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	1
Stenanthemum sp. (indet)	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Brachyscome ciliaris	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calotis hispidula	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Cheilanthes brownii	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia boophthona	Herb	< 1
Goodenia berardiana	Herb	1
Goodenia mimuloides	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Haloragis trigonocarpa	Herb	< 1
Helipterum craspedioides	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Phyllanthus maderaspatensis	Herb	< 1

Name	Stratum	Percent cover (%)
Podolepis gardneri	Herb	< 1
Ptilotus aervoides	Herb	< 1
Ptilotus helipteroides	Herb	1
Rhodanthe maryonii	Herb	1
Roebuckiella ciliocarpa	Herb	< 1
Roepera eichleri	Herb	2
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1

IR03

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568548.43 mE 7019872.26 mN
Landform	Ridge	**Slope**	Steep
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia rhodophloia	Shrub (>2 m)	5
Thryptomene decussata	Shrub (>2 m)	10
Acacia incurvaneura	Shrub (1-2 m)	1
Grevillea berryana	Shrub (1-2 m)	< 1
Philotheca brucei subsp. *brucei*	Shrub (1-2 m)	1
Santalum lanceolatum	Shrub (1-2 m)	< 1
Acacia exocarpoides	Shrub (0-1 m)	< 1
Dodonaea pachyneura	Shrub (0-1 m)	3
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	4
Harnieria kempeana subsp. *muelleri*	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Paspalidium clementii	Grass	< 1
Calandrinia eremaea	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Erymophyllum ramosum subsp. *ramosum*	Herb	< 1
Goodenia tenuiloba	Herb	1
Rhodanthe maryonii	Herb	1
Rhodanthe polycephala	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Trachymene ornata	Herb	< 1

IR04

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 566261.94 mE 7017292.06 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Common (10-30%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	15
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	5
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	15
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Eremophila georgei	Shrub (1-2 m)	1
Psydrax latifolia	Shrub (1-2 m)	< 1
Psydrax rigidula	Shrub (1-2 m)	< 1
Psydrax suaveolens	Shrub (1-2 m)	< 1
Eremophila foliosissima	Shrub (0-1 m)	< 1
Eremophila jucunda subsp. *jucunda*	Shrub (0-1 m)	< 1
Maireana villosa	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	1
Aristida contorta	Grass	< 1
Eragrostis eriopoda	Grass	< 1
Monachather paradoxus	Grass	< 1
?*Rhodanthe* sp. (indet.)	Herb	< 1
Calandrinia eremaea	Herb	< 1
Chthonocephalus viscosus	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Goodenia quasilibera	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Hibiscus burtonii	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1

IR05

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568934.66 mE 7020061.11 mN
Landform	Ridge	**Slope**	Steep
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	1
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	2
Acacia rhodophloia	Shrub (>2 m)	1
Allocasuarina acutivalvis subsp. *acutivalvis*	Shrub (>2 m)	< 1
Thryptomene decussata	Shrub (>2 m)	5
Dodonaea pachyneura	Shrub (1-2 m)	2
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	2
Philotheca brucei subsp. *brucei*	Shrub (0-1 m)	1
Prostanthera petrophila	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Eriachne helmsii	Grass	< 1
Eriachne pulchella subsp. *dominii*	Grass	< 1
Paspalidium clementii	Grass	< 1
Calandrinia eremaea	Herb	< 1
Cheilanthes brownii	Herb	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Goodenia tenuiloba	Herb	2
Harnieria kempeana subsp. *muelleri*	Herb	< 1
Lawrencella davenportii	Herb	< 1
Lepidium oxytrichum	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Rhodanthe battii	Herb	< 1
Rhodanthe maryonii	Herb	1
Rhodanthe polycephala	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1

Name	Stratum	Percent cover (%)
Trachymene ornata	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR06

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568538.28 mE 7019774.85 mN
Landform	Midslope	**Slope**	Moderate
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	10
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	5
Thryptomene decussata	Shrub (>2 m)	1
Acacia exocarpoides	Shrub (1-2 m)	< 1
Dodonaea pachyneura	Shrub (0-1 m)	3
Eremophila georgei	Shrub (0-1 m)	1
Eremophila glutinosa	Shrub (0-1 m)	1
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	< 1
Grevillea berryana	Shrub (0-1 m)	< 1
Marsdenia australis	Shrub (0-1 m)	< 1
Micromyrtus placoides	Shrub (0-1 m)	2
Philotheca brucei subsp. *brucei*	Shrub (0-1 m)	< 1
Prostanthera petrophila	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Stenanthemum petraeum	Shrub (0-1 m)	< 1
Arthropodium dyeri	Herb	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Dysphania saxatilis	Herb	< 1
Erodium crinitum	Herb	< 1
Goodenia havilandii	Herb	< 1
Goodenia tenuiloba	Herb	1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1

IR07

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568904.19 mE 7019936.78 mN
Landform	Midslope	**Slope**	Moderate
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	5
Acacia mulganeura	Shrub (>2 m)	2
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	10
Acacia exocarpoides	Shrub (1-2 m)	< 1
Grevillea berryana	Shrub (1-2 m)	< 1
Thryptomene decussata	Shrub (1-2 m)	5
Dodonaea pachyneura	Shrub (0-1 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila glutinosa	Shrub (0-1 m)	1
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	2
Micromyrtus placoides	Shrub (0-1 m)	2
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Goodenia tenuiloba	Herb	2
Ptilotus polystachyus	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roebuckiella ciliocarpa	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR08

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 569038.72 mE 7020028.08 mN
Landform	Midslope	**Slope**	Moderate
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Continuous (> 70 %)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	10
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	5
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	5
Acacia exocarpoides	Shrub (1-2 m)	< 1
Dodonaea pachyneura	Shrub (1-2 m)	< 1
Grevillea berryana	Shrub (1-2 m)	< 1
Thryptomene decussata	Shrub (1-2 m)	5
Eremophila glutinosa	Shrub (0-1 m)	1
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	2
Harnieria kempeana subsp. *muelleri*	Shrub (0-1 m)	< 1
Micromyrtus placoides	Shrub (0-1 m)	3
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Ptilotus schwartzii	Shrub (0-1 m)	1
Solanum ashbyae	Shrub (0-1 m)	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Erodium crinitum	Herb	< 1
Goodenia tenuiloba	Herb	2
Lawrencella davenportii	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Rhodanthe polycephala	Herb	< 1
Roebuckiella ciliocarpa	Herb	< 1
Sida sp. (indet.)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR09

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568836.85 mE 7019605.73 mN
Landform	Minor Creek (< 5 m)	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Basalt; Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Very Good	**Disturbance**	Weeds (minor occurrences)
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia fuscaneura	Shrub (>2 m)	5
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	1
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
Hibiscus sturtii var. *forrestii*	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*artemisioides*	Shrub (1-2 m)	1
Dodonaea amplisemina	Shrub (0-1 m)	1
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	5
Grevillea inconspicua	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Pluchea dentex	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	2
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	1
Senna artemisioides subsp. *helmsii*	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Cymbopogon ambiguus	Grass	5
Abutilon oxycarpum	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calocephalus knappii	Herb	< 1
Calotis hispidula	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Cheilanthes brownii	Herb	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Daucus glochidiatus	Herb	< 1
Duperreya commixta	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia boophthona	Herb	< 1
Glycine canescens	Herb	< 1
Goodenia tenuiloba	Herb	1
Haloragis trigonocarpa	Herb	1

Name	Stratum	Percent cover (%)
Helipterum craspedioides	Herb	< 1
Lepidium oxytrichum	Herb	< 1
Lysimachia arvensis	Herb	< 1
Marsdenia australis	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Phyllanthus maderaspatensis	Herb	< 1
Podolepis gardneri	Herb	< 1
Ptilotus aervoides	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roebuckiella ciliocarpa	Herb	< 1
Roepera eichleri	Herb	< 1
Senecio sp. (indet.)	Herb	< 1
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Synaptantha tillaeacea var. *tillaeacea*	Herb	< 1
Trachymene ornata	Herb	< 1
Trichodesma zeylanicum	Herb	< 1
Wahlenbergia tumidifructa	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR10

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568800.29 mE 7019220.13 mN
Landform	Minor Creek (< 5 m)	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Basalt; Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	2
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	2
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	< 1
Dodonaea amplisemina	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	1
Heliotropium ovalifolium	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Pluchea dentex	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*artemisioides*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. *helmsii*	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Tribulus suberosus	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Cymbopogon ambiguus	Grass	5
Brachyscome ciliaris	Herb	< 1
Calandrinia ? *ptychosperma*	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calocephalus knappii	Herb	< 1
Calotis hispidula	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Chthonocephalus viscosus	Herb	< 1
Duperreya commixta	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia australis var. *subtomentosa*	Herb	< 1

Name	Stratum	Percent cover (%)
Euphorbia boophthona	Herb	< 1
Goodenia tenuiloba	Herb	1
Haloragis trigonocarpa	Herb	< 1
Helipterum craspedioides	Herb	< 1
Lepidium oxytrichum	Herb	< 1
Myriocephalus rudallii	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Phyllanthus maderaspatensis	Herb	< 1
Podolepis gardneri	Herb	< 1
Ptilotus aervoides	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Rhodanthe charsleyae	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roebuckiella ciliocarpa	Herb	< 1
Senecio sp. (indet.)	Herb	< 1
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Swainsona kingii	Herb	< 1
Synaptantha tillaeacea var. *tillaeacea*	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene cyanopetala	Herb	< 1
Trachymene ornata	Herb	< 1
Tribulus astrocarpus	Herb	< 1
Trichodesma zeylanicum	Herb	< 1
Wahlenbergia tumidifructa	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR11

Botanist	AC	**Date**	03-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568434.49 mE 7019983.54 mN
Landform	Minor Creek (< 5 m)	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Basalt; Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Very Good	**Disturbance**	Weeds (minor occurrences)
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	5
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
Psydrax rigidula	Shrub (>2 m)	< 1
Santalum lanceolatum	Shrub (>2 m)	< 1
Hibiscus sturtii var. *forrestii*	Shrub (1-2 m)	1
Dodonaea amplisemina	Shrub (0-1 m)	< 1
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	5
Heliotropium ovalifolium	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*artemisioides*	Shrub (0-1 m)	1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. *helmsii*	Shrub (0-1 m)	1
Solanum austropiceum	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Tribulus suberosus	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Austrostipa trichophylla	Grass	< 1
Cymbopogon ambiguus	Grass	5
Paspalidium clementii	Grass	< 1
Rostraria pumila	Grass	< 1
Abutilon oxycarpum	Herb	< 1
Brachyscome ciliaris	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calotis hispidula	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Cheilanthes brownii	Herb	< 1
Convolvulus clementii	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	1

Name	Stratum	Percent cover (%)
Euphorbia australis var. *subtomentosa*	Herb	< 1
Euphorbia boophthona	Herb	< 1
Glycine canescens	Herb	< 1
Goodenia berardiana	Herb	1
Haloragis trigonocarpa	Herb	< 1
Helipterum craspedioides	Herb	< 1
Lepidium oxytrichum	Herb	< 1
Marsdenia australis	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Phyllanthus maderaspatensis	Herb	< 1
Podolepis gardneri	Herb	< 1
Ptilotus aervoides	Herb	< 1
Ptilotus helipteroides	Herb	2
Ptilotus polystachyus	Herb	< 1
Rhodanthe charsleyae	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roepera eichleri	Herb	< 1
Senecio sp. (indet.)	Herb	< 1
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum filifolium	Herb	1
Trachymene cyanopetala	Herb	< 1
Trachymene ornata	Herb	< 1
Trichodesma zeylanicum	Herb	< 1

IR12

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 566527.45 mE 7017704.03 mN
Landform	Plain, drainage line	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Common (10-30%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia pruinocarpa	Tree (<10 m)	5
Acacia incurvaneura	Shrub (>2 m)	10
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	5
Acacia mulganeura	Shrub (>2 m)	< 1
Acacia pteraneura	Shrub (>2 m)	1
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	10
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Eremophila georgei	Shrub (1-2 m)	3
Eremophila foliosissima	Shrub (0-1 m)	5
Maireana villosa	Shrub (0-1 m)	1
Psydrax latifolia	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Teucrium teucriiflorum	Shrub (0-1 m)	< 1
Eragrostis eriopoda	Grass	< 1
Eriachne helmsii	Grass	< 1
?*Rhodanthe* sp. (indet.)	Herb	< 1
Abutilon oxycarpum	Herb	< 1
Calocephalus knappii	Herb	< 1
Calotis hispidula	Herb	< 1
Calotis porphyroglossa	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia boophthona	Herb	< 1
Euphorbia drummondii	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Helipterum craspedioides	Herb	< 1
Hibiscus burtonii	Herb	< 1
Lawrencella davenportii	Herb	< 1

Name	Stratum	Percent cover (%)
Marsdenia australis	Herb	< 1
Marsdenia australis	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Rhodanthe battii	Herb	< 1
Rhodanthe charsleyae	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Rhodanthe propinqua	Herb	< 1
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR13

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 566867.73 mE 7017821.41 mN
Landform	Plain, drainage line	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Common (10-30%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia pruinocarpa	Tree (<10 m)	5
Acacia fuscaneura	Shrub (>2 m)	15
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	1
Acacia pteraneura	Shrub (>2 m)	1
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	10
Grevillea berryana	Shrub (>2 m)	2
Psydrax latifolia	Shrub (>2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (>2 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Psydrax rigidula	Shrub (1-2 m)	< 1
Psydrax suaveolens	Shrub (1-2 m)	< 1
Santalum lanceolatum	Shrub (1-2 m)	< 1
Eremophila georgei	Shrub (0-1 m)	5
Maireana villosa	Shrub (0-1 m)	1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Eriachne helmsii	Grass	< 1
Brachyscome ciliaris	Herb	< 1
Calocephalus knappii	Herb	< 1
Calotis porphyroglossa	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia boophthona	Herb	< 1
Euphorbia drummondii	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Helipterum craspedioides	Herb	< 1
Marsdenia australis	Herb	< 1
Marsdenia australis	Herb	< 1

Name	Stratum	Percent cover (%)
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Ptilotus roei	Herb	< 1
Rhodanthe propinqua	Herb	< 1
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1

IR14

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567344.9 mE 7018661.78 mN
Landform	Minor Creek (< 5 m)	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	10
Acacia pruinocarpa	Shrub (>2 m)	< 1
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	5
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Grevillea berryana	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	< 1
Senna artemisioides subsp. *helmsii*	Shrub (1-2 m)	< 1
Enchylaena tomentosa var. *tomentosa*	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila mackinlayi subsp. *spathulata*	Shrub (0-1 m)	< 1
Harnieria kempeana subsp. *muelleri*	Shrub (0-1 m)	5
Hibiscus burtonii	Shrub (0-1 m)	< 1
Hibiscus sturtii var. *forrestii*	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Indigofera monophylla sens. lat.	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Rhagodia eremaea	Shrub (0-1 m)	< 1
Santalum lanceolatum	Shrub (0-1 m)	< 1
Scaevola spinescens	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*artemisioides*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Sida ectogama	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Teucrium teucriiflorum	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Cymbopogon ambiguus	Grass	1
Eriachne pulchella subsp. *pulchella*	Grass	< 1
Monachather paradoxus	Grass	< 1

Name	Stratum	Percent cover (%)
Angianthus tomentosus	Herb	< 1
Apocynaceae sp. (indet.)	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calotis hispidula	Herb	< 1
Calotis porphyroglossa	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Convolvulus clementii	Herb	< 1
Duperreya commixta	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Erodium crinitum	Herb	< 1
Euphorbia boophthona	Herb	< 1
Glycine canescens	Herb	< 1
Goodenia havilandii	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Haloragis trigonocarpa	Herb	< 1
Helipterum craspedioides	Herb	< 1
Maireana georgei	Herb	< 1
Maireana villosa	Herb	< 1
Marsdenia australis	Herb	< 1
Podolepis gardneri	Herb	< 1
Ptilotus exaltatus	Herb	< 1
Ptilotus gaudichaudii	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Rhodanthe battii	Herb	< 1
Rhodanthe polycephala	Herb	< 1
Roepera eichleri	Herb	< 1
Sclerolaena densiflora	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Swainsona kingii	Herb	< 1
Trichodesma zeylanicum	Herb	< 1
Wahlenbergia tumidifructa	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR15

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 568233.22 mE 7019246.6 mN
Landform	Plain, drainage Line	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia pruinocarpa	Shrub (>2 m)	10
Acacia pteraneura	Shrub (>2 m)	30
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	5
Acacia exocarpoides	Shrub (1-2 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Eremophila glutinosa	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	< 1
Enchylaena tomentosa var. *tomentosa*	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	< 1
Harnieria kempeana subsp. *muelleri*	Shrub (0-1 m)	10
Hibiscus sp. Gardneri (A.L. Payne PRP 1435)	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	5
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Senna artemisioides subsp. *helmsii*	Shrub (0-1 m)	< 1
Senna sp. Meekatharra (E. Bailey 1-26)	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Teucrium teucriiflorum	Shrub (0-1 m)	< 1
Eriachne helmsii	Grass	< 1
?*Rhodanthe* sp. (indet.)	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1
Euphorbia boophthona	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Maireana georgei	Herb	< 1
Marsdenia australis	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Roebuckiella ciliocarpa	Herb	< 1

Name	Stratum	Percent cover (%)
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1

IR16

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 566199.08 mE 7017623.58 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Common (10-30%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	10
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	1
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	10
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Eremophila foliosissima	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	1
Maireana villosa	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Teucrium teucriiflorum	Shrub (0-1 m)	< 1
Eragrostis eriopoda	Grass	1
Goodenia tenuiloba	Herb	1
Helipterum craspedioides	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Thysanotus manglesianus	Herb	< 1

IR17

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567093.83 mE 7017506.29 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	10
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	5
Acacia tetragonophylla	Shrub (1-2 m)	< 1
Eremophila foliosissima	Shrub (0-1 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (0-1 m)	< 1
Eremophila fraseri	Shrub (0-1 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Maireana villosa	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Teucrium teucriiflorum	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Eragrostis eriopoda	Grass	< 1
Brachyscome ciliaris	Herb	< 1
Calocephalus knappii	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Erodium crinitum	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Ptilotus roei	Herb	< 1
Rhodanthe charsleyae	Herb	< 1
Solanum lasiophyllum	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Thysanotus manglesianus	Herb	< 1

IR18

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567683.61 mE 7018682.89 mN
Landform	Plain	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	5
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	2
Acacia pruinocarpa	Shrub (>2 m)	< 1
Acacia pteraneura	Shrub (>2 m)	2
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	10
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	5
Eremophila latrobei subsp. *latrobei*	Shrub (1-2 m)	1
Eremophila simulans	Shrub (1-2 m)	< 1
Grevillea berryana	Shrub (1-2 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Brachyscome ciliaris	Herb	< 1
Erodium crinitum	Herb	< 1
Goodenia quasilibera	Herb	< 1
Goodenia tenuiloba	Herb	1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Ptilotus roei	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR19

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567954.2 mE 7019032.01 mN
Landform	Plain	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	5
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	2
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	20
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	4
Eremophila glutinosa	Shrub (1-2 m)	< 1
Psydrax rigidula	Shrub (1-2 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila jucunda subsp. *jucunda*	Shrub (0-1 m)	1
Eremophila latrobei subsp. *latrobei*	Shrub (0-1 m)	1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Eragrostis eriopoda	Grass	< 1
Brachyscome ciliaris	Herb	< 1
Goodenia macroplectra	Herb	< 1
Goodenia tenuiloba	Herb	2
Thysanotus manglesianus	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR20

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 569028.64 mE 7019225.19 mN
Landform	Plain	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)

Name	Stratum	Percent cover (%)
Acacia incurvaneura	Shrub (>2 m)	2
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	2
Acacia mulganeura	Shrub (>2 m)	2
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	20
Acacia sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	2
Acacia exocarpoides	Shrub (1-2 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	2
Eremophila latrobei subsp. *latrobei*	Shrub (1-2 m)	< 1
Grevillea berryana	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	< 1
Eremophila glutinosa	Shrub (0-1 m)	< 1
Eremophila jucunda subsp. *jucunda*	Shrub (0-1 m)	5
Hemigenia virescens	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Eragrostis eriopoda	Grass	< 1
Monachather paradoxus	Grass	< 1
Erodium crinitum	Herb	< 1
Goodenia tenuiloba	Herb	2
Ptilotus polystachyus	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Waitzia acuminata var. *acuminata*	Herb	< 1

IR21

Botanist	AC	**Date**	04-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567602.72 mE 7017876.73 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Calcrete; Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia ramulosa var. *ramulosa*	Shrub (>2 m)	10
Acacia craspedocarpa	Shrub (1-2 m)	1
Eremophila fraseri	Shrub (1-2 m)	< 1
Acacia tetragonophylla	Shrub (0-1 m)	2
Eremophila jucunda subsp. *jucunda*	Shrub (0-1 m)	< 1
Psydrax rigidula	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	1
Scaevola spinescens	Shrub (0-1 m)	2
Senna ? *artemisioides* subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*artemisioides*	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Cephalipterum drummondii	Herb	< 1
Maireana georgei	Herb	< 1
Maireana melanocoma	Herb	1
Maireana triptera	Herb	< 1
Marsdenia australis	Herb	< 1
Podolepis gardneri	Herb	< 1
Ptilotus helipteroides	Herb	< 1
Roepera eichleri	Herb	2

IR23

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567500.12 mE 7017162.84 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Calcrete; Banded ironstone	**Rock Abundance**	Many (30-70%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia craspedocarpa	Shrub (>2 m)	1
Acacia fuscaneura	Shrub (>2 m)	2
Acacia incurvaneura	Shrub (>2 m)	1
Acacia tetragonophylla	Shrub (>2 m)	< 1
Eremophila fraseri	Shrub (>2 m)	1
Ptilotus obovatus	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*artemisioides*	Shrub (0-1 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Enneapogon caerulescens	Grass	< 1
Calotis porphyroglossa	Herb	< 1
Cephalipterum drummondii	Herb	< 1
Maireana georgei	Herb	< 1
Marsdenia australis	Herb	< 1
Roepera eichleri	Herb	< 1
Salsola australis	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Swainsona kingii	Herb	< 1
Trichanthodium skirrophorum	Herb	< 1

IR24

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567255.2 mE 7017353.01 mN
Landform	Plain	**Slope**	Negligible
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Common (10-30%)
Vegetation Condition	Excellent	**Disturbance**	None evident
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia fuscaneura	Shrub (>2 m)	5
Acacia incurvaneura × *mulganeura*	Shrub (>2 m)	1
Acacia tetragonophylla	Shrub (1-2 m)	< 1
Eremophila fraseri	Shrub (1-2 m)	< 1
Eremophila georgei	Shrub (0-1 m)	< 1
Eremophila macmillaniana	Shrub (0-1 m)	< 1
Maireana villosa	Shrub (0-1 m)	< 1
Psydrax latifolia	Shrub (0-1 m)	< 1
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Aristida contorta	Grass	< 1
Eragrostis eriopoda	Grass	< 1
Chthonocephalus viscosus	Herb	< 1
Goodenia quasilibera	Herb	< 1
Goodenia tenuiloba	Herb	< 1
Ptilotus gaudichaudii	Herb	< 1
Ptilotus roei	Herb	< 1
Stenopetalum sp. (indet.)	Herb	< 1
Trianthema glossostigmum	Herb	< 1

IR25

Botanist	AC	**Date**	05-Sep-19
Site Type	20 m x 20 m	**Northwest Corner**	50K 567699.73 mE 7019040.91 mN
Landform	Plain	**Slope**	Gentle
Soil Colour	Red-brown	**Soil Texture**	Clay Loam
Rock Type	Banded ironstone	**Rock Abundance**	Few (< 10%)
Vegetation Condition	Very Good	**Disturbance**	Weeds (minor occurrences), cattle
Time since Fire	No Evidence	**Leaf Litter Cover**	Low (< 10%)



Name	Stratum	Percent cover (%)
Acacia pruinocarpa	Tree (<10 m)	5
Acacia incurvaneura	Shrub (>2 m)	15
Acacia ramulosa var. *linophylla*	Shrub (>2 m)	15
Grevillea berryana	Shrub (>2 m)	< 1
Acacia exocarpoides	Shrub (1-2 m)	< 1
Eremophila forrestii subsp. *forrestii*	Shrub (1-2 m)	10
Eremophila georgei	Shrub (1-2 m)	5
Eremophila glutinosa	Shrub (1-2 m)	< 1
Eremophila latrobei subsp. *latrobei*	Shrub (1-2 m)	< 1
Senna artemisioides subsp. ×*sturtii*	Shrub (1-2 m)	< 1
Acacia tetragonophylla	Shrub (0-1 m)	< 1
Hibiscus sp. Gardneri (A.L. Payne PRP 1435)	Shrub (0-1 m)	< 1
Maireana villosa	Shrub (0-1 m)	1
Psydrax suaveolens	Shrub (0-1 m)	< 1
Ptilotus obovatus	Shrub (0-1 m)	5
Ptilotus schwartzii	Shrub (0-1 m)	< 1
Senna artemisioides subsp. *helmsii*	Shrub (0-1 m)	< 1
Solanum ashbyae	Shrub (0-1 m)	< 1
Solanum lasiophyllum	Shrub (0-1 m)	< 1
Tribulus suberosus	Shrub (0-1 m)	< 1
Monachather paradoxus	Grass	< 1
Paspalidium clementii	Grass	< 1
Abutilon oxycarpum	Herb	< 1
Calandrinia eremaea	Herb	< 1
Calocephalus knappii	Herb	< 1
Calotis hispidula	Herb	< 1
Calotis porphyroglossa	Herb	< 1
Cheilanthes sieberi subsp. *sieberi*	Herb	< 1
Cuscuta planiflora	Herb	< 1
Dysphania rhadinostachya subsp. *rhadinostachya*	Herb	< 1

Name	Stratum	Percent cover (%)
Erodium crinitum	Herb	5
Euphorbia drummondii	Herb	< 1
Goodenia tenuiloba	Herb	4
Marsdenia australis	Herb	< 1
Nicotiana rosulata subsp. *rosulata*	Herb	< 1
Ptilotus polystachyus	Herb	< 1
Rhodanthe battii	Herb	< 1
Rhodanthe battii	Herb	< 1
Rhodanthe maryonii	Herb	< 1
Roebuckiella ciliocarpa	Herb	5
Sida sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
Stenopetalum sp. (indet.)	Herb	1
Swainsona kingii	Herb	< 1
Thysanotus manglesianus	Herb	< 1
Trachymene ornata	Herb	< 1

APPENDIX H SURVEY TRACK LOG

565000 566000 567000 568000 569000 570000

7020000
7019000
7018000
7017000

Study area
Proposed infrastructure
Track log

ecologia ENVIRONMENT

Project: 1796
Date: 17 July 2019
Author: TM
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:15,000 @A3

Appendix H: Survey track log

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX I THREATENED AND PRIORITY FLORA REPORT FORMS

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Acacia dilloniorum **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7020038.079
Long / Easting: 568548.6542
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	84			84
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☒
Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☒		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland
	2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: A.I. Craigie 1796.01 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Acacia speckii **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7020025.649
Long / Easting: 568553.4459
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	73			73
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☐
Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
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•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☒		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland
	2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: A.I.Craigie 1796.02 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Dodonaea amplisemina **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P4 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7019983.543
Long / Easting: 568434.4904
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	140			140
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☐
Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☒		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland
	2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: A.I.Craigie 1796.03 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Grevillea inconspicua **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P4 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7019651.078
Long / Easting: 568788.2711
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:

	Mature:	Juveniles:	Seedlings:	Totals:
Alive	19			19
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☒
Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☒		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☒	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☐	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☒	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla tall sparse shrubland
	2. Eremophila mackinlayi subsp. spathulata, Ptilotus obovatus, Senna artemisioides subsp. helmsii low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: A.I.Craigie 1796.03 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Hemigenia virescens **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7019165.75
Long / Easting: 568921.6026
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	37			37
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☒
Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
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•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☒	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☐	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia ramulosa var. linophylla, Acacia incurvaneura, Acacia incurvaneura × mulganeura tall sparse shrubland
	2. Eremophila forrestii subsp. forrestii, Eremophila jucunda subsp. jucunda, Ptilotus schwartzii low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

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SPECIMEN: Collectors No: A.I.Craigie 1796.04 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

Please complete as much of the form as possible.
For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Micromyrtus placoides **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7020028.086
Long / Easting: 569038.7234
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:

	Mature:	Juveniles:	Seedlings:	Totals:
Alive	860			860
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☒
Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
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Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☒	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia incurvaneura, Acacia mulganerua, Acacia ramulosa var. linophylla tall sparse shrubland
	2. Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

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SPECIMEN: Collectors No: A.I.Craigie 1796.06 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
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Version 1.2 August 2013

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For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Prostanthera petrophila **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7019774.85
Long / Easting: 568538.2801
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:

	Mature:	Juveniles:	Seedlings:	Totals:
Alive	51			51
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☐
Immature fruit ☒ Fruit ☐ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

Please return completed form to **Species And Communities Branch** DPaW,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Accepted in Database** ☐

Department of Parks and Wildlife

Threatened and Priority Flora Report Form

Version 1.2 August 2013

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☒	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia incurvaneura, Acacia mulganerua, Acacia ramulosa var. linophylla tall sparse shrubland
	2. Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

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Version 1.2 August 2013

DRF PERMIT/ LICENCE No:

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SPECIMEN: Collectors No: A.I.Craigie 1796.07 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

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For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at http://www.dpaw.wa.gov.au/

TAXON: Stenanthemum patens **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2019 **CONSERVATION STATUS:** P1 New population ☒

OBSERVER/S: Andrew Craigie **PHONE:** 6168 7200

ROLE: Botanist **ORGANISATION:** Ecologia Environment

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Weld Range, ca. 60 km north-west of Cue.

Reserve No:

DISTRICT: **LGA:** Shire of Cue Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☒
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 7019908.055
Long / Easting: 568707.6753
Zone: 50K

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☒ Full survey ☐ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☒

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:

	Mature:	Juveniles:	Seedlings:	Totals:
Alive	2			2
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☐
Immature fruit ☒ Fruit ☐ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. **Rate current and potential threat impact:** N=Nil, L=Low, M=Medium, H=High, E=Extreme **Estimate time to potential impact:** S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
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HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	**ROCK TYPE:**	**LOOSE ROCK:**	**SOIL TYPE:**	**SOIL COLOUR:**	**DRAINAGE:**
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☒	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☒	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐	50-100% ☒	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:* E.g. **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) **3**. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata tall sparse shrubland
	2. Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei low sparse shrubland
	3.
	4.
ASSOCIATED SPECIES: Other (non-dominant) spp	

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

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SPECIMEN: Collectors No: A.I.Craigie 1796.08 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: Andrew Craigie **Role:** Botanist

Signature: **Date submitted:** 20/11/2019

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APPENDIX J FAUNA HABITAT ASSESSMENT SITE SHEETS

Site	Landform		Condition	Habitat
HA01	Creek/Drainage Line		Very Good	Open Shrubland
Description	Mid dense shrubland bordering minor drainage over thick leaf litter and woody debris			
% Ground Cover	Bare Soil	30		
	Litter	Moderate (10-40%)		
	Canopy Cover	30		
	Understorey	50		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Pebbles (0-50mm)		
Soil	Type	Clay loam		
	Colour	Red		
Habitat Features	Water Impacts	Scouring	**Vegetation**	
	Fire Presence	> 5 Years	**Stratum**	**Form**	**Height**	**Species**
	Woody Debris	Moderate (10-40%)	Upper	Tree	<10m	*Acacia pruinocarpa*
	Grazing					
	Rock Crevices		Middle	Shrub	<3m	*Acacia pteraneura, Acacia ramulosa var. linophylla* tall open shrubland
	Burrowing Suitability	Moderate				
	Large trees present		Ground	Grasses	<1m	*Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus* low sparse shrubland.
	Tree Hollows (>10cm)					

Site	Landform		Condition	Habitat
HA02	Plain		Very Good	Open Shrubland
Description	Open woodland of *Eucalyptus wandoo* over grazed grasses and woody debris.			
% Ground Cover	Bare Soil	90		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	10		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Pebbles (0-50mm)		
Soil	Type	Loam		
	Colour	Red		
Habitat Features	Water Impacts		**Vegetation**	
	Fire Presence	> 5 Years	**Stratum** / **Form** / **Height** / **Species**	
	Woody Debris	Low (< 10%)	Upper / Tree /	*Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura* tall sparse shrubland
	Grazing			
	Rock Crevices		Middle / Shrub / >0.75m	*Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia* low sparse shrubland
	Burrowing Suitability	Moderate		
	Large trees present		Ground / Grasses / 0.75m	
	Tree Hollows (>10cm)			

Site	Landform		Condition	Habitat
HA03	Creek/Drainage Line		Very Good	Minor Drainage Line
Description	Open woodland of *Eucalyptus loxophleba* over grazed grasses and woody debris.			
% Ground Cover	Bare Soil	70		
	Litter	Moderate (10-40%)		
	Canopy Cover	10		
	Understorey	20		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Cobbles (51-250mm)		
Soil	Type	Sandy loam		
	Colour	Red		
Habitat Features	Water Impacts	Scouring	**Vegetation**	
	Fire Presence	> 5 Years	**Stratum**	**Form**
	Woody Debris	Low (< 10%)	Upper	Tree
	Grazing			
	Rock Crevices		Middle	Shrub
	Burrowing Suitability	Moderate		
	Large trees present		Ground	Grasses
	Tree Hollows (>10cm)			



Height	Species
>10m <10m	*Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla* tall sparse shrubland
	Eremophila mackinlayi subsp. spathulata, Ptilotus obovatus, Senna artemisioides subsp. helmsii low sparse shrubland.
<0.75m	

Site	Landform		Condition	Habitat
HA04	Hill		Excellent	Ridge
Description	Open woodland of *Eucalyptus loxophleba* over grazed grasses and woody debris.			
% Ground Cover	Bare Soil	40		
	Litter	Low (< 10%)		
	Canopy Cover	5		
	Understorey	10		
Rocks	No exposed rock			
	<20% exposed rock			
	20-50% exposed rock	X		
	>50% exposed rock			
	Boulders / Rocks %	50		
	Surface Stones	Boulders (>250mm)		
Soil	Type	Clay loam		
	Colour	Red		
Habitat Features	Water Impacts		**Vegetation**	
	Fire Presence	No Evidence	**Stratum**	**Form**	**Height**	**Species**
	Woody Debris	Low (< 10%)	Upper	Tree	<5m	*Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata* tall sparse shrubland
	Grazing					
	Rock Crevices	Low (< 10%)	Middle	Shrub	>2m	*Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei* low sparse shrubland.
	Burrowing Suitability	Low				
	Large trees present		Ground			
	Tree Hollows (>10cm)					

Site	Landform		Condition	Habitat
HA05	Valley		Excellent	Open Shrubland
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* and *Hakea preisii* over tussock grasses and herbs on granite outcropping and cobbles.			
% Ground Cover	Bare Soil	70		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	10		
Rocks	No exposed rock			
	<20% exposed rock			
	20-50% exposed rock	X		
	>50% exposed rock			
	Boulders / Rocks %	40		
	Surface Stones	Cobbles (51-250mm)		
Soil	Type	Sandy loam		
	Colour	Red		
Habitat Features	Water Impacts	Sheet runoff		
	Fire Presence	No Evidence		
	Woody Debris	Low (< 10%)		
	Grazing			
	Rock Crevices			
	Burrowing Suitability	Low		
	Large trees present			
	Tree Hollows (>10cm)			



Vegetation			
Stratum	**Form**	**Height**	**Species**
Upper	Tree	<4m	*Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura* tall sparse shrubland
Middle	Shrub	>2m	*Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. ×sturtii* low sparse shrubland.
Ground			

Site	Landform		Condition	Habitat
HA06	Hill		Excellent	Ridge
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil			
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	10		
Rocks	No exposed rock			
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock	X		
	Boulders / Rocks %	90		
	Surface Stones	Boulders (>250mm)		
Soil	Type	Clay loam		
	Colour	Red		
Habitat Features	Water Impacts		**Vegetation**	
	Fire Presence	No Evidence	**Stratum**	**Form** / **Height** / **Species**
	Woody Debris	Low (< 10%)	Upper	Tree / >10m / *Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata* tall sparse shrubland
	Grazing			
	Rock Crevices	Moderate (10-40%)	Middle	Shrub / >2m / *Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei* low sparse shrubland.
	Burrowing Suitability			
	Large trees present		Ground	
	Tree Hollows (>10cm)			

Site	Landform		Condition	Habitat
HA07	Hill		Excellent	Ridge
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil			
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	11		
Rocks	No exposed rock			
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock	X		
	Boulders / Rocks %	91		
	Surface Stones	Boulders (>250mm)		
Soil	Type	Clay loam		
	Colour	Red		
Habitat Features	Water Impacts		**Vegetation**	
	Fire Presence	No Evidence	**Stratum**	**Form**
	Woody Debris	Low (< 10%)	Upper	Tree
	Grazing			
	Rock Crevices	Moderate (10-40%)	Middle	Shrub
	Burrowing Suitability			
	Large trees present		Ground	
	Tree Hollows (>10cm)			

Height	**Species**
>10m	*Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata* tall sparse shrubland
>2m	*Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei* low sparse shrubland.

Site	Landform		Condition	Habitat
HA08	Plain		Excellent	Open Shrubland
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil	90		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	10		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Cobbles (51-250mm)		
Soil	Type	Loam		
	Colour	Red		
Habitat Features	Water Impacts			
	Fire Presence	> 5 Years		
	Woody Debris	Low (< 10%)		
	Grazing			
	Rock Crevices			
	Burrowing Suitability	Moderate		
	Large trees present			
	Tree Hollows (>10cm)			



Vegetation

Stratum	Form	Height	Species
Upper	Tree	>10m	*Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura* tall sparse shrubland
Middle	Shrub	>2m	*Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia* low sparse shrubland
Ground	Grasses	0.75m	

Site	Landform		Condition	Habitat
HA09	Creek/Drainage Line		Very Good	Minor Drainage Line
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil	70		
	Litter	Moderate (10-40%)		
	Canopy Cover	10		
	Understorey	20		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Cobbles (51-250mm)		
Soil	Type	Clay loam		
	Colour	Red		
Habitat Features	Water Impacts	Minor Drainage		
	Fire Presence	No Evidence		
	Woody Debris	Low (< 10%)		
	Grazing			
	Rock Crevices			
	Burrowing Suitability	Moderate		
	Large trees present			
	Tree Hollows (>10cm)			



Vegetation

Stratum	Form	Height	Species
Upper	Tree	<5m	*Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia incurvaneura, Acacia ramulosa var. linophylla* tall open shrubland
Middle	Shrub	<2m	*Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus* low sparse shrubland.
Ground			

Site	Landform		Condition	Habitat
HA10	Plain		Excellent	Stony Plain
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil	90		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	10		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Cobbles (51-250mm)		
Soil	Type	Loam		
	Colour	Red		
Habitat Features	Water Impacts		**Vegetation**	
	Fire Presence	No Evidence	**Stratum**	**Form**
	Woody Debris		Upper	Tree
	Grazing			
	Rock Crevices		Middle	Shrub
	Burrowing Suitability	Moderate		
	Large trees present	Yes	Ground	
	Tree Hollows (>10cm)			



Height	**Species**
>6m	*Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura* tall sparse shrubland
>2m	*Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia* low sparse shrubland.

Site	Landform		Condition	Habitat
HA11	Plain		Excellent	Open Shrubland
Description	Open woodland of *Eucalyptus wandoo* over *Xanthorrhoea preisii* over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.			
% Ground Cover	Bare Soil	90		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	5		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Pebbles (0-50mm)		
Soil	Type	Loam		
	Colour	Red		
Habitat Features	Water Impacts			
	Fire Presence	No Evidence		
	Woody Debris	Low (< 10%)		
	Grazing			
	Rock Crevices			
	Burrowing Suitability	Moderate		
	Large trees present			
	Tree Hollows (>10cm)			



Vegetation

Stratum	Form	Height	Species
Upper	Tree	>10m	*Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura* tall sparse shrubland
Middle	Shrub	>2m	*Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia* low sparse shrubland
Ground	Grasses	0.75m	

Site	Landform		Condition	Habitat
HA12	Plain		Excellent	Open Shrubland
Description	open mulga woodland/ acacia shrubland with A aneura over scattered herbs and tussock grasses			
% Ground Cover	Bare Soil	90		
	Litter	Low (< 10%)		
	Canopy Cover			
	Understorey	5		
Rocks	No exposed rock	X		
	<20% exposed rock			
	20-50% exposed rock			
	>50% exposed rock			
	Boulders / Rocks %			
	Surface Stones	Pebbles (0-50mm)		
Soil	Type	Loam		
	Colour	Red		
Habitat Features	Water Impacts			
	Fire Presence	No Evidence		
	Woody Debris	Low (< 10%)		
	Grazing			
	Rock Crevices			
	Burrowing Suitability	Moderate		
	Large trees present			
	Tree Hollows (>10cm)			



Vegetation			
Stratum	**Form**	**Height**	**Species**
Upper	Tree	>10m	*Acacia incurvaneura, Acacia fuscaneura, Acacia incurvaneura × mulganeura* tall sparse shrubland
Middle	Shrub	>2m	*Eremophila georgei, Eremophila forrestii subsp. forrestii, Psydrax latifolia* low sparse shrubland
Ground	Grasses	0.75m	

Biologic Environmental Survey Pty Ltd
PO Box 179
Floreat, WA, 6014

15th April 2019

Attn: Jeremy Shepherdson

Ecotec (WA) Pty Ltd
3 Glenunga Way
Craigie WA 6025

Dear Jeremy,

Ecotec (WA) Pty Ltd (Ecotec) are currently undertaking approvals for Fenix Resources Ltd (Fenix) for tenement M20/118 (the Project Area) within the Murchison bioregion, Western Australia. Ecotec has commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a status review of the trapdoor spider *Idiosoma nigrum* Main 1952 (shield-backed trapdoor spider) and an assessment of further survey requirements for the species, taking into account the survey work undertaken by Biologic for this species at the Project Area (Biologic, 2012). This letter presents the results of that status review and assessment.

In 2012, Biologic undertook a targeted *Idiosoma nigrum* survey at tenement M20/118 for Atlas Iron Ltd. This work provided a comprehensive assessment of the *I. nigrum* population at the Project Area taking into account previous work undertaken (Bamford, 2009; Ecologia, 2009) and the greater population throughout Weld Range. This work was required at the time as *I. nigrum* was listed under Schedule 1 of the WA Wildlife Conservation Act 1950 as Vulnerable.

In 2018, a conservation systematics review was published (Rix *et al.*, 2018) that detailed the revision of the genus *Idiosoma*. One of the results of this review was that *Idiosoma nigrum* was shown to contain multiple species and *I. nigrum* was relimited to include only those populations within the central and central-western Wheatbelt bioregion (Figure 1) (Rix *et al.*, 2018). The *Idiosoma* populations recorded through the Murchison bioregion and the northern sections of the Yalgoo bioregion, which includes the Project Area, are now regarded as *Idiosoma clypeatum* Rix and Harvey, 2018 (Figure 1), and now commonly referred to as the northern shield-backed

trapdoor spider. The review included an examination of material from Weld Range and Rix *et al.* (2018) concluded that *I. clypeatum* is the only known species from this genus in the Murchison bioregion.

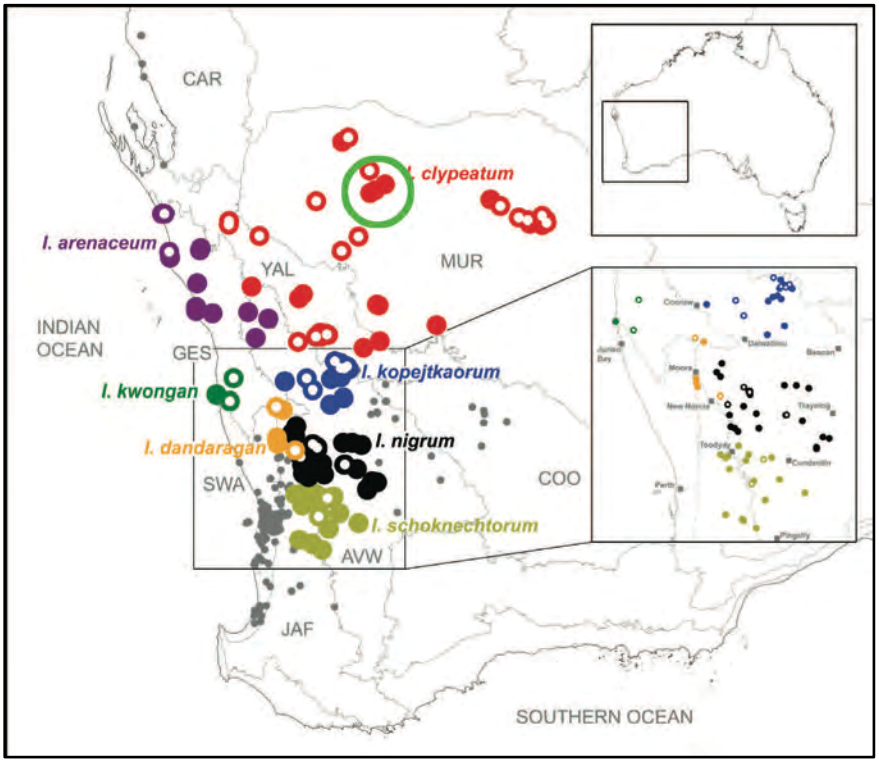


Figure 1: The known distribution of *Idiosoma nigrum* and *I. clypeatum* (from Rix *et al.* 2018). The large green circle identifies the approximate location of the Project Area.

Idiosoma clypeatum has a widespread distribution in Western Australia's inland arid zone, extending from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie (Rix *et al.*, 2018) (Figure 1). This distribution appears to correlate strongly with an annual rainfall of less than 250 mm (Rix *et al.*, 2018) making it one of the most arid adapted species of the genus *Idiosoma*.

In 2017, *Idiosoma clypeatum* was formally assessed as 'priority 3' fauna using a standard International Union for the Conservation of Nature (IUCN) approach and is currently listed as such under the Biodiversity Conservation Act 2016 (BC Act); specially protected fauna under section 13(1). Rix *et al.* (2018) concluded that while the species' extent of occurrence of over 120,000 km^2 excludes it from consideration as threatened under Criterion B, a 'priority 3' recommendation was made due to the occurrence of the species in areas prospective for mining and mineral resources. Rix

et al. (2018) also concluded that close assessment under Criteria A and B is warranted in the future.

Priority 3 fauna are regarded as “Poorly-known species” and defined as follows;

- Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey (DBCA, 2019).

Based on this assessment, it can be concluded that the species of *Idiosoma* present within the Project Area is *Idiosoma clypeatum*, which is currently regarded as ‘priority 3’ under the BC Act. While species under this ranking are regarded as in need of further survey, the extent of survey work previously undertaken at the Project Area can be regarded as adequate for an approval.

In conclusion, further survey work is regarded as not required; however, the previous report provided by Biologic (Biologic, 2012), which also incorporated the previous survey work (Bamford, 2009; Ecologia, 2009), could be updated to reflect the current conservation status.

If you have any queries, please do not hesitate to get in contact.

Yours sincerely,

Brad Durrant
Managing Director
Brad@biologicenv.com.au
0417 998 440

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Bamford Consulting Ecologists (2009) Weld Range Direct Shipping Ore Project. Targeted Shield-backed Trapdoor Spider, SRE Invertebrate and Vertebrate Fauna Survey: September 2009. Report to Atlas Iron Limited.

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Rix MG, Huey JA, Cooper SJB, Austin AD, Harvey MS (2018) Conservation systematics of the shield-backed trapdoor spiders of the *nigrum*-group (Mygalomorphae, Idiopidae, *Idiosoma*): integrative taxonomy reveals a diverse and threatened fauna from south-western Australia. ZooKeys 756: 1–121. https://doi.org/10.3897/zookeys.756.24397

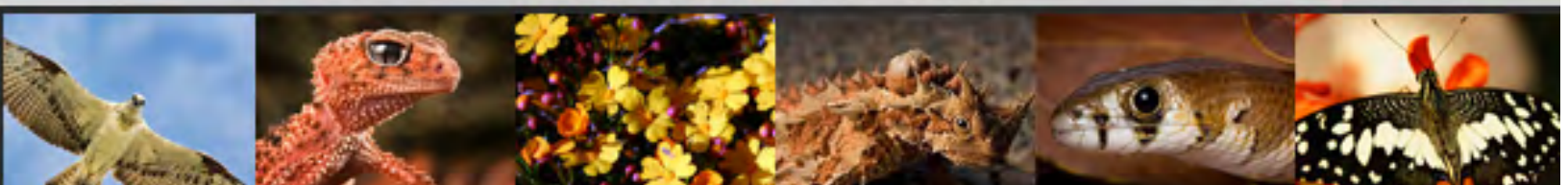
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biologic

Weld Range *Idiosoma nigrum* Survey

Atlas Iron Limited

June 2012



DOCUMENT STATUS				
Version No.	**Author**	**Review / Approved for Issue**	**Approved for Issue to**	
			Name	**Date**
1	Brad Durrant	Jessica Oates	Michelle Rigo	30/11/2011
2	Brad Durrant	Morgan O'Connell	Clare Grosser	22/06/2012

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Executive Summary

Biologic Environmental Survey (Biologic) was commissioned by Atlas Iron Limited (Atlas) to conduct a targeted *Idiosoma nigrum* Main 1952 (shield-backed trapdoor spider) survey and prepare an impact assessment for the Weld Range Project (Weld Range). Atlas's Weld Range tenement M20/118, hereafter referred to as the *Study Area*, (Figure 1.1) forms part of the Weld Range, which lies in the Murchison Biogeographic Region in the Arid zone of Western Australia. The *Study Area* is approximately 2km long and 600m wide, running in a north-east to south-west direction.

The objective of this survey report was to detail the results of Biologic's *I. nigrum* survey, consolidate these data with previous *I. nigrum* survey data in the area, report on the distribution of the species in, and adjacent to, the *Study Area* and apply a valid extrapolation to the data to allow an accurate indication of the size of the local population.

Idiosoma nigrum was found throughout the Weld Range but within the *Study Area* it showed a high variation in density with the north-eastern corner containing the majority of burrows recorded by both Bamford (2009) and Biologic (2011).

All three studies found a strong association with *Acacia* vegetation, although results from Bamford (2009) and Biologic (2011) data indicated a more specific association with *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994). The vegetation data from Ecologia (2009c) and Woodman (2009) both show vegetation communities dominated by *A.* sp. Weld Range are widespread throughout the Weld Range. The Ecologia (2009c) vegetation data also indicates a strong likelihood that the *I. nigrum* population in the *Study Area* continues into the adjacent Weld Range area due to this association with *A.* sp. Weld Range, as it appears to form part of a population continuing to the north-east.

This connectivity with the *I. nigrum* populations adjacent to the *Study Area,* likely continues throughout much of the Weld Range, with the genetic work conducted by Ecologia (2010) indicating that gene flow in the central part of the Range (which includes the *Study Area*) appears to be continuous.

The loss of the I. nigrum population within the *Study Area* would be unlikely to affect the viability of the adjacent population, in either the short or long term, due to the size and likely connectivity with much of the central Weld Range.

1 INTRODUCTION

1.1 Background

Biologic Environmental Survey (Biologic) was commissioned by Atlas Iron Limited (Atlas) to conduct a targeted *Idiosoma nigrum* (shield-backed trapdoor spider) survey and prepare an impact assessment for the Weld Range Project (Weld Range). Weld Range is located on Glen Station, within the Murchison Bioregion, approximately 56 kilometres (km) north north-west of the township of Cue.

This impact assessment is based on previously completed survey work:

- Ecologia Environment (Ecologia), *Sinosteel - Weld Range Iron Ore Project. The Shield-back Spider Idiosoma nigrum Targeted Survey (2009a)*;
- Bamford Consulting Ecologists (Bamford) - *Weld Range Direct Shipping Ore Project. Targeted Shield-backed Trapdoor Spider, SRE Invertebrate and Vertebrate Fauna Survey: (2009)*,

; as well as recent *I. nigrum* survey work carried out by Biologic.

The objective of this impact assessment was to determine the level of risk to *I. nigrum* associated with the Weld Range Proposal using survey and habitat data collected by Ecologia (2009), Bamford (2009) and Biologic (2011).

1.1.1 Idiosoma nigrum

Idiosoma nigrum is regarded as one of the most arid-adapted mygalomorph spiders in Australia (Main 1982). This adaptability has allowed the species to survive the aridification of Western Australia (Main 1982), particularly in the arid Murchison Region where its distribution is now restricted to some Banded Ironstone Formation (BIF) ranges and breakaways. In particular, it is the species' unique abdomen that is the greatest adaptation, a highly sclerotized "shield" that

reduces water loss through evaporation and provides protection by allowing the individual to “plug” the inside of the burrow (also known as phragmosing) to stop predators entering. Other characteristics that have increased the species ability to survive in arid environments include building deep burrows, up to 32cm (DEWHA 2011), that allow greater control over temperature and humidity, “twig-lining” burrows to increase foraging capacity (DEWHA 2011) and larger eyes and longer legs which give a greater ability to capture prey.

Despite these adaptations, this species has biological characteristics that impinge on its ability to reproduce and disperse, characteristics that are common in short-range endemic (SRE) species, i.e. species that have limited distributions (Harvey 2002). These biological traits include:

- time to reach maturity: typically five to six years for both males and females, during which there is a high mortality rate (Main 2003) (Table 1.1);
- low dispersal capabilities: emergent spiderlings generally establish a burrow within several centimetres of the matriarch female (as they lack the ability to disperse aerially), forming distinct clusters (Main 1982, 2003);
- low genetic flow: gene flow is facilitated by the dispersal of males when sexual maturity is reached but appears to only occur over small distances, possibly no greater than 500m (B. Main 2010 pers. comm.); and
- limited fecundity: it is likely that mature females only reproduce every second year, and then only until they are around 20 years of age (Main 2003).

Much of the ecological and biological information for *I. nigrum* was collected as part of a study at East Yorkrakine Nature Reserve over several years (Main 2003). This also included establishing the size classes for emergent spiderlings,

juveniles and adults using trapdoor and lumen (internal diameter of a burrow) sizes (Table 1.2).

Table 1.1: Percentage mortality over several years for each life stage; after Main (2003).

	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	Average
Emergents	85%	65%	25%	57%	50%	**56%**
Juveniles	30%	36%	77%	39%	33%	**43%**
Adults	30%	36%	19%	40%	20%	**29%**

Table 1.2: Size classes for each life stage; after Main (2003).

	Emergents	Juveniles	Adults
Door (mm)	≤ 14	15 – 20	≥ 21
Lumen (mm)	≤ 10	11 – 14	≥ 15
Age (years)	< 1	1 – 5 or 6	> 5 or 6

Idiosoma nigrum is listed under Schedule 1 of the WA *Wildlife Conservation Act 1950* as Vulnerable. The species is currently known from the central and northern Wheatbelt, and the coastal and interior Midwest, extending into the north-eastern Goldfields. Within the Wheatbelt, the species is in decline largely due to land fragmentation and degradation (Main 1987, 1991; Yen 1995) primarily through cropping, grazing and salinisation. In the Midwest and Goldfields, populations rarely occur away from the ranges and breakaways,

making them highly isolated and can be confidently regarded as separate populations with little, if any, gene flow.

1.2 Scope

To conduct a survey for *I nigrum*, consolidate previous survey data for I nigrum and:

- ground-truth any changes to the population density of *I. nigrum* in the *Study Area*;
- provide a more robust dataset to allow a valid extrapolation of *I. nigrum* numbers; and
- complete a detailed report on the distribution of *I. nigrum* burrows within the *Study Area.*

This survey was conducted within the Environmental Protection Authority (EPA) framework guidelines relevant to fauna survey work (EPA 2002; 2004).

1.3 Study Area

Atlas's Weld Range tenement M20/118 (Figure 1.1) forms part of the Weld Range, which lies in the Murchison Biogeographic Region in the Arid zone of Western Australia. The *Study Area* is approximately 2km long and 600m wide, running in a north-east to south-west direction.

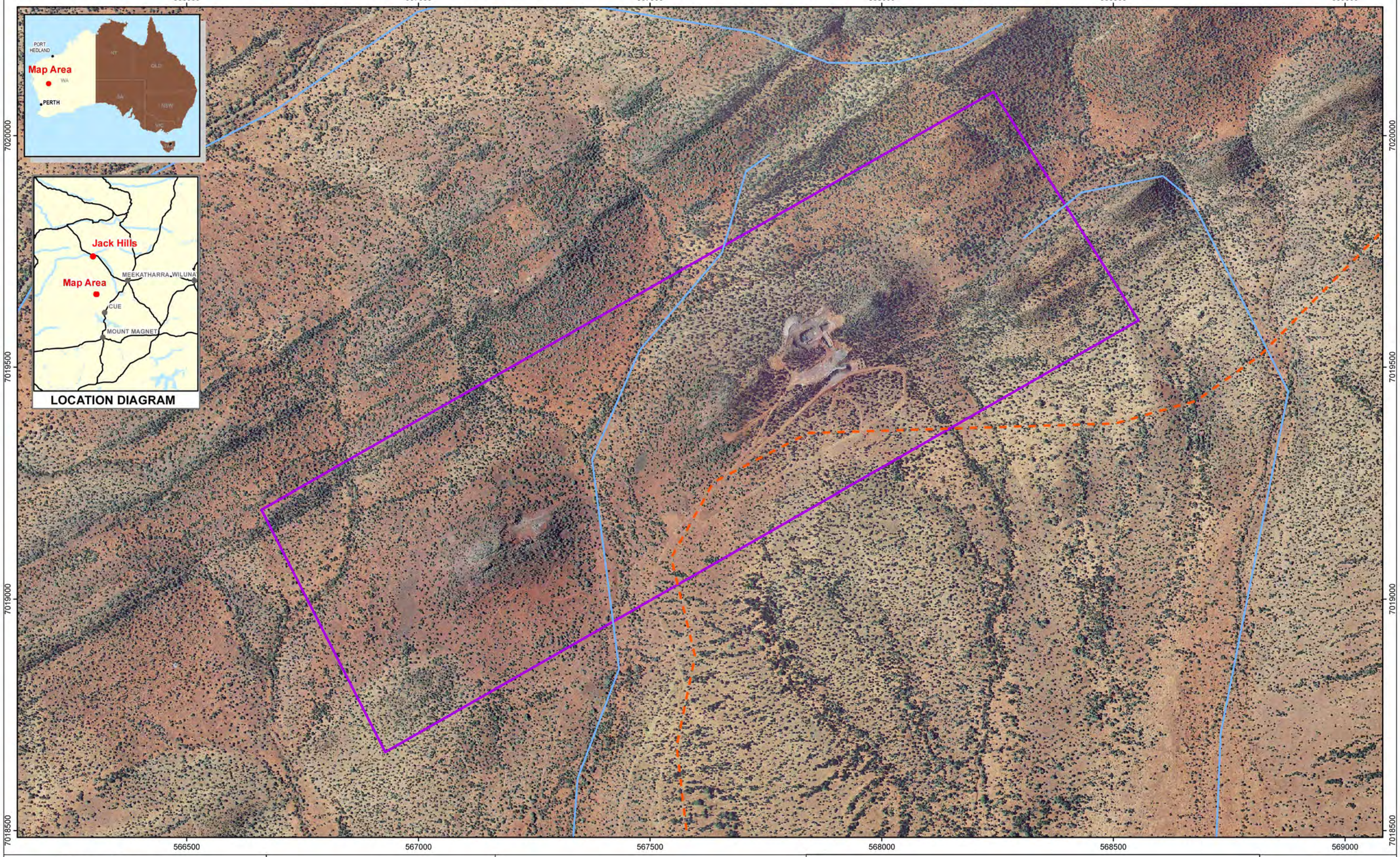
The *Study Area* consists of ironstone ridges, valleys, lower slopes, plains and minor drainage lines with some outcropping along the ridges. Although mostly intact, there is an excavated mine pit in the central ridge area, along with several cleared tracks and cleared pads.

In 2008, Woodman Environmental Consulting (Woodman) conducted a flora and vegetation assessment of the Study Area. Five Floristic Community Types (FCT) were identified from the Study Area (Figure 1.2):

- FCT 5: Open tall shrubland of *Acacia aneura* with emergent low trees of *Acacia pruinocarpa* over open mid shrubland of *Thryptomene decussate*,

Eremophila latrobei subsp. *latrobei* over sparse low shrubland of *Sida* sp. *excedentifolia* (J.L. Egan 1925) over open low forbland of *Goodenia tenuiloba*, *Goodenia macroplectra* and *Monachather paradoxus*. Occurs on Lower slopes, flats and outwashes, occasionally upper and mid slopes.

- FCT 6a: Open tall shrubland of *Acacia aneura* and *Acacia ramulosa* var. *linophylla* over sparse mid shrubland of *Ptilotus obovatus* over open low forbland of *Goodenia tenuiloba* and *Monachather paradoxus*. Occurs on Lower slopes, flats and outwashes, occasionally upper and mid slopes.
- FCT 6b: Open tall shrubland of *Acacia aneura* and *Acacia ramulosa* var. *linophylla* over open mid shrubland of mixed *Eremophila* spp. over open to sparse low shrubland of *Ptilotus obovatus* over open low forbland of *Cheilanthes sieberi*, *Goodenia tenuiloba* and *Monachather paradoxus*. Occurs on Upper and mid slopes, occasionally lower xlopes.
- FCT 7: Open tall shrubland of *Acacia aneura* with emergent low trees of *Acacia pruinocarpa*, over low shrubland of *Ptilotus obovatus* and *Eremophila* spp. over open low forbland of *Goodenia tenuiloba*, *Lepidium oxytrichum* and *Enneapogon caerulescens*. Occurs on Steep upper slopes, hill crests.
- FCT 8: Open tall shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* over open mid shrubland of *Eremophila mackinlayi* subsp. *spathulata* and mixed *Senna* spp. over open low shrubland of *Ptilotus obovatus* and *Heliotropium ovalifolium* over open low forbland of *Goodenia tenuiloba*, *Velleia glabrata* and *Ptilotus helipteroides*. Generally occurs on mid and lower slopes, occasionally upper slopes to crests, creeklines and colluvial fans.



LOCATION DIAGRAM

biologic
ENVIRONMENTAL SCIENCE

BIOLOGIC ENVIONMENTAL SCIENCE		Date:	24/11/2011
Sheet Size:	A3	Status:	FINAL
Drawn by: GSM	Requested by: BD	GSM Reference: FIG 1	

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Datum: GDA94
Projection: MGA Zone 50

ATLAS IRON Ltd

Figure 1.1

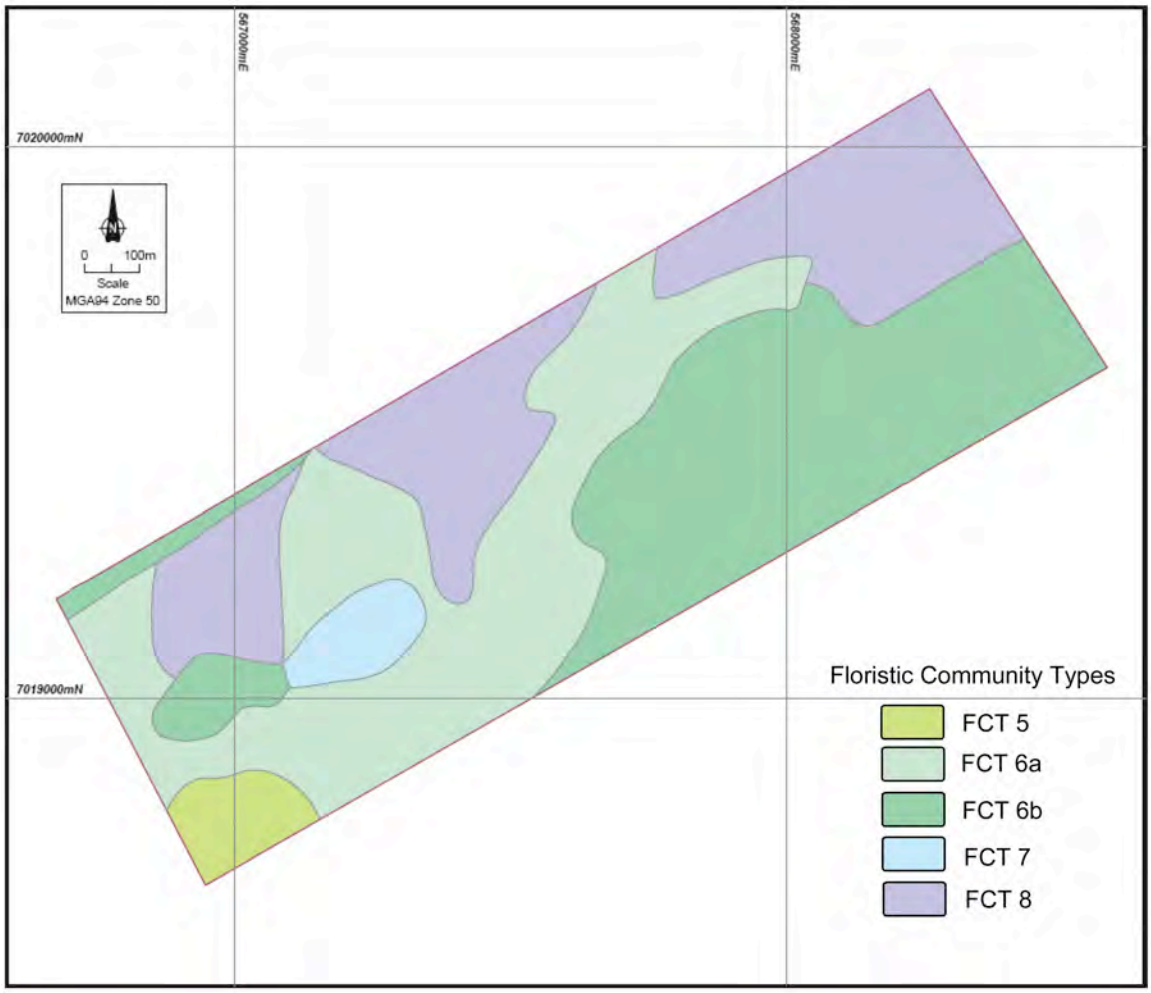
Weld Range *Study Area*

Legend

- *Study Area*
- Track
- Watercourse

Griffin Spatial & Mapping
2 Epacris Elbow Pelican Point
Bunbury WA 6230
griffinspatial@bigpond.com
+61 (0) 8 9725 3213

Figure 1.2: Floristic Community Types (FCT) (Woodman 2008)



2 DATABASE REVIEW

A search of the Department of Environment and Conservation's (DEC) *Naturemap* was conducted for records of *I. nigrum* in the vicinity of Weld Range. A radius of 40km was searched, with the *Study Area* used as the centroid, which covered the entire length of Weld Range.

The search revealed 1529 records of *I. nigrum*, all confined to Weld Range and extending along the entire length (ca. 60km). All records were collected in 2007, 2009 and 2010 indicating they are likely to have been all recorded as part of Sinosteel Midwest Corporation Ltd's (SMC) Weld Range Iron Ore Project (2009a), which is discussed in more detail in Section 2.2.

Beyond the Weld Range the closest record of *I. nigrum*, according to *Naturemap*, is Jack Hills, approximately 100km to the north.

2.1 Assessment Methods of Previous Studies

Two *I. nigrum* surveys have previously taken place in the vicinity of the *Study Area*.

2.1.1 Ecologia SMC *Idiosoma nigrum* Survey

The first survey was conducted by Ecologia for SMC's Weld Range Iron Ore Project (Ecologia 2009a; 2009b; 2010). *Idiosoma nigrum* was first recorded at Weld Range during SMC's baseline SRE survey (Ecologia 2009a), which prompted a targeted *I. nigrum* survey (Ecologia 2009b), followed by a population genetic study targeting the species (Ecologia 2010).

The survey was conducted across all five sections of Weld Range (Figure 2.1) and covered a total area of 76 hectares (ha). Seventy-five randomly placed 100m x 100m (1ha) quadrats were placed evenly throughout the five sections. Each quadrat was surveyed using five 100m long transects, effectively covering the entire 1ha quadrat.

Data were collected for each transect when burrows were recorded, including burrow measurements and activity, soil type, aspect, leaf litter cover and vegetation. This habitat preference information was then used to extrapolate areas of suitable habitat throughout Weld Range and, in turn, estimate the size of the populations of *I. nigrum* in each section.

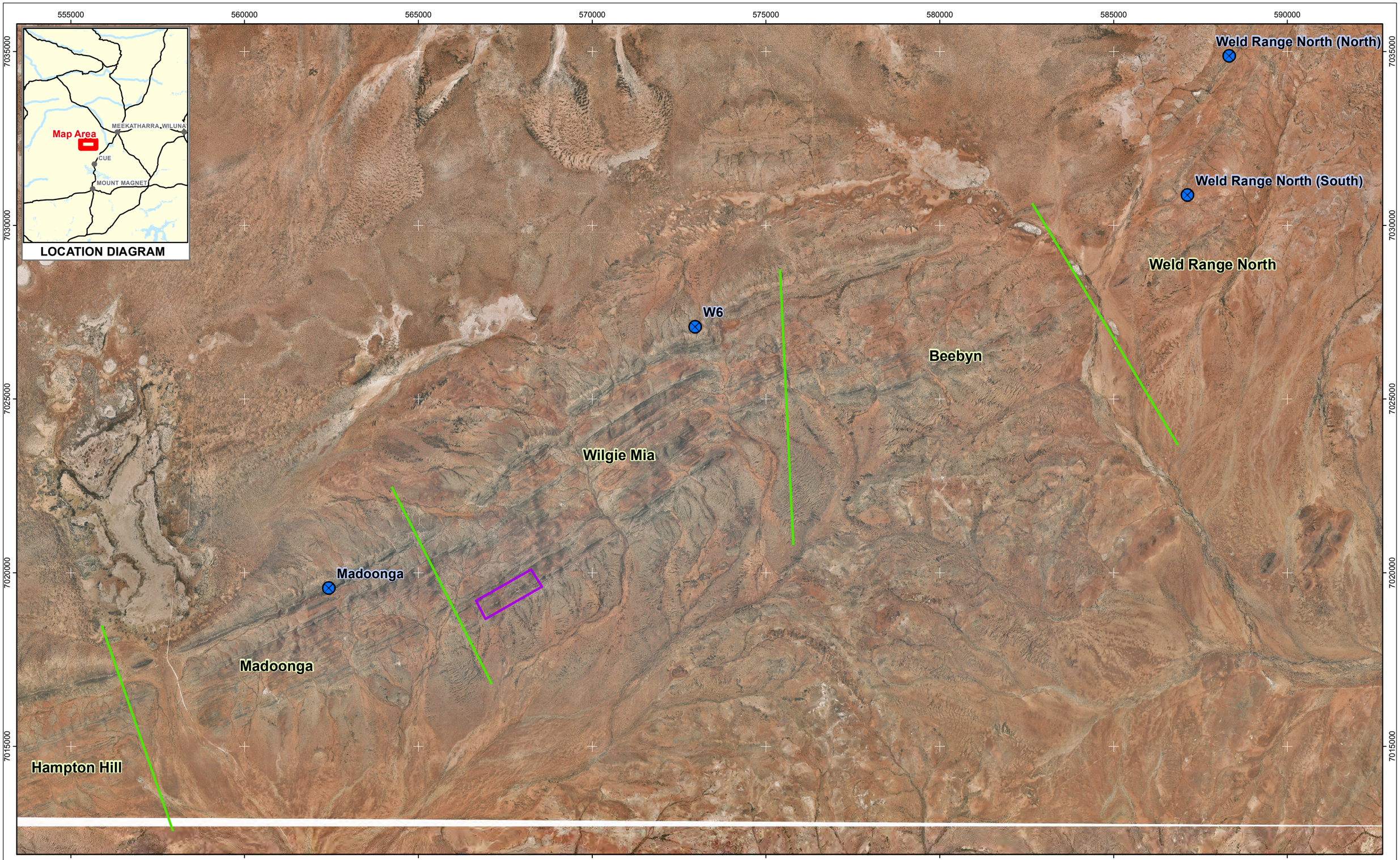
A population genetic study was conducted using specimens taken during the previous survey, covering three different sections of Weld Range (Figure 2.1), two in the southern part of Weld Range (Madoonga and W6) and one at Weld Range North (which was further divided into two sites; Northern Ridge and Central Ridge).

For further details on the assessment methods, please refer to Ecologia (2009b and 2010).

2.1.2 Bamford *Idiosoma nigrum* Survey

The second survey was conducted by Bamford Consulting Ecologists in September 2009. Twelve transects were chosen which covered all major vegetation types and landscape features (hill crests, upper slopes, mid slopes, lower slopes and surrounding plains). A series of 10m x 10m quadrats were surveyed intensively along each transect, at approximately 50m intervals, covering a total of 12,300m^2 (1.23ha) (Figure 2.2).

Burrow measurements and activity were recorded, as well as soil, vegetation and landscape data. This data was used, in conjunction with vegetation mapping by Woodman (2009) to extrapolate population size for the *Study Area*.
For further details on the assessment methods, please refer to Bamford (2009).



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Ecologia (2009b;2010) Survey Area

Legend

- *Study Area*
- Ecologia Survey Sections (2009b)
- Ecologia Genetics Study Populations (2010)

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2.2 Biologic Assessment Methods

Targeted searches for *I. nigrum* were conducted in the *Study Area* on the 25th and 26th of September 2011. Six transects were run between the north-eastern and south-western boundaries (Figure 2.2), covering all major vegetation and habitat types in the *Study Area*. Areas of high disturbance or habitats where spiders would not be found were avoided. Altogether, approximately 11,500m of transects were surveyed to a width of two metres giving a total survey area of approximately 23,000m^2 (2.3ha). The numbers of trees visited were also recorded, to a total number of 1,117 across all transects.

Each transect was surveyed to a width of two metres and ran from tree to tree so as to maximise the possibility of finding burrows. When a burrow was located a radius of two metres was surveyed to record all burrows within the cluster.

Each burrow had measurements taken, internal diameter (lumen) and external diameter (trap door), twig lining type (what type of phyllodes used), activity (active, sealed or inactive) and topographical position and vegetation characteristics.

Population size was estimated using the following:

$(A_f / A_s) \times N_s = N_f$, where:

A_f = the area (ha) of the favourable habitat in the Study Area, based on Woodman (2008);

A_s = the area (ha) of the transects searched;

N_s = the number of burrows within the transects (search area); and

N_f = the number of estimated burrows within the favourable habitat.

566500 567000 567500 568000 568500 569000

7020000
7019500
7019000
7018500



LOCATION DIAGRAM

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Bamford (2009) and Biologic (2011) *Study Area*

Legend

- *Study Area*
- Biologic Transects (2011)
- Bamford Transects (2009)

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3 RESULTS AND DISCUSSION

3.1 Previous Survey Results

3.1.1 Ecologia SMC *Idiosoma nigrum* Survey (2009b, 2010)

A total of 1708 burrows of *I. nigrum* were recorded from the five sections of the Weld Range *Study Area* (Figure 3.1). This study found that all *I. nigrum* burrows were found within the boundaries of drainage lines and underneath *Acacia* vegetation (*A. aneura* var. *aneura*, *A. ramulosa* var. *imophylla* and *A*. sp. Weld Range). All burrows were found on the southern aspect of the range, except in one section (Weld Range North) which has a north-south orientation. Results show that the hilltops were the least likely habitat to have *I. nigrum* burrows, with the slopes and plains the most likely. Similarly, habitats without clayey soil or rock were least likely to have *I. nigrum* burrows, compared to those that have a combination of these two soil characteristics, although the presence of sand also appears to reduce the likelihood.

Population numbers varied amongst the sections, ranging from 658 burrows at Weld Range North to 170 burrows at Hampton Hill. Likewise the population structure varied within each section, with the populations at Weld Range North and Hampton Hill regarded as growing populations, due to the higher numbers of emergents and juveniles to adults, which compared to the deficit of juveniles at the Madoonga and Wilgie Mia sections.. It was concluded that these two latter populations are in decline because of this deficit.

The effective population sizes were smallest for Beebyn (274 ± 197), Hampton Hill (439 ± 126) and Madoonga (642 ± 250), and it was concluded that they may be regarded as being in danger of genetic inbreeding if the population sizes decreased further. The population sizes at Weld Range North (1078 ± 456) and Wilgie Mia (2387 ± 436) were both considered well above the short-term and long-term requirements to maintain an effective population, although it was

cautioned that the deficit of juveniles at Wilgie Mia may impact upon that if it continues.

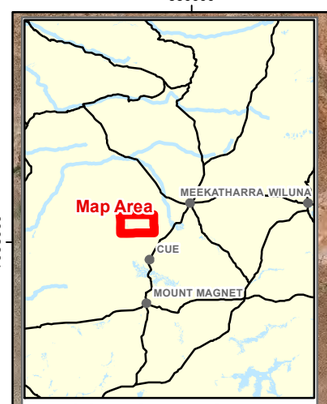
The genetic study conducted at Weld Range (Ecologia 2010) found significant population subdivision between the Weld Range South sites and the Weld Range North sites, no subdivision between the two Weld Range North sites and a small subdivision between the two Weld Range South sites. It was concluded that while distance does play a part in creating genetic distance, the geographical barrier (in this case a break in the range, likely created by a drainage line) separating Weld Range North and Weld Range South (indicated on Figure 3.1 as the line separating the Weld Range North and Beebyn sections) plays a very significant role. It was also suggested that as a similar geographical barrier exists at the southern end of Weld Range, separating Weld Range South and Hampton Hill (indicated on Figure 3.1 just to the east of the line separating the Hampton Hill and Madoonga sections), these populations will likely have a similar level of subdivision to that between Weld Range North and Weld Range South. Ecologia (2010) concluded that it is highly likely that there are three distinct populations at Weld Range (Hampton Hill, Weld Range South and Weld Range North) with little genetic variation within each population, likely due to the lack of geographical barriers.

3.1.2 Bamford *Idiosoma nigrum* Survey

A total of 135 burrows (113 active) of *I. nigrum* were recorded in the *Study Area*, plus an additional ten burrows between quadrats (Figure 3.2). Of the 123 quadrats only 19 had active burrows recorded in them.

The majority of the burrows were recorded in the north-east section of the *Study Area*, largely confined to the mid and lower slopes of the adjacent valley and the valley floor within the drainage line. The majority of the burrows (90) were also found associated with *A.* sp. Weld Range and within floristic community FCT 8, described as: Open tall shrubland of *A.* sp. Weld Range (A. Markey & S.Dillon

2994) and *A. speckii* over open mid shrubland of *Eremophila mackinlayi* subsp. *spathulata* and mixed *Senna* spp. over open low shrubland of *Ptilotus obovatus* and *Heliotropium ovalifolium* over open low forbland of *Goodenia tenuiloba*, *Velleia glabrata* and *Ptilotus heliperoides*. Thirty nine burrows were recorded associated with *A. aneura*. Burrows were



LOCATION DIAGRAM

550000 555000 560000 565000 570000 575000 580000 585000 590000 595000

7035000 7030000 7025000 7020000 7015000 7010000

Weld Range North

Beebyn

Wilgie Mia

Madoonga

Hampton Hill

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Ecologia (2009b;2010) Survey Results

Legend

- Ecologia (2009b) *Idiosoma nigrum* records
- Ecologia Survey Sections (2009b)
- *Study Area*

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also concentrated in areas of gravelly-loam soil and were not recorded in very rocky areas (generally upper slopes and crests) and areas with a lot of clay (lower slopes and plain).

The population structure recorded in the *Study Area* showed a higher number of emergent and juveniles to adults, suggesting a growing population. The extrapolated population size was determined as being 595 spiders/ha, based on the density in occupied areas and ignoring areas where spiders were not found. A conservative estimate of the amount of suitable habitat in the *Study Area* was set at 23%, based on 23% of the quadrats searched containing spiders. These figures were used to formulate a minimum population size in the *Study Area* of 14,994 spiders.

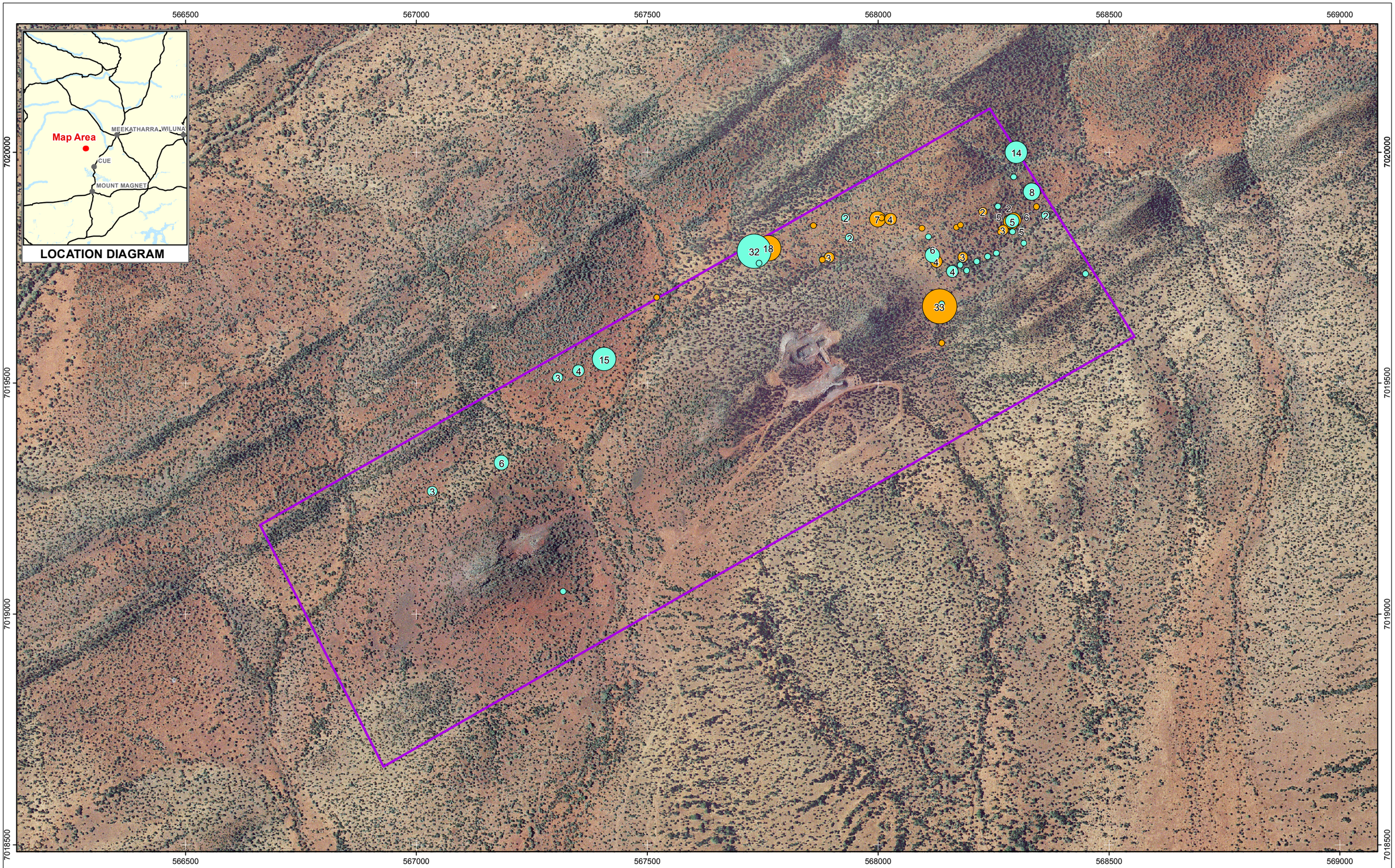
3.2 Biologic Survey Results and Discussion

3.2.1 Burrow Numbers and Occurrence

A total of 105 burrows of *I. nigrum* (104 active and 17 of those sealed) were recorded in the *Study Area* (Figure 3.2). The burrows were recorded in 23 distinct clusters in the *Study Area*, with 10 of these consisting of only one burrow and the two largest clusters consisting of 18 and 33 burrows. The average number of burrows in a cluster was 4-5 burrows (Table 3.1). The Study Area was divided into four sections based on the occurrence of *A*. sp. Weld Range (Figure 3.3); three separate sections where *A*. sp. Weld Range occurs (WR1, WR2 and WR3) and the remainder of the Study Area (Non-WR). The occurrence of each cluster in relation to these sections is also in Table 3.1).

Table 3.1: Location and burrow numbers in each cluster.

Cluster number	Easting	Northing	Burrow numbers	Vegetation section
Cluster 1	568138	7019587	1	Non-WR
Cluster 2	568134	7019666	33	WR3
Cluster 3	568343	7019882	1	WR3
Cluster 4	568290	7019847	5	WR3
Cluster 5	568294	7019853	6	WR3
Cluster 6	568288	7019851	2	WR3
Cluster 7	568286	7019849	5	WR3
Cluster 8	568271	7019831	3	WR3
Cluster 9	568265	7019827	1	WR3
Cluster 10	568184	7019773	3	WR3
Cluster 11	568127	7019763	4	WR3
Cluster 12	567894	7019772	3	WR3
Cluster 13	567879	7019767	1	WR3
Cluster 14	567521	7019685	1	WR2
Cluster 15	567763	7019792	18	WR3
Cluster 16	567860	7019841	1	WR3
Cluster 17	567999	7019855	7	WR3
Cluster 18	568008	7019858	1	WR3
Cluster 19	568027	7019855	4	WR3
Cluster 20	568095	7019835	1	WR3
Cluster 21	568170	7019837	1	WR3
Cluster 22	568179	7019842	1	WR3
Cluster 23	568227	7019871	2	WR3



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Bamford (2009) and Biologic (2011) Survey Results

Legend

- *Study Area*
- Biologic (2011) *Idiosoma nigrum* cluster
- Bamford (2009) *Idiosoma nigrum* cluster

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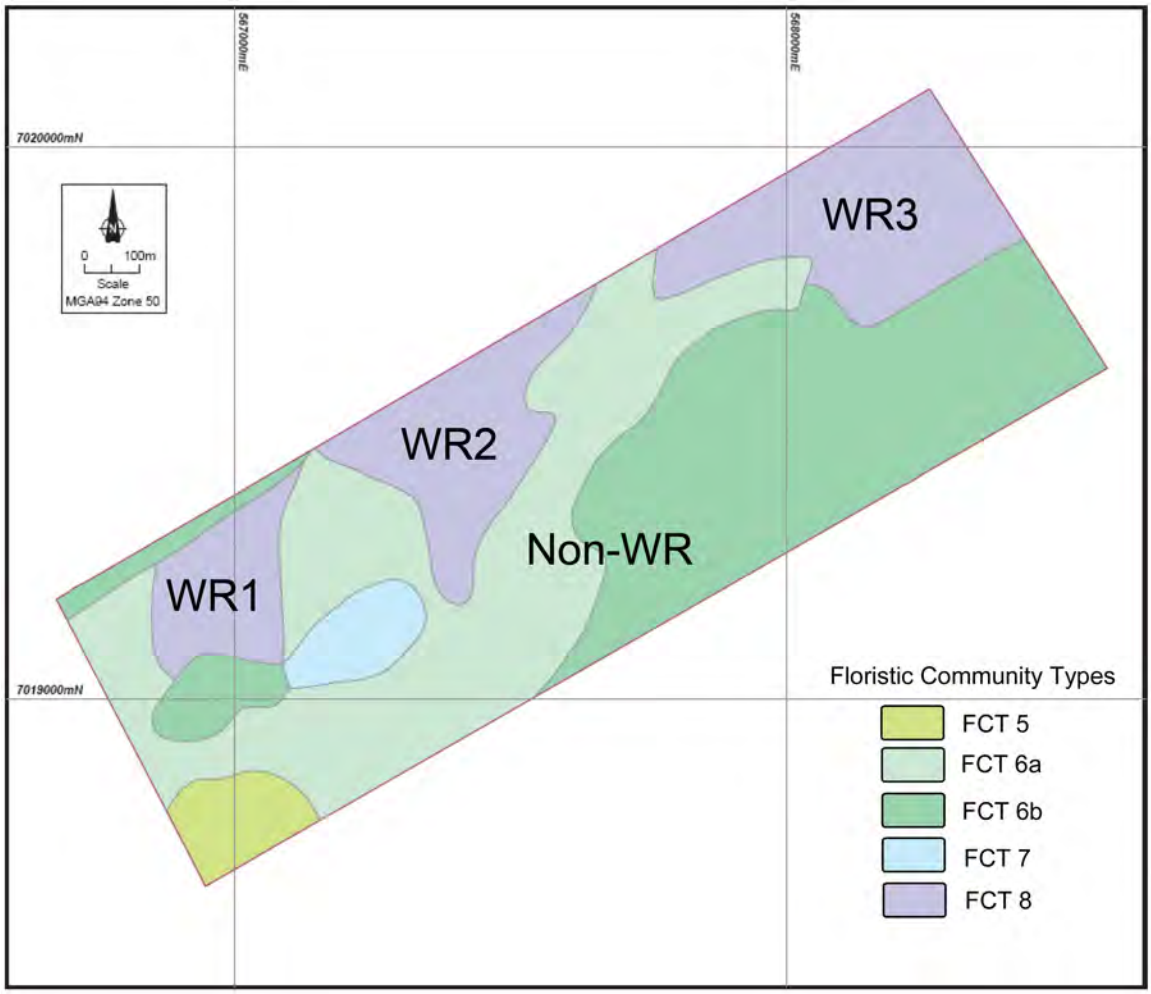
Only one cluster (Cluster 1; consisting of one burrow) was found outside of floristic community FCT 8 (Non-WR). This was located on the southern slope in the *A. aneura* dominated community FCT 6b. This burrow was the only one recorded that used thin phyllodes (from *A. aneura*) for the twig lines of the trapdoor, all other burrows were associated with *A.* sp. Weld Range, which has wider phyllodes.

As well, the majority of burrows were recorded on the mid and lower slopes of the valley in the north-eastern part of the *Study Area,* and within the most eastern occurrence of FCT 8 (WR3) (Figure 3.2). There were three Clusters outside of this WR3;

- Cluster 1: as mentioned above, in Non-WR;
- Cluster 2: 33 burrows recorded on the boundary of FCT 8 (WR3), but on a flat, upper slope of the *Study Area*, separated from the remainder of WR3; and
- Cluster 14: 1 burrow within the central occurrence of FCT 8 (WR2), on the outskirts of the flat drainage area.

Floristic survey work conducted by Ecologia (2009c) across Weld Range appears to show two types of *A.* sp. Weld Range communities occurring alongside the *Study Area*, community 4a and 4b (Figure 3.4). It should be noted that this study does not cover the *Study Area* but does cover 75% of the boundary, allowing reasonable assumptions to be made, in conjunction with the vegetation surveys carried out by Woodman (2008) (Figure 3.3). Vegetation community 4a (*A.* sp. Weld Range and *A. aneura* var. *macrocarpa* open tall shrubland over *Eremophila macmillianiana* and mixed *Senna* spp. open shrubland over *Ptilotus obovatus* open low shrubland) borders much of the northern and western extent of the *Study Area* and is the dominant community throughout the range, interrupted largely by the stoney ridge tops (which are dominated by *A. aneura*) and drainage lines dominated by the second *A.* sp. Weld Range community (4b).

Figure 3.3: Vegetation Map of the *Study Area*; from Woodman (2008).

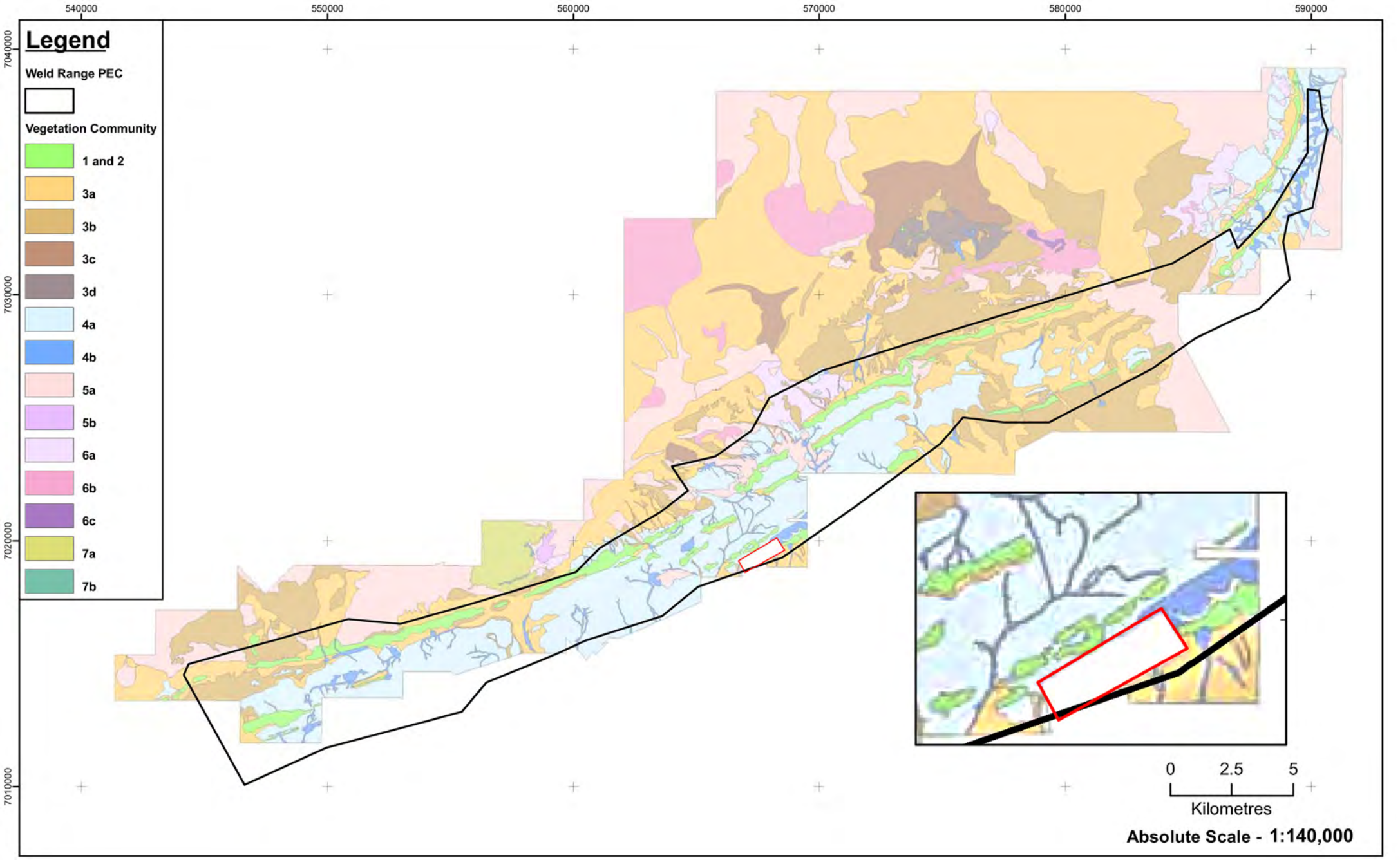


This latter community (4b: *A.* sp. Weld Range and *A. speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemina* open shrubland over *Cymbopogon ambiguous* sparse tussock grassland) appears to be the one most closely connected to section WR3, where the dense *I. nigrum* population of the *Study Area* occurs. Community 4b is also found throughout Weld Range, although covering smaller areas and largely discontinuous with each other, compared to community 4a. Where community 4a connects with the *Study Area,* appears to be one of the larger continuous occurrences of this community on Weld Range (Figure 3.4). This indicates it is

very likely that the population of I. nigrum, in the north-eastern corner of the *Study Area,* continues for at least another two kilometres to the north-east, and that its occurrence in the *Study Area* is the edge of a large local population of at least 52ha (based on Ecologia's vegetation mapping). Using this data it appears likely that the burrows recorded in the *Study Area* constitute a maximum of 27% of this population.

3.2.2 Population Structure and Size

Based on the lumen measurements of non-sealed burrows (88 burrows) there were 17 emergent burrows, 16 juvenile burrows and 55 adult burrows, giving a ratio of 1:1 for emergent and juveniles, and less than 1:1 for non-adults and adults. This deficit of emergents and juveniles may indicate a declining population, which contrasts with Bamford (2009), which appeared to show a growing population. This difference is more likely an artefact of sampling, where the Bamford (2009) survey may have managed to record more emergent and/or juveniles due to a greater amount of survey time or greater intensity survey work within quadrats. Emergent burrows are also more easily seen just after they have burrowed into the ground, so this may have been a factor.


Legend
Weld Range PEC
Vegetation Community
1 and 2
3a
3b
3c
3d
4a
4b
5a
5b
6a
6b
6c
7a
7b
540000
550000
560000
570000
580000
590000
7040000
7030000
7020000
7010000
0
2.5
5
Kilometres
Absolute Scale - 1:140,000

The size of the population within the *Study Area* was extrapolated from the available data and compared to the estimated population sizes given by Bamford (2009). The Bamford data were also subjected to the same extrapolation method as the Biologic data, to allow a direct comparison.

The three occurrences of FCT 8 are dealt with separately (WR1, WR2 and WR3) (Table 3.1 and Figure 3.3), due to the differences in population densities. The rest of the *Study Area* (Non-WR) is treated as likely to have the same density of burrows throughout.

Table 3.2: Extrapolated population size for Bamford (2009) and Biologic (2011) data.

		Bamford Data (2009)			**Biologic Data (2011)**		
	Total Area (ha) (A_f)	Burrow Numbers (N_s)	Search Area (ha) (A_s)	Estimated. Burrow Numbers (N_f)	Burrow Numbers (N_s)	Search Area (ha) (A_s)	Estimated. Burrow Numbers (N_f)
WR1	6.38	3	0.228	84	0	0.134	0
WR2	8.2	22	0.286	631	1	0.132	62
WR3	13.68	88	0.582	2,069	103	0.350	4,025
Non-WR	80.74	8	2.350	275	1	1.681	48
Total	**109**	121	3.446	**3,059**	105	2.297	**4,135**

The estimated population sizes for the *Study Area* vary between the two data sets (3,059 for the Bamford data and 4,135 for the Biologic data) but are both much lower than the original Bamford estimate (14,994 spiders) (Table 3.1). This difference is largely due to the original Bamford estimate being based on a more

generalised approach, where all favourable habitat was treated as having the same density of active burrows, which both sets of survey data clearly show is not the case.

Using the Biologic population data, and the extrapolated area of vegetation community 4b adjoining the *Study Area* (as discussed in Section 3.2.1), it is estimated that the population of *I. nigrum* connected to, and occurring in, the *Study Area* is around 14,907 spiders, of which 27% occurs within the *Study Area*.

Beyond this it appears likely that the Study Area population is part of the Central Weld Range population, as identified by Ecologia (2010).

4 CONCLUSIONS

The work that has been carried out in the *Study Area* shows that the majority of the *I. nigrum* population occurring within the *Study Area* is concentrated in the north-eastern corner. This area is dominated by a vegetation community of predominantly *A.* sp. Weld Range, which also occurs in two other sections in the *Study Area*. The other two occurrences of this population have much lower densities of spiders, likely owing to increased disturbance and exposure. Results from the flora survey work conducted by Ecologia (2009c) shows it is likely that these two vegetation community (4a) occurrences are a different type of *A.* sp. Weld Range community to that in the north-eastern corner (community 4b).

Vegetation community results from Ecologia (2009c) also show it is highly likely that this north-eastern occurrence of *A*. sp. Weld Range extends well beyond the *Study Area*, which also illustrates the high level of connectivity between the Study Area and the rest of Weld Range. The genetic work on *I. nigrum*, conducted by Ecologia (2010), demonstrates that gene flow within the central part of Weld Range (which includes the *Study Area*) is largely uninterrupted, indicating dispersal between individuals within this area.

The *I. nigrum* population in the *Study Area* is quite dense, compared to others in Weld Range, and is comparable to Weld Range North. The population age class structure conflicts with the Bamford (2009) data that described a growing population, while the Biologic data showed a stable, or potentially declining, population, but sampling differences between the two surveys may explain this difference. Given the lack of disturbance in the area, and the robust size and density of the population, it is more likely that it is growing rather than declining.

The *Study Area* contains approximately 4,135 burrows (extrapolated from 105 active burrows) and is part of a local *I. nigrum* population of approximately 14,907 burrows that continues to the north-east of the *Study Area*. This is largely

based on what appears to be a close association with *A.* sp. Weld Range. The vegetation survey and genetic work by Ecologia (2009c and 2010 respectively) also show that this local population is likely to be part of the greater Central Weld Range population, as identified by Ecologia (2010).

The loss of the *I. nigrum* community within the *Study Area* would be unlikely to affect the long term viability of the local *I. nigrum* population (which would be reduced by approximately 27%) due to the size and connectivity of the population outside the *Study Area,* both at a local population level and as part of the Central Weld Range population.

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Appendix A: *Idiosoma nigrum* burrow data (Biologic 2012)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 01	active	568138	7019587	25.7	17.7	*Acacia aneura*	Thin (*Acacia aneura*)
Cluster 02	inactive	568134	7019666	18.9		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	14.7	10.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	26	17.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	12.5	11.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	14.4	11.8	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	14.1	10.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568134	7019666	16.5	11.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568134	7019666	23.9	17.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568139	7019663	23.7	18.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568139	7019663	23.8	18.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568139	7019663	12.2	7.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568139	7019663	27.2	18.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019664	21.8	16.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019664	30	22.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019664	15.3	9.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568133	7019664	14.1	11.8	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019664	10.9	8.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	sealed	568133	7019660	8.2		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	sealed	568133	7019660	6.7		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019660	25.1	19.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	sealed	568133	7019660	10		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568131	7019658	12.6	7.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568127	7019658	17.7	11.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568127	7019658	16.6	12.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568127	7019658	25.2	16.8	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019657	24.8	17.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	sealed	568133	7019657	9.7		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019657	16.1	13	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019657	23.6	18.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019657	25.9	17.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568133	7019657	25.2	18.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	sealed	568135	7019656	7.6		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 02	active	568135	7019656	15	9.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 03	active	568343	7019882	27.8	17.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 04	active	568290	7019847	25.6	17.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 04	active	568290	7019847	16.4	12.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 04	active	568290	7019847	22.8	17.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 04	active	568290	7019847	13.6	10.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 04	active	568290	7019847	20.6	17.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 05	active	568294	7019853	24.4	17.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 05	active	568294	7019853	15	11.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 05	active	568294	7019853	24	19	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 05	active	568294	7019853	24.9	18.8	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 05	active	568294	7019853	26.7	19.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 05	sealed	568294	7019853	16.8		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 06	active	568288	7019851	19.8	13.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 06	sealed	568288	7019851	20.6		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 07	active	568286	7019849	23.6	18.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 07	active	568286	7019849	12.4	8.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 07	sealed	568286	7019849	12.5		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 07	active	568286	7019849	22.6	17.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 07	active	568286	7019849	11.8	8.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 08	active	568271	7019831	24.1	18.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 08	active	568271	7019831	11.7	7.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 08	active	568271	7019831	22.6	16.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 09	sealed	568265	7019827	11.2		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 10	sealed	568184	7019773	28.2		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 10	sealed	568184	7019773	14.7		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 10	active	568184	7019773	18.9	12.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 11	active	568127	7019763	25.5	18.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 11	sealed	568127	7019763	20.3		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 11	active	568127	7019763	12.1	8.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 11	active	568127	7019763	27.3	18.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 12	active	567894	7019772	20.8	16.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 12	active	567894	7019772	25.8	19	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 12	active	567894	7019772	26	19.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 13	active	567879	7019767	21.5	14.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 14	active	567521	7019685	25.3	18.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	26.1	20	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	22	18.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	24.3	21.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

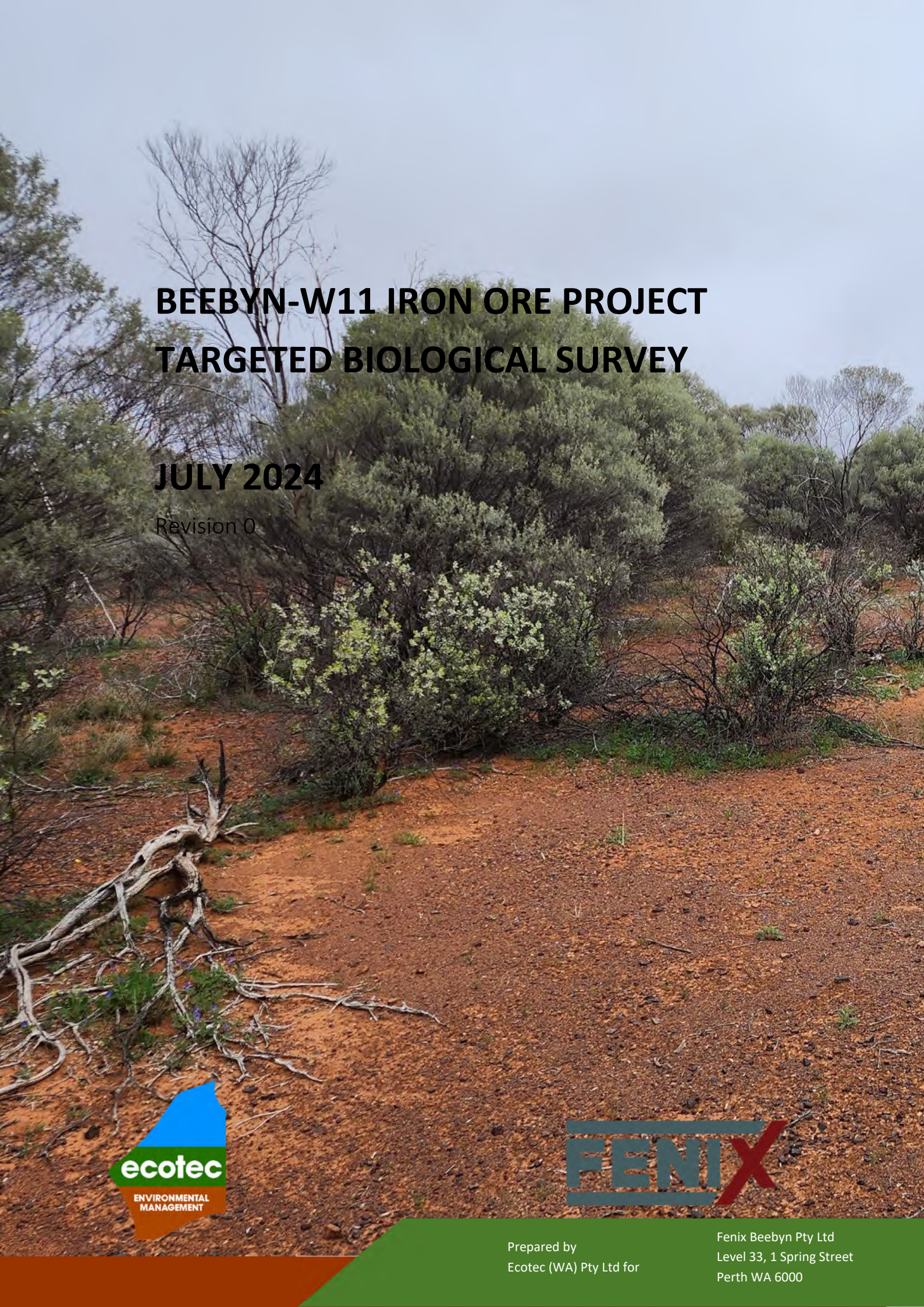
Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 15	active	567763	7019792	17.8	11.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	9.8	7.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	11	8.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	sealed	567763	7019792	12.4		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	11.5	8.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	23.8	18.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	sealed	567763	7019792	12		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	sealed	567763	7019792	18.9		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 15	sealed	567763	7019792	18.5		*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	23.1	14.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	12.1	7.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	22	17.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	13.9	12.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	24.7	18.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 15	active	567763	7019792	25.3	23.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 16	active	567860	7019841	25.9	19.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 17	active	567999	7019855	26.7	25.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	567999	7019855	25.3	19.4	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	567999	7019855	14.4	8.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	567999	7019855	28.7	25.7	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	567999	7019855	23.8	17.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	567999	7019855	22.9	21.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 17	active	568008	7019858	22.8	21.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 18	active	568008	7019858	22.8	17.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 19	active	568027	7019855	22.5	20.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 19	active	568027	7019855	25.7	23.3	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 19	active	568027	7019855	28.1	23.1	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 19	active	568027	7019855	17.8	14.5	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 20	active	568095	7019835	24.2	18.9	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 21	active	568170	7019837	24.5	18.6	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 22	active	568179	7019842	24.3	18.2	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)
Cluster 23	active	568227	7019871	22.1	16	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 23	sealed	568227	7019871	25.9	18	*Acacia* sp. Weld Range	Thick (*Acacia* sp. Weld Range)



BEEBYN-W11 IRON ORE PROJECT
TARGETED BIOLOGICAL SURVEY

JULY 2024

Revision 0

ecotec
ENVIRONMENTAL MANAGEMENT

FENIX

Prepared by
Ecotec (WA) Pty Ltd for

Fenix Beebyn Pty Ltd
Level 33, 1 Spring Street
Perth WA 6000

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APPENDICES

Appendix 1: Conservation codes for Western Australian flora and fauna

Appendix 2: Flora species recorded during the survey

Appendix 3: Vegetation site descriptions

1.0 INTRODUCTION

Fenix Beebyn Pty Ltd (Fenix) is proposing to develop the Beebyn-W11 Iron Ore Project (the Project), approximately 600 km north-east of Perth and 85 km south-west of Meekatharra in the Mid-West Region of Western Australia (Figure 1.1 and Figure 1.2).

Sinosteel Midwest Corporation Limited (SMC) is the registered holder of Mining Lease 51/869. In October 2023, Fenix signed a binding agreement with SMC securing the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range (Fenix 2023).

Flora and fauna surveys have been completed in and around the project area and the wider Weld Range. The project area and surrounds have been quite extensively covered by prior biological surveys. The most recent survey, undertaken by Animal Plant Mineral (APM) in November 2023, included flora and vegetation and basic terrestrial fauna survey of most of the project area (APM 2024); however, did not cover the full project area due to revisions of the proposed disturbance footprint after that survey was completed.

Prior to the APM survey, Ecologia Environment Pty Ltd (*ecologia*) conducted Level 2 flora and vegetation surveys of the project area and surrounds between 2006 and 2009 (*ecologia* 2010a); as well as a targeted conservation significant flora survey of exploration drilling in the area.

Fenix engaged Ecotec (WA) Pty Ltd (Ecotec) to undertake a targeted flora, vegetation and fauna habitat survey of the project area. The purpose of the survey was to:

- undertake a targeted survey for conservation significant flora and fauna habitat within the project area
- confirm the presence and identity of Hibiscus ?*krichauffianus*
- refine the vegetation mapping as defined by APM (2024) and *ecologia* (2010a)
- undertake a targeted survey for *Idiosoma clypeatum* burrows within the project area
- refine the fauna habitat mapping as defined by APM (2024)
- prepare a report outlining the findings of the assessment.

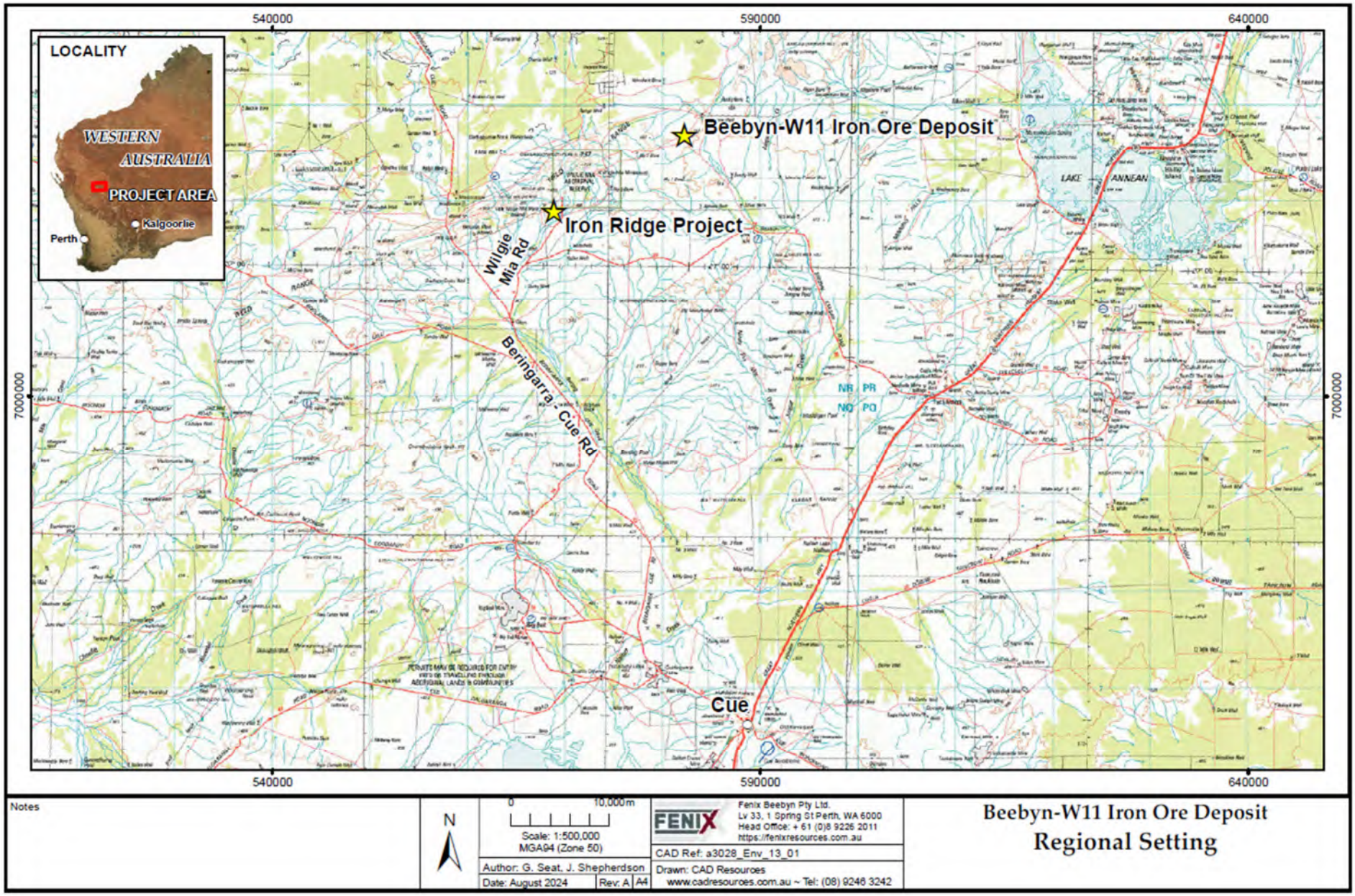


Figure 1.1: The Beebyn W11 Project location.

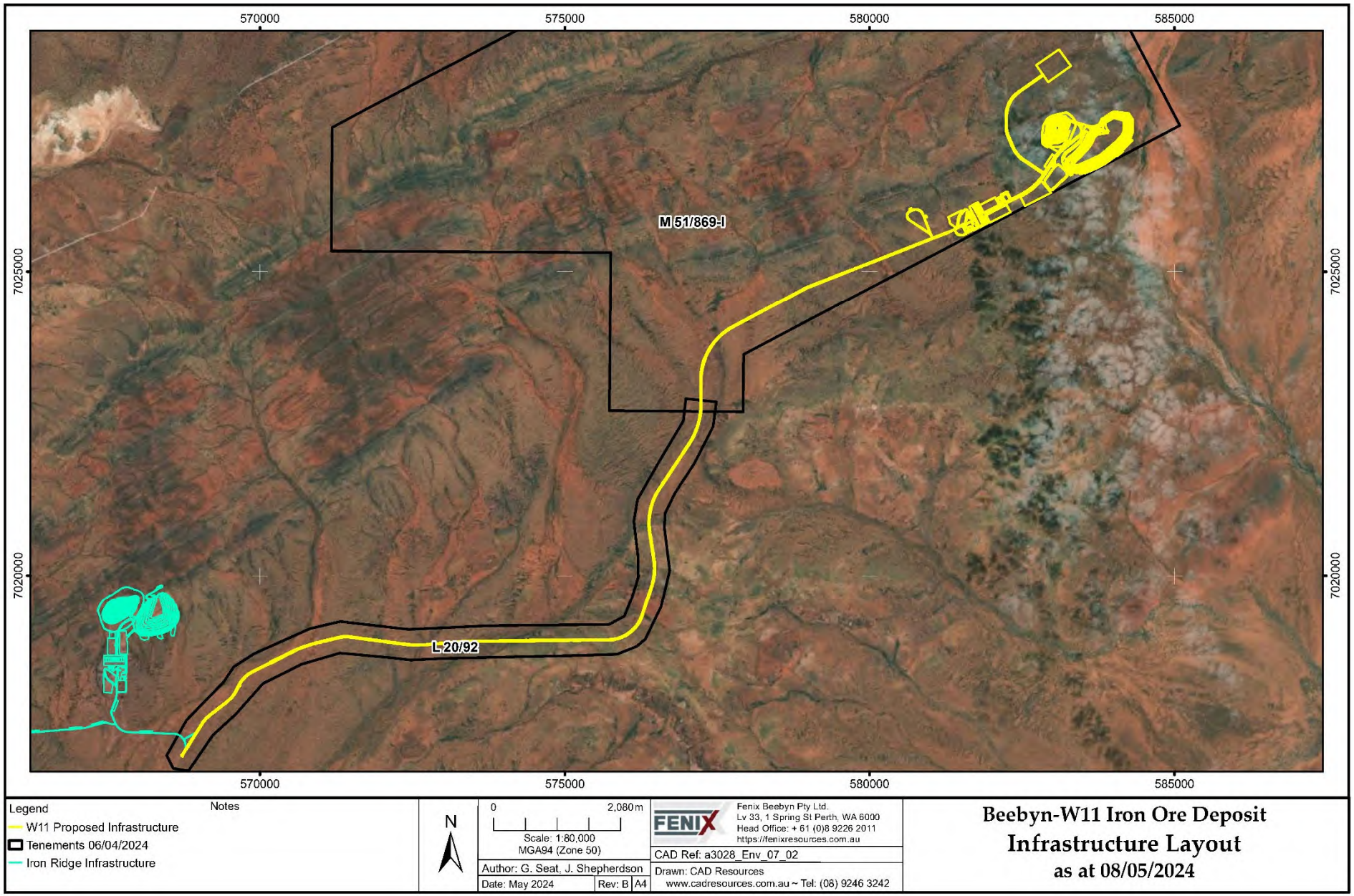


Figure 1.2: The proposed layout of the Beebyn W11 Project.

2.0 EXISTING ENVIRONMENT

2.1 Climate

The Project is located in the arid climatic region of Western Australia, characterised by low rainfall and high evaporation. According to the Bureau of Meteorology (BoM), the mean maximum daily temperature in Meekatharra (approximately 73 km north-east of the Project area) is 36.7°C, with a mean minimum daily temperature of 22.3°C. The hottest month is January, with a mean maximum temperature of 38.4°C. The coldest month is July with a mean minimum temperature of 7.5°C and a mean maximum of 19.3°C.

The mean annual rainfall (1948 – 2023) at Meekatharra Airport (BoM weather station # 7045) is 232.2 mm. Average annual evaporation ranges from 2800 mm to 3200 mm (BoM 2024).

Figure 2.1 provides climatic data relevant to the project area (BoM 2024).

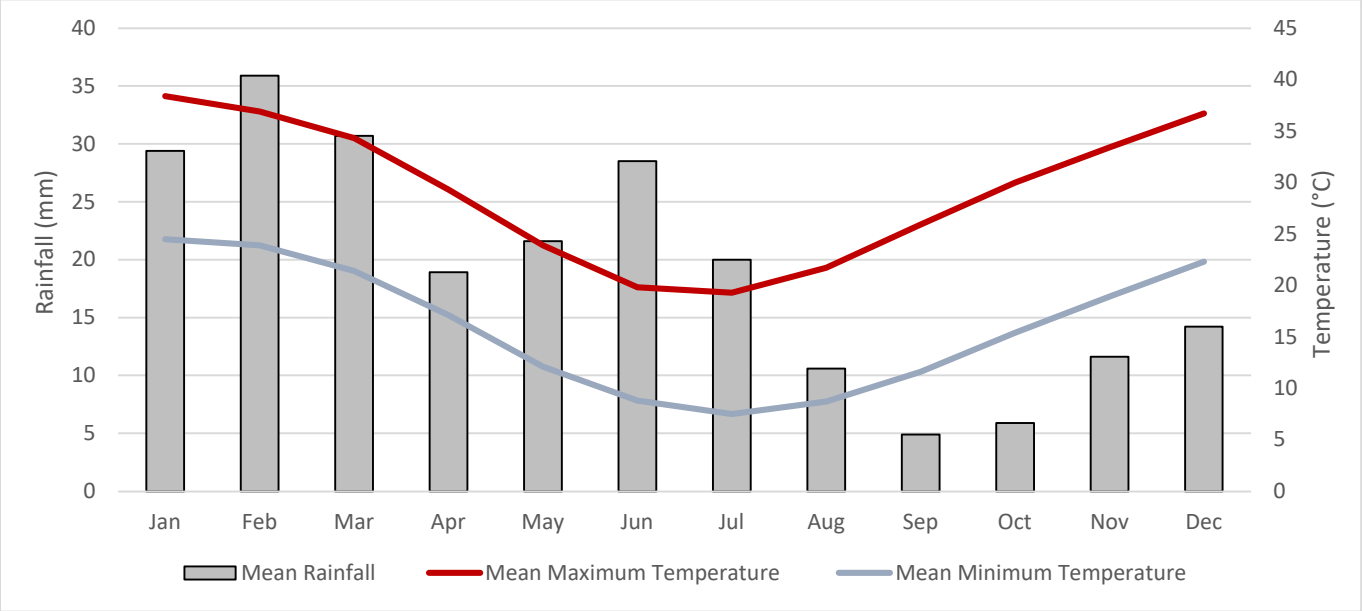


Figure 2.1: Climatic data for the project area.

Rainfall recorded during 2024 up to the time of survey is presented in Figure 2.2. A total of 196 mm of rainfall was recorded to July 2024, marginally above the long term average of 185.2 mm for the same period.

Annual rainfall had been well below the mean from 2019-2021 resulting in widespread die off of vegetation across the region. Rainfall in 2022 was above average and then marginally below average in 2023, however the rainfall patterns were not typical, with much of the rainfall occurring at different times to usual. 2024 appears to be following this atypical rainfall pattern with higher than usual rainfall during the winter months.

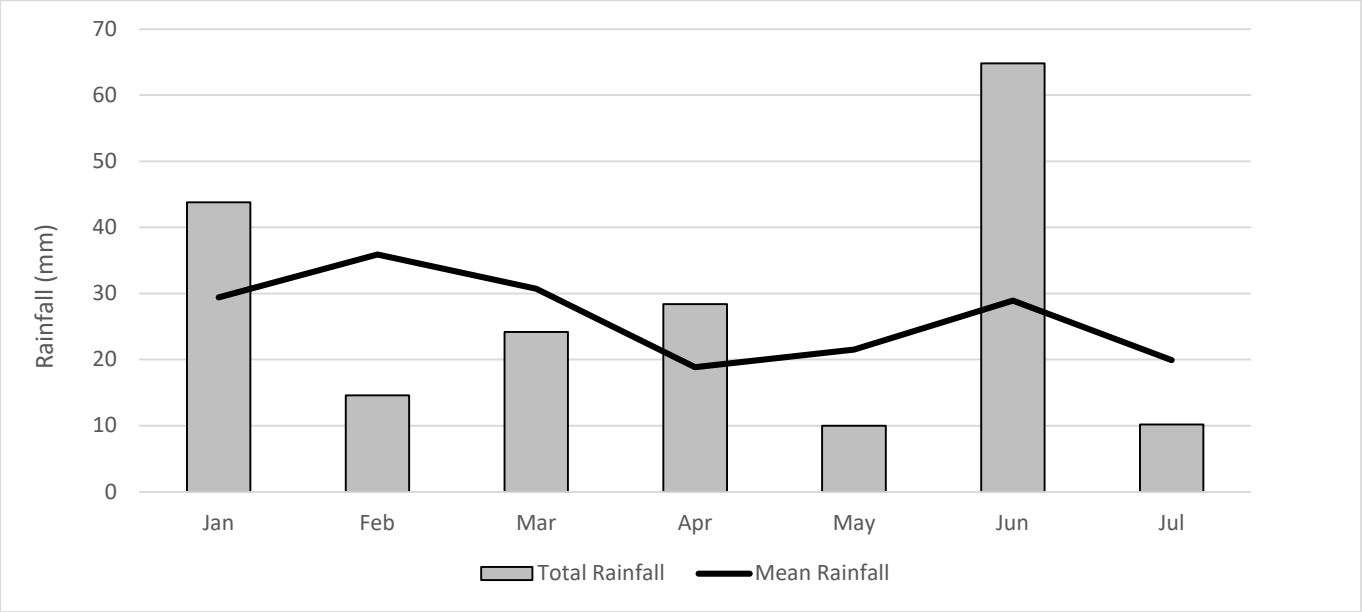


Figure 2.2: Rainfall data for the project area during 2024.

2.2 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics. The project area is situated within the Murchison Bioregion according to IBRA 7 and is situated in the Western Murchison subregion (MUR2), close to the boundary of the Eastern Murchison subregion (MUR1).

The MUR2 subregion is described by Desmond et. al. (in DAWE 2019) as follows:

"*Mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia. Contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. Arid climate with bimodal rainfall that usually falls in winter. The subregional area is 7,847,996 ha.*" (DAWE 2019b).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The Western Murchison subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling granitic and greenstone strata (Desmond et al. 2001, in DAWE 2019). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and *Halosarcia* low shrublands on saline alluvia.

2.3 Flora and Vegetation

2.3.1 Flora

Previous database searches indicate that a total of 28 conservation significant flora taxa have been recorded within a 30 km area around the project site. The database search results indicate that no Threatened flora species have been recorded in the area. Definitions of the conservation codes used in the table are included as Appendix 1.

The surveys undertaken by *ecologia* recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species, as listed by the Department of Biodiversity and Conservation (DBCA).

No Threatened species were recorded (*ecologia* 2010a).

APM (2024) recorded 77 vascular flora taxa from 21 families and 40 genera. The reduction in taxa recorded when compared to the earlier surveys is due to timing of the survey, the region having been in drought conditions for several years and the prevalence of goats, which have had a significant impact on the vegetation.

No Threatened species were recorded; however, a single potential record of the Priority 3 listed species *Hibiscus krichauffianus* was recorded. Due to seasonal conditions, insufficient material was available to definitively determine the species. *Hibiscus krichauffianus* is common in the central parts of Australia and the Queensland mid coast. The nearest known record is approximately 250 km south west of the project area, with most records in WA from the Pilbara. The species has not previously been recorded in the Murchison Region (APM 2024).

Table 2.1 provides a summary of the conservation significant flora recorded during survey work, as well as those species considered to be possible inhabitants of the immediate project area. Species that were considered as unlikely to occur following the survey by APM (2024) are not included in this summary table.

Table 2.1: Conservation significant flora recorded and potentially occurring in the project area.

Species	Conservation Status	Likelihood of occurrence
Acacia dilloniorum	P1	Possible – suitable habitat exists in the project area, no known records in immediate vicinity.
Beyeria lapidicola	P1	Recorded (*ecologia* 2010b)
Euphorbia sarcostemmoides	P1	Possible – suitable habitat exists in the project area
Stenanthemum mediale	P1	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
Stenanthemum patens	P1	Recorded (*ecologia* 2010b)
Acacia burrowsiana	P3	Possible – suitable habitat exists in the project area
Hemigenia virescens	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
Hibiscus ?krichauffianus	P3	Tentative record (APM 2024)
Homalocalyx echinulatus	P3	Possible - suitable habitat exists in the project area, previous records in immediate vicinity (*ecologia* 2010b)
Micromyrtus placoides	P3	Recorded (*ecologia* 2010b)
Prostanthera petrophila	P3	Recorded (*ecologia* 2010b)
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity
Tribulus adelacanthus	P3	Possible - previous records known from the Northen extent of the Weld Range
Verticordia jamiesonii	P3	Recorded (*ecologia* 2010b)
Acacia speckii	P4	Recorded (*ecologia* 2010b)
Dodonaea amplisemina	P4	Recorded (*ecologia* 2010b)
Grevillea inconspicua	P4	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.

The distribution of Priority species recorded historically and in the APM (2024) survey in relation to the proposed development infrastructure is shown on Figure 2.3 and Figure 2.4.

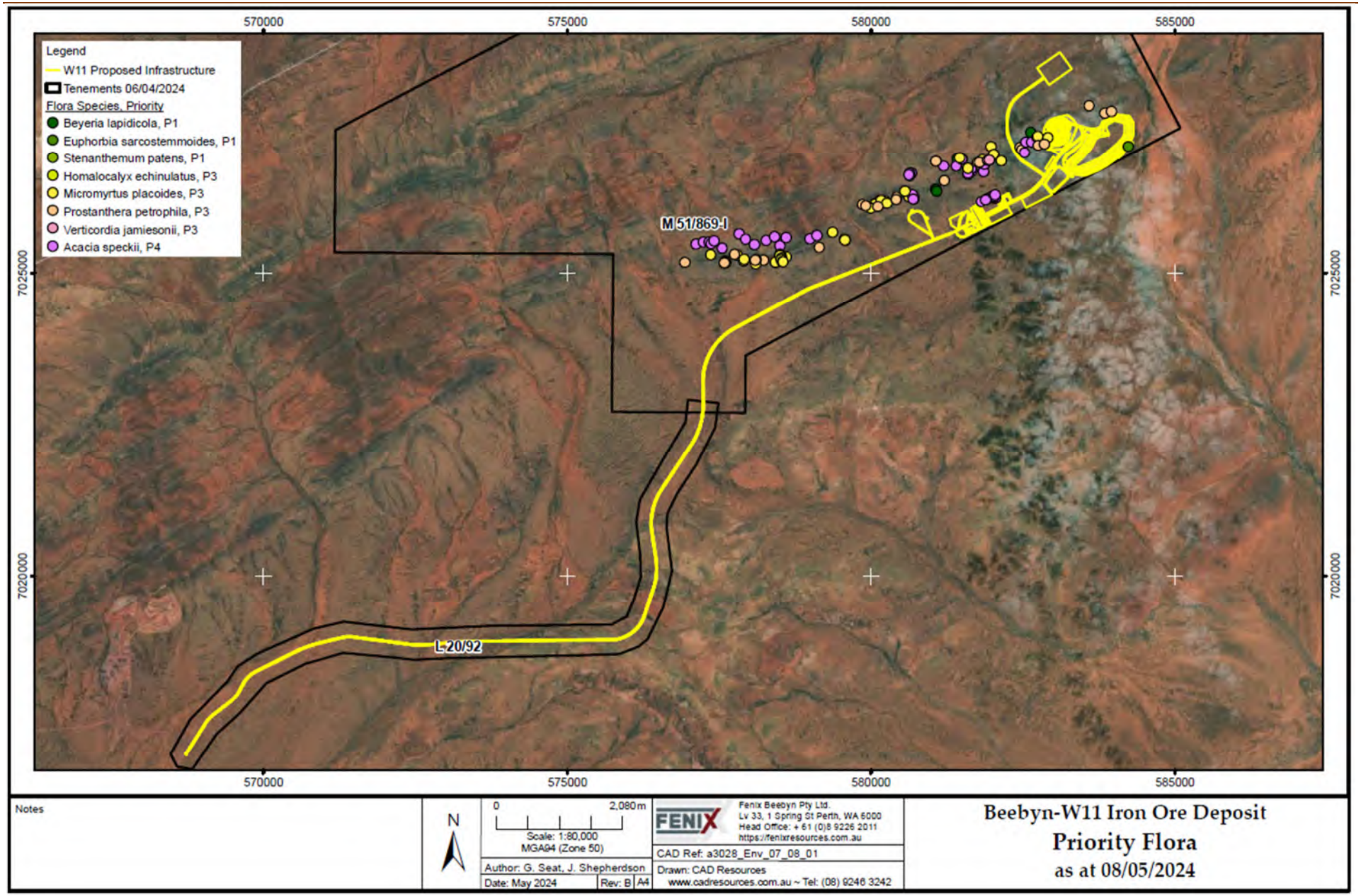


Figure 2.3: Previously recorded Priority flora locations within the proposed Beebyn-W11 project area.

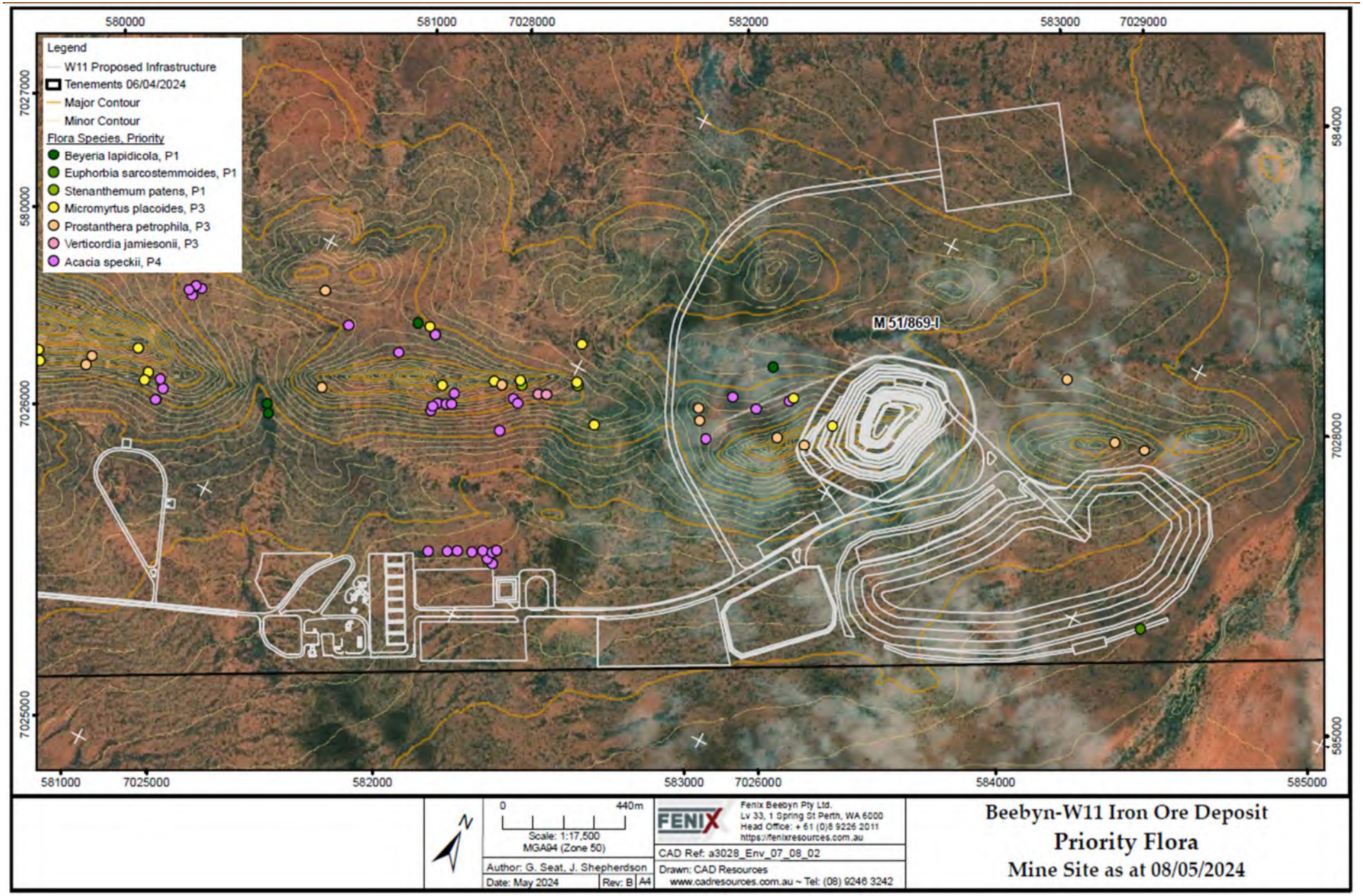


Figure 2.4: Previous Priority flora records within the proposed Beebyn-W11 infrastructure area.

2.3.2 Vegetation

APM (2024) recorded three vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008) and *ecologia* (2009a). The vegetation types described in the APM report are listed in Table 2.2 and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008). Figure 2.5 and Figure 2.6 show the distribution of vegetation types within the project area.

No State (DBCA) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area. The project area partly coincides with the Priority 1 Priority Ecological Community (PEC) Weld Range Vegetation Complexes (banded ironstone formation) (DBCA 2019). Figure 2.5 shows the PEC boundary and vegetation in relation to the proposed project layout. The PEC boundary defined by DBCA includes a 500 m "administrative buffer", which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.1% of this area.

ecologia (2009a) identified Communities 1 and 2 as being of conservation significance due to their restricted occurrence outside the area identified as a PEC, and of local significance due to the high number of taxa which were locally restricted to them. These communities predominantly occurred on BIF ridges. The APM (2024) mapped vegetation type 2a aligns with Community 2 as identified by *ecologia*.

Table 2.2: Vegetation types identified in the project area.

Code	Landform	Description	Soil type and surface geology
2a[2]	BIF outcrops	Scattered low *Acacia aneura, Psydrax latifolia* and *Acacia pruinocarpa* over *Eremophila latrobei* subsp. *latrobei* , *Thryptomene decussata* and *Philotheca brucei* mid sparse shrubland with *Ptilotus obovatus, Dodonaea pachyneura* and *Dysphania rhadinostachya* low sparse shrubland.	Light red sandy clay loam; BIF outcrops and rocklands on moderate to steep hillslopes.
3a[2]	Gravelly plains	*Acacia aneura, A. ramulosa* subsp. *linophylla* and *Acacia mulganeura* tall sparse shrubland over *Eremophila punicea*, *Eremophila forrestii* subsp. *forrestii* and *Eremophila margarethae* mid sparse shrubland with *Ptilotus obovatus*, *Eragrostis eriopoda* and ?*Swainsona purpurea* scattered low groundcover.	Red to red-brown clay loam to sandy clay loam with ironstone gravel to small stones at the surface; sandy outwash and gravelly plains and footslopes of BIF ranges, on gentle mid and lower slopes.
3a[1]	Sandy outwash plains	+/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.	Sandy outwash and gravelly plains and footslopes of BIF ranges.
3b[2]	Sandy outwash plains	*Acacia aneura*, *Acacia pruinocarpa* and *Acacia ramulosa* var *linophylla* low open woodland over *Eremophila forrestii* ssp *forrestii*, *Eremophila latrobei* and *Grevillea obliquistigma* mid open shrubland and *Ptilotus obovatus*, *Sida calyxhymenia* and *Abutilon cryptopetalum* sparse low shrubs.	Lower slopes and outwashes of ironstone colluvium; drainage lines and low-lying areas on sandy outwash plains.
3b[1]	Sandy outwash plains	*Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* closed shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.	Drainage lines and low lying areas on sandy and outwash plains.
4a[1]	Granite/dolerite slopes and plains	*Acacia* sp. Weld Range and *A. aneuria* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.	Undulating scree plains and mid to low slopes of granite and dolerite.
5a[1]	Various	*Acacia* low woodland over *Solanum ashbyae / lasiophyllum* and *Ptilotus obovatus* var. *obovatus l*ow shrubland over mixed low tussock grassland.	Ridge tops and upper slopes of BIF ridges, low lying semi saline flats, riparian areas and ironstone scree flat plains.
D	Disturbed – clear of vegetation		

[1] - *ecologia* (2010b)

[2] – APM (2024)

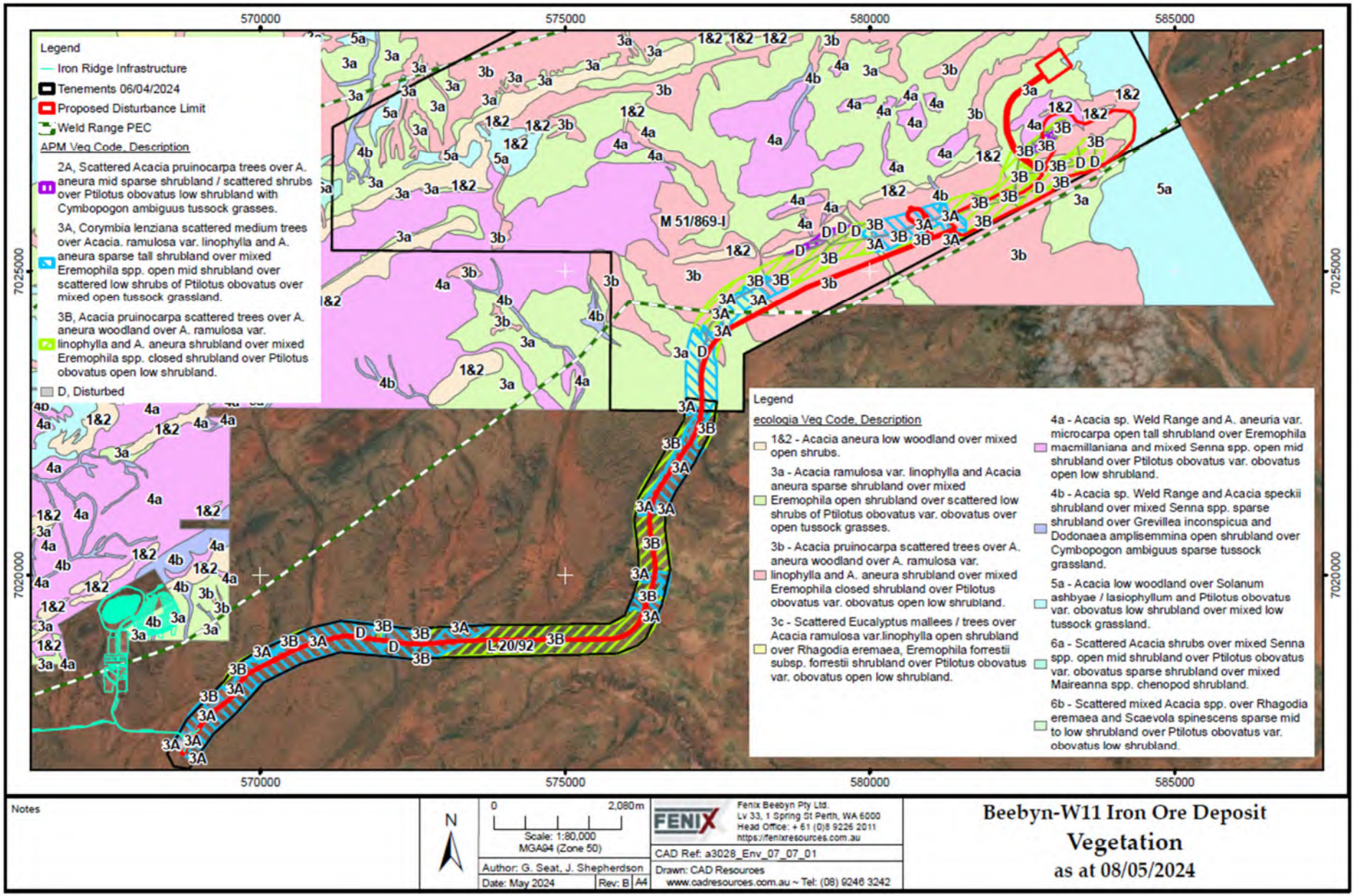


Figure 2.5: Previously recorded vegetation types associated with the project area.

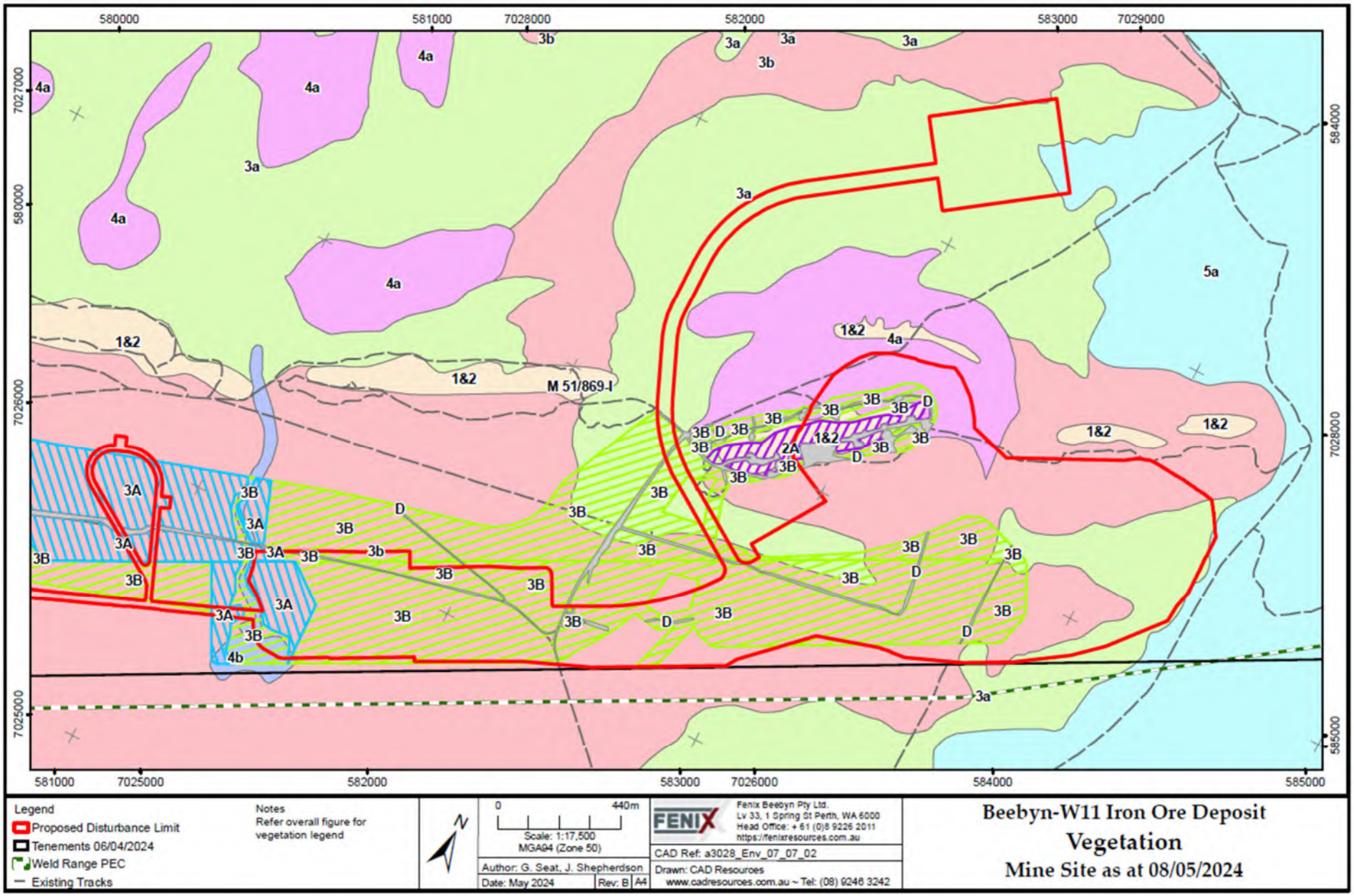


Figure 2.6: Previously recorded vegetation types associated with the infrastructure area.

2.4 Fauna

The surveys undertaken by *ecologia* (2010a) recorded 148 vertebrate species in and around the project area, including 80 bird species, 44 reptiles, 23 mammals (17 native and six introduced) and one amphibian.

Twenty vertebrate fauna species and two invertebrate species of conservation significance were identified from database searches of a 30 km radius from the study area including seven mammals, 11 birds and two reptiles (APM 2024). Species listed as Marine or species not known to inhabit terrestrial environments are considered very unlikely to inhabit the project area and have been excluded. Table 2.4 provides a summary of those conservation significant species occurring or likely to occur within the Project area. Previously recorded locations of conservation significant fauna are presented in Figure 2.7.

At the Weld Range, the long-tailed dunnart has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex (*ecologia* 2010a). Within the project area, APM (2024) found suitable habitat exists in the Banded Ironstone and Drainage Line habitats.

Old, inactive malleefowl mounds have been recorded in the project area; however, mounds may last decades after abandonment and the presence of inactive mounds is not a reliable indication of current presence. The species is not expected to be a resident at Weld Range but may persist in surrounding areas of dense unburnt habitat (APM 2024).

The project area is on the northernmost extent of malleefowl distribution at this longitude in WA, and the closest records are over 50 km to the south. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or near the larger drainage features low in the plains (APM 2024).

The project area contains some large trees that may be suitable for development of hollows by the Southern whiteface (a bird listed as Vulnerable); however, the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats, and historic clearing for mining exploration. The understory is sparse and the litter layer sparse to absent, but thicker in narrow bands around the drainage lines. Due to the poor condition of the understory, the area is unlikely to host habitat critical to the survival of the Southern whiteface (APM 2024).

Suitable foraging habitat for the grey falcon is present within the area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Known records are more than 50 km away and whilst the grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species (APM 2024).

The Western spiny-tailed skink typically resides in family groups in coarse woody debris, such as fallen log piles (Bradley et. al 2022) or burrows under boulders and exfoliated sheets of granite. This species is generally easy to detect as the animals use a communal latrine which persists for many months even when the animals are concealed or absent. The species was not recorded in the project area during the fauna survey undertaken by APM (2024).

The West Coast mulga slider has previously been recorded in the Weld Range, including locations close to the project area; however, APM (2024) found the habitats within the project area were generally of poor quality. Leaf litter is scarce within the project area and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable.

ecologia conducted a targeted *Idiosoma nigrum* survey at Weld Range (ecologia 2010b), which included a collection of detailed data on the spider's demography, population structure and habitat preference. A total of 76 ha was surveyed for *Idiosoma nigrum*, with 1,708 burrows found, all within the boundaries of drainage lines and underneath Acacia vegetation, predominately on the southern face of hill slopes. Within the Beebyn-W11 project area, 393 burrows were recorded, with an estimated population size of 274 ± 197 individuals (*ecologia* 2010b).

Biologic Environmental Survey Pty Ltd (Biologic) undertook a status review of the species in April 2019 and confirmed that the trapdoor spider found in the Weld Range area is now regarded as *Idiosoma clypeatum*, a Priority 3 species under the WA Biodiversity Conservation Act (Biologic 2019).

Intensive targeted surveys have previously been conducted throughout the Weld Range when the northern shield-backed trapdoor spider was regarded as *I. nigrum* and listed as a Vulnerable species under the *WA Wildlife Conservation Act 1950*. Over 1800 trapdoor burrows have been identified from database searches, the majority of which are from within the Weld Range. Biologic (2012) estimated the population size of *I. clypeatum* across the Weld Range to be more than 14,000 individuals.

2.4.1 Fauna habitat

APM (2024) identified four main habitat types in the project area, described in Table 2.3 and shown on Figure 2.8. The habitat types are similar to those identified at the nearby Iron Ridge project (*ecologia* 2020a).

Table 2.3: Fauna habitat recorded in the study area.

Habitat type	APM study area (ha)	Project area (ha)
Acacia Sand Plains	500.5	28.9
Banded Ironstone Ridge	6.1	3.3
Drainage Line	186.1	7.0
Mulga Woodland on Hill Slope	333.0	91.6
Disturbed	30.5	8.7
Not mapped (portion of M51/869)	-	122.6
Total	**1,056.2**	**262.1**

Acacia Sand Plains habitat occurs predominantly on the lower slopes of the study area, where the haul road is proposed to be developed. Associated soils include sandy to lightly rocky clay loam.

Mulga Woodland on Hill Slope habitat is dominated by *Acacia pruinocarpa* trees and *Acacia aneura* shrublands over on sandy or stony clay loam on hill slopes and is the most widespread habitat present in the area. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider. This habitat is considered widespread in the Weld Range area.

Drainage Line habitat provides suitable habitat for the west coast mulga slider. Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range in leaf litter fringing drainage lines.

Banded Ironstone Ridge habitat occurs in a small portion in the north of the project area and is the least widespread habitat present in the area. The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas, such as this habitat type. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes. Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory). The species was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats, especially banded iron formation ranges within the Midwest.

Approximately 122 ha were not covered in the survey undertaken by APM; however, based on the surveyed area, this unmapped portion was expected to be *Mulga Woodland on Hill Slope* habitat.

Table 2.4: Conservation significant fauna likelihood of occurrence.

Common name	Scientific name	EPBC status	WA status	Comments	Likelihood of occurrence
Mammals					
Bilby	*Macrotis lagotis*	VU	VU	The local record has a low level of certainty and was recorded in 1984.	Unlikely
Black-flanked rock-wallaby	*Petrogale lateralis lateralis*	EN	EN	Historical local record is a fossilised specimen	Unlikely
Brush-tailed mulgara	*Dasycercus blythi*		P4	Historical local record is a fossilised specimen	Unlikely
Ghost bat	*Macroderma gigas*	VU	VU	Historical local record is a fossilised specimen	Unlikely
Gould's mouse	*Pseudomys gouldii*	VU	VU	Historical local record is a fossilised specimen	Unlikely
Greater stick-nest rat	*Leporillus conditor*	VU	CD	Historical local record is a fossilised specimen	Unlikely
Long-tailed dunnart	*Antechinomys longicaudata*		P4	Suitable habitat present in the BIF	Recorded
Birds					
Curlew sandpiper	*Calidris ferruginea*	CR, MI	CR	No suitable habitat present	Unlikely
Fork-tailed swift	*Apus pacificus*	MI	IA	Potential to overfly the area	Possible
Grey falcon	*Falco hypoleucos*	VU	VU	Suitable foraging habitat present. No suitable nesting habitat.	Possible
Grey wagtail	*Motacilla cinerea*	MI	MI	No suitable habitat present	Unlikely
Malleefowl	*Leipoa ocellata*	VU	VU	Inactive mounds have been recorded	Possible
Night parrot	*Pezoporus occidentalis*	EN	CR	No suitable habitat present	Unlikely
Pectoral sandpiper	*Calidris melanotos*	MI	IA	No suitable habitat present	Unlikely
Peregrine falcon	*Falco peregrinus*		OS	Foraging habitat present	Possible
Sharp-tailed sandpiper	*Calidris acuminata*	VU, MI	IA	No suitable habitat present	Unlikely
Southern whiteface	*Aphelocephala leucopsis*	VU	-	All habitats suitable, project area unlikely to host habitat critical to survival.	Possible
Yellow wagtail	*Motacilla flava*	MI	MI	No suitable habitat present	Unlikely
Reptiles					
West coast mulga slider	*Lerista eupoda*		P1	Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.	Possible
Western spiny-tailed skink	*Egernia stokesii badia*	EN	VU	Suitable habitat may be present	Possible
Invertebrate					
Northern shield-backed trapdoor spider	*Idiosoma clypeatum*		P3	Recorded within the study area, then identified as *I. nigrum*	Recorded
Shield-backed trapdoor spider	*Idiosoma nigrum*	VU	EN	All specimens in the Murchison region determined to be *I. clypeatum*	Unlikely

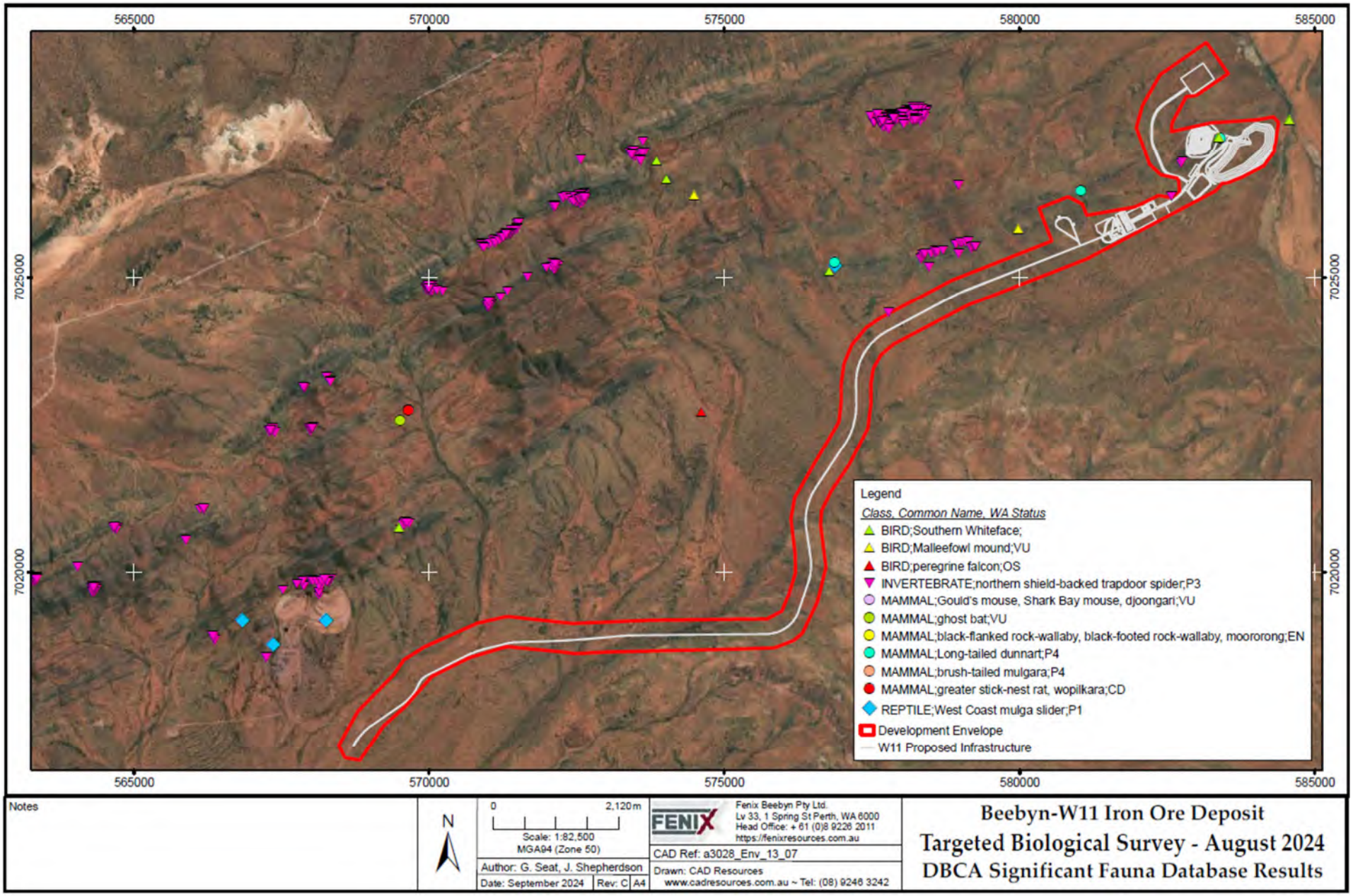


Figure 2.7: Database search records of conservation significant fauna within 30 km of the project area.

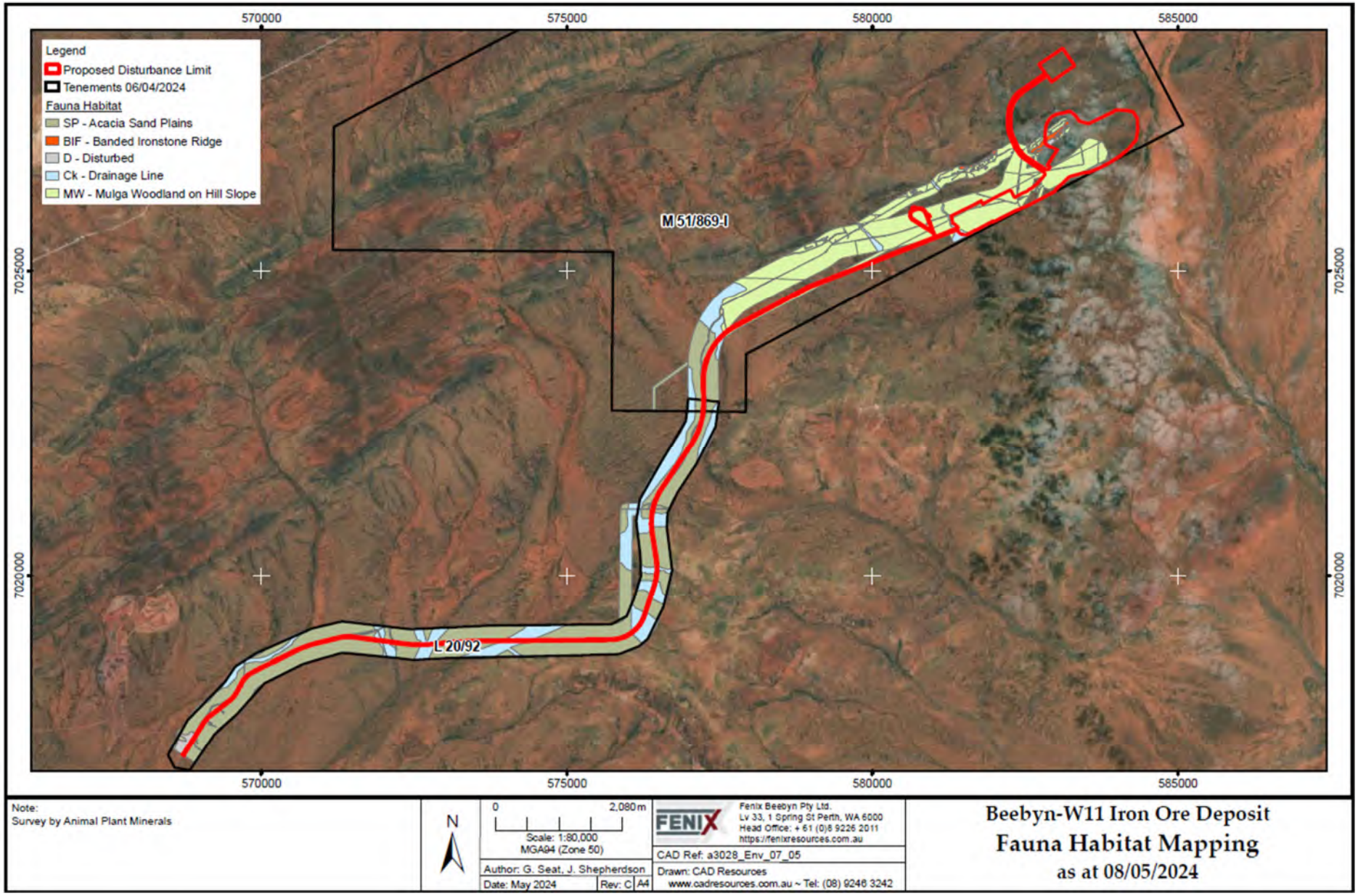


Figure 2.8: Fauna habitat in the project area (APM 2023).

3.0 METHODOLOGY

3.1 Personnel

The survey work was undertaken by botanist Jenny Borger and biologist/environmental consultant Jeremy Shepherdson.

Jenny has more than 20 years' experience as a botanist and specialises in flora of the Midwest Region. She has undertaken and been involved in numerous surveys of the Weld Range and surrounding region for clients including Sinosteel Midwest Corporation Ltd, Fenix Resources and DBCA. Jenny is very familiar with the flora of this area, including each of the conservation significant species that have been previously recorded.

Jeremy has over 25 years' experience as a biologist and environmental consultant across Western Australia. He has extensive experience in biological surveys, including targeted surveys for conservation significant species such as the malleefowl, spiny-tailed skink and shield-backed trapdoor spiders. He is competent in identification of flora, fauna and fauna habitat with considerable experience in the Midwest Region.

3.2 Desktop review

Prior to undertaking this survey, available information from previous surveys and database searches was reviewed, the results of which are detailed in Sections 2.3 and 2.4.

Descriptions and photos of each of the previously recorded Priority flora were printed for reference in the field if needed. Previous vegetation mapping and recorded locations of Priority flora was loaded into hand held GPS units for ground truthing.

3.3 Field survey

The field survey was undertaken from the 29th July to 3rd August 2024 and involved:

- a targeted survey for conservation significant flora within the project area
- confirming the presence and identity of Hibiscus ?*krichauffianus*
- refining and expanding the vegetation mapping as defined by APM (2024) and *ecologia* (2010a)
- a targeted survey for conservation significant fauna within the project area, including *Idiosoma clypeatum* burrows and malleefowl (*Leipoa ocellata*) mounds
- refining and expanding the fauna habitat mapping as defined by APM (2024)

72 survey points (20 x 20 m quadrats and relevés) were used for vegetation sampling. At each point, the following information was recorded:

- GPS location and survey date
- physical features (landform, elevation, soil type, ground surface cover, litter, rock type)
- vegetation condition as described for the Eremaean province (EPA 2016)
- dominant growth form, height, cover, and species for each strata (upper, mid and ground) compatible with NVIS Level 6 (ESCAVI 2003)
- level and nature of disturbances (e.g. weed presence, fire, and time since last fire, impacts from grazing, vegetation clearing, erosion)
- list of all species within the quadrat including weeds and listing species average height and cover.

Plants unable to be determined in the field were collected for later identification using relevant taxonomic keys and/ or compared against specimens at the WA Herbarium.

The locations of previously recorded conservation significant flora and fauna were revisited and a species search and population count (if species present) undertaken. Areas of suitable habitat (as identified in Table 2.1 and Table 2.4) were also targeted for each conservation significant species with a possible or higher likelihood (as identified in Table 2.1 and Table 2.4) of occurring in the survey area.

Fauna habitat assessments were performed at each vegetation survey point. Descriptive data was recorded including soil type, landform and disturbances.

3.4 Limitations

An assessment of survey-specific issues and limitations for flora (EPA 2016) and fauna (EPA 2020) is detailed in Table 3.1.

Table 3.1: Study limitations.

Aspect	Constraint?	Comment
Availability of contextual information at a regional and local scale (EPA 2016 and 2020)	No	Detailed surveys have been undertaken in the project area (APM 2024, *ecologia* 2010a and b, *ecologia* 2009) and surrounds (*ecologia* 2020a and b, Biologic 2012, Bamford 2009). This information was adequate to provide appropriate contextual information for the current survey.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed (EPA 2016 and 2020)	No	The survey personnel have more than 20 years' experience undertaking surveys in Western Australia and have worked in the Murchison Bioregion since 2005.
Scope of the survey, e.g. were faunal groups excluded from the survey (EPA 2020)	No	The fauna scope was to target conservation significant fauna (including *Idiosoma clypeatum*) and verify fauna habitat mapping. This aspect was not a limitation.
Proportion of flora recorded and/or collected, any identification issues (EPA 2016)	No	Climatic conditions prior to the survey were average, with 75 mm rainfall received in the two months prior to the survey, resulting in many species flowering and easily identifiable. A minor number of specimens were not identified to the species level due to being sterile, none of these are expected to be flora of conservation significance.
Was the appropriate area fully surveyed (effort and extent) (EPA 2016 and 2020)	No	The area was surveyed fully.
Access restrictions within the survey area (EPA 2016 and 2020)	No	The survey area was accessible by vehicle and foot.
Survey timing, rainfall, season of survey (EPA 2016 and 2020)	No	The survey was undertaken in late Winter, and most perennials were flowering. The survey area is within the Eremaean botanical province. Recommended timing for flora and vegetation survey is 6-8 weeks post wet season (March – June) for primary survey, and a dry season survey (after winter rainfall if available) for supplementary survey (EPA 2016). The timing of the field survey is within the period recommended for supplementary surveys and coincides with the flowering period of many of the regions flora. Rainfall at Meekatharra during 2024 was above average (185.2 mm), with 196 mm received up to the time of survey,

Aspect	Constraint?	Comment
		including 75 mm in the two months prior to the survey (June and July). The overall condition of the vegetation was quite healthy.
Disturbance that may have affected the results of survey such as fire, flood or clearing (EPA 2016 and 2020)	No	Some historical disturbance was noted throughout the survey area; however, did not affect the results of the survey.
Problems with data and analysis, including sampling biases (EPA 2020)	No.	There were no data problems and this aspect was not a limitation.

4.0 RESULTS

4.1 Flora

A total of 151 species of flora were recorded within the survey area, from 35 Families and 77 Genera. One introduced (weed) species, *Oxalis ?corniculata* was recorded in one location (Site 49, Figure 4.4). The full list of species recorded is presented in Appendix 2.

Prior locations of Priority flora were investigated to determine whether the previously recorded individuals were still present. In some locations no specimens of the previously recorded Priority species could be located. On the exposed upper portions of BIF ridge there was evidence of vegetation death, likely resulting from several years of low rainfall, and it was considered likely that the previously recorded individuals had died. In other locations plant species very similar in appearance were located but the Priority species could not be. It is possible that the similar species were mistakenly identified as the Priority species if there were no flowering parts present at the time of the previous surveys.

The survey recorded seven DBCA Priority listed species in the project area, as outlined in Table 4.1 and shown in Figure 4.1 and Figure 4.2. No Threatened flora were recorded. Definitions of the conservation codes used in the table are included as Appendix 1.

Track logs of the surveyed area are presented in Figure 4.3.

Table 4.1: Priority flora recorded during the survey.

Species	Conservation Code	Number of locations	Number of individuals
Beyeria lapidicola	P1	2	100
Euphorbia sarcostemmoides	P1	1	1
Stenanthemum mediale	P1	102	264
Micromyrtus placoides	P3	61	1,075
Prostanthera petrophila	P3	18	108
Verticordia jamiesonii	P3	8	147
Acacia speckii	P4	25	51

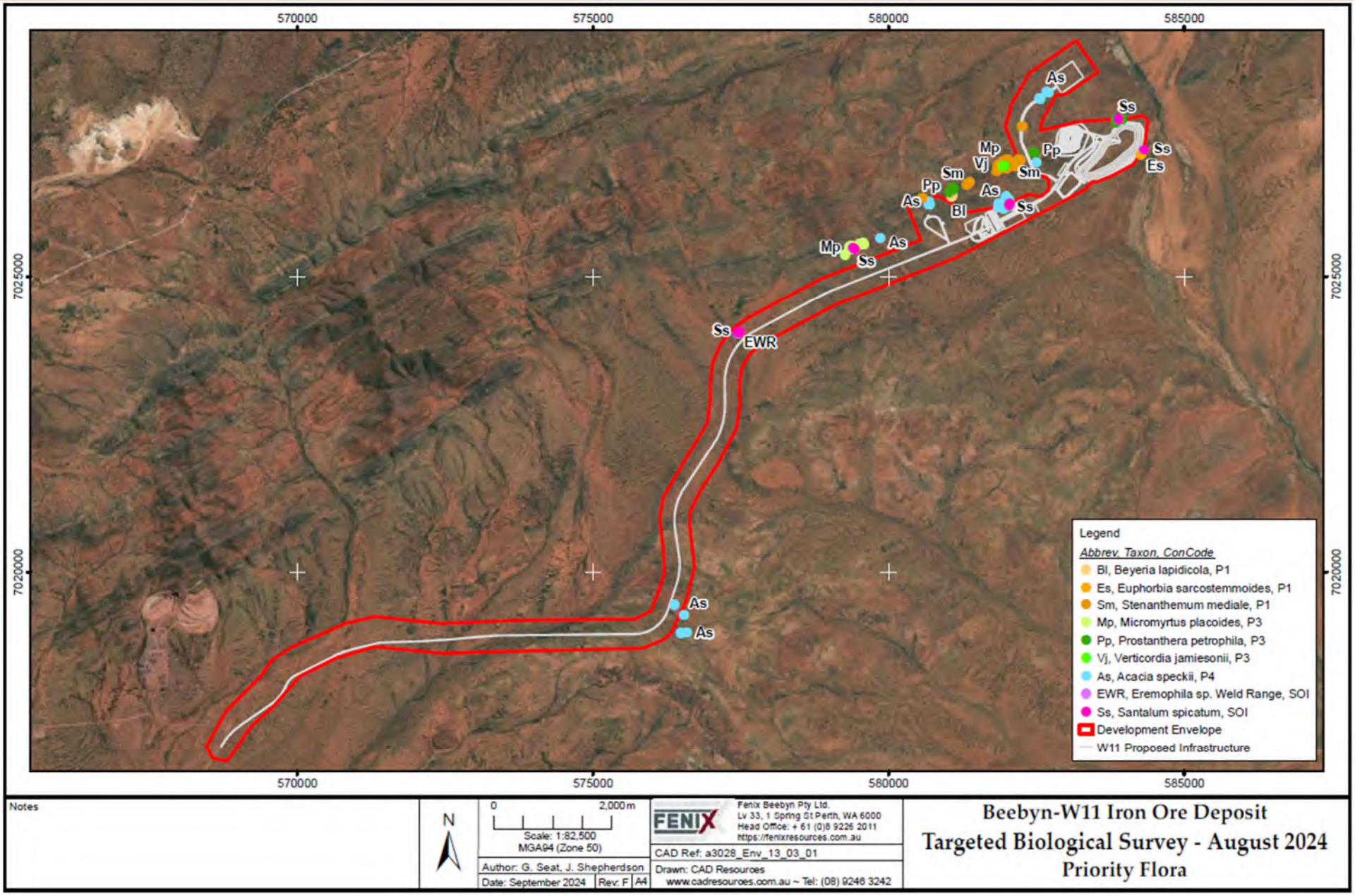


Figure 4.1: Priority flora recorded during the survey - overview.

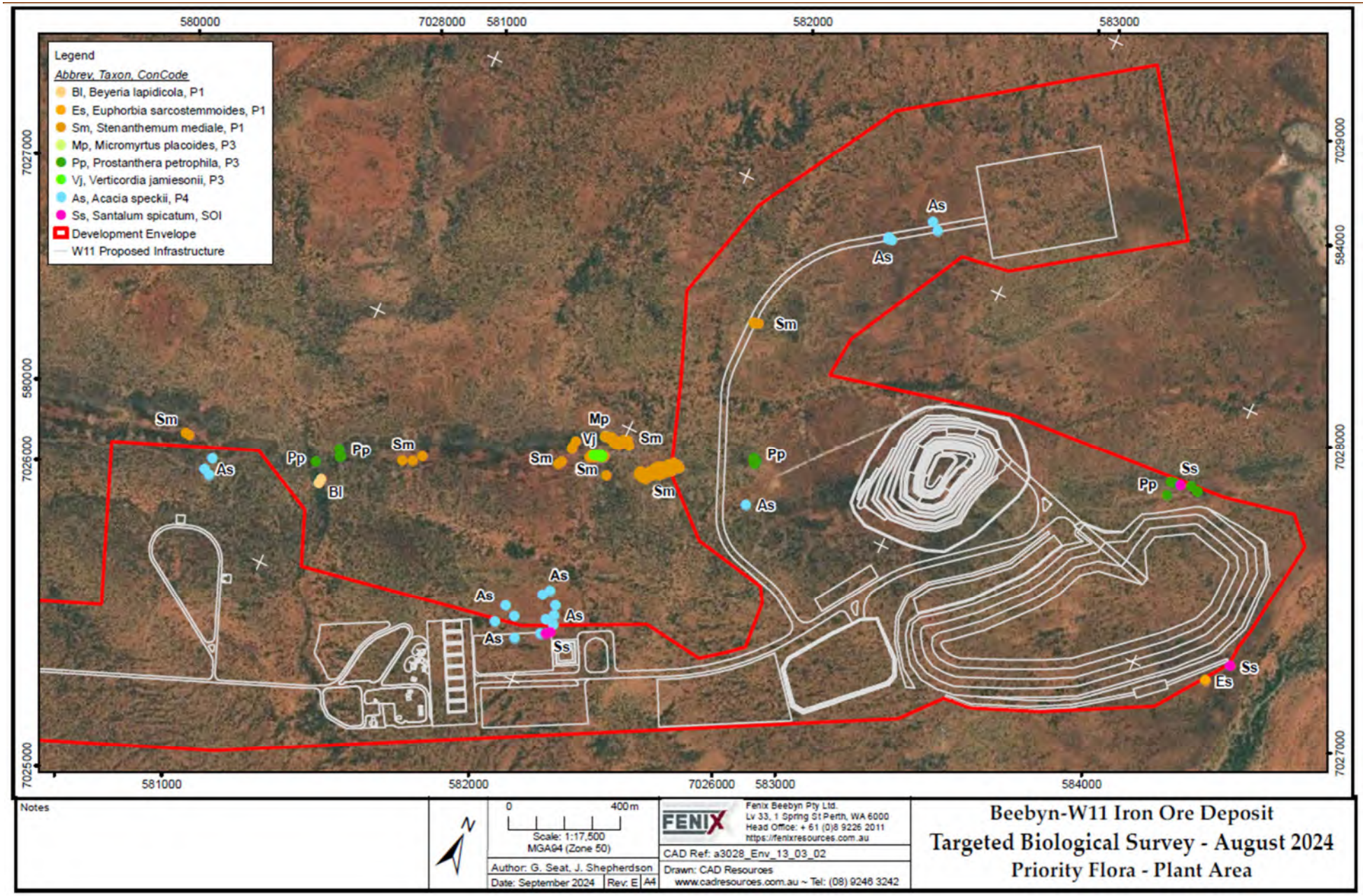


Figure 4.2: Priority flora recorded during the survey – mine area.

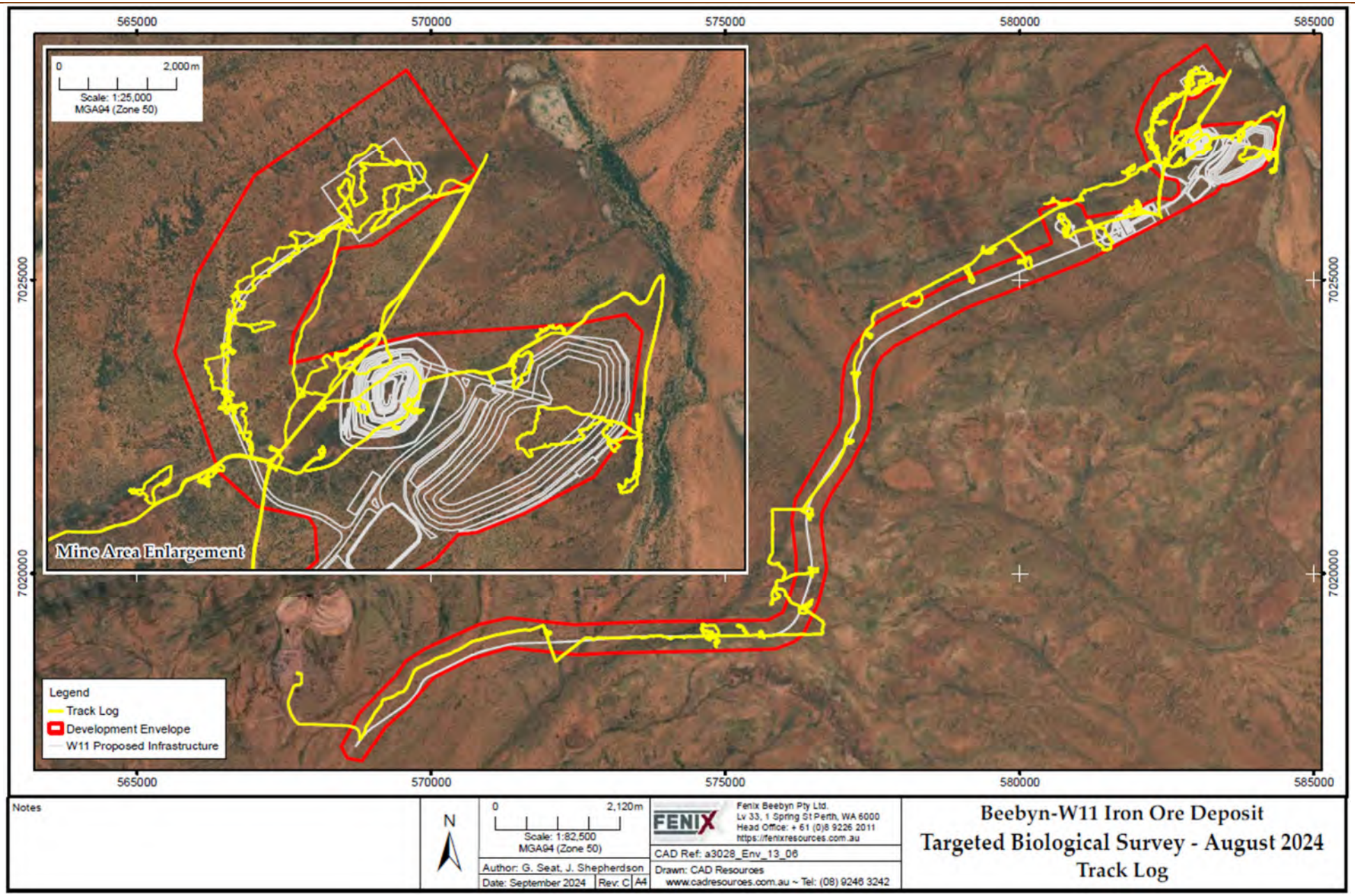


Figure 4.3: Track logs of the survey area.

4.1.1 *Beyeria lapidicola* – Priority 1

Beyeria lapidicola is a much branched shrub growing to 1.6 m high with resinous and sticky stems and leaves. The branches are pale, yellow-green becoming grey or black and leaves are narrow oblong, have three ribs on the under surface and are hairy between the ribs (*ecologia* 2012). This species has a known range of approximately 450 km (Western Australian Herbarium 1998–) and typically occurs on sand over banded ironstone or dry creek beds with sandy clay and fine gravel.

Prior recorded locations of *B. lapidicola* were investigated and in most cases plants were found to be dead or absent. A large previously recorded population in a creek line to the north (upstream) of the proposed infrastructure area was found to be healthy with more than 100 individuals present.

Within the Beebyn-W11 project area, no individuals were recorded within the proposed disturbance footprint with more than 100 plants present outside the development envelope. It is quite likely that *Beyeria lapidicola* will be present in other larger creek lines in the surrounding area. These are avoided by the proposed development.



Photograph 4.1: Numerous dead shrubs in the vicinity of one of the previously recorded *B. lapidicola* locations.



Photograph 4.2: *B. lapidicola* and its preferred habitat.

4.1.2 *Euphorbia sarcostemmoides* – Priority 1

Euphorbia sarcostemmoides is an erect, multi-stemmed, semi-succulent shrub growing to 2 m high. The preferred habitat for this species is sandstone ridges and quartzite hills (Western Australian Herbarium 1998–), however has been recorded on flat plains at Weld Range (*ecologia* 2012). *Euphorbia sarcostemmoides* has been recorded in both Western Australia and the Northern Territory, over a range of approximately 1,200 km.

A single individual was recorded in the W11 area during previous surveys and was found alive during this survey on the flat plain to the south of the proposed footprint (Photograph 4.3). A search of the surrounding area failed to find any additional specimens. The single individual is located close to, but outside the proposed footprint of a topsoil stockpile.



Photograph 4.3: The single *E. sarcostemmoides* plant, found growing within a dead shrub.

4.1.3 *Stenanthemum mediale* – Priority 1

Stenanthemum mediale is a shrub growing to 0.35 m high and has a known range of over 250 km (Western Australian Herbarium 1998–). The leaves are small, egg shaped with hairs on the under surface. This species can be confused with the more common *S. patens*, which has hairs on the upper surface, or both surfaces, of the leaf. The flowers of *S. mediale* are white, small, hairy tubular flowers primarily flowering in April – August.

Previously recoded locations of *S. patens* were investigated and found to be *S. mediale*, which was found to be abundant but quite localised along the ridge to the south-west of the proposed pit.

Within the Beebyn-W11 project area, more than 250 individuals were recorded, four of which will be impacted by the proposed development.



Photograph 4.4: *Stenanthemum mediale* growing on ridge habitat.

4.1.4 *Micromyrtus placoides* – Priority 3

Micromyrtus placoides is a shrub growing to 2.3 m, sometimes widely spreading with several stems or branches from the base (Western Australian Herbarium 1998–), occurring within the Murchison and Yalgoo IBRA bioregions (Eastern Murchison, Western Murchison and Tallering subregions). It has a relatively restricted distribution from near Cue (Weld Range), south-west to Tallering Peak. It occurs extensively across Weld Range in a variety of habitats including undulating plains, dry creek beds, hill slopes and ridges, on red-orange or orange-yellow sandy clay, coarse gravel, BIF, laterite, quartz and basalt (Western Australian Herbarium 1998–).

A targeted survey undertaken in 2020 estimated 33,724 individuals occur at Weld Range (*ecologia* 2020c). Over 25,000 individuals have also been recorded at Tallering Peak (*ecologia* 2020b), around 250 km south-west of the project area.

Prior locations of recorded *M. placoides* in the vicinity of the proposed W11 project were investigated and in several instances the plants were found to be dead (Photograph 4.5) or no longer present, particularly on the higher and more exposed positions on the BIF ridges. In some locations *Micromyrtus sulphurea* (Photograph 4.6) appears to have been mistakenly recorded as *M. placoides*. The two species are very similar without buds or flowers.

Several new locations of healthy and flowering *M. placoides* were recorded during the survey including patches of young plants (Photograph 4.7) and individuals having emerged in rehabilitated exploration disturbance (Photograph 4.8).

Within the Beebyn-W11 project area, over 1000 individuals were recorded, all outside the proposed disturbance footprint.



Photograph 4.5: Dead vegetation at a previously recorded *M. placoides* location on an exposed section of BIF ridge.



Photograph 4.6: *Micromyrtus sulphurea* may have been mistakenly recorded as *M. placoides* in some locations.



Photograph 4.7: One of the locations recorded during this survey with more than 90 *M. placoides* plants growing beneath an Acacia shrub.



Photograph 4.8: *M. placoides* growing in rehabilitated exploration disturbance.

4.1.5 *Prostanthera petrophila* – Priority 3

Prostanthera petrophila is a spreading shrub growing to 1.5 m high with densely hairy branches and white flowers usually produced in August. This species typically grows on lateritic soils and has a known distribution of approximately 350 km (Western Australian Herbarium 1998–).

In several locations previously recorded *P. petrophila* were dead or no longer present. In some locations individuals appeared to have died off and were recovering (Photograph 4.9) following rainfall in the months before the survey, and in other locations *P. petrophila* individuals were healthy, in good numbers and flowering (Photograph 4.10).

Within the Beebyn-W11 project area, 108 individuals were recorded from 18 locations, with 17 individuals located within the proposed disturbance footprint.



Photograph 4.9: Dead *Prostanthera petrophila* plants around a recovering plant on BIF ridge.



Photograph 4.10: *Prostanthera petrophila* in flower.

4.1.6 *Verticordia jamiesonii* – Priority 3

Verticordia jamiesonii is a shrub growing to 0.6 m high with white/pink flowers between September and October. The preferred habitat for this species is sand or clay on lateritic breakaways and it has a known range of over 350 km (Western Australian Herbarium 1998–).

The previously recorded population was located and appeared to be in good health, although not flowering at the time of this survey.

Within the Beebyn-W11 project area, all 147 individuals were recorded outside the proposed disturbance footprint.

4.1.7 *Acacia speckii* – Priority 4

Acacia speckii is a bushy, rounded shrub or tree growing up to 3 m high, on rocky soils over granite, basalt or dolerite (Western Australian Herbarium 1998–). At Weld Range, this species has been observed to occur across the mid-sloped rocky hills and near drainage lines (*ecologia* 2012). *Acacia speckii* has a known range of over 150 km, between Meekatharra and Cue, with disjunct populations recorded further south in Yalgoo.

Many of the previously recorded locations of *Acacia speckii* appear to have been misidentification of *Acacia ramulosa var. linophylla*, which is very similar in appearance and more common in the area. Within the Beebyn-W11 project area, 25 individuals were recorded within the proposed disturbance footprint and 26 outside.

4.1.8 Other species of interest

Despite searches being undertaken in the areas of previous Hibiscus ?*krichauffianus* records (as recorded by APM), this species was not found during the survey, nor were any species that are similar in appearance.

Santalum spicatum (Sandalwood) is a slow-growing, long-lived small woody tree or shrub, with a known range extending across most of Western Australia (Western Australian Herbarium 1998–). Sandalwood is economically valuable and is commercially harvested for the aromatic oils contained in the heartwood. As the heartwood extends throughout the tree, the whole tree (including roots) is removed and processed. This commercial use is considered a threat to populations and therefore, Sandalwood is listed as a Vulnerable species on the IUCN Red List (International Union for the Conservation of Nature 2024).

27 individuals of Sandalwood were recorded during the survey, two of which occur within the proposed disturbance footprint.

Eremophila sp. Weld Range is a dense, hairy, grey shrub growing to 1.5 m high with flattened, shortly hairy leaves to and mauve to purple flowers. This species is known from a range of approximately 150 km, including at the Weld Range on upper slopes and drainage lines of rocky hills (Brown and Buirchell, 2021). *Eremophila* sp. Weld Range is not of conservation significance, however, has a relatively restricted distribution and is only known from three lodged specimens within WA (FloraBase 1998-).

Two *Eremophila* sp. Weld Range individuals were recorded during the survey (Photograph 4.11), in a single location in a drainage depression in *Acacia pruinocarpa* and mulga forest (vegetation type 12), outside of the proposed disturbance footprint.



Photograph 4.11: *Eremophila* sp. Weld Range.

4.2 Vegetation

A total of 72 survey points were used for vegetation mapping and their locations are shown in Figure 4.4. Vegetation site descriptions are included in Appendix 3.

The survey refined the six vegetation types recorded by APM (2024) into 16 vegetation types, described in Table 4.2 and shown in Figure 4.5 to Figure 4.18. Vegetation condition of the survey area was considered ‘Good’ with historically disturbed areas (generally the western end and central survey areas) considered ‘Poor’ or ‘Completely Degraded’.

Table 4.2: Vegetation types recorded during the survey.

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
1	*Acacia pruinocarpa* open woodland or isolated trees over *Acacia aptaneura, A. caesaneura, A. craspedocarpa* tall sparse shrubland over *Eremophila fraseri* subsp. *fraseri, Acacia tetragonophylla, Rhagodia eremaea, Teucrium teucriiflorum* sparse shrubland over *Ptilotus obovatus, Menkea villosula, Goodenia tenuiloba* low sparse to open shrubland; understory denser under pockets of trees. Landform: Stony plains and lower slopes CSF: *Euphorbia sarcostemmoides* P1 Not representative of PEC.	71.4	48.4	
2	*Acacia pruinocarpa* mostly absent; *Harnieria kempeana* subsp. *muelleri*, *Acacia* sp. Weld Range occasional *Acacia incurvaneura, A. pteraneura, Acacia aptaneura, Grevillea berryana* tall open shrubland over *A. ramulosa* var. *linophylla, Ptilotus rotundifolius, Eremophila fraseri* subsp. *fraseri, E. glutinosa, E. forrestii* subsp. *forrestii* sparse shrubland over *Eragrostis eriopoda, Ptilotus aervoides, Erodium cygnorum,* low sparse tussock grassland. Landform: lower to upper midslopes on south facing colluvial outwash slopes; stony and gravel mantles Representative of PEC – aligns with Community 3 identified by Markey & Dillion (2008)	37.1	30.0	
3	*Acacia ramulosa var. linophylla, A. rhodophloia* isolated tall shrubs over *Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *latrobei, Acacia ramulosa* var. *linophylla, Harnieria kempeana* subsp. *muelleri, Sida s*p. Golden calyces glabrous open shrubland over *Erodium cygnorum, Goodenia tenuiloba* Landform: Hills; mostly mid to upper slopes; south aspect Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	62.2	45.4	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
4	*Acacia pruinocarpa, A. incurvaneura* isolated trees over *Eremophila latrobei* subsp. *latrobei, Dodonaea pachyneura, Philotheca brucei* subsp. *brucei, Prostanthera petrophila, Tribulus suberosus* open shrubland over *Ptilotus obovatus, Micromyrtus sulphurea, Eremophila latrobei* subsp. *latrobei, Dysphania rhadinostachya* subsp. *rhadinostachya, Stylidium longibracteatum, Goodenia tenuiloba, Hysterobaeckea occlusa* low open shrubland/ low open forbland. Representative of PEC – aligns with Communities 1b and 2 identified by Markey & Dillion (2008)	8.4	5.7	
5	*Acacia incurvaneura* low open woodland/ tall sparse shrubland over *Acacia* sp. Weld Range, *Eremophila macmillaniana* tall sparse shrubland over *Eremophila macmillaniana, Senna glaucifolia, Ptilotus rotundifolius* open shrubland over *Eremophila forrestii* subsp. *forrestii, E. macmillaniana, Hibiscus sturtii* low sparse shrubland over *Maireana melanocoma, Ptilotus aervoides, Goodenia tenuiloba* low sparse chenopod shrubland. Landform: Hill; BIF ridge and upper slopes, moderate to steep slopes; > 80 % rock, boulders, rock outcrops CSF: *Acacia speckii* P4 Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	46.3	29.5	
6	*Acacia incurvaneura, A. pruinocarpa, A. fuscaneura* low woodland over *Acacia ramulosa* var. *linophylla, Psydrax latifolia* tall open shrubland over *Eremophila forrestii* subsp. *forrestii, E. georgei, Rhagodia eremaea, Senna artemisioides* subsp. *xsturtii, S. glutinosa* subsp. *xluerssenii* shrubland over *Erodium cygnorum, Tetragonia cristata, Isoetopsis graminifolia, Menkea villosula, Cheilanthes sieberi* subsp. *sieberi* low forbland. Landform: Drainage lines and depressions; lower to midslopes; water gaining areas Not representative of PEC.	60.1	24.3	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
7	*Acacia incurvaneura, A.* sp. Weld Range, *A. speckii* tall sparse shrubland over *Ptilotus rotundifolius, Eremophila fraseri, E. latrobei, Senna artemisioides* subsp. *helmsii* sparse shrubland over *Sida ectogama, Ptilotus aervoides, P. schwartzii , Erodium cygnorum l*ow sparse shrubland. Landform: Hill; Midslopes; dolerite; very rocky, minor outcrops CSF: *Acacia speckii* P4 Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	37.5	3.7	
8	*Acacia incurvaneura, A. pruinocarpa* tall open shrubland over *Acacia ramulosa, Eremophila latrobei, Scaevola spinescens, Senna glaucifolia,* sparse shrubland over *Eremophila latrobei, Stenanthemum mediale, Sida ectogama, Micromyrtus sulphurea* low sparse shrubland. Landform: Low hill; minor outcrops CSF: *Stenanthemum mediale* P1 Representative of PEC – aligns with Community 2 identified by Markey & Dillion (2008)	16.7	1.8	
9	a) Patches of Acacia *pruinocarpa* low woodland over *Acacia incurvaneura, A. ramulosa* var. *linophylla* tall open shrubland over *Eremophila simulans* subsp. *simulans, E. georgei, E. forrestii* subsp. *forrestii* open shrubland over *Eragrostis eriopoda, Paspalidium basicladum, Ptilotus obovatus* low sparse tussock grassland. b) Tall open shrubland of *Acacia incurvaneura* and *A. ramulosa* var. *linophylla* over sparse shrubland over low sparse tussock grassland c) Mulga low woodlands further away from disturbance areas Landform: Hardpan plain lower catchment Not representative of PEC.	231.0	66.3	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
10	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa, A. ramulosa* var. *linophylla, Grevillea berryana,* low open woodland/ tall open shrubland over *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *filifolia, Acacia* spp. open shrubland over *Eremophila jucunda* subsp. *jucunda, E. forrestii* subsp. *forrestii, E. simulans* subsp. *simulans, Sida ectogama, S.* sp. Golden calyces glabrous, *Ptilotus schwartzii, Eragrostis eriopoda* low sparse shrubland. Landform: Low gravel hills Not representative of PEC.	129.5	9.1	
11	a) *Acacia pruinocarpa, A. incurvaneura* open forest over *Glycine canescens, Santalum spicatum, Psydrax latifolia* vineland over *Acacia ramulosa* var. *linophylla, Glycine canescens, Psydrax latifolia, Eremophila forrestii* subsp. *hastieana, E. georgei* open shrubland over *Sida ectogama, Ptilotus obovatus, Glycine canescens, Rhagodia eremaea* low shrubland b) *Acacia pruinocarpa, A. incurvaneura* open forest over *Psydrax suaeveolens* low open woodland over *Eremophila forrestii* subsp. *hastieana, E. georgei, Sida ectogama, Glycine canescens* shrubland over *Ptilotus obovatus, Eremophila georgei, Acacia incurvaneura* low open shrubland. Landform: Alluvial plain; broad unincised drainage line. Not representative of PEC.	11.3	1.6	
12	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa* low woodland/ *A. tetragonophylla, A. craspedocarpa, Psydrax latifolia* tall open shrubland/ *Eremophila forrestii* var. *forrestii* or var. *hastieana, A. ramulosa, Eremophila georgei* shrubland/ *Sida ectogama, Cheilanthes sieberi* low shrubland. Landform: Drainage lines lower catchment, plains; often associated with VC11 Not representative of PEC.	89.2	6.6	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
13	Groves: *Acacia pruinocarpa* low isolated trees over *Acacia incurvaneura, A. tetragonophylla* tall sparse shrubland over *Acacia ramulosa* var. *linophylla, A. incurvaneura, Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *latrobei, E. georgei* open shrubland over *Eremophila georgei, E. foliosissima, Ptilotus schwartzii, Stenopetalum filifolium, Menkea villosula, Isoetopsis graminifolia* low open forbland Stony plain: *Acacia aptaneura* tall sparse shrubland over *Acacia tetragonophylla, A. ramulosa* var. *linophylla Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Eremophila jucunda subsp. jucunda* or *E. compacta* or *E. punicea, Ptilotus schwartzii, Solanum lasiophyllum, Eragrostis eriopoda, Monachather paradoxus* low isolated to sparse shrubs and grass tussocks. Landform: Ironstone gravel plain Not representative of PEC.	410.3	33.7	
14	*Acacia aptaneura, A. grasbyi* low open woodland over *Eremophila pantonii, Acacia aptaneura, Senna glaucifolia* sparse shrubland over *Maireana thesioides, M. triptera, Senna glaucifolia* low open chenopod shrubland. Not representative of PEC.	9.4	0.7	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
15	*Acacia aneura, A. sp. Weld Range* tall isolated shrubs over *Eremophila macmillaniana, Acacia* sp. Weld Range, *Acacia speckii* sparse shrubland over *Cephalipterum drummondii, Sida ectogama, Aristida contorta* low sparse forbland. CSF: *Acacia speckii* P4 Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	43.5	3.5	
16	*Acacia pteraneura, A. fuscaneura* tall open shrubland over *Acacia fuscaneura, Grevillea deflexa, Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Calytrix desolata, Grevillea deflexa* low sparse shrubland over *Calytrix desolata, Grevillea deflexa* low sparse shrubland over *Cymbopogon ambiguus* low sparse tussock grassland. Not representative of PEC.	24.2	2.2	
CL	Cleared areas	20.9	8.8	-
	Total	**1,309.2**	**321.4**	-

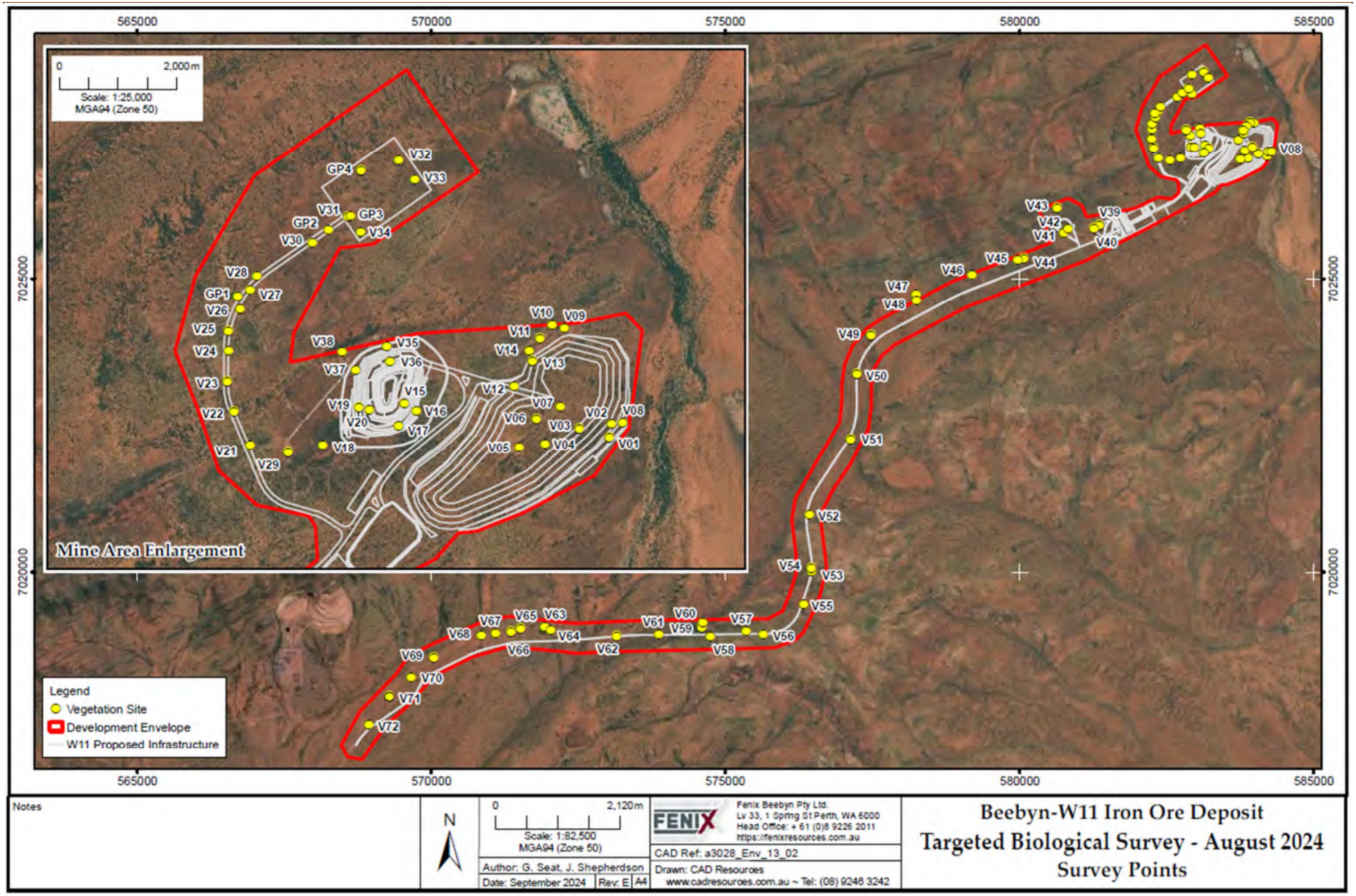


Figure 4.4: Vegetation mapping survey points.

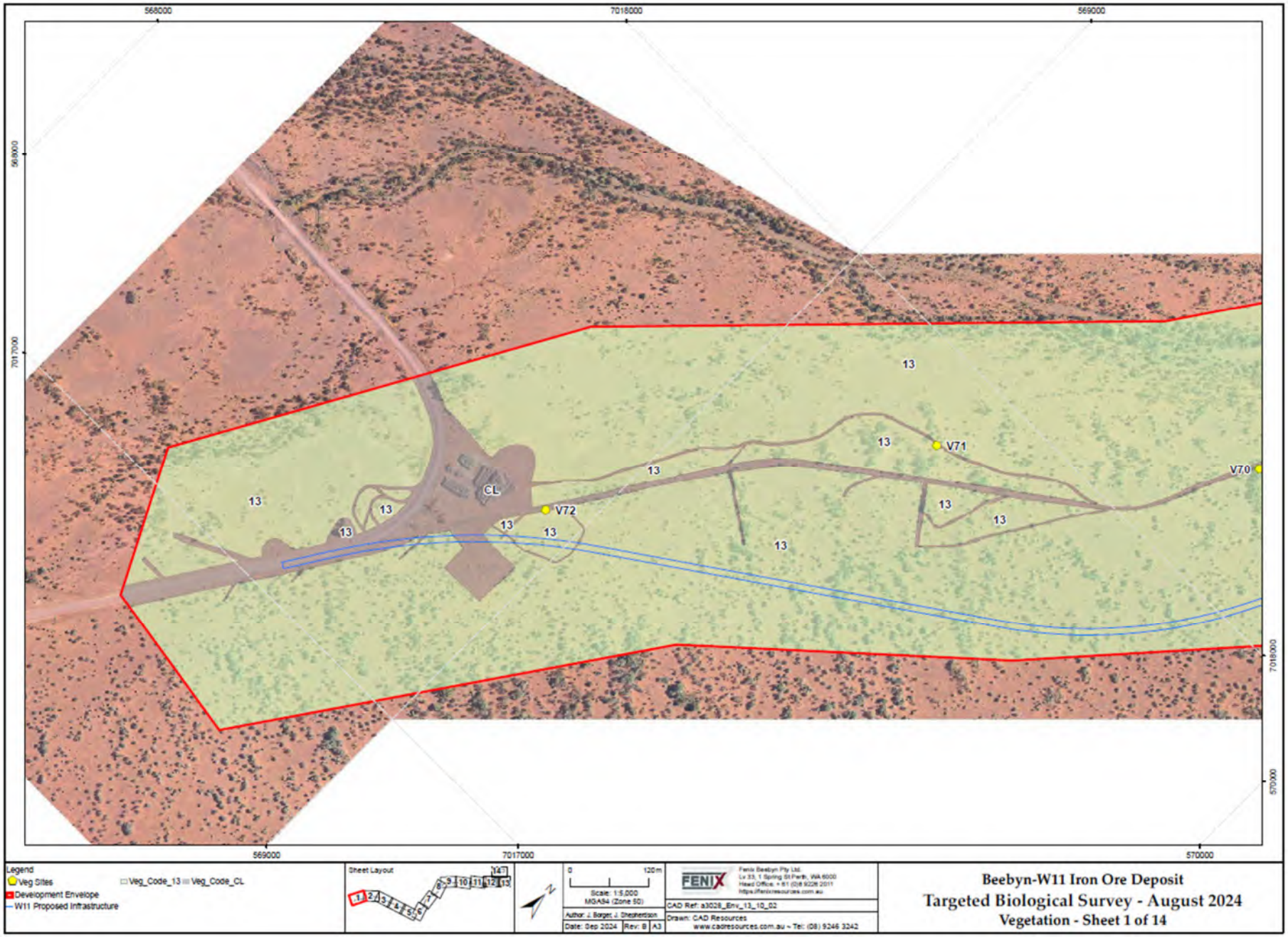


Figure 4.5: Vegetation types mapped within the survey area – map 1 of 14.

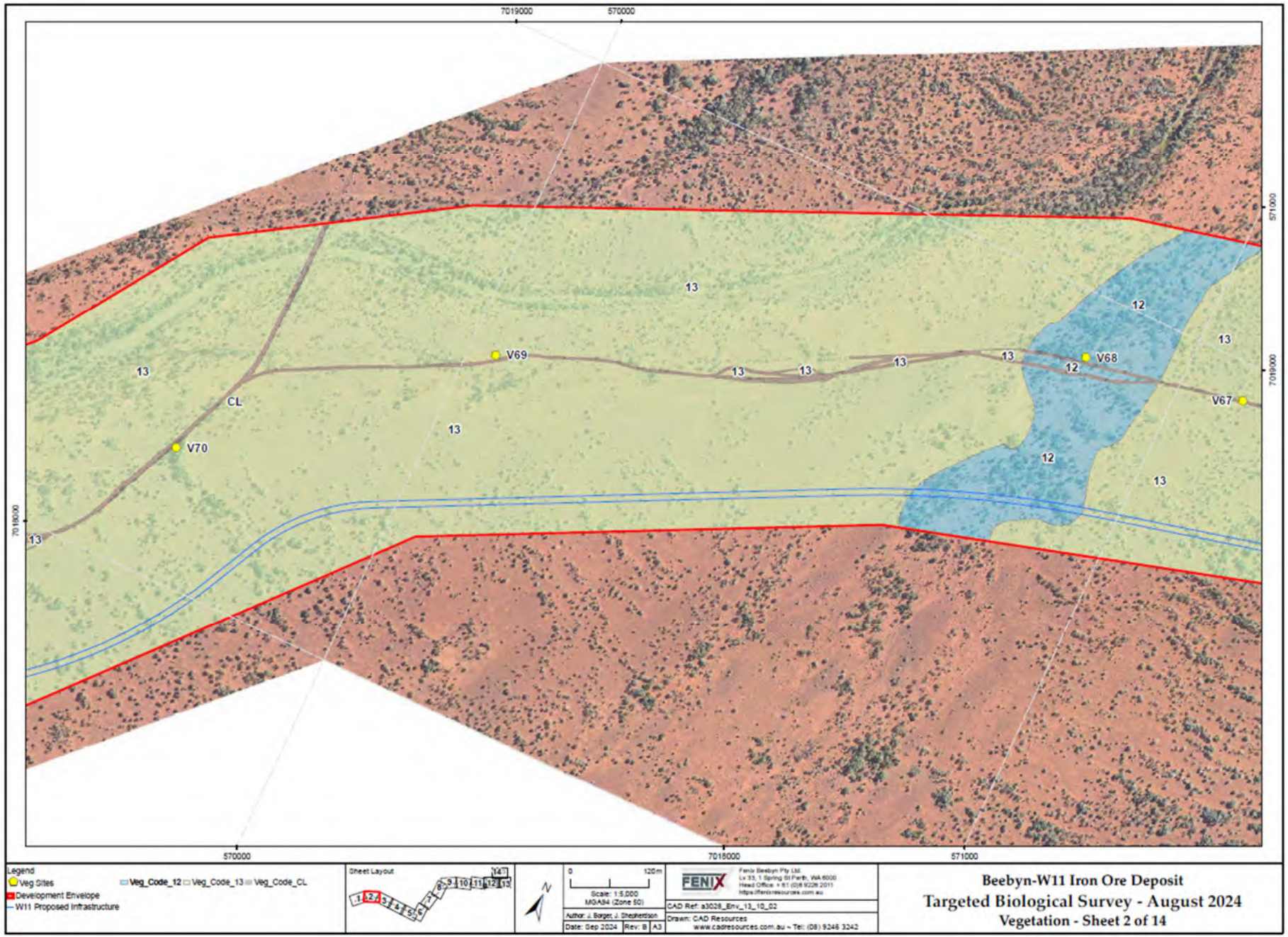


Figure 4.6: Vegetation types mapped within the survey area – map 2 of 14.

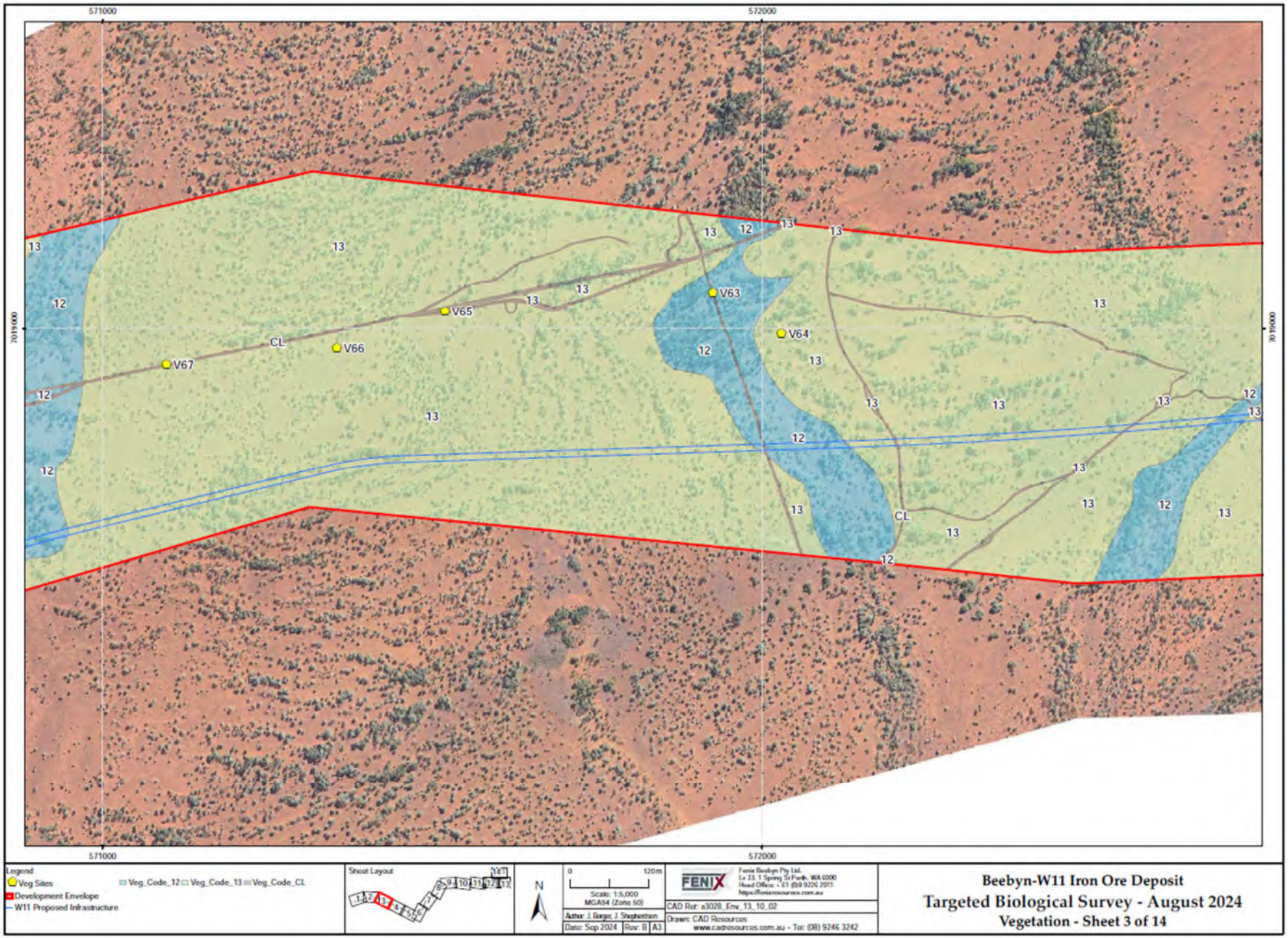


Figure 4.7: Vegetation types mapped within the survey area – map 3 of 14.

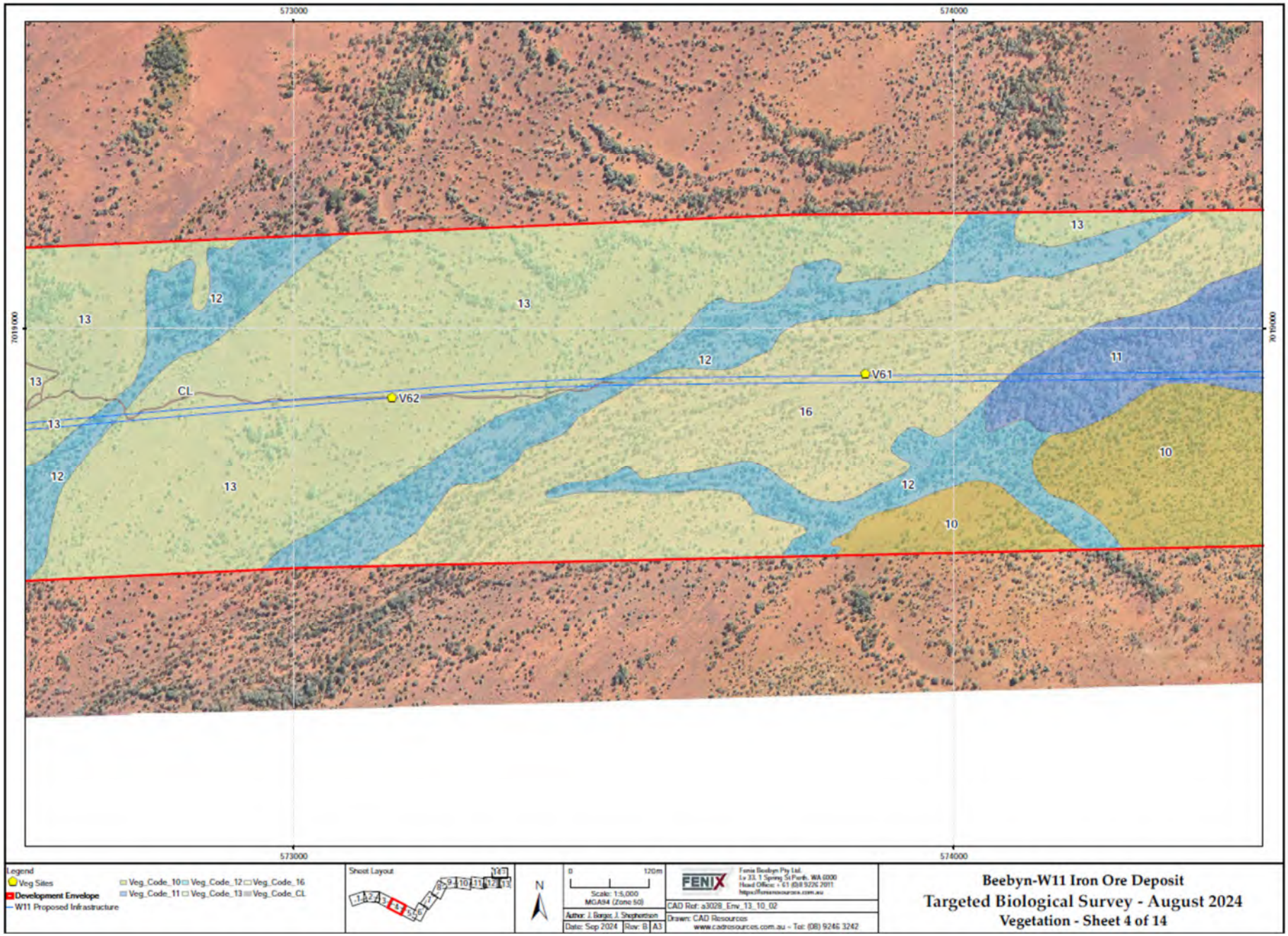


Figure 4.8: Vegetation types mapped within the survey area – map 4 of 14.

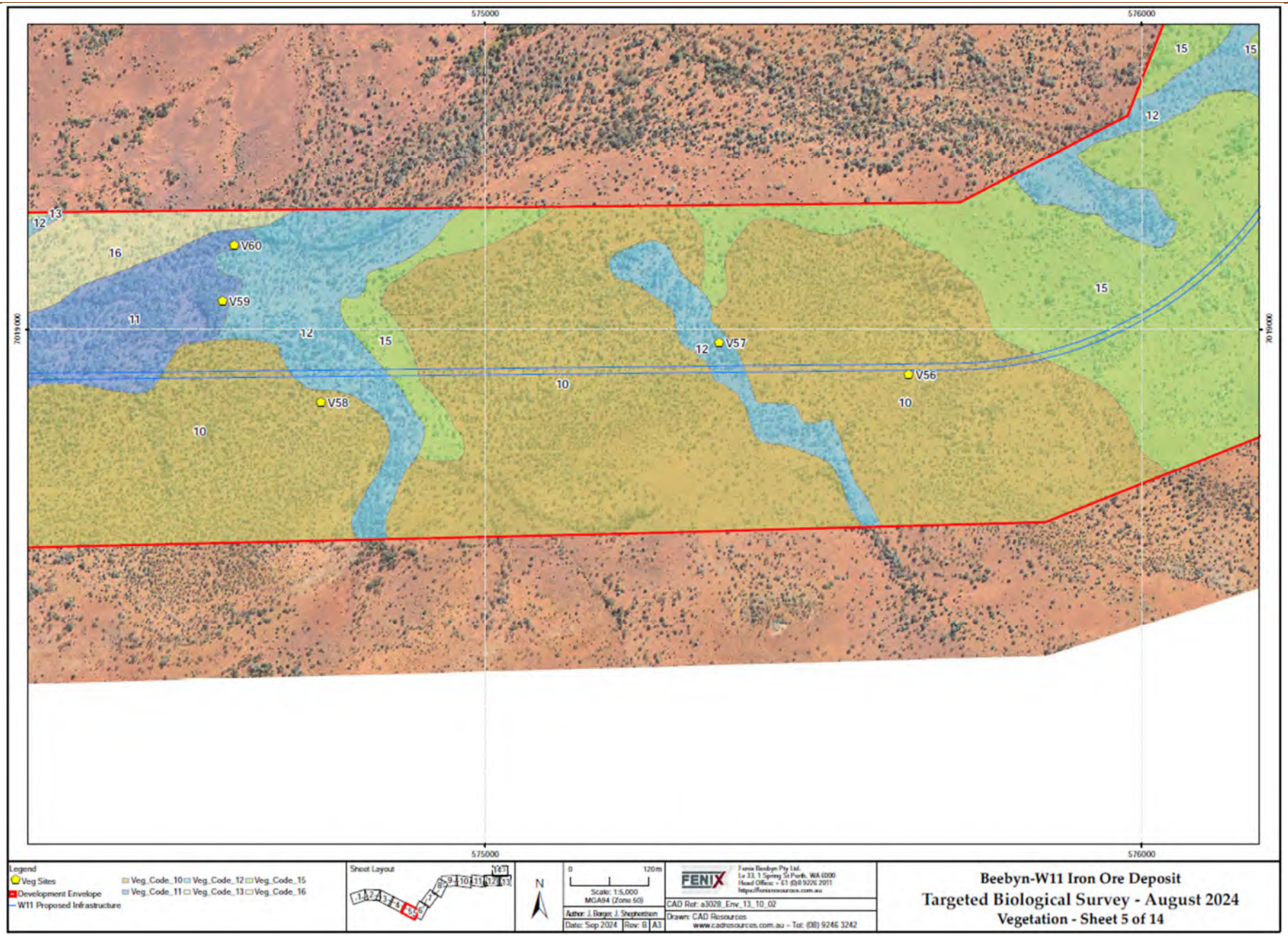


Figure 4.9: Vegetation types mapped within the survey area – map 5 of 14.

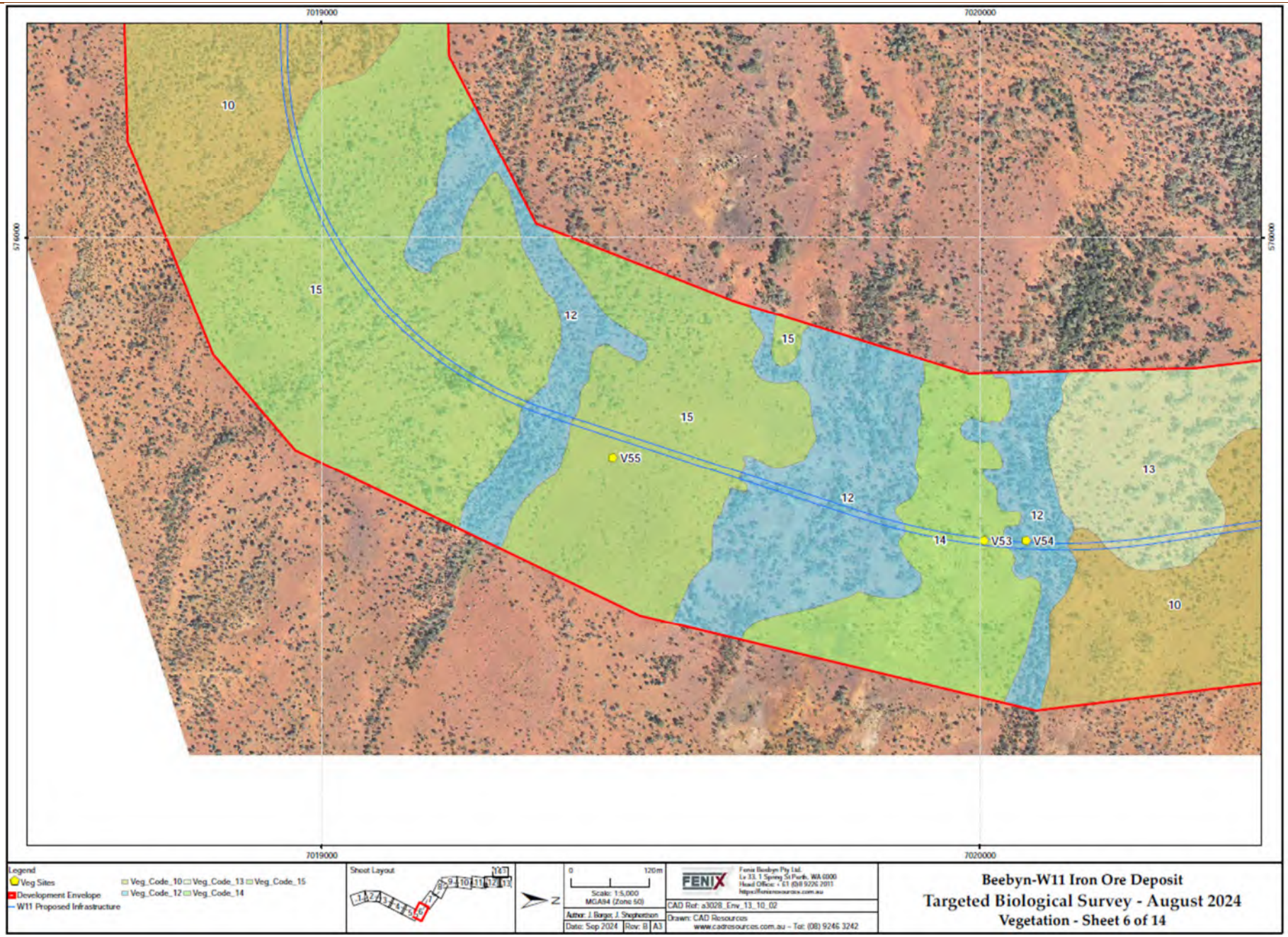


Figure 4.10: Vegetation types mapped within the survey area – map 6 of 14.

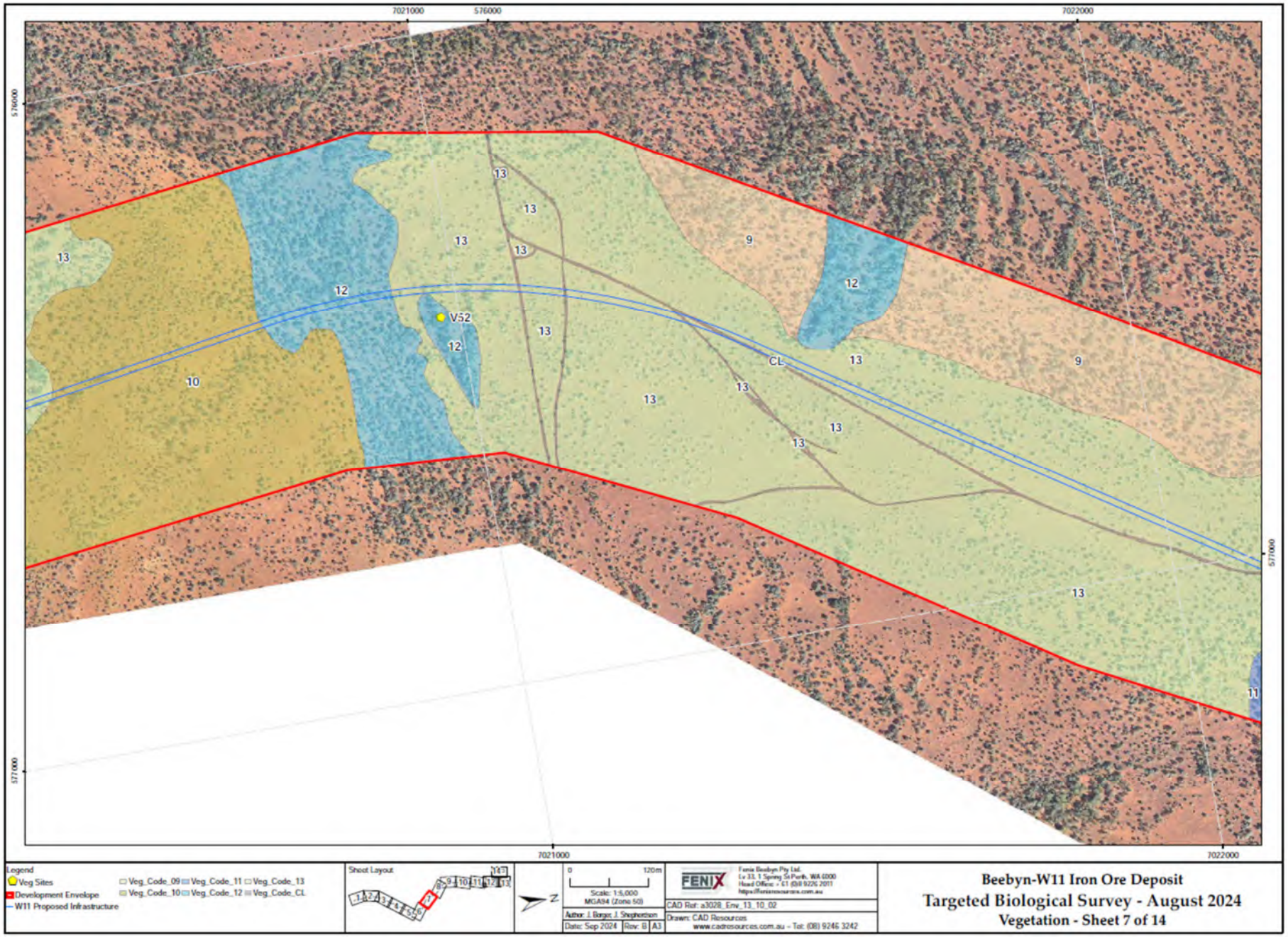


Figure 4.11: Vegetation types mapped within the survey area – map 7 of 14.

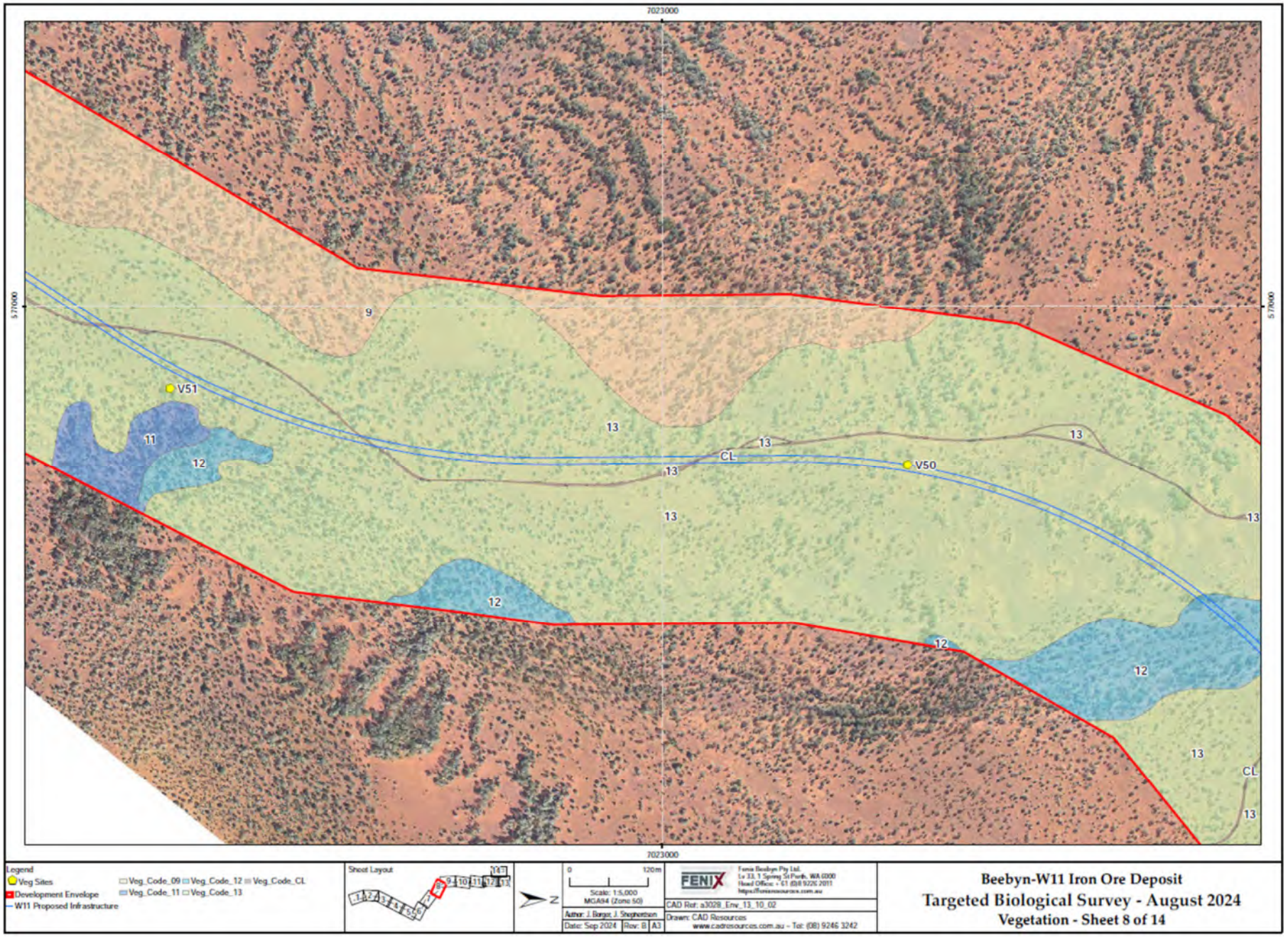


Figure 4.12: Vegetation types mapped within the survey area – map 8 of 14.

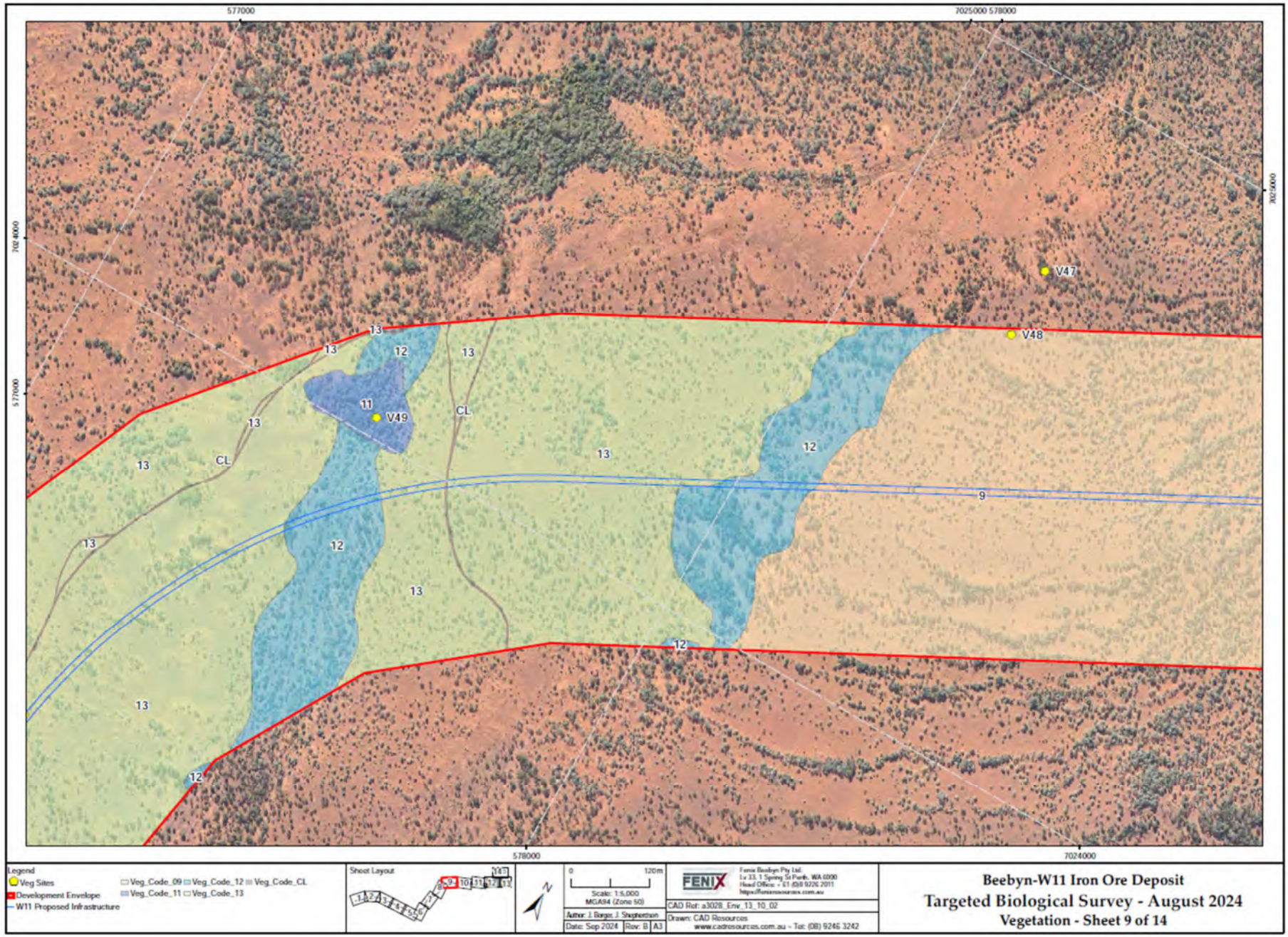


Figure 4.13: Vegetation types mapped within the survey area – map 9 of 14.

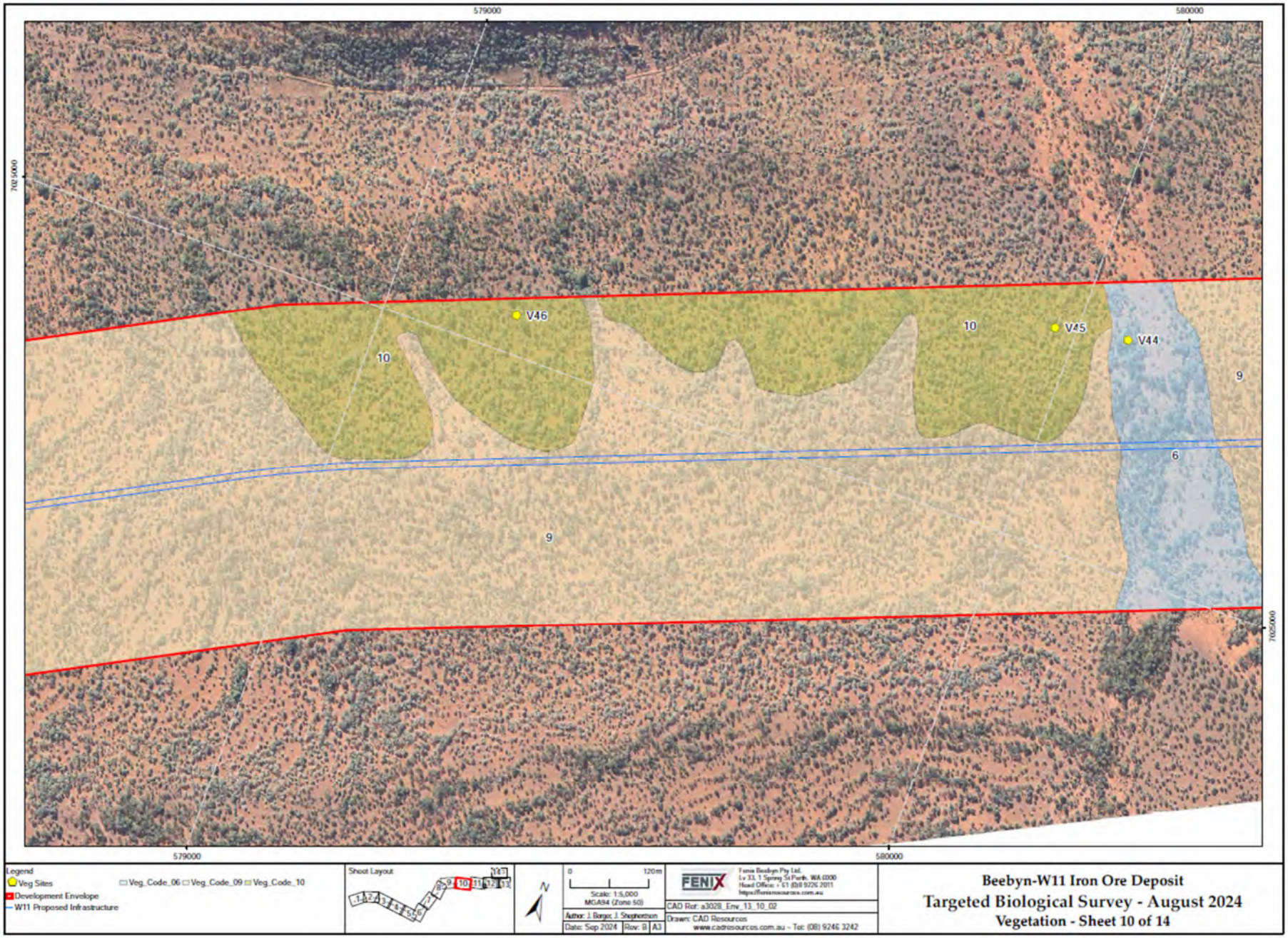


Figure 4.14: Vegetation types mapped within the survey area – map 10 of 14.

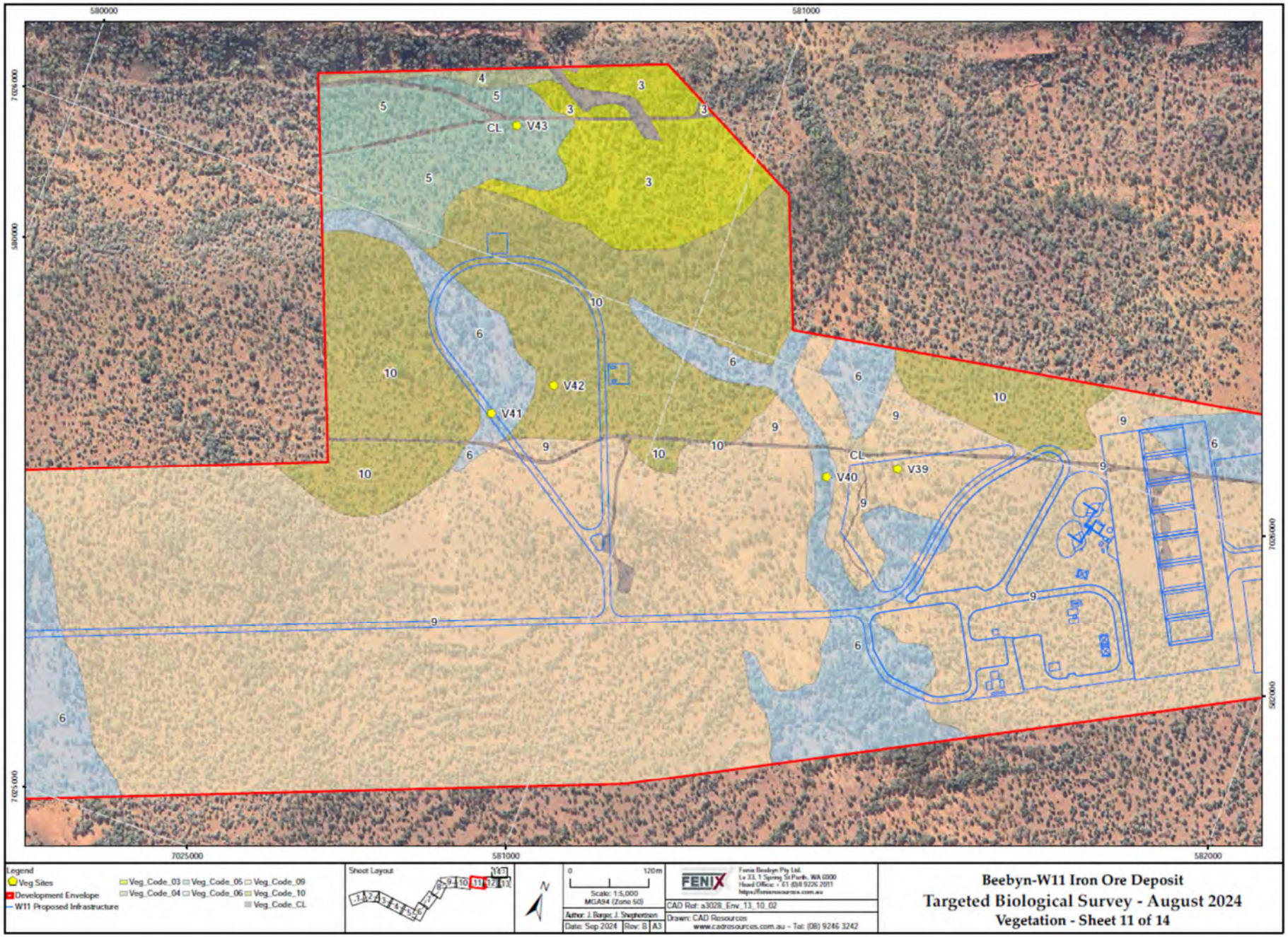


Figure 4.15: Vegetation types mapped within the survey area – map 11 of 14.

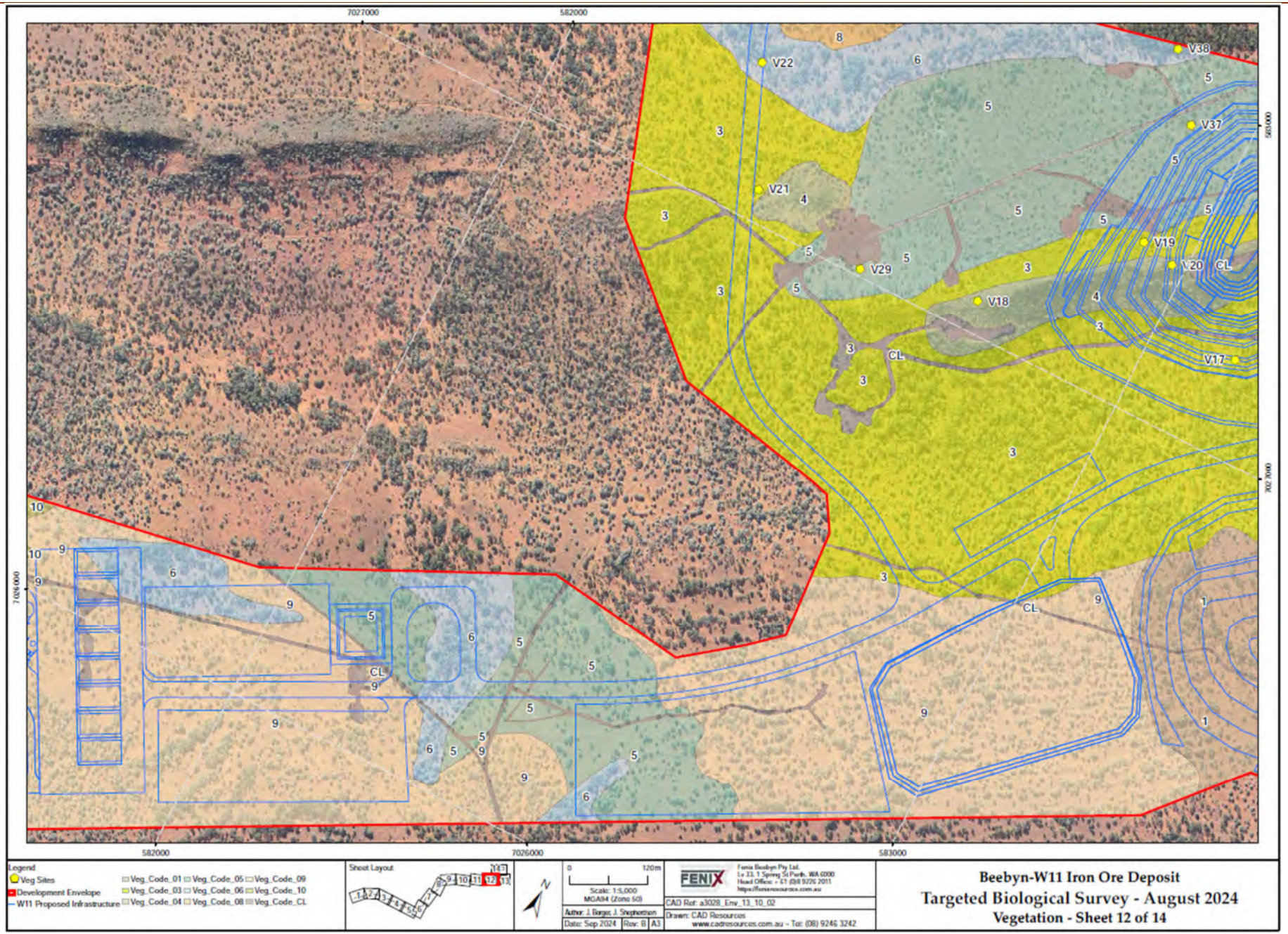


Figure 4.16: Vegetation types mapped within the survey area – map 12 of 14.

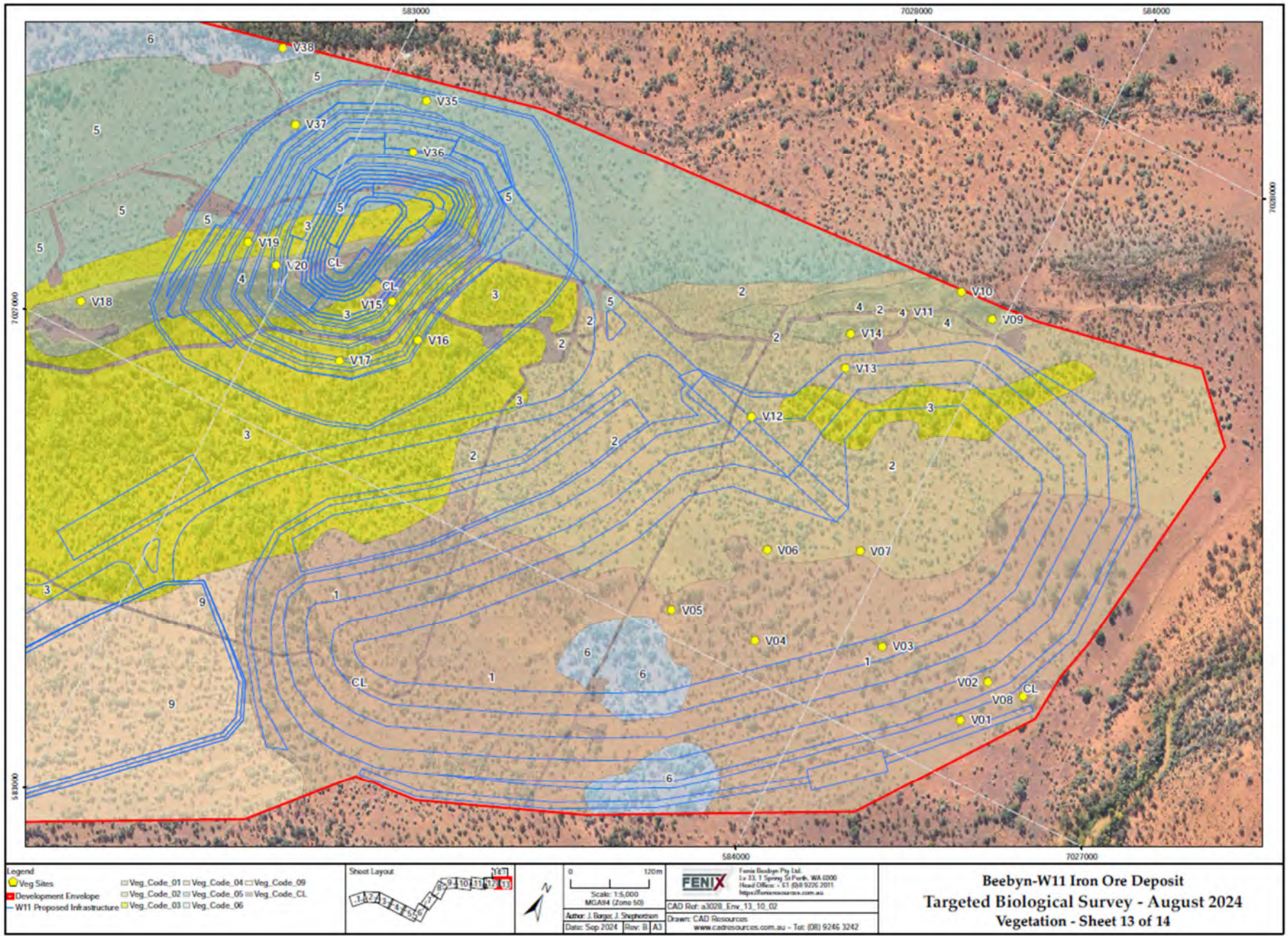


Figure 4.17: Vegetation types mapped within the survey area – map 13 of 14.

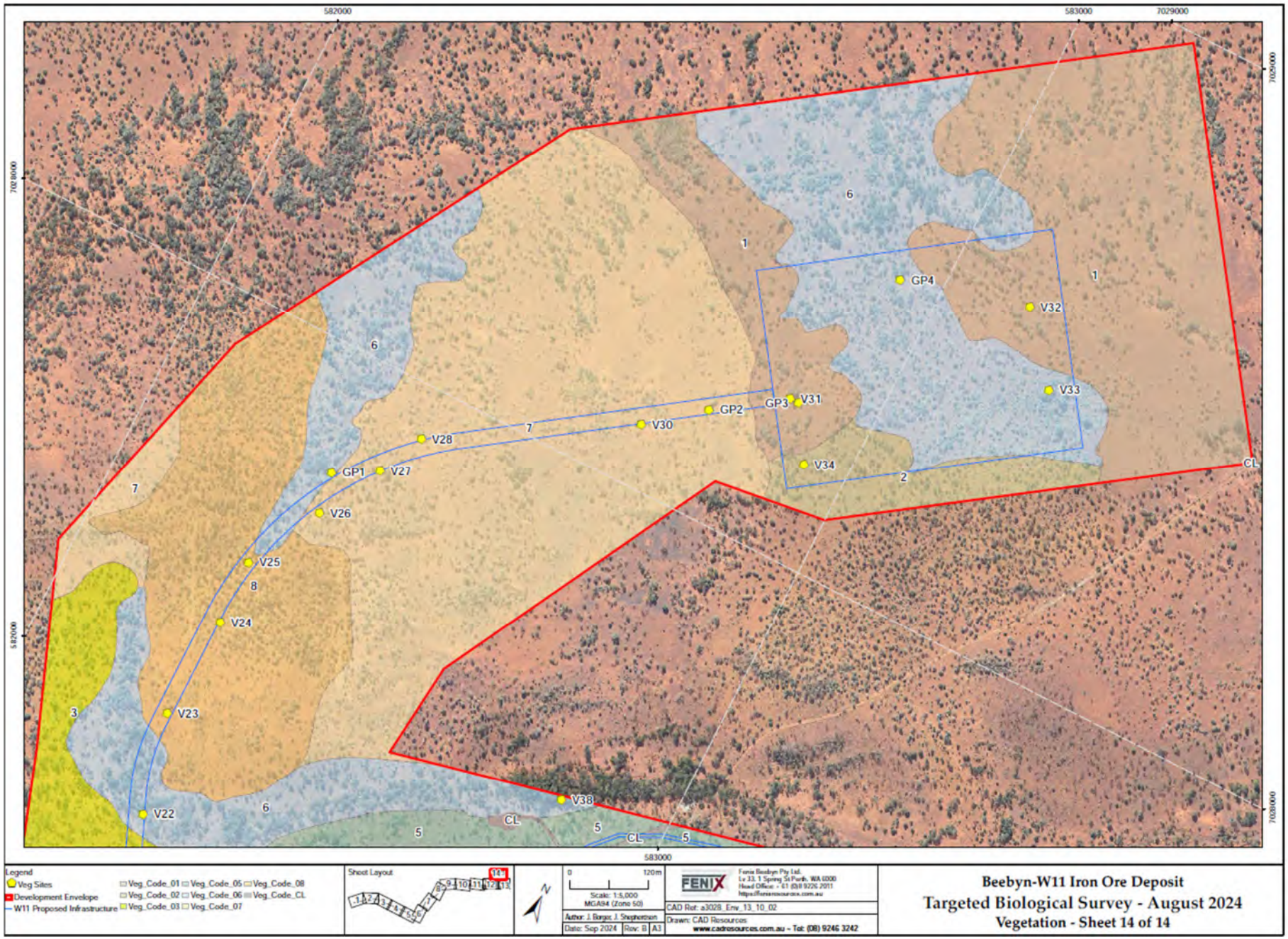


Figure 4.18: Vegetation types mapped within the survey area – map 14 of 14.

Veg_Code	Description
1	*Acacia pruinocarpa open woodland/ isolated trees over Acacia aptaneura, A. caesaneura tall sparse shrubland/ Eremophila fraseri, Acacia tetragonophylla, Rhagodia eremaea sparse shrubland/ Ptilotus obovatus on stony plains and lower slopes*
2	*Acacia incurvaneura, A. pteraneura, Grevillea berryana tall open shrubland/ A. ramulosa, Ptilotus rotundifolius, Eremophila fraseri, E. glutinosa sparse shrubland/ Eragrostis eriopoda, Ptilotus aervoides sparse tussock grassland on gravelly/ stony midslopes*
3	*Acacia incurvaneura, A. pruinocarpa low open woodland over Eremophila forrestii, E. latrobei, Acacia ramulosa, Harnieria kempeana, Sida sp. Golden calyces glabrous open shrubland over Erodium cygnorum, Goodenia tenuiloba low open forbland; mid to upper slopes; south facing*
4	*Acacia pruinocarpa, A. incurvaneura isolated trees/ Eremophila latrobei, Dodonaea pachyneura, Philotheca brucei, Prostanthera petrophila open shrubland/ Ptilotus obovatus, Micromyrtus sulphurea, Eremophila latrobei, Dysphania rhadinostachya, Stylidium longibracteatum low open shrubland; BIF ridge and upper slopes*
5	*Acacia incurvaneura low open woodland/ Acacia sp. Weld Range, Eremophila macmillaniana tall sparse shrubland/ Eremophila macmillaniana, Senna glaucifolia, Ptilotus rotundtifolius open shrubland/ Eremophila forrestii, E. macmillaniana low sparse shrubland/ Maireana melanocoma, Ptilotus aervoides low sparse chenopod shrubland; midslopes, north facing*
6	*Acacia incurvaneura, A. pruinocarpa, A. fuscaneura low woodland/ Acacia ramulosa, Psydrax latifolia tall open shrubland/ Eremophila forrestii, E. georgei, Rhagodia eremaea shrubland/ Erodium cygnorum, Tetragonia cristata, Cheilanthes sieberi low forbland; drainge lines*
7	*Acacia incurvaneura, A. sp. Weld Range, A. speckii tall sparse shrubland over Ptilotus rotundifolius, Eremophila fraseri, E. latrobei, Senna artemisioides subsp. helmsii sparse shrubland over Sida ectogama, Ptilotus aervoides, P. schwartzii , Erodium cygnorum low sparse shrubland; dolerite midslopes*
8	*Acacia incurvaneura, A. pruinocarpa tall open shrubland over Acacia ramulosa, Eremophila latrobei, Scaevola spinescens, Senna glaucifolia, sparse shrubland over Eremophila latrobei, Stenanthemum mediale, Sida ectogama, Micromyrtus sulphurea low sparse shrubland; rocky hill*
9	*Acacia pruinocarpa low woodland/ Acacia incurvaneura, A. ramulosa tall open shrubland over Eremophila simulans, E. georgei, E. forrestii open shrubland patches in Tall open shrubland of Acacia incurvaneura and A. ramulosa; hardpan plains*
10	*Acacia incurvaneura, A. caesaneura, A. ramulosa low open woodland/ tall open shrubland over Eremophila forrestii, Senna artemisioides subsp. filifolia open shrubland/ Eremophila jucunda, E. forrestii, Sida spp., Ptilotus schwartzii low sparse shrubland; low gravelly hills*
11	*Acacia pruinocarpa, A. incurvaneura open forest/ Glycine canescens, Santalum spicatum, Psydrax latifolia vineland/ Acacia ramulosa, Glycine canescens, Psydrax latifolia, Eremophila forrestii var. hastieana open shrubland over Sida ectogama, Ptilotus obovatus, Rhagodia eremaea low shrubland; drainage lines*
12	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa low woodland/ A. tetragonophylla, A. craspedocarpa, Psydrax latifolia tall open shrubland/ Eremophila forrestii var. forrestii or var. hastieana, A. ramulosa, Eremophila georgei shrubland/ Sida ectogama, Cheilanthes sieberi low shrubland; drainage lines*
13	*Acacia pruinocarpa isolated trees/ Acacia incurvaneura, A. tetragonophylla tall sparse shrubland over Acacia ramulosa, A. incurvaneura, Eremophila forrestii, E. latrobei sparse shrubland over Eremophila georgei, E. foliosissima, E. jucunda, Ptilotus schwartzii low open shrubland; ironstone plains*
14	*Acacia aptaneura, A. grasbyi low open woodland/ Eremophila pantonii, Acacia aptaneura, Senna glaucifolia sparse shrubland over Maireana thesioides, M. triptera, Senna glaucifolia low open chenopod shrubland; stony hill; chert, quartz*
15	*Acacia aneura, A. sp. Weld Range tall isolated shrubs over Eremophila macmillaniana, Acacia sp. Weld Range, Acacia speckii sparse shrubland over Cephalipterum drummondii, Sida ectogama, Aristida contorta low sparse forbland; stony plain; dolerite*
16	*Acacia pteraneura, A. fuscaneura tall open shrubland over Acacia fuscaneura, Grevillea deflexa, Eremophila fraseri subsp. fraseri sparse shrubland over Calytrix desolata, Grevillea deflexa low sparse shrubland*



Legend
- Development Envelope
- Veg_Code_01
- Veg_Code_02
- Veg_Code_03
- Veg_Code_04
- Veg_Code_05
- Veg_Code_06
- Veg_Code_07
- Veg_Code_08
- Veg_Code_09
- Veg_Code_10
- Veg_Code_CL

Notes
CL denotes historial clearing

0 640m
Scale: 1:25,000
MGA94 (Zone 50)
Author: J. Borger, J. Shepherdson
Date: September 2024 Rev:A A4

FENIX
Fenix Beebyn Pty Ltd.
Lv 33, 1 Spring St Perth, WA 6000
Head Office: + 61 (0)8 9226 2011
https://fenixresources.com.au
CAD Ref: a3028_Env_13_10_01
Drawn: CAD Resources
www.cadresources.com.au ~ Tel: (08) 9246 3242

Beebyn-W11 Iron Ore Deposit
Targeted Biological Survey - August 2024
Vegetation Legend

Figure 4.19: Vegetation types mapped within the survey area – vegetation descriptions.

4.3 Fauna and habitat

Fauna habitat mapping aligned with that recorded by APM (2024). The approximately 122 ha of the proposed disturbance footprint not surveyed by APM was assessed in this survey and determined to align with the Mulga Woodland on Hill Slope and Acacia Sand Plain habitat as described by APM (2024) and detailed in Section 2.4.1.

4.3.1 Shield-backed trapdoor spider

A number of previous records of, then *Idiosoma nigrum*, now *I. clypeatum* exist within the footprint and are associated mainly with south-facing slopes. These areas were investigated and no sign of trapdoor burrows could be located at the time of the survey.

Recent experience has found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees and shrubs in areas where there is evidence of surface water sheet flow (Photograph 4.12), or in denser vegetation adjacent to ephemeral drainage (Photograph 4.13).

Searches were undertaken of each of the main areas of Drainage Line habitat, which is present from the western end of the W11 infrastructure area and along the haul road route. Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey. None were located within the proposed disturbance footprint. The location of recorded burrows in relation to the proposed disturbance is presented in Figure 4.20.

Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions.



Photograph 4.12: Evidence of sheet flow. Trapdoor burrows were found beneath the trees in the background.



Photograph 4.13: Acacia thicket adjacent to a drainage line. Numerous trapdoor burrows were found in this area.



Photograph 4.14: An active trapdoor burrow found adjacent to the proposed haul road route.

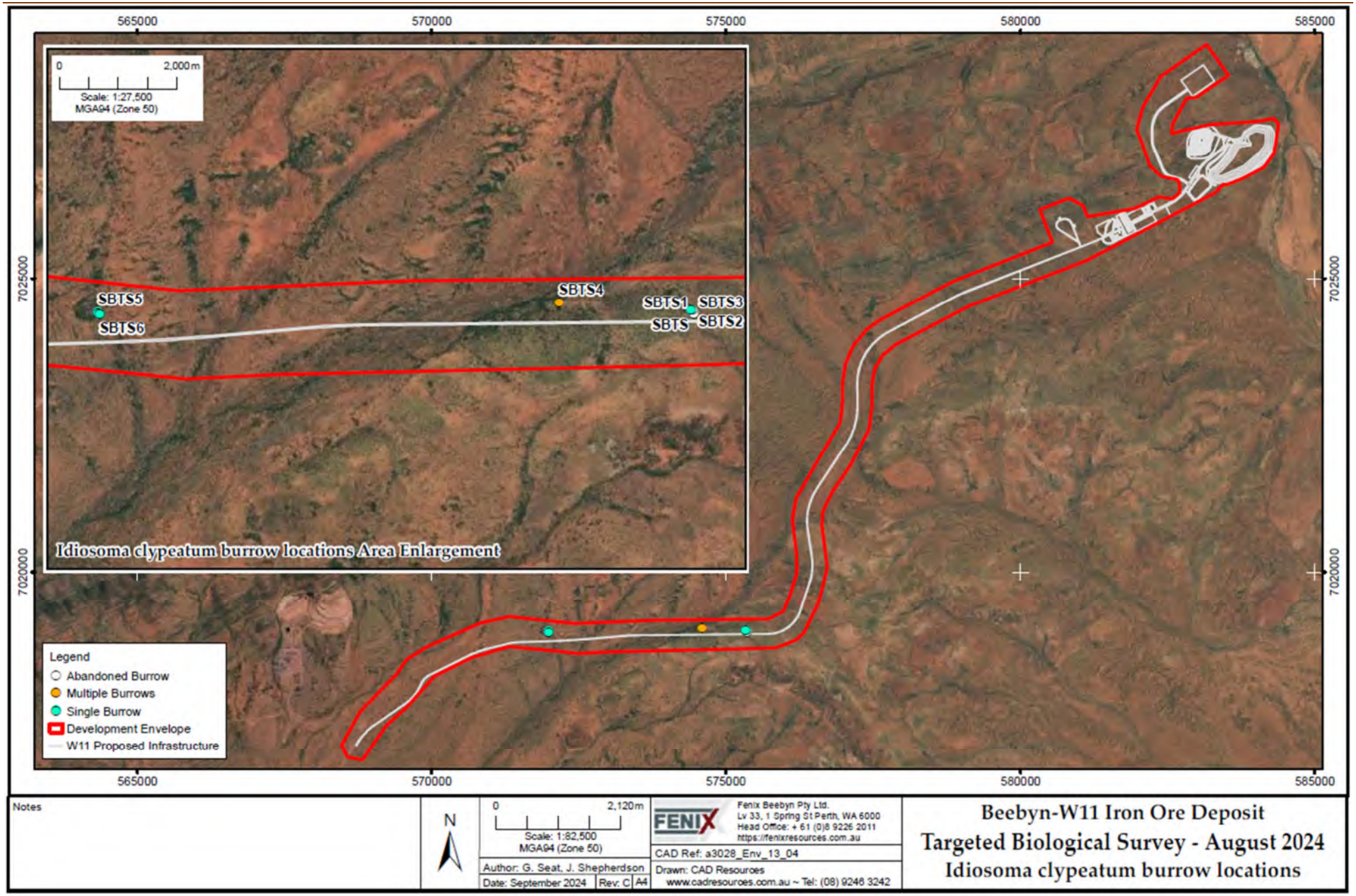


Figure 4.20: Locations of *Idiosoma clypeatum* burrows recorded during the survey.

4.3.2 Malleefowl

Database searches have returned several records of malleefowl (*Leipoa ocellata*) mounds in the vicinity of the W11 project. Nine possible extinct (long unused and unlikely to be used again) malleefowl mounds were recorded during the survey (Figure 4.21). While it is considered reasonably likely that the structures observed are long-extinct mounds, it is possible that some are former rabbit warrens or even geologic formations. If they were constructed by malleefowl they have not been used for decades.

The W11 project area is likely to have supported malleefowl in the past but is now at the northern extent of the species' range. Suitable habitat requirements include dense vegetation with abundant leaf litter, which is used to fill the mounds to incubate the eggs as it composts. The survey area now lacks much of the understorey biomass that was once present and is therefore lacking in leaf litter, food resources and cover provided by denser vegetation. Photograph 4.15 and Photograph 4.16 show two of the possible former mounds with open vegetation and near absence of leaf litter in the surrounding area.



Photograph 4.15: A possible long-extinct malleefowl mound at the eastern end of the project area.



Photograph 4.16: A possible long-extinct malleefowl mound at the central part of the project area.

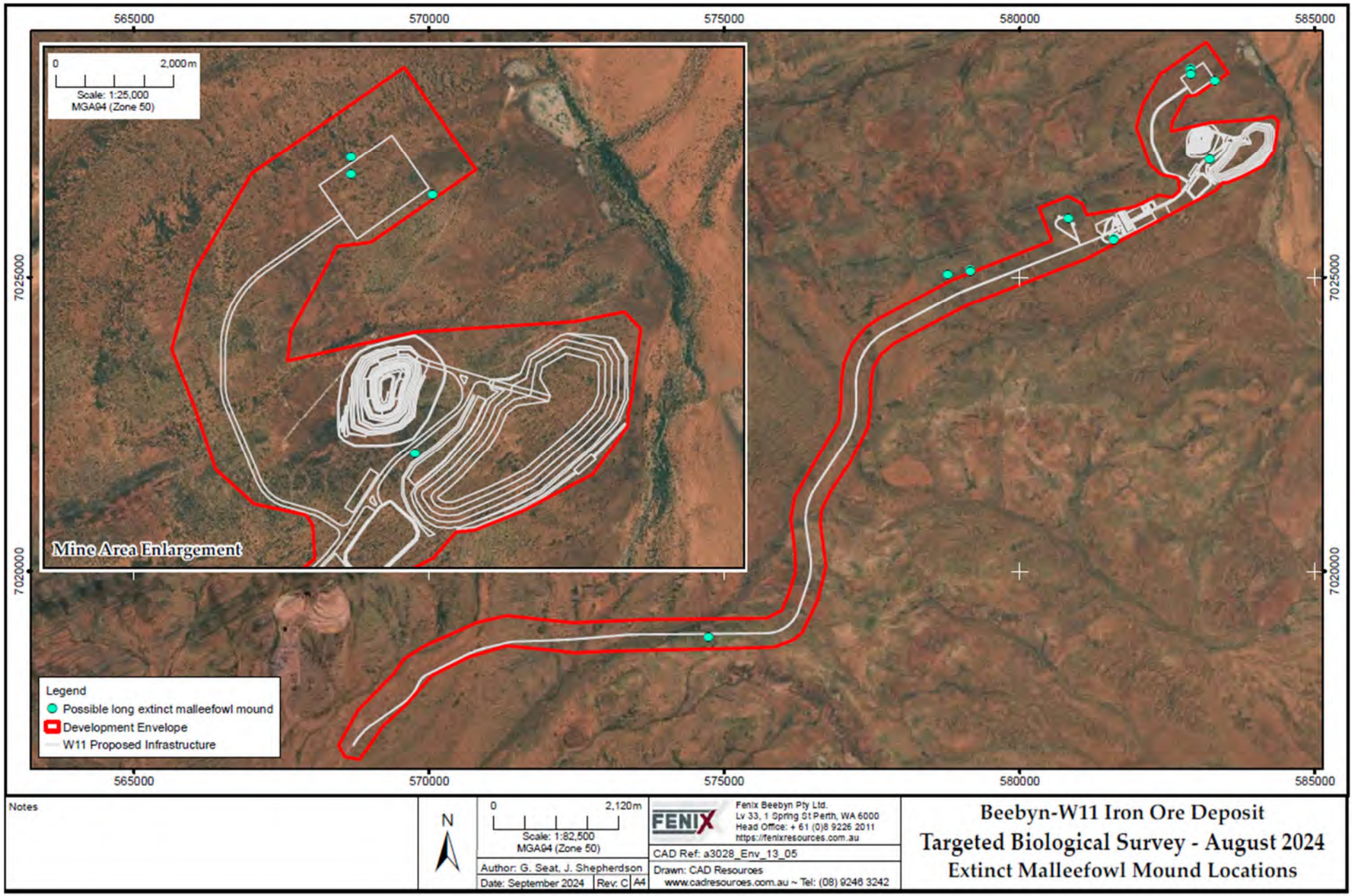


Figure 4.21: Locations of Malleefowl mounds recorded during the survey.

5.0 DISCUSSION

5.1 Flora and vegetation

Seven species of Priority flora were recorded during the survey, all of which have a known distribution of at least 150 km. Of these, three will be impacted by the proposed development:

- *Stenanthemum mediale* (P1)
- *Prostanthera petrophila* (P3)
- *Acacia speckii* (P4)

Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint. As discussed in Section 4.1, all three species have a wide distribution and it is likely that additional individuals also occur elsewhere across the Weld Range, including the unsurveyed areas adjacent to the development envelope.

Although rainfall for 2024 up to the time of survey was slightly above average, rainfall in the region has been below average for much of the previous eight years (BoM 2024). This has likely resulted in the loss of *Prostanthera petrophila* and *Micromyrtus placoides* individuals on the BIF ridges, with previous records not located. There were many long dead, low shrubs present in these areas that were likely *Micromyrtus placoides*, however were unable to be identified due to lack of vegetative material.

No Hibiscus ?*krichauffianus* individuals were recorded during the survey. It is likely that the individuals of this species previously recorded by APM (2024) have since senesced or were misidentified due to lack of reproductive material present at the time of the APM survey. Prior to the survey described in this report, the project area had received average rainfall for the year (refer to Section 2.1), with the flora in good condition and many species reproductive (flowering, fruiting) and therefore more easily identifiable.

The vegetation types recorded during the survey are typical of the Weld Range area and align with those described by Markey and Dillon (2008). Vegetation types 2, 3, 4, 5, 7, 8 and 15 correspond to the known Priority 1 Weld Range Vegetation Complexes (banded ironstone formation) PEC, as delineated by DBCA (2019). As discussed in Section 2.3.2, the PEC boundary defined by DBCA includes a 500 m “administrative buffer”, which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.1% of this area.

Vegetation condition ranged from ‘Very Good’ to ‘Completely Degraded’. Most of the disturbance was a result of moderate to heavy grazing impact from goats and euro, and historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. Historical pastoral grazing has also resulted in the loss of palatable shrubs, grasses and forbs, and a low recruitment of perennial species.

5.2 Fauna and habitat

Fauna habitat mapping generally aligned with that recorded by APM (2024). The approximately 122 ha of the proposed disturbance footprint not surveyed by APM was determined to align with the Mulga Woodland on Hill Slope and Acacia Sand Plain habitat as described by APM (2024) and detailed in Section 2.4.1.

Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey, all within Drainage Line habitat and outside the proposed disturbance footprint. Previous records of *I. clypeatum* (then *Idiosoma nigrum*) were investigated and no sign of trapdoor burrows could be located at the time of the survey.

As outlined in Section 4.3.1, recent experience has found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees

and shrubs in areas where there is evidence of surface water sheet flow or in denser vegetation adjacent to ephemeral drainage.

Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions.

The malleefowl mounds recorded in the project area are extinct and unlikely to be used again. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or near the larger drainage features low in the plains (APM 2024). No mounds were recorded in this habitat and malleefowl are unlikely to occur in the project area, given the lack of suitable understorey available for foraging and predator protection, primarily as a result of heavy grazing from goats when the pastoral station was stocked.

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Appendix 1

Conservation Codes and Definitions

Conservation codes for Western Australian flora and fauna (BC Regulations 2018).

Code	Definition
T	**Threatened species** Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act). Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.
CR	**Critically endangered species** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered species** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
VU	**Vulnerable species** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
	Extinct species Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.
EX	**Presumed extinct species** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	**Extinct in the wild species** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

	Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
	Specially protected species Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
	Priority species Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
P1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more

	locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Conservation codes for species listed under the Environmental Protection and Biodiversity Conversation Act 1999

Status	Definition
Extinct	There is no reasonable doubt that the last member of the species has died.
Extinct in the wild	It is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range, or It has not been recorded in its known and/or 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	It is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	It is not critically endangered; and It is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	It is not critically endangered or endangered; and It is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation dependant	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; or The following subparagraphs are satisfied: - The species is a species of fish - The species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised - The plan of management is in force under a law of the Commonwealth or of a State or Territory - Cessation of the plan of management would adversely affect the conservation status of the species.
Threatened Ecological Communities	
Critically Endangered	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable	If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

Appendix 2

Flora species list

Family	Scientific Name	Status
Acanthaceae	*Harnieria kempeana subsp. muelleri*	
Aizoaceae	*Tetragonia cristata*	
Amaranthaceae	*Ptilotus aervoides*	
	Ptilotus exaltatus	
	Ptilotus obovatus	
	Ptilotus polystachyus	
	Ptilotus rotundifolius	
	Ptilotus schwartzii	
Apocynaceae	*Leichhardtia australis*	
	Vincetoxicum lineare	
Asparagaceae	*Arthropodium sp.*	
	Thysanotus manglesianus	
Asteraceae	*Brachyscome iberidifolia*	
	Calotis multicaulis	
	Cephalipterum drummondii	
	Chthonocephalus pseudevax	
	Helipterum craspedioides	
	Isoetopsis graminifolia	
	Lawrencella davenportii	
	Panaetia lessonii	
	Rhodanthe ?sterilescens (in bud)	
	Rhodanthe sp.	
	Waitzia acuminata	
Brassicaceae	*Lepidium oxytrichum*	
	Menkea villosula	
	Stenopetalum anfractum	
	Stenopetalum filifolium	
Celastraceae	*Stackhousia muricata*	
Chenopodiaceae	*Dysphania rhadinostachya subsp. rhadinostachya*	
	Enchylaena tomentosa	
	Eriochiton sclerolaenoides	
	Maireana carnosa	
	Maireana georgei	
	Maireana melanocoma	
	Maireana sp.	
	Maireana thesioides	
	Maireana triptera	
	Rhagodia eremaea	
	Sclerolaena diacantha	
	Sclerolaena eurotioides	
	Sclerolaena fusiformis	
	Sclerolaena sp.	
Crassulaceae	*Crassula colorata var. acuminata*	
Euphorbiaceae	*Euphorbia boophthona*	
	Euphorbia sarcostemmoides	
	Beyeria lapidicola	P1

Family	Scientific Name	Status
Fabaceae	*Acacia aneura*	
	Acacia aptaneura	
	Acacia caesaneura	
	Acacia craspedocarpa	
	Acacia fuscaneura	
	Acacia grasbyi	
	Acacia incurvaneura	
	Acacia mulganeura	
	Acacia pruinocarpa	
	Acacia pteraneura	
	Acacia ramulosa var. linophylla	
	Acacia rhodophloia	
	Acacia sclerosperma subsp. sclerosperma	
	Acacia sp. Weld Range	
	Acacia speckii	P4
	Acacia tetragonophylla	
	Chorizema genistoides	
	Glycine canescens	
	Senna artemisioides subsp. artemisioides	
	Senna artemisioides subsp. filifolia	
	Senna artemisioides subsp. helmsii	
	Senna artemisioides subsp. xsturtii	
	Senna glaucifolia	
	Senna glutinosa subsp. chatelainiana	
	Senna glutinosa subsp. *xluerssenii*	
	Senna sp. Meekatharra	
	Senna symonii	
Geraniaceae	*Erodium cygnorum*	
Goodeniaceae	*Goodenia berardiana*	
	Goodenia tenuiloba	
	Scaevola spinescens	
Haloragaceae	*Haloragis odontocarpa*	
Lamiaceae	*Prostanthera petrophila*	
	Teucrium teucriiflorum	
Malvaceae	*Abutilon sp.*	
	Androcalva luteiflora	
	Brachychiton gregorii	
	Hibiscus sp.	
	Hibiscus sturtii	
	Sida calyxhymenia	
	Sida ectogama	
	Sida sp. Golden calyces glabrous	
Marsileaceae	*Marsilea hirsuta*	
Montiaceae	*Calandrinia sp.*	
Myrtaceae	*Calytrix desolata*	
	Hysterobaeckea occlusa	

Family	Scientific Name	Status
Myrtaceae	*Micromyrtus placoides*	P3
	Micromyrtus sulphurea	
	Thryptomene decussata	
	Verticordia jamiesonii	P3
Oxalidaceae	*Oxalis ?corniculata**	Weed
Pittosporaceae	*Pittosporum angustifolium*	
Poaceae	*Amphipogon caricinus var. caricinus*	
	Aristida contorta	
	Austrostipa elegantissima	
	Cymbopogon ambiguus	
	Eragrostis dielsii	
	Eragrostis eriopoda	
	Eragrostis falcata	
	Monachather paradoxus	
	Paspalidium basicladum	
	Thyridolepis multiculmis	
Portulaceae	*Portulaca oleracea*	
Proteaceae	*Grevillea berryana*	
	Grevillea deflexa	
	Hakea lorea	
	Hakea preissii	
Pteridaceae	*Cheilanthes lasiophyllum*	
	Cheilanthes sieberi subsp. sieberi	
	Cheilanthes sp.	
Rhamnaceae	*Stenanthemum mediiale*	P1
Rubiaceae	*Psydrax latifolia*	
	Psydrax rigidula	
	Psydrax suaveolens	
Rutaceae	*Philotheca brucei subsp. brucei*	
Santalaceae	*Santalum spicatum*	R
Sapindaceae	*Dodonaea pachyneura*	
Scrophulariaceae	*Eremophila compacta*	
	Eremophila eriocalyx	
	Eremophila exilifolia	
	Eremophila foliosissima	
	Eremophila forrestii subsp. forrestii	
	Eremophila forrestii subsp. hastieana	
	Eremophila fraseri subsp. fraseri	
	Eremophila georgei	
	Eremophila gilesii	
	Eremophila glutinosa	
	Eremophila granitica	
	Eremophila jucunda subsp. jucunda	
	Eremophila latrobei subsp. latrobei	
	Eremophila mackinlayi subsp. spathulata	
	Eremophila macmillaniana	

Family	Scientific Name	Status
Scrophulariaceae	*Eremophila pantonii*	
	Eremophila punicea	
	Eremophila serrulata	
	Eremophila simulans subsp. simulans	
	Eremophila sp. Weld Range	
	Eremophila spathulata	
Solanaceae	*Nicotiana obliqua*	
	Nicotiana rosulata	
	Solanum lasiophyllum	
Stylidiaceae	*Stylidium longibracteatum*	
Zygophyllaceae	*Roepera lobulata*	
	Roepera sp.	
	Tribulus suberosus	

Appendix 3

Vegetation site descriptions

Fenix Beebyn-W11 Haul Road, Pit, WRD and Gravel Pit site descriptions

NVIS foliage cover codes.

Cover Characteristics					
Foliage cover	70 – 100	30 – 70	10 – 30	< 10	~ 0 (<2)
Crown cover	>80	50 – 80	20 – 50	0.25 – 20	<0.25
% cover	>80	50 – 80	20 – 50	0.25 - <20	<0.25
Cover code	d	c	i	r	bi

Height classes defined for the NVIS.

Height		**Growth Form**				
Height Class	Height Range (m)	Tree	Shrub, chenopod shrub	Tree mallee, mallee shrub	Tussock grass	Bryophyte, lichen
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

Summary of NVIS strata codes.

NVIS stratum code	**NVIS sub-stratum**	**Description**	**Growth forms**	**Height classes**
U	U1	Tallest stratum	Tree, tree mallees (mallee shrubs)	8, 7, 6, (5)
	U2	Sub-canopy layer, second tree layer		
	U3	Sub-canopy layer, third tree layer		
M	M1	Tallest shrub layer	Shrubs, low trees, mallee shrubs, low shrubs, vines	(6), 5, 4, 3
	M2	Next shrub layer		
	M3	Third shrub layer		
G	G1	Tallest ground species	Grasses, forbs, sedges, rushes, vines, lichens, low shrubs	(4, 3), 2, 1
	G2	Ground		

Growth Form Codes used in descriptions

T	Tree	U	Samphire shrub	F	Forb
M	Mallee	Z	Heath shrub	E	Fern
S	Shrub	G	Tussock grass	L	Vine
R	Rush	V	Sedge	B	Bryophyte (moss, liverwort)
C	Chenopod shrub	K	Epiphyte	N	Lichen

V 1 30/07/2024 WRD area	
GPS: 584216 E/ 7027089 N Elevation: 499 m	Landform: Stony plain, very gentle slope aspect east Proposed WRD east end
Land surface: Yellowish red silty clay loam; surface rock (BIF, quartz 2 – 10 cm, 30 – 40 %; gravel 20 – 30 %); litter 2 – 10 %	
Condition & disturbances: Poor; pastoral impacts – grazing, tracks; active erosion	
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\7\bi; U2^ Acacia aptaneura, A. pruinocarpa\Acacia\^tree\6\r; M1^ Acacia aptaneura, A. craspedocarpa, Eremophila fraseri subsp. fraseri\Acacia\^shrub, tree\4\r; M2^ Eremophila fraseri subsp. fraseri, Senna symonii, Eremophila mackinlayi subsp. spathulata, Sida ectogama\Eremophila\^shrub\2\bi; G1^ Ptilotus obovatus, Enchylaena tomentosa, Goodenia tenuiloba, Erodium cygnorum, Eragrostis eriopoda\Ptilotus\^shrub, chenopod shrub, forb\1\i*	
Vegetation: *Acacia pruinocarpa isolated trees over Acacia aptaneura, A. pruinocarpa low open woodland over Acacia aptaneura, A. craspedocarpa, Eremophila fraseri subsp. fraseri tall sparse shrubland over Ptilotus obovatus, Enchylaena tomentosa, Goodenia tenuiloba low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
8 – 12	< 2	T	*Acacia pruinocarpa*
4 – 8	2 – 10	T	*Acacia aptaneura, A. pruinocarpa*
2 – 4	2 – 10	S, T	*Acacia aptaneura, A. craspedocarpa, Eremophila fraseri subsp. fraseri*
0.5 – 1	< 2	S	*Eremophila fraseri subsp. fraseri, Senna symonii, Eremophila mackinlayi subsp. spathulata, Sida ectogama*
< 0.5	10 – 20	S, C, F	*Ptilotus obovatus, Enchylaena tomentosa, Goodenia tenuiloba, Erodium cygnorum, Eragrostis eriopoda*

Other species: Acacia caesaneura, A. incurvaneura, A. tetragonophylla, Euphorbia sarcostemmoides, Monachather paradoxus, Rhagodia eremaea

Acacia aptaneura
Acacia caesaneura
Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Acacia tetragonophylla
Enchylaena tomentosa
Eragrostis eriopoda
Eremophila fraseri subsp. fraseri
Eremophila mackinlayi subsp. spathulata
Erodium cygnorum
Euphorbia sarcostemmoides P1
Goodenia tenuiloba
Monachather paradoxus
Ptilotus obovatus
Rhagodia eremaea
Senna symonii (sterile; tentative)
Sida ectogama



V 2 30th July 2024 WRD area	
GPS: 584227 E/ 7027159 N Elevation: 499 m	Landform: Stony plain; denser patch of vegetation
Land surface: Yellowish red silty clay loam	
Condition & disturbances: Good; many germinating forbs; pastoral impacts	
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\6\i; M1^ Acacia tetragonophylla, A. caesaneura, A. aptaneura\Acacia\^shrub\4\i; M2^ Eremophila fraseri subsp. fraseri, Acacia tetragonophylla\ Eremophila\^shrub\3\r; G1^ Ptilotus obovatus, Sida ectogama, Rhagodia eremaea, Acacia tetragonophylla, Eremophila fraseri subsp. fraseri\Ptilotus\^shrub, chenopod shrub\1\c; G2^ Menkea villosula, Crassula colorata var. acuminata, Stenopetalum anfractum, Aristida contorta, Leichhardtia australis\Menkea\^forb, tussock grass, climber\1\c*	
Vegetation: *Acacia pruinocarpa open woodland over Acacia tetragonophylla, A. caesaneura, A. aptaneura tall sparse shrubland over Eremophila fraseri subsp. fraseri, Acacia tetragonophylla sparse shrubland over Ptilotus obovatus, Sida ectogama, Rhagodia eremaea low open shrubland over Menkea villosula, Crassula colorata var. acuminata, Stenopetalum anfractum low forbland*	

Height (m)	Crown cover %	Habit	Species
8 – 10	10 – 30	T	*Acacia pruinocarpa*
2 – 3	2 – 10	S	*Acacia tetragonophylla, A. caesaneura, A. aptaneura*
1 – 2	2 – 10	S	*Eremophila fraseri subsp. fraseri, Acacia tetragonophylla*
0.3 – 0.6	20 – 30	S, C	*Ptilotus obovatus, Sida ectogama, Rhagodia eremaea, Acacia tetragonophylla, Eremophila fraseri subsp. fraseri*
< 0.2	40 – 60	F, G, L	*Menkea villosula, Crassula colorata var. acuminata, Stenopetalum anfractum, Aristida contorta, Leichhardtia australis*

Acacia aptaneura
Acacia caesaneura
Acacia pruinocarpa
Acacia tetragonophylla
Aristida contorta
Crassula colorata var. acuminata
Eremophila fraseri subsp. fraseri
Leichhardtia australis
Menkea villosula
Ptilotus obovatus
Rhagodia eremaea
Stenopetalum anfractum
Sida ectogama



V3 30th July 2024 7.56 am WRD area Relevé	
GPS: 584060 E/ 7027134 N Elevation: 501 m	Landform: Gently sloping stony plain; aspect east
Land surface: Yellowish red silty clay loam; surface rock 10 – 30 %	
Condition & disturbances: Good within patch; poor to degraded in surrounding areas	
Vegetation: *Acacia pruinocarpa, A. aptaneura low open woodland over Acacia pruinocarpa, A. aptaneura, A. tetragonophylla tall sparse shrubland over Acacia caesaneura, A. tetragonophylla, Eremophila fraseri subsp. fraseri isolated shrubs over Ptilotus obovatus, Maireana sp., Enchylaena tomentosa, Ptilotus schwartzii low sparse shrubland*	
Other species: *Scaevola spinescens, Acacia sclerosperma subsp. sclerosperma, Ptilotus rotundifolius*	
	
Low woodland patch within sparse shrubland area	
Acacia aptaneura *Acacia caesaneura* *Acacia pruinocarpa* *Acacia sclerosperma subsp. sclerosperma* *Acacia tetragonophylla* *Enchylaena tomentosa*	*Eremophila fraseri subsp. fraseri* *Maireana sp.* *Ptilotus obovatus* *Ptilotus rotundifolius* *Ptilotus schwartzii* *Scaevola spinescens*

V4 30th July 2024 8.09 am WRD area	
GPS: 583884 E/ 7027054 N Elevation: 504 m	Landform: Low rise; stony, gentle slope; aspect east
Land surface: Yellowish red silty clay loam; surface rock 2 – 10 cm (BIF, chert, quartz, 10 – 20 %); gravel (30 – 40 %); litter < 5 %; fallen timber < 2 %	
Condition & disturbances: Poor; lacking understory; pastoral impacts	
NVIS 6: *U1^ Acacia pruinocarpa\Acacia\ ^tree\6\bi; M1+^ Acacia aptaneura, A. pruinocarpa\Acacia\ ^shrub, tree\4\i; M2^ Acacia tetragonophylla, A. pruinocarpa, Eremophila fraseri subsp. fraseri\ Acacia\^shrub\3\bi; G1^ Acacia pruinocarpa, Eremophila fraseri subsp. fraseri, Acacia aptaneura, Ptilotus obovatus, P. schwartzii\Acacia\^shrub\2\r*	
Vegetation: *Acacia pruinocarpa isolated trees over Acacia aptaneura, A. pruinocarpa tall open shrubland over Acacia tetragonophylla, A. pruinocarpa, Eremophila fraseri subsp. fraseri isolated shrubs over Acacia pruinocarpa, Eremophila fraseri subsp. fraseri, Acacia aptaneura low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
10	< 2	T	*Acacia pruinocarpa*
3 – 8	10 – 20	S, T	*Acacia aptaneura, A. pruinocarpa*
1 – 2	< 2	S	*Acacia tetragonophylla, A. pruinocarpa, Eremophila fraseri subsp. fraseri*
< 1	2 – 10	S	*Acacia pruinocarpa, Eremophila fraseri subsp. fraseri, Acacia aptaneura, Ptilotus obovatus, P. schwartzii*

Other species: Acacia craspedocarpa

Acacia aptaneura
Acacia craspedocarpa
Acacia pruinocarpa
Acacia tetragonophylla
Eremophila fraseri subsp. fraseri
Ptilotus obovatus
Ptilotus schwartzii



V5 30th July 2024 8.20 am WRD area Relevé	
GPS: 583750 E/ 7027038 N Elevation: 506 m	Landform: Low hill; lower slope; colluvial outwash; aspect south
Land surface: Yellowish red silty clay loam; surface rock < 10 %	
Condition & disturbances: Good; lot of pastoral disturbances; erosion active	
Vegetation: *Acacia aneura tall open shrubland over Eremophila forrestii subsp. forrestii low isolated shrubs (0.5 – 1 m) over Maireana sp., Enchylaena tomentosa, Eragrostis eriopoda, Erodium cygnorum low sparse chenopod shrubland*	
Acacia aneura *Enchylaena tomentosa* *Eragrostis eriopoda* *Eremophila forrestii subsp. forrestii* *Erodium cygnorum* *Maireana sp.*	

V6 30th July 2024 WRD area 8.30 am Relevé	
GPS: 583838 E/ 7027185 N Elevation:	Landform: Lower slope of outwash slope; colluvium
Land surface: Yellowish red silty clay loam; surface rock 2 – 10 cm 10 – 20 %, gravel 10 – 20 %; litter < 10 %; fallen timber < 2 %	
Condition & disturbances: Poor; moderate to high pastoral impacts, old tracks; rabbits, regeneration very low	
Vegetation: *Acacia aptaneura, A. incurvaneura, A. caesaneura tall open shrubland over Eremophila fraseri subsp. fraseri, Acacia ramulosa var. linophylla isolated shrubs over Helipterum craspedioides, Erodium cygnorum, Eragrostis eriopoda, Acacia caesaneura low sparse forbland*	
V6 & V7 species list *Acacia aptaneura* *Acacia caesaneura* *Acacia incurvaneura* *Acacia ramulosa var. linophylla* *Eragrostis eriopoda* *Eremophila fraseri subsp. fraseri* *Erodium cygnorum* *Helipterum craspedioides* *Ptilotus aervoides (V7)* *Ptilotus rotundifolius (V7)*	

V7 30th July 2024 WRD area Relevé	
GPS: 583984 E/ 7027248 N Elevation:	Landform: Plain; gentle slope aspect south east WRD area
Land surface:	
Condition & disturbances: Poor; pastoral impacts; erosion moderate	
Vegetation: *Acacia aptaneura, A. caesaneura* tall sparse shrubland *over Acacia aptaneura, A. ramulosa* var. *linophylla, Ptilotus rotundifolius* sparse shrubland over *Eragrostis eriopoda, Ptilotus aervoides* low open tussock grassland	

V8 30th July 2024 rehabilitation site WRD area			
GPS: 584284 E/ 7027164 N Elevation: 500	Landform: Plain; gentle slope; aspect south east		
Land surface: Yellowish red gritty clay loam; surface rock (hardpan, other) 60 – 80 %; bare ground < 20 %			
Condition & disturbances: Good; historic drill location that has been rehabilitated (ripped); recruitment and growth good			
NVIS 6: *G1+^ Ptilotus obovatus, Rhagodia eremaea, Acacia pruinocarpa, Enchylaena tomentosa, Cymbopogon ambiguus\Ptilotus\^shrub, chenopod shrub, tussock grass\2\i; G2^ Cephalipterum drummondii, Maireana triptera, Menkea villosula, Ptilotus obovatus\Cephalipterum\^forb, chenopod shrub, shrub\1\bi*			
Vegetation: *Ptilotus obovatus, Rhagodia eremaea, Acacia pruinocarpa low open shrubland over Cephalipterum drummondii, Maireana triptera, Menkea villosula isolated low forbs and chenopod shrubs*			
Height (m)	Crown cover %	Habit	Species
0.2 – 0.8	20 – 30	S, C, G	*Ptilotus obovatus, Rhagodia eremaea, Acacia pruinocarpa, Enchylaena tomentosa, Cymbopogon ambiguus*
< 0.2	< 2	F, C, S	*Cephalipterum drummondii, Maireana triptera, Menkea villosula, Ptilotus obovatus*
Other species (outside/ edges): Acacia aneura, Cheilanthes sp., Eremophila fraseri subsp. fraseri, Psydrax latifolia, Santalum spicatum			

Acacia aneura (edge)
Acacia pruinocarpa
Cephalipterum drummondii
Cheilanthes sp. (edge)
Cymbopogon ambiguus
Enchylaena tomentosa
Eremophila fraseri subsp. fraseri (edge)
Maireana triptera
Menkea villosula
Psydrax latifolia (edge)
Ptilotus obovatus
Rhagodia eremaea
Santalum spicatum R (edge)



<table>
<tr><th colspan="2">V8b 30th July 2024 Relevé WRD area</th></tr>
<tr><td>GPS: 584261 E/ 7026852 N
Elevation: 498 m</td><td>Landform: Stony plain; south side of WRD area
Area searched for Euphorbia sarcostemmoides</td></tr>
<tr><td colspan="2">Land surface: Yellowish red silty clay loam; surface rock (BIF, chert, quartz) 10 – 20 %; litter < 5 %; fallen timber < 2 %</td></tr>
<tr><td colspan="2">Condition & disturbances: Poor; pastoral impacts high; sheet erosion; rabbits; many drought deaths and part crown deaths; condition of woodland patches – good</td></tr>
<tr><td colspan="2">Vegetation: Woodland patch – Acacia pruinosa, Acacia aptaneura low woodland over Teucrium teucriiflorum, Vincetoxicum lineare, Senna glutinosa subsp. xluerssenii, Psydrax suaveolens shrubland over Maireana georgei low open chenopod shrubland over Lepidium oxytrichum, Erodium cygnorum, Menkea villosula, Goodenia tenuiloba, Isoetopsis graminifolia low forbland</td></tr>
<tr><td colspan="2">Vegetation: Stony plain – Acacia aptaneura low isolated trees over Acacia ramulosa var. linophylla, Eremophila fraseri subsp. fraseri, Senna glaucifolia sparse shrubland over Ptilotus aervoides, Goodenia tenuiloba, Erodium cygnorum low sparse forbland</td></tr>
<tr><td>Stony plain
Acacia aptaneura
Acacia ramulosa var. linophylla
Eremophila fraseri subsp. fraseri
Erodium cygnorum
Goodenia tenuiloba
Ptilotus aervoides
Senna glaucifolia</td><td></td></tr>
<tr><td>Woodland patch
Acacia aptaneura
Acacia pruinocarpa
Erodium cygnorum
Goodenia tenuiloba
Isoetopsis graminifolia
Lepidium oxytrichum
Maireana georgei
Menkea villosula
Psydrax suaveolens
Senna glutinosa subsp. xluerssenii
Teucrium teucriiflorum
Vincetoxicum lineare</td><td>No image</td></tr>
</table>

V9 30th July 2024 WRD east area	
GPS: 583983 E/ 7027651 N Elevation: 515 m	Landform: Hill; ridge, upper slope; aspect south Rocky scree slope
Land surface: Shallow yellowish red silty clay loam; surface rock (BIF, chert) 60 – 80 %	
Condition & disturbances: Very good; pastoral impacts lower; forbs – many germinating	
NVIS 6: *U1+^ Acacia aptaneura\Acacia\^shrub\4\i; M1^ Eremophila latrobei subsp. latrobei, E. glutinosa, E. spathulata, Acacia aptaneura, Ptilotus rotundifolius\Eremophila\^shrub\3\i; G1^ Helipterum craspedioides, Cheilanthes sieberi subsp. sieberi, Nicotiana rosulata\Helipterum\^forb, fern\1\r*	
Vegetation: *Acacia aptaneura* tall open shrubland over *Eremophila latrobei subsp. latrobei, E. glutinosa, E. spathulata open shrubland over Helipterum craspedioides, Cheilanthes sieberi subsp. sieberi, Nicotiana rosulata low sparse forbland*	

Height (m)	Crown cover %	Habit	Species
4 – 6	10 – 20	S	*Acacia aptaneura*
0.9 – 1.5	20 – 30	S	*Eremophila latrobei subsp. latrobei, E. glutinosa, E. spathulata, Acacia aptaneura, Ptilotus rotundifolius*
< 0.2	2 – 10	F, E	*Helipterum craspedioides, Cheilanthes sieberi subsp. sieberi, Nicotiana rosulata*

Acacia aptaneura
Cheilanthes sieberi subsp. sieberi
Eremophila latrobei subsp. latrobei
Eremophila glutinosa
Eremophila spathulata
Nicotiana rosulata
Ptilotus rotundifolius



V10 30th July 2024 Relevé	
GPS: 583922 E/ 7027668 N Elevation: 524 m	Landform: BIF Ridge; massive BIF outcrops; moderate to steep slopes north and south North edge of Beebyn Prescribed area
Land surface: Skeletal yellowish red silty clay loam; surface rock > 90 %; litter < 10 %	
Condition & disturbances: Very good to excellent; low pastoral impacts; drought impacts – several deaths of small shrubs; healthy new growth from recent rains	
Vegetation: *Acacia incurvaneura isolated tall shrubs over Thryptomene decussata, Eremophila latrobei subsp. latrobei, Eremophila glutinosa, Dodonaea pachyneura, Acacia incurvaneura open shrubland over Micromyrtus sulphurea, Prostanthera petrophila, Hysterobaeckea occlusa, Thryptomene decussata low open shrubland over Stylidium longibracteatum, Dysphania rhadinostachya subsp. rhadinostachya, Cheilanthes lasiophyllum low open forbland*	
Other species: Santalum spicatum (low tree), Acacia pruinocarpa (low tree), Brachyscome iberidifolia, Amphipogon caricinus var. caricinus	
Acacia incurvaneura *Acacia pruinocarpa* *Amphipogon caricinus var. caricinus* *Brachyscome iberidifolia* *Cheilanthes lasiophyllum* *Dodonaea pachyneura* *Dysphania rhadinostachya subsp. rhadinostachya* *Eremophila glutinosa* *Eremophila latrobei subsp. latrobei* *Hysterobaeckea occlusa* *Micromyrtus sulphurea* *Prostanthera petrophila* *Santalum spicatum* *Stylidium longibracteatum* *Thryptomene decussata* Bottom image: *Prostanthera petrophila* habitat; massive BIF outcrop	 

V11 11.30 am 30th July 2024	
GPS: 583701 E/ 7027463 N Elevation: 523 m	Landform: Hill; upper slope; aspect south east; colluvial outwash slope, moderate slope
Land surface: Yellowish red silty clay loam; surface rock 30 – 40 %; litter < 5 %; fallen timber < 2 %	
Condition & disturbances: Poor to good; pastoral Impacts; drought impacts – few deaths	
NVIS 6: *U1+^ Acacia fuscaneura, A. pteraneura, A. sp. Weld Range, Thryptomene decussata\Acacia\ ^shrub\4\i; M1^ Acacia pteraneura, Eremophila latrobei subsp. latrobei, Senna glaucifolia, Thryptomene decussata\Acacia\^shrub\3\r; M2^ Eremophila glutinosa, E. forrestii subsp. forrestii, Ptilotus obovatus, Harnieria kempeana subsp. muelleri\Eremophila\2\r; G1^ Erodium cygnorum, Helipterum craspedioides, Monachather paradoxus, Harnieria kempeana subsp. muelleri\Erodium\ ^forb, tussock grass, shrub\1\bi*	
Vegetation: *Acacia fuscaneura, A. pteraneura, A. sp. Weld Range tall open shrubland over Acacia pteraneura, Eremophila latrobei subsp. latrobei, Senna glaucifolia sparse shrubland over Eremophila glutinosa, E. forrestii subsp. forrestii, Ptilotus obovatus low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
2 – 6	10 – 30	S	*Acacia fuscaneura, A. pteraneura, A. sp. Weld Range, Thryptomene decussata*
1 – 2	2 – 10	S	*Acacia pteraneura, Eremophila latrobei subsp. latrobei, Senna glaucifolia, Thryptomene decussata*
0.2 – 1	2 – 10	S	*Eremophila glutinosa, E. forrestii subsp. forrestii, Ptilotus obovatus, Harnieria kempeana subsp. muelleri*
< 0.2	< 2	F, G, S	*Erodium cygnorum, Helipterum craspedioides, Monachather paradoxus, Harnieria kempeana subsp. muelleri*

Other species: Grevillea berryana, Philotheca brucei subsp. brucei (on minor BIF outcrop), Acacia tetragonophylla

Acacia fuscaneura
Acacia pteraneura
Acacia sp. Weld Range
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila glutinosa
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Grevillea berryana
Harnieria kempeana subsp. muelleri
Helipterum craspedioides
Monachather paradoxus
Philotheca brucei subsp. brucei
Ptilotus obovatus
Senna glaucifolia
Thryptomene decussata



<table>
<tr><th colspan="5">V12 30th July 2024 WRD area north</th></tr>
<tr><td colspan="2">GPS: 583725 E/ 7027355 N
Elevation: 514 m</td><td colspan="3">Landform: Hill; lower midslope; colluvium; aspect south</td></tr>
<tr><td colspan="5">Land surface: Surface rock (mostly gravel, 2 – 5 % 2 – 10 cm) 10 – 20 %; cryptogams (lichen) 50 – 60 %</td></tr>
<tr><td colspan="5">Condition & disturbances: Poor; pastoral impacts moderate to high; active erosion</td></tr>
<tr><td colspan="5">NVIS 6: U1+^ Acacia fuscaneura, A. pteraneura\Acacia\^shrub, tree\4\i; M1^ Acacia ramulosa var. linophylla, A. fuscaneura\Acacia\^shrub\3\r; G1^ Solanum lasiophyllum, Ptilotus obovatus, Eragrostis eriopoda\Solanum\^shrub, tussock grass\1\bi</td></tr>
<tr><td colspan="5">Vegetation: Acacia fuscaneura, A. pteraneura tall open shrubland over Acacia ramulosa var. linophylla, A. fuscaneura sparse shrubland</td></tr>
<tr><th>Height (m)</th><th>Crown cover %</th><th>Habit</th><th colspan="2">Species</th></tr>
<tr><td>2 – 6</td><td>10 – 30</td><td>S, T</td><td colspan="2">Acacia fuscaneura, A. pteraneura</td></tr>
<tr><td>1 – 2</td><td>2 – 10</td><td>S</td><td colspan="2">Acacia ramulosa var. linophylla, A. fuscaneura</td></tr>
<tr><td>< 0.5</td><td>< 2</td><td>S, G</td><td colspan="2">Solanum lasiophyllum, Ptilotus obovatus, Eragrostis eriopoda</td></tr>
<tr><td colspan="5">Other species: Ptilotus rotundifolius, Eremophila glutinosa</td></tr>
<tr><td colspan="2">Acacia fuscaneura
Acacia pteraneura
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila glutinosa
Ptilotus obovatus
Ptilotus rotundifolius
Solanum lasiophyllum</td><td colspan="3"></td></tr>
<tr><td colspan="2">V13
GPS: 583819 E/ 7027484 N
isolated Acacia pruinocarpa starting, towards east</td><td colspan="3">Several Harnieria kempeana, Goodenia tenuiloba, Isoetopsis graminifolia</td></tr>
<tr><td colspan="2">V14
GPS: 583802 E/ 7027535 N
Landform: Hill; minor BIF outcrop; upper slope; aspect south
Condition: good; several drought deaths

Acacia fuscaneura low isolated trees over Acacia fuscaneura, A. rhodophloia tall sparse shrubland over Eremophila latrobei subsp. latrobei, Philotheca brucei subsp. brucei, Grevillea berryana sparse shrubland over Brachyscome iberidifolia low sparse forbland</td><td colspan="3"></td></tr>
</table>

<table>
<tr><th colspan="2">V15 30th July 2024 Pit area</th></tr>
<tr><td>GPS: 583160 E/ 7027264 N
Elevation: 538 m</td><td>Landform: Hill; BIF; colluvial outwash slope; aspect south east; BIF ridge to north</td></tr>
<tr><td colspan="2">Land surface: Yellowish red silty clay loam; surface rock – variable (due to level of disturbance)</td></tr>
<tr><td colspan="2">Condition & disturbances: Degraded with good patches; significant areas disturbed through historic mining activities; erosion active in some areas</td></tr>
<tr><td colspan="2">Vegetation: Acacia pruinocarpa isolated trees over Acacia pteraneura, A. aptaneura tall open shrubland over Dodonaea pachyneura sparse shrubland over Eremophila latrobei subsp. latrobei, Ptilotus obovatus, Harnieria kempeana subsp. muelleri, Sida sp. Golden calyces, Maireana sp. low sparse to open shrubland</td></tr>
<tr><td colspan="2">Other species: Eremophila forrestii subsp. forrestii</td></tr>
<tr><td>Acacia aptaneura
Acacia pruinocarpa
Acacia pteraneura
Dodonaea pachyneura
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Harnieria kempeana subsp. muelleri
Maireana sp.
Ptilotus obovatus
Sida sp. Golden calyces glabrous</td><td></td></tr>
</table>

V16 30th July 2024 Pit area			
GPS: 583222 E/ 7027228 N Elevation: 532 m	Landform: Hill; midslope; moderate slope; aspect SE		
Land surface: Yellowish red silty clay loam; surface rock 60 – 70 % (2 – 10 cm BIF, quartz, chert – 10 – 20 %; gravel 40 – 60 %); litter < 10 %; fallen timber < 2 %			
Condition & disturbances: Good; pastoral and mining impacts; erosion active; drought impacts; low shrubs and groundcover grasses, forbs mainly under groups of taller shrubs or trees			
NVIS 6: *U1^ Acacia pruinocarpa\Acacia\^tree\6\bi; M1+^ Acacia aptaneura, A. rhodophloia, A. pruinocarpa\Acacia\^shrub\4\i; M2^ Thryptomene decussata, Acacia ramulosa var. linophylla, A. pruinocarpa\Thryptomene\^shrub\3\r; G1^ Sida sp. Golden calyces, Harnieria kempeana subsp. muelleri, Thyridolepis multiculmis, Eragrostis eriopoda, Goodenia tenuiloba\Sida\^shrub, tussock grass, forb\2\r*			
Vegetation: *Acacia pruinocarpa low isolated trees over Acacia aptaneura, A. rhodophloia, A. pruinocarpa tall open shrubland over Thryptomene decussata, Acacia ramulosa var. linophylla, A. pruinocarpa sparse shrubland over Sida sp. Golden calyces, Harnieria kempeana subsp. muelleri, Thyridolepis multiculmis low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
8 – 10	< 2	T	*Acacia pruinocarpa*
3 – 6	10 – 30	S	*Acacia aptaneura, A. rhodophloia, A. pruinocarpa*
1 – 2	2 – 10	S	*Thryptomene decussata, Acacia ramulosa var. linophylla, A. pruinocarpa*
< 1	2 – 10	S, G, F	*Sida sp. Golden calyces, Harnieria kempeana subsp. muelleri, Thyridolepis multiculmis, Eragrostis eriopoda, Goodenia tenuiloba*
Other species: Grevillea berryana, Eremophila glutinosa			
Acacia aptaneura *Acacia pruinocarpa* *Acacia ramulosa var. linophylla* *Acacia rhodophloia* *Eragrostis eriopoda* *Eremophila glutinosa* *Goodenia tenuiloba* *Grevillea berryana* *Harnieria kempeana subsp. muelleri* *Sida sp. Golden calyces glabrous* *Thryptomene decussata* *Thyridolepis multiculmis*			

V17 30th July 2024 Pit area 1.45 pm			
GPS: 583130 E/ 7027147 N Elevation: 527 m	Landform: Hill; midslope; gentle slope; aspect SE		
Land surface: Yellowish red fine sandy clay loam; surface rock 10 – 20 %; litter < 10 %; fallen timber < 5 %; bare ground – patches of washed sand/ sandy loam 10 – 30 %			
Condition & disturbances: Good – pastoral impacts; moderate mining impacts in broader area – some sedimentation from erosion along track; grasses mostly absent; some larger cleared areas adjacent			
NVIS 6: *U1+^ Acacia incurvaneura\Acacia\^tree, shrub\6\i; M1^ Acacia ramulosa var. linophylla, A. rhodophloia\Acacia\^shrub\4\bi; M2^ Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Harnieria kempeana subsp. muelleri, Eremophila fraseri subsp. fraseri, Abutilon sp. \Eremophila\^shrub\3\i; G1^ Brachyscome iberidifolia, Erodium cygnorum, Goodenia tenuiloba, Cheilanthes sieberi subsp. sieberi*			
Vegetation: *Acacia incurvaneura low woodland over Acacia ramulosa var. linophylla, A. rhodophloia isolated tall shrubs over Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Harnieria kempeana subsp. muelleri open shrubland over Brachyscome iberidifolia, Erodium cygnorum, Goodenia tenuiloba, Cheilanthes sieberi subsp. sieberi low open forbland*			
Height (m)	Crown cover %	Habit	Species
6 – 9	25 – 30	T, S	*Acacia incurvaneura*
2 – 4	< 2	S	*Acacia ramulosa var. linophylla, A. rhodophloia*
0.5 – 1.5	20 – 30	S	*Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Harnieria kempeana subsp. muelleri, Eremophila fraseri subsp. fraseri, Abutilon sp.*
< 0.3	10 – 20	F, E	*Brachyscome iberidifolia, Erodium cygnorum, Goodenia tenuiloba, Cheilanthes sieberi subsp. sieberi*
Other species: Acacia pruinocarpa, Ptilotus rotundifolius			

Abutilon sp.
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia rhodophloia
Brachyscome iberidifolia
Cheilanthes sieberi subsp. sieberi
Eremophila forrestii subsp. forrestii
Eremophila fraseri subsp. fraseri
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Goodenia tenuiloba
Harnieria kempeana subsp. muelleri
Ptilotus rotundifolius



V18 30th July 2024 Pit area	
GPS: 582740 E/ 7027049 N Elevation: 555 m	Landform: BIF ridge; upper slope; aspect north/ south steep sides; gentle to west; very steep to east > crest
Land surface: Skeletal soils; surface rock (BIF, quartz) small rocks to boulders, 80 – 90 %	
Condition & disturbances: Very good; some mining activities on lower slope – clearing for drill locations and access tracks; signs of rabbits in broader area	
NVIS 6: *M1^ Thryptomene decussata, Acacia pruinocarpa\Thryptomene\^shrub, tree\4\r; M2^ Acacia aptaneura, Thryptomene decussata\Acacia\^shrub\3\r; M3^ Eremophila latrobei subsp. latrobei, Ptilotus obovatus, Dodonaea pachyneura, Tribulus suberosus\Eremophila\^shrub\2\i; G1^ Dysphania rhadinostachya subsp. rhadinostachya, Erodium cygnorum, Helipterum craspedioides, Goodenia tenuiloba, Stenopetalum anfractum\Dysphania|^forb\1\i*	
Vegetation: *Thryptomene decussata, Acacia pruinocarpa tall isolated shrubs over Acacia incurvaneura, Thryptomene decussata isolated shrubs over Eremophila latrobei subsp. latrobei, Ptilotus obovatus, Dodonaea pachyneura, Tribulus suberosus low open shrubland over Dysphania rhadinostachya subsp. rhadinostachya, Erodium cygnorum, Helipterum craspedioides low open forbland*	

Height (m)	Crown cover %	Habit	Species
2 – 4	2 – 10	S, T	*Thryptomene decussata, Acacia pruinocarpa*
1 – 2	2 – 10	S	*Acacia incurvaneura, Thryptomene decussata*
0.3 – 1	10 – 30	S	*Eremophila latrobei subsp. latrobei, Ptilotus obovatus, Dodonaea pachyneura, Tribulus suberosus*
< 0.3	20 – 30	F, S, G	*Dysphania rhadinostachya subsp. rhadinostachya, Erodium cygnorum, Helipterum craspedioides, Goodenia tenuiloba, Stenopetalum anfractum, Micromyrtus sulphurea, Monachather paradoxus*

Other species: Eremophila glutinosa, Philotheca brucei subsp. brucei, Senna glutinosa subsp. chatelainiana

Acacia incurvaneura
Acacia pruinocarpa
Dodonaea pachyneura
Dysphania rhadinostachya subsp. rhadinostachya
Eremophila glutinosa
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Goodenia tenuiloba
Helipterum craspedioides
Micromyrtus sulphurea
Monachather paradoxus
Philotheca brucei subsp. brucei
Ptilotus obovatus
Senna glutinosa subsp. chatelainiana
Stenopetalum anfractum
Tribulus suberosus
Thryptomene decussata



Image > east



Image > west; gently sloping platform

V19 30th July 2024 Pit area	
GPS: 582925 E/ 7027244 N Elevation: 547 m	Landform: BIF ridge; upper slope; moderate to steep slope; rocky scree slope; aspect north
Land surface: Shallow yellowish red silty clay loam; surface rock (BIF, quartz, chert) ^ 40 cm, > 80 %; litter < 10 %; fallen timber < 2 %	
Condition & disturbances: Very good; historic mining activities adjacent – drill location, tunnel	
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa\Acacia\^tree, shrub\6\i; M1^ Eremophila latrobei subsp. latrobei, Tribulus suberosus, Psydrax latifolia, Ptilotus obovatus, Eremophila macmillaniana\ Eremophila\^shrub\2\i; G1^ Erodium cygnorum, Dysphania rhadinostachya subsp. rhadinostachya, Lepidium oxytrichum, Goodenia tenuiloba, Paspalidium basicladum \Erodium\^forb, tussock grass \1\i*	
Vegetation: *Acacia incurvaneura, A. pruinocarpa low woodland over Eremophila latrobei subsp. latrobei, Tribulus suberosus, Psydrax latifolia low open shrubland over Erodium cygnorum, Dysphania rhadinostachya subsp. rhadinostachya, Lepidium oxytrichum low open forbland*	

Height (m)	Crown cover %	Habit	Species
5 – 9	20 – 30	T, S	*Acacia incurvaneura, A. pruinocarpa*
0.5 – 1.2	10 – 30	S	*Eremophila latrobei subsp. latrobei, Tribulus suberosus, Psydrax latifolia, Ptilotus obovatus, Eremophila macmillaniana*
< 0.3	10 – 15	F, G, S	*Erodium cygnorum, Dysphania rhadinostachya subsp. rhadinostachya, Lepidium oxytrichum, Goodenia tenuiloba, Paspalidium basicladum, Ptilotus obovatus*

Acacia incurvaneura
Acacia pruinocarpa
Dysphania rhadinostachya subsp. rhadinostachya
Eremophila latrobei subsp. latrobei
Eremophila macmillaniana
Erodium cygnorum
Goodenia tenuiloba
Lepidium oxytrichum
Paspalidium basicladum
Psydrax latifolia
Ptilotus obovatus
Tribulus suberosus



V20 30th July 2024 Pit area	
GPS: 582979 E/ 7027232 N Elevation: 559 m	Landform: Hill, BIF ridge; outcrops; hill trends NE – SW; aspect NW, SE; steep upper slopes and narrow ridge
Land surface: Skeletal pockets of reddish yellow silty clay loam; surface rock – outcrop and boulders > 90 %	
Condition & disturbances: Excellent; low impacts	
NVIS 6: *U1^ Acacia pruinocarpa, A. incurvaneura\Acacia\^tree, shrub\6\bi; M1+^ Eremophila latrobei subsp. latrobei, Dodonaea pachyneura, Philotheca brucei subsp. brucei\Eremophila\ ^shrub\3\i; G1^ Ptilotus obovatus, Eremophila latrobei subsp. latrobei, Goodenia tenuiloba, Dysphania rhadinostachya subsp. rhadinostachya, Erodium cygnorum\Ptilotus\^shrub, forb\1\c*	
Vegetation: *Acacia pruinocarpa, A. incurvaneura low isolated trees to low open woodland over Eremophila latrobei subsp. latrobei, Dodonaea pachyneura, Philotheca brucei subsp. brucei open shrubland over Ptilotus obovatus, Eremophila latrobei subsp. latrobei, Goodenia tenuiloba low shrubland*	

Height (m)	Crown cover %	Habit	Species
6 – 9	2 (– 5)	T, S	*Acacia pruinocarpa, A. incurvaneura*
1 – 2	10 – 30	S	*Eremophila latrobei subsp. latrobei, Dodonaea pachyneura, Philotheca brucei subsp. brucei*
< 0.5	30 – 40	S, F, G	*Ptilotus obovatus, Eremophila latrobei subsp. latrobei, Goodenia tenuiloba, Dysphania rhadinostachya subsp. rhadinostachya, Erodium cygnorum, Sclerolaena sp., Paspalidium basicladum, Harnieria kempeana subsp. muelleri*

Acacia incurvaneura
Acacia pruinocarpa
Dodonaea pachyneura
Dysphania rhadinostachya subsp. rhadinostachya
Erodium cygnorum
Eremophila latrobei subsp. latrobei
Goodenia tenuiloba
Harnieria kempeana subsp. muelleri
Paspalidium basicladum
Philotheca brucei subsp. brucei
Ptilotus obovatus
Sclerolaena sp.



V21 31st July 2024 Gravel pit access	
GPS: 582366 E/ 7027049 N Elevation: 524 m	Landform: Hill; midslope, valley; gentle slope, aspect NNE
Land surface: Yellowish red silty clay loam; surface rock (BIF, quartz) 2 – 5 %; litter 20 – 30 % (under shrubs); fallen timber 2 – 4 %	
Condition & disturbances: Very good; historic mining and recent pastoral impacts; old track, overgrown; sheet erosion	
NVIS 6: *U1^ Acacia incurvaneura, A. caesaneura, A. pruinocarpa, A. craspedocarpa\Acacia\^tree, shrub\6\r; M1+^ Acacia incurvaneura, A. ramulosa var. linophylla, Senna glaucifolia\Acacia\^shrub\ 4\i; M2^ Eremophila forrestii subsp. forrestii, Tribulus suberosus, Eremophila georgei\Eremophila\ 3\i; G1^ Erodium cygnorum, Eragrostis eriopoda, Monachather paradoxus\Erodium\^forb, tussock grass\1\i*	
Vegetation: *Acacia incurvaneura, A. caesaneura, A. pruinocarpa low open woodland over Acacia incurvaneura, A. ramulosa var. linophylla, Senna glaucifolia tall open shrubland over Eremophila forrestii subsp. forrestii, Tribulus suberosus, Eremophila georgei open shrubland over Erodium cygnorum, Eragrostis eriopoda, Monachather paradoxus low open forbland*	

Height (m)	Crown cover %	Habit	Species
4 – 7	2 – 10	T, S	*Acacia incurvaneura, A. caesaneura, A. pruinocarpa, A. craspedocarpa*
2 – 4	10 – 30	S	*Acacia incurvaneura, A. ramulosa var. linophylla, Senna glaucifolia*
1 – 2	10 – 30	S	*Eremophila forrestii subsp. forrestii, Tribulus suberosus, Eremophila georgei*
< 0.3	10 – 30	F, G	*Erodium cygnorum, Eragrostis eriopoda, Monachather paradoxus*

Acacia caesaneura
Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila forrestii subsp. forrestii
Eremophila georgei
Erodium cygnorum
Monachather paradoxus
Senna glaucifolia
Tribulus suberosus



V22 31st July 2024 Gravel pit access	
GPS: 582283 E/ 7027224 N Elevation: 523 m	Landform: Hill; midslope, unincised drainage line
Land surface: Yellowish red fine sandy clay loam; surface rock < 1 %; litter ^ 20 cm, 40 – 50 %; fallen timber < 1 %	
Condition & disturbances: Very good; pastoral impacts; overgrown track; erosion (low) and sedimentation; rabbits	
NVIS 6: *U1+^ Acacia fuscaneura, A. pruinocarpa\Acacia\^tree, shrub\6\i; M1^ Acacia ramulosa var. linophylla, Senna glutinosa subsp. xluerssenii, Psydrax latifolia\Acacia\^shrub, tree\4\i; M2^ Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea, Eremophila gilesii, E. latrobei subsp. latrobei\Eremophila\^shrub\3\c; G1^ Erodium cygnorum, Isoetopsis graminifolia, Menkea villosula, Cheilanthes sieberi subsp. sieberi, Chthonocephalus pseudevax\Erodium\^forb\1\c*	
Vegetation: *Acacia fuscaneura, A. pruinocarpa low woodland over Acacia ramulosa var. linophylla, Senna glutinosa subsp. xluerssenii, Psydrax latifolia tall open shrubland over Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea shrubland over Erodium cygnorum, Isoetopsis graminifolia, Menkea villosula low forbland*	

Height (m)	Crown cover %	Habit	Species
5 – 8	20 – 30	T, S	*Acacia fuscaneura, A. pruinocarpa*
2 – 4	20 – 30	S, T	*Acacia ramulosa var. linophylla, Senna glutinosa subsp. xluerssenii, Psydrax latifolia*
1 – 2	30 – 40	S	*Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea, Eremophila gilesii, E. latrobei subsp. latrobei*
< 0.5	50 – 60	F, E, S	*Erodium cygnorum, Isoetopsis graminifolia, Menkea villosula, Cheilanthes sieberi subsp. sieberi, Chthonocephalus pseudevax, Panaetia lessonii, Eremophila latrobei subsp. latrobei*

Acacia fuscaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Cheilanthes sieberi subsp. sieberi
Chthonocephalus pseudevax
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila gilesii
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Isoetopsis graminifolia
Menkea villosula
Panaetia lessonii
Psydrax latifolia
Rhagodia eremaea
Senna glutinosa subsp. xluerssenii



V23 31st July 2024 Gravel pit access 8.14 am			
GPS: 582246 E/ 7027377 N Elevation: 526 m	Landform: Low gravelly hill, midslope; gentle to moderate slope; aspect south		
Land surface: Yellowish red silty clay loam; surface rock (gravel, chert, BIF, quartz) > 90 %; litter < 5 %; fallen timber < 1 %; bare ground < 2 %			
Condition & disturbances: Degraded to poor; pastoral impacts, rabbits			
NVIS 6: *U1^ Acacia aptaneura, A. pruinocarpa\Acacia\^tree, shrub\6\r; M1^ Senna glaucifolia, Scaevola spinescens, Acacia aptaneura\Senna\^shrub\3\r; G1^ Maireana melanocoma, germinating forbs, Eremophila forrestii subsp. forrestii, E. compacta \Maireana\^chenopod shrub, forb, shrub\1\r*			
Vegetation: *Acacia aptaneura, A. pruinocarpa low open woodland over Senna glaucifolia, Scaevola spinescens, Acacia aptaneura sparse shrubland over Maireana melanocoma, germinating forbs, Eremophila forrestii subsp. forrestii low sparse chenopod shrubland*			
Height (m)	Crown cover %	Habit	Species
4 – 8	2 – 10	T, S	*Acacia aptaneura, A. pruinocarpa*
1 – 1.5	2 – 10	S	*Senna glaucifolia, Scaevola spinescens, Acacia aptaneura*
0.1 – 0.3	2 – 10	C, F, S	*Maireana melanocoma, germinating forbs, Eremophila forrestii subsp. forrestii, E. compacta*
Other species: Dodonaea pachyneura, Grevillea berryana, Sida ectogama, Micromyrtus sulphurea, Solanum lasiophyllum, Thryptomene decussata			
Acacia aptaneura *Acacia pruinocarpa* *Dodonaea pachyneura* *Eremophila compacta* *Eremophila forrestii subsp. forrestii* *Grevillea berryana* *Maireana melanocoma* *Micromyrtus sulphurea* *Scaevola spinescens* *Senna glaucifolia* *Sida ectogama* *Solanum lasiophyllum* *Thryptomene decussata*			

V24 31st July 2024 Gravel pit access	
GPS: 582255 E/ 7027536 N Elevation: 529 m	Landform: Low hill; upper slope; gravelly hill; aspect north, gentle to moderate slope
Land surface: Yellowish red silty clay loam; surface rock (gravel) > 90 %	
Condition & disturbances: Good; pastoral impacts, rabbits; minor erosion	
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa, A. aptaneura\Acacia\^shrub, tree\4\i; M1^ Acacia ramulosa var. linophylla, Eremophila latrobei subsp. latrobei, Acacia incurvaneura\Acacia\ ^shrub\3\r; M2^ Eremophila latrobei subsp. latrobei, Acacia incurvaneura, Senna glaucifolia, Stenanthemum patens, Eremophila compacta, Sida ectogama\Eremophila\^shrub\2\r; G1^ Ptilotus schwartzii, Eragrostis eriopoda\^Ptilotus\^shrub, tussock grass\1\bi*	
Vegetation: *Acacia incurvaneura, A. pruinocarpa, A. aptaneura tall open shrubland over Acacia ramulosa var. linophylla, Eremophila latrobei subsp. latrobei, Acacia incurvaneura sparse shrubland over Eremophila latrobei subsp. latrobei, Acacia incurvaneura, Senna glaucifolia low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
4 – 6	10 – 30	S, T	*Acacia incurvaneura, A. pruinocarpa, A. aptaneura*
1 – 2	2 – 10	S	*Acacia ramulosa var. linophylla, Eremophila latrobei subsp. latrobei, Acacia incurvaneura*
0.2 – 1	2 – 10	S	*Eremophila latrobei subsp. latrobei, Acacia incurvaneura, Senna glaucifolia, Stenanthemum patens, Eremophila compacta, Sida ectogama*
< 0.2	<2	S, G	*Ptilotus schwartzii, Eragrostis eriopoda*

Other species: Eremophila glutinosa (becoming dominant downslope), Grevillea berryana

Acacia aptaneura
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila compacta
Eremophila glutinosa
Eremophila latrobei subsp. latrobei
Grevillea berryana
Ptilotus schwartzii
Senna glaucifolia
Sida ectogama
Stenanthemum patens P1



V25 31st July 2024 Gravel pit access			
GPS: 582252 E/ 7027637 N Elevation: 520 m	Landform: Hill; lower slope, valley with broad drainage line		
Land surface: Reddish yellow (7.5YR6/6) fine sandy clay loam; surface rock (gravel) 30 – 40 %;			
Condition & disturbances:			
NVIS 6: *U1+^ Acacia incurvaneura, A. fuscaneura, A. sp. Weld Range, Grevillea berryana\Acacia\ ^tree, shrub\6\i; M1^ Eremophila forrestii subsp. forrestii, Acacia ramulosa var. linophylla, Senna glaucifolia\ Eremophila\^shrub\3\i; M2^ Eremophila forrestii subsp. forrestii, E. glutinosa, Sida ectogama, Solanum lasiophyllum, Thysanotus manglesianus\Eremophila\^shrub, climber\2\r; G1^ Erodium cygnorum, Eragrostis eriopoda\Erodium\^forb, tussock grass*			
Vegetation: *Acacia incurvaneura, A. fuscaneura, A. sp. Weld Range low woodland over Eremophila forrestii subsp. forrestii, Acacia ramulosa var. linophylla, Senna artemisioides subsp. xsturtii open shrubland over Eremophila forrestii subsp. forrestii, E. glutinosa, Sida ectogama low sparse shrubland over Erodium cygnorum, Eragrostis eriopoda low open forbland*			
Height (m)	Crown cover %	Habit	Species
4 – 8	10 – 30	T, S	*Acacia incurvaneura, A. fuscaneura, A. sp. Weld Range, Grevillea berryana*
1 – 2	10 – 30	S	*Eremophila forrestii subsp. forrestii, Acacia ramulosa var. linophylla, Senna artemisioides subsp. xsturtii*
0.3 – 1	2 – 10	S, L	*Eremophila forrestii subsp. forrestii, E. glutinosa, Sida ectogama, Solanum lasiophyllum, Thysanotus manglesianus*
< 0.3	10 – 20	F, G	*Erodium cygnorum, Eragrostis eriopoda*

Acacia fuscaneura
Acacia incurvaneura
Acacia ramulosa var. linophylla
Acacia sp. Weld Range
Eragrostis eriopoda
Eremophila forrestii subsp. forrestii
Eremophila glutinosa
Erodium cygnorum
Grevillea berryana
Senna artemisioides subsp. xsturtii
Sida ectogama
Solanum lasiophyllum
Thysanotus manglesianus



Downslope from description site – erosion moderate with erosion gullies, sheet erosion and areas of deposition

Other species:
Brachyscome iberidifolia
Psydrax latifolia
Psydrax suaveolens



V26 31st July 2024 8.55 am Gravel pit access			
GPS: 582314 E/ 7027752 N Elevation: 522 m	Landform: Stony hill; midslope; aspect north; gentle slope		
Land surface: Yellowish red silty clay loam; surface rock (BIF, chert, quartz, 3 – 10 cm) 40 – 60 %; litter < 5 %; fallen timber < 1 %; bare ground 20 – 30 %			
Condition & disturbances: Good; pastoral impacts, rabbits, sheet erosion; drought impacts – some deaths, and part crown deaths			
NVIS 6: *U1+^ Acacia incurvaneura, A. sp. Weld Range\Acacia\^shrub\4\r; M1^ Ptilotus rotundifolius, Eremophila forrestii subsp. forrestii, Scaevola spinescens, Eremophila glutinosa, Acacia ramulosa var. linophylla\Ptilotus\^shrub\3\r; G1^ Ptilotus aervoides, P. schwartzii , Erodium cygnorum , Eremophila forrestii subsp. forrestii\Ptilotus\^shrub, forb\1\bi*			
Vegetation: *Acacia incurvaneura, A. sp. Weld Range tall sparse shrubland over Ptilotus rotundifolius, Eremophila forrestii subsp. forrestii, Scaevola spinescens sparse shrubland over Ptilotus aervoides, P. schwartzii , Erodium cygnorum low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
4 – 6	2 – 10	S	*Acacia incurvaneura, A. sp. Weld Range*
1 – 2	2 – 10	S	*Ptilotus rotundifolius, Eremophila forrestii subsp. forrestii, Scaevola spinescens, Eremophila glutinosa, Acacia ramulosa var. linophylla*
< 0.3	< 2	S, F	*Ptilotus aervoides, P. schwartzii , Erodium cygnorum , Eremophila forrestii subsp. forrestii*
Other species: Senna artemisioides subsp. helmsii, S. artemisioides subsp. xsturtii			
Acacia incurvaneura *Acacia ramulosa var. linophylla* *Acacia sp. Weld Range* *Eremophila forrestii subsp. forrestii* *Eremophila glutinosa* *Erodium cygnorum* *Ptilotus aervoides* *Ptilotus rotundifolius* *Ptilotus schwartzii* *Scaevola spinescens* *Senna artemisioides subsp. helmsii* *Senna artemisioides subsp. xsturtii*			
Opportunistic site; downslope from V26 GPS582302 E/ 7027815 N 520 m Broad drainage line, unincised *Acacia incurvaneura* woodland over *Eremophila georgei, E. forrestii* subsp. *forrestii, Acacia ramulosa var. linophylla* open shrubland over *Erodium cygnorum, Paspalidium basicladum* low sparse forbland			

V27 31st July 2024 Gravel pit access Relevé	
GPS: 582366 E/ 7027851 N Elevation: 524 m	Landform: Hill, midslope; change from valley to stony slope; aspect NW
Land surface: Surface rock 20 – 40 %	
Condition & disturbances: Good; pastoral impacts; drought impacts	
Vegetation: *Acacia pruinocarpa, A. caesaneura, A. incurvaneura, A.* sp. Weld Range tall open shrubland over *Eremophila latrobei* subsp. *latrobei, Ptilotus rotundifolius, E. fraseri* subsp. *fraseri, E. glutinosa, Senna artemisioides* subsp. *helmsii, Acacia tetragonophylla, Sida ectogama* sparse shrubland over *Hibiscus sturtii* low isolated shrubs	
Eremophila fraseri subsp. *fraseri* becoming more common as changes to stony hillslope	
Acacia caesaneura *Acacia incurvaneura* *Acacia pruinocarpa* *Acacia sp. Weld Range* *Acacia tetragonophylla* *Eremophila fraseri subsp. fraseri*	*Eremophila glutinosa* *Eremophila latrobei subsp. latrobei* *Hibiscus sturtii* *Ptilotus rotundifolius* *Senna artemisioides subsp. helmsii* *Sida ectogama*

V28 31st July 2024 9.16 am Gravel pit access	
GPS: 582432 E/ 7027922 N Elevation: 521 m	Landform: Hill, stony surface; gentle to moderate; aspect NW
Land surface: Yellowish red silty clay loam; surface rock (BIF, dolerite, quartz, 2 – 10 cm) 40 – 60 %; litter < 2 %; fallen timber < 2 %	
Condition & disturbances: Poor; pastoral impacts, drought impacts – *Acacia ramulosa* shrub died; patches of germinating forbs	
NVIS 6: *U1+^Acacia incurvaneura, A. sp. Weld Range\Acacia\^shrub\4\bi; M1^ Eremophila fraseri subsp. fraseri, A. speckii\Eremophila\^shrub\3\bi; G1^ Goodenia tenuiloba, Ptilotus schwartzii\ Goodenia\^forb, shrub\1\r*	
Vegetation: *Acacia incurvaneura, A. sp. Weld Range tall isolated shrubs over Eremophila fraseri subsp. fraseri, A. speckii isolated shrubs over Goodenia tenuiloba, Ptilotus schwartzii low sparse forbland*	

Height (m)	Crown cover %	Habit	Species
3 – 6	< 2	S	*Acacia incurvaneura, A. sp. Weld Range*
1 – 2	< 2	S	*Eremophila fraseri subsp. fraseri, A. speckii*
< 0.3	2 – 10	F, S	*Goodenia tenuiloba, Ptilotus schwartzii*

Acacia incurvaneura
Acacia speckii P4
Acacia sp. Weld Range
Eremophila fraseri subsp. fraseri
Goodenia tenuiloba
Ptilotus schwartzii



V29 31st July 2024 Gravel pit access			
GPS: 582559 E/ 7028011 N Elevation: 519 m	Landform: Hill; stony with small outcrops of dolerite; gentle slope; aspect NW		
Land surface: Reddish brown clay loam; surface rock (dolerite – boulders, outcrop; BIF, chert rocks 2 – 20 cm) 60 – 80 %; litter < 10 %; fallen timber < 2 %			
Condition & disturbances: Pastoral impacts; drought impacts – deaths and part crown deaths; *Acacia speckii* with moderate to high crown death (2 deaths)			
NVIS 6: *M1+^ Acacia speckii, A. sp. Weld Range, Eremophila fraseri subsp. fraseri\Acacia\ 4\i; M2^ Eremophila latrobei subsp. latrobei, Ptilotus rotundifolius\Eremophila\^shrub\3\r; G1^ Eremophila fraseri subsp. fraseri, E. compacta, Sida ectogama\Eremophila\^shrub\2\r; G2^ Cephalipterum drummondii, Eremophila fraseri subsp. fraseri, Maireana georgei\Cephalipterum\^forb, shrub, chenopod shrub\1\bi*			
Vegetation: *Acacia speckii, A. sp. Weld Range, Eremophila fraseri subsp. fraseri tall open shrubland over Eremophila latrobei subsp. latrobei, Ptilotus rotundifolius sparse shrubland over Eremophila fraseri subsp. fraseri, E. compacta, Sida ectogama*			
Height (m)	Crown cover %	Habit	Species
2 – 3.5	10 – 20	S	*Acacia speckii, A. sp. Weld Range, Eremophila fraseri subsp. fraseri*
1 – 2	2 – 10	S	*Eremophila latrobei subsp. latrobei, Ptilotus rotundifolius*
0.2 – 0.8	2 – 10	S	*Eremophila fraseri subsp. fraseri, E. compacta, Sida ectogama*
< 0.2	< 2	F, S, C	*Cephalipterum drummondii, Eremophila fraseri subsp. fraseri, Maireana georgei*

Acacia speckii P4
Acacia sp. Weld Range
Cephalipterum drummondii
Eremophila compacta
Eremophila fraseri subsp. fraseri
Eremophila latrobei subsp. latrobei
Maireana georgei
Ptilotus rotundifolius
Sida ectogama



<table>
<tr><th colspan="4">V30 31st July 2024 Gravel pit access</th></tr>
<tr><td colspan="2">GPS: 582687 E/ 7028093 N
Elevation: 511 m</td><td colspan="2">Landform: Hill; lower slope; gentle sloping stony plain with dolerite outcrops; aspect NNW</td></tr>
<tr><td colspan="4">Land surface: Reddish brown clay loam; surface rock (dolerite boulders and outcrop; BIF, chert, quartz rocks) > 70 %; litter < 5%; fallen timber < 2 %</td></tr>
<tr><td colspan="4">Condition & disturbances: Good; pastoral impacts; rabbits; drought impacts</td></tr>
<tr><td colspan="4">NVIS 6: U1+^ Acacia incurvaneura, A. aptaneura\Acacia\^tree\6\r; M1^ Senna artemisioides subsp. helmsii, Eremophila fraseri subsp. fraseri\Senna\^shrub\r; G1^ Sida ectogama, Eremophila latrobei subsp. latrobei, Maireana georgei\Sida\^shrub, chenopod shrub\2\bi; G2^ Erodium cygnorum\ Erodium\^forb\1\bi</td></tr>
<tr><td colspan="4">Vegetation: Acacia incurvaneura, A. aptaneura low open woodland over Senna artemisioides subsp. helmsii, Eremophila fraseri subsp. fraseri sparse shrubland over Sida ectogama, Eremophila latrobei subsp. latrobei, Maireana georgei low isolated shrubs</td></tr>
<tr><th>Height (m)</th><th>Crown cover %</th><th>Habit</th><th>Species</th></tr>
<tr><td>4 – 6</td><td>2 – 10</td><td>T</td><td>Acacia incurvaneura, A. aptaneura</td></tr>
<tr><td>1 – 2</td><td>2 – 10</td><td>S</td><td>Senna artemisioides subsp. helmsii, Eremophila fraseri subsp. fraseri</td></tr>
<tr><td>0.2 – 0.8</td><td>< 2</td><td>S, C</td><td>Sida ectogama, Eremophila latrobei subsp. latrobei, Maireana georgei</td></tr>
<tr><td>< 0.2</td><td>< 2</td><td>F</td><td>Erodium cygnorum</td></tr>
<tr><td colspan="4">Other species: Acacia speckii</td></tr>
<tr><td colspan="2">Acacia aptaneura
Acacia incurvaneura
Acacia speckii P4
Eremophila fraseri subsp. fraseri
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Maireana georgei
Senna artemisioides subsp. helmsii
Sida ectogama</td><td colspan="2"></td></tr>
<tr><td colspan="4">Opportunistic site
GPS: 582768 E/ 7028160 N 509 m
Minor drainage line
Acacia incurvaneura, A. craspedocarpa tall open shrubland over Eremophila georgei, E. fraseri open shrubland</td></tr>
</table>

V31 Gravel pit area West			
GPS: 582870 E/ 7028230 N Elevation: 510 m	Landform: Change from stony plain/ lower slope of hill to alluvium/ hardpan plain; possible water discharge point		
Land surface: Yellowish red fine sandy clay loam; surface rock within depression/ wet area < 10 %			
Condition & disturbances: Very good; pastoral disturbances and rabbits; some drought impacts			
NVIS 6: *U1+^ Acacia pruinocarpa, Acacia incurvaneura\Acacia\^tree, shrub\7\c; M1^ Acacia craspedocarpa, Psydrax suaveolens\Acacia\^shrub, tree\4\r; M2^ Eremophila georgei, E. latrobei subsp. latrobei, E. forrestii subsp. forrestii\Eremophila\^shrub\3\c; G1^ Maireana georgei, Erodium cygnorum\Maireana\^chenopod shrub, forb\1\bi*			
Vegetation: *Acacia pruinocarpa, Acacia incurvaneura woodland over Acacia craspedocarpa, Psydrax suaveolens tall isolated shrubs over Eremophila georgei, E. latrobei subsp. latrobei, E. forrestii subsp. forrestii shrubland over Maireana georgei, Erodium cygnorum low isolated chenopod shrubs*			
Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 40	T, S	*Acacia pruinocarpa, Acacia incurvaneura*
3 – 4	2 – 10	S, T	*Acacia craspedocarpa, Psydrax suaveolens*
1 – 1.5	30 – 40	S	*Eremophila georgei, E. latrobei subsp. latrobei, E. forrestii subsp. forrestii*
< 0.5	< 2	C, F	*Maireana georgei, Erodium cygnorum*

Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Maireana georgei
Psydrax suaveolens



Opportunistic site GP1
GPS: 582884 E/ 7028230 N
Hardan plain
Condition: poor; pastoral impacts – moderate to high; lacks grasses, recruitment mostly absent

Acacia incurvaneura low isolated trees over Eremophila forrestii subsp. forrestii open shrubland over Erodium cygnorum low sparse forbland



Opportunistic site GP2
GPS: 582937 E/ 7028466 N Elevation: 508 m
Hardpan plain; drainage area; alluvium
Condition: poor; pastoral impacts; drought impacts moderate to high; recruitment/ regrowth of *Eremophila foliosissima* following wetter conditions
Acacia pruinocarpa, Acacia incurvaneura low open woodland to low isolated trees over *Eremophila forrestii* subsp. *forrestii* sparse shrubland over *Eremophila foliosissima* low sparse shrubland over *Erodium cygnorum*, grass tussocks low open forbland



V32 Gravel pit area NE	
GPS: 583130 E/ 7028519 N Elevation: 509 m	Landform: Stony plain with ironstone gravel; very gentle slope; aspect N - NE
Land surface: Yellowish red fine sandy clay loam; surface rock – Ironstone gravel 30 – 40 %; rocks (BIF, chert, quartz) 30 – 40 %; litter < 5 %; fallen timber < 1 %	
Condition & disturbances: Poor; pastoral impacts – groundcover absent; little recruitment; drought impacts – several dead shrubs present	
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa, A. mulganeura\Acacia\^tree, shrub\6\r; M1^ Acacia incurvaneura, A. mulganeura\Acacia\^shrub\3\bi; G1^ Chenopod sp.\Chenopod sp.\^chenopod shrub\1\bi*	
Vegetation: *Acacia incurvaneura, A. pruinocarpa, A. mulganeura low open woodland over Acacia incurvaneura, A. mulganeura isolated shrubs over Chenopod sp. low isolated chenopod shrubs*	

Height (m)	Crown cover %	Habit	Species
4 – 7	2 – 10	T, S	*Acacia incurvaneura, A. pruinocarpa, A. mulganeura*
1 – 2	< 2	S	*Acacia incurvaneura, A. mulganeura*
< 1	< 2	S	*Chenopod sp. (sterile, nearly dead)*

Acacia incurvaneura
Acacia mulganeura
Acacia pruinocarpa
Chenopod sp.



V33 31st July 2024 10.46 am Gravel pit area East	
GPS: 583213 E/ 7028420 N Elevation: 509 m	Landform: Alluvial plain; depression/ partly incised drainage line
Land surface: Yellowish red fine sandy clay loam	
Condition & disturbances: Good; pastoral impacts – many cattle tracks through area; rabbits; erosion; drought deaths – in particular one large tree (*A. pruinocarpa*); grasses absent	
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\7\i; M1^ Acacia incurvaneura, A. fuscaneura, A. tetragonophylla\Acacia\^shrub, tree\4\i; M2^ Eremophila forrestii subsp. forrestii, Acacia pruinocarpa, Ptilotus obovatus\Eremophila\^shrub\3\i; G1^ Erodium cygnorum, Tetragonia cristata, Maireana ?tomentosa, Ptilotus polystachyus, Eremophila forrestii subsp. forrestii\Erodium\^forb, chenopod shrub, shrub\1\i*	
Vegetation: *Acacia pruinocarpa woodland over Acacia incurvaneura, A. fuscaneura, A. tetragonophylla tall open shrubland over Eremophila forrestii subsp. forrestii, Acacia pruinocarpa, Ptilotus obovatus open shrubland over Erodium cygnorum, Tetragonia cristata, Eriochiton sclerolaenoides, Ptilotus polystachyus low open forbland*	

Height (m)	Crown cover %	Habit	Species
> 10	20 – 30	T	*Acacia pruinocarpa*
2 – 5	10 – 30	S, T	*Acacia incurvaneura, A. fuscaneura, A. tetragonophylla*
1 – 1.5	20 – 30	S	*Eremophila forrestii subsp. forrestii, Acacia pruinocarpa, Ptilotus obovatus*
< 0.5	10 – 30	F, C, S	*Erodium cygnorum, Tetragonia cristata, Eriochiton sclerolaenoides , Ptilotus polystachyus, Eremophila forrestii subsp. forrestii*

Acacia fuscaneura
Acacia incurvaneura
Acacia pruinocarpa
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eriochiton sclerolaenoides
Erodium cygnorum
Paspalidium basicladum
Ptilotus obovatus
Ptilotus polystachyus
Senna sp. Meekatharra
Tetragonia cristata



Large *Acacia pruinocarpa* dead - ?drought impact

Regrowth under old crown extent – *Ptilotus obovatus, Eremophila forrestii* subsp. *forrestii* low open shrubland over *Erodium cygnorum, Tetragonia cristata* low forbland

Taller *Eremophila, Senna* sp. Meekatharra at edges



Opportunistic site GP3
Alluvial plain/ hardpan
GPS: 583196 E/ 7028436 N Elevation: 509 m
Condition: degraded to poor; pastoral impacts (cattle) high; erosion – sheet wash and deposition

Acacia incurvaneura, A. pruinocarpa, A. ramulosa var. *linophylla* tall shrubland patches over *Eremophila forrestii* subsp. *forrestii* sparse shrubland over *Erodium cygnorum, Paspalidium basicladum, Eremophila forrestii* subsp. *forrestii* low open forbland



V34 31st July 2024 Gravel pit area SW

GPS: 582934 E/ 7028150 N Elevation: 516 m	Landform: Stony gentle sloping plain; aspect NE

Land surface: Yellowish red silty clay loam; surface rock – ironstone gravel 20 – 40 %; larger rocks 2 – 10 cm 20 – 40 %; litter < 5 %; fallen timber < 2 %

Condition & disturbances: Poor; pastoral impacts, drought impacts – some deaths; sheet erosion

NVIS 6: *U1+^ Grevillea berryana, Acacia aptaneura\Grevillea\^tree\6\bi; M1^ Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila glutinosa\Acacia\^shrub\3\bi; G1^ Eragrostis eriopoda, Ptilotus aervoides\Eragrostis\^tussock grass, forb\1\bi*

Vegetation: *Grevillea berryana, Acacia aptaneura low isolated trees over Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila glutinosa isolated shrubs over Eragrostis eriopoda, Ptilotus aervoides low isolated tussock grasses*

Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	T	*Grevillea berryana, Acacia aptaneura*
1 – 2	< 2	S	*Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila glutinosa*
< 0.2	< 2	G, F	*Eragrostis eriopoda, Ptilotus aervoides*

Acacia aptaneura
Acacia incurvaneura
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila glutinosa
Grevillea berryana
Ptilotus aervoides



Change to broad drainage line GPS: 583071 E/ 7028202 N Elevation: 514 m	*Acacia pruinosa* isolated trees over *Acacia incurvaneura, A. ramulosa* var. *linophylla* tall open shrubland over Eremophila forrestii subsp. forrestii open shrubland

V35 31st July 2024 Pit area, north side			
GPS: 583069 E/ 7027557 N Elevation: 522 m	Landform: Colluvial outwash slope below BIF ridge; lower slope		
Land surface: Surface rock (BIF, chert, quartz) 30 – 40 %			
Condition & disturbances: Very good; pastoral impacts moderate			
NVIS 6: *U1^ Acacia incurvaneura, A. caesaneura\Acacia\^tree, shrub\6\r; M1+^ Ptilotus rotundifolius, Senna glaucifolia, Acacia caesaneura, Eremophila forrestii subsp. forrestii, Acacia incurvaneura \Ptilotus\^shrub\3\i; G1^ Ptilotus aervoides, Stenopetalum anfractum\Ptilotus\ ^forb\1\bi*			
Vegetation: *Acacia incurvaneura, A. caesaneura low open woodland over Ptilotus rotundifolius, Senna glaucifolia, Acacia caesaneura open shrubland over Ptilotus aervoides, Stenopetalum anfractum low isolated forbs*			
Height (m)	Crown cover %	Habit	Species
4 – 8	2 – 10	T, S	*Acacia incurvaneura, A. caesaneura*
1 – 2	10 – 20	S	*Ptilotus rotundifolius, Senna glaucifolia, Acacia caesaneura, Eremophila forrestii subsp. forrestii, Acacia incurvaneura, Eremophila latrobei subsp. latrobei*
< 0.3	< 2	F	*Ptilotus aervoides, Stenopetalum anfractum*

Acacia caesaneura
Acacia incurvaneura
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Ptilotus aervoides
Ptilotus rotundifolius
Senna glaucifolia
Stenopetalum anfractum



V36 31st July 2024 Pit area, north side			
GPS: 583086 E/ 7027479 N Elevation: 527 m	Landform: Hill, colluvial outwash slope; moderate slope; aspect NW		
Land surface: Yellowish red silty clay loam; surface rock – fine gravel 30 – 40 %, BIF, chert rocks 5 – 20 cm 30 – 40 %; litter < 5 %; fallen timber < 1 %			
Condition & disturbances: Very good; historic mining activities – tracks and drill locations; lower pastoral impacts			
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa, A. sp. Weld Range\Acacia\^tree, shrub\6\r; M1^ Eremophila macmillaniana, Senna glaucifolia, Eremophila fraseri subsp. fraseri, Ptilotus rotundifolius\Eremophila\^shrub\3\r; M2^ Ptilotus rotundifolius, Senna glaucifolia\Ptilotus\^shrub\2\bi; G1^ Maireana melanocoma, Ptilotus aervoides, Portulaca oleracea, Stenopetalum filifolium\Maireana\^chenopod shrub, forb\1\bi*			
Vegetation: *Acacia incurvaneura, A. pruinocarpa, A. sp. Weld Range tall open shrubland over Eremophila macmillaniana, Senna glaucifolia, Eremophila fraseri subsp. fraseri sparse shrubland over Maireana melanocoma, Ptilotus aervoides, Portulaca oleracea low isolated chenopod shrubs*			
Height (m)	Crown cover %	Habit	Species
3 – 8	10 – 20	T, S	*Acacia incurvaneura, A. pruinocarpa, A. sp. Weld Range*
1 – 2	2 – 10	S	*Eremophila macmillaniana, Senna glaucifolia, Eremophila fraseri subsp. fraseri, Ptilotus rotundifolius*
0.3 – 1	< 2	S	*Ptilotus rotundifolius, Senna glaucifolia*
< 0.3	< 2	C, F	*Maireana melanocoma, Ptilotus aervoides, Portulaca oleracea, Stenopetalum filifolium, Eragrostis eriopoda*
Other species: Scaevola spinescens			

Acacia incurvaneura
Acacia pruinocarpa
Acacia sp. Weld Range
Eremophila fraseri subsp. fraseri
Eremophila macmillaniana
Maireana melanocoma
Ptilotus aervoides
Ptilotus rotundifolius
Portulaca oleracea
Senna glaucifolia
Stenopetalum filifolium
Scaevola spinescens



V37 31st July 2024 Gravel pit area north	
GPS: 582908 E/ 7027436 N Elevation: 524 m	Landform: Hill; colluvial outwash lower slope; moderate slope; aspect NW
Land surface: Yellowish red silty clay loam; surface rock (BIF, chert) 30 – 40 %	
Condition & disturbances: Very good; access road (calcrete surfaced) to north, downslope	
NVIS 6: *U1+^ Acacia incurvaneura\Acacia\^tree\6\i; M1^ Acacia sp. Weld Range, Eremophila macmillaniana\Acacia\^shrub\4\r; M2^ Eremophila macmillaniana, Senna glaucifolia, Psydrax latifolia, Senna artemisioides subsp. helmsii\Eremophila\^shrub\3\i; M3^ Eremophila forrestii subsp. forrestii, Psydrax latifolia, Hibiscus sturtii, Senna artemisioides subsp. helmsii\Eremophila\2\r; G1^ Maireana melanocoma, Ptilotus obovatus, Goodenia tenuiloba, Psydrax latifolia, Solanum lasiophyllum\Maireana\^chenopod shrub, shrub, forb\1\r*	
Vegetation: *Acacia incurvaneura low open woodland over Acacia sp. Weld Range, Eremophila macmillaniana tall sparse shrubland over Eremophila macmillaniana, Senna glaucifolia, Psydrax latifolia open shrubland over Eremophila forrestii subsp. forrestii, Psydrax latifolia, Hibiscus sturtii low sparse shrubland over Maireana melanocoma, Ptilotus obovatus, Goodenia tenuiloba low sparse chenopod shrubland*	

Height (m)	Crown cover %	Habit	Species
5 – 8	10 – 30	T	*Acacia incurvaneura*
2 – 4	2 – 10	S	*Acacia sp. Weld Range, Eremophila macmillaniana*
1 – 2	10 – 30	S	*Eremophila macmillaniana, Senna glaucifolia, Psydrax latifolia, Senna artemisioides subsp. helmsii*
0.3 – 1	2 – 10	S	*Eremophila forrestii subsp. forrestii, Psydrax latifolia, Hibiscus sturtii, Senna artemisioides subsp. helmsii*
< 0.3	2 – 10	C, S, F	*Maireana melanocoma, Ptilotus obovatus, Goodenia tenuiloba, Psydrax latifolia, Solanum lasiophyllum, Erodium cygnorum*

Acacia incurvaneura
Acacia sp. Weld Range
Eremophila forrestii subsp. forrestii
Eremophila macmillaniana
Erodium cygnorum
Goodenia tenuiloba
Hibiscus sturtii
Ptilotus obovatus
Maireana melanocoma
Psydrax latifolia
Senna artemisioides subsp. helmsii
Senna glaucifolia
Solanum lasiophyllum



V38 31st July 2024 Gravel pit area north/ outside			
GPS: 582838 E/ 7027530 N Elevation: 520 m	Landform: Broad drainage line; very gentle slope; aspect ? west		
Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 10 – 20 %; fallen timber 2 – 5 %			
Condition & disturbances: Very good; pastoral impacts; sedimentation from erosion upslope – breach of road side bank			
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa\Acacia\^tree\7\c; U2^ Psydrax latifolia\Psydrax\ 6\r; M1^ Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea\Eremophila\^shrub, chenopod shrub\3\i; G1^ Erodium cygnorum, Eremophila forrestii subsp. forrestii, Psydrax latifolia, Goodenia tenuiloba, Lepidium oxytrichum\Erodium\^forb, shrub\2\c*			
Vegetation: *Acacia incurvaneura, A. pruinocarpa open forest over Psydrax latifolia low open woodland over Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea open shrubland over Erodium cygnorum, Eremophila forrestii subsp. forrestii, Psydrax latifolia low forbland*			
Height (m)	Crown cover %	Habit	Species
8 – 12 m	30 – 40	T	*Acacia incurvaneura, A. pruinocarpa*
4 – 7	2 – 10	T	*Psydrax latifolia*
1 – 2	20 – 30	S, C	*Eremophila forrestii subsp. forrestii, E. georgei, Rhagodia eremaea*
< 1	30 – 70	F, S, C, G	*Erodium cygnorum, Eremophila forrestii subsp. forrestii, Psydrax latifolia, Goodenia tenuiloba, Lepidium oxytrichum, Ptilotus obovatus, Maireana georgei, Crassula colorata var. acuminata, Monachather paradoxus, Tetragonia cristata, Acacia incurvaneura*	

Acacia incurvaneura
Acacia pruinocarpa
Crassula colorata var. acuminata
Eremophila forrestii subsp. forrestii
Eremophila georgei
Erodium cygnorum
Goodenia tenuiloba
Lepidium oxytrichum
Maireana georgei
Monachather paradoxus
Psydrax latifolia
Ptilotus obovatus
Rhagodia eremaea
Tetragonia cristata



Opportunistic Site Pit01
GPS: 582832 E/ 7027456 N Elevation: 522 m

Condition: degraded – active erosion (sheet, gully) from breach of road bank; calcrete road surface (white) washed downslope

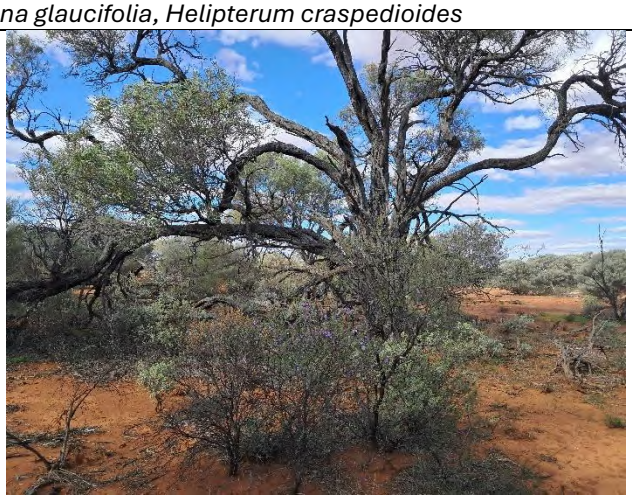


V39 31st July 2024 2.30 pm Haul road and infrastructure	
GPS: 581362 E/ 7025906 N Elevation: 518 m	Landform: Hardpan plain; alluvium; very gentle slope; aspect south; woodland patch
Land surface: Strong brown (7.5YR6/8) fine sandy clay loam; surface rock (very fine gravel) 10 – 20 %; litter 30 – 40 %; fallen timber 10 – 20 %; bare ground 10 – 30 %	
Condition & disturbances: Very good within patch; degraded to poor in surrounding plain; pastoral impacts, rabbits; drought impacts	
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\6\i; M1^ Acacia incurvaneura, A. ramulosa var. linophylla\ Acacia\^shrub\4\r; M2^ Eremophila simulans subsp. simulans, E. georgei, E. forrestii subsp. forrestii, E. latrobei subsp. latrobei, Acacia tetragonophylla\^shrub\3\i; G1^ Eragrostis eriopoda, Paspalidium basicladum, Ptilotus obovatus, Eremophila forrestii subsp. forrestii, Erodium cygnorum \Eragrostis\^tussock grass, shrub, forb\1\r*	
Vegetation: *Acacia pruinocarpa low woodland over Acacia incurvaneura, A. ramulosa var. linophylla tall sparse shrubland over Eremophila simulans subsp. simulans, E. georgei, E. forrestii subsp. forrestii open shrubland over Eragrostis eriopoda, Paspalidium basicladum, Ptilotus obovatus low sparse tussock grassland*	

Height (m)	Crown cover %	Habit	Species
9 – 10	20 – 30	T	*Acacia pruinocarpa*
3 – 4	8 – 10	S	*Acacia incurvaneura, A. ramulosa var. linophylla*
1 – 2	10 – 20	S	*Eremophila simulans subsp. simulans, E. georgei, E. forrestii subsp. forrestii, E. latrobei subsp. latrobei, Acacia tetragonophylla*
< 0.5	2 – 10	G, S , F	*Eragrostis eriopoda, Paspalidium basicladum, Ptilotus obovatus, Eremophila forrestii subsp. forrestii, Erodium cygnorum*

Other species: Maireana georgei, Psydrax latifolia, Senna glaucifolia, Helipterum craspedioides

Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila latrobei subsp. latrobei
Eremophila simulans subsp. simulans
Eragrostis eriopoda
Erodium cygnorum
Helipterum craspedioides
Maireana georgei
Paspalidium basicladum
Ptilotus obovatus
Psydrax latifolia
Senna glaucifolia



Surrounding plain
Condition: degraded to poor
Active sheet erosion, hummocking, pedestalling

Tall open shrubland of *Acacia incurvaneura* and *A. ramulosa var. linophylla* over sparse shrubland over low sparse tussock grassland



<table>
<tr><th colspan="2">V40 31st July 2014 Relevé Haul road and infrastructure</th></tr>
<tr><td>GPS: 581266 E/ 7025857 N
Elevation: 517 m</td><td>Landform: Hardpan plain; minor drainage line, incised
Aspect south</td></tr>
<tr><td colspan="2">Land surface: Gravelly banks</td></tr>
<tr><td colspan="2">Condition & disturbances: Good; pastoral impacts along banks – some erosion; narrow strip of woodland/ tall shrubland</td></tr>
<tr><td colspan="2">Vegetation: Acacia incurvaneura, A. pruinocarpa open woodland over Acacia ramulosa var. linophylla, A. incurvaneura, A. caesaneura, A. craspedocarpa, Psydrax latifolia tall open shrubland over Acacia tetragonophylla sparse shrubland over Cheilanthes sieberi subsp. sieberi, Liverworts, grass tussocks low isolated ferns</td></tr>
<tr><td>Acacia caesaneura
Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Psydrax latifolia
Cheilanthes sieberi subsp. sieberi</td><td></td></tr>
<tr><td>Adjacent plain, hardpan
GPS: 581224 E/ 7025861 N
Condition: degraded; high pastoral impacts, almost parkland cleared; severe erosion (sheet)

Acacia incurvaneura tall isolated shrubs to tall sparse shrubland over Eremophila forrestii subsp. forrestii, A. ramulosa var. linophylla isolated shrubs over Eragrostis eriopoda low sparse tussock grassland and Erodium cygnorum sparse forbs</td><td></td></tr>
</table>

V41 31st July 2024 3.30 pm Haul road – ROM and stockpile area			
GPS: 580755 E/ 7025775 N Elevation: 516 m	Landform: Outwash lower slope; drainage line; incised		
Land surface: Yellowish red fine sandy clay loam; surface rock (gravel) < 20 %; litter 30 – 40 %; fallen timber 2 – 10 %; bare ground 20 – 30 %			
Condition & disturbances: Very good; good diversity, recruitment; erosion along channel low to moderate; lower pastoral impacts than plain area			
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa\Acacia\^tree\7\c; M1^ Acacia ramulosa var. linophylla, Eremophila forrestii subsp. forrestii, Acacia pruinocarpa\Acacia\^shrub, tree\4\r; M2^ Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, Senna glaucifolia, Acacia pruinocarpa, A. ramulosa var. linophylla\Eremophila\^shrub\3\c; G1^ Senna artemisioides subsp. filifolia, Solanum lasiophyllum, Eremophila forrestii subsp. forrestii, Ptilotus schwartzii, Stenopetalum anfractum\Senna\^shrub, forb\2\r*			
Vegetation: *Acacia incurvaneura, A. pruinocarpa open forest over Acacia ramulosa var. linophylla, Eremophila forrestii subsp. forrestii, Acacia pruinocarpa tall sparse shrubland over Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, Senna glaucifolia shrubland over Senna artemisioides subsp. filifolia, Solanum lasiophyllum, Eremophila forrestii subsp. forrestii low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 40	T	*Acacia incurvaneura, A. pruinocarpa*
1.8 – 4	2 – 10	S, T	*Acacia ramulosa var. linophylla, Eremophila forrestii subsp. forrestii, Acacia pruinocarpa*
1 – 1.6	30 – 40	S	*Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, Senna glaucifolia, Acacia pruinocarpa, A. ramulosa var. linophylla, Eremophila latrobei subsp. latrobei*
< 1	2 – 10	S, F, G	*Senna artemisioides subsp. filifolia, Solanum lasiophyllum, Eremophila forrestii subsp. forrestii, Ptilotus schwartzii, Stenopetalum filifolium, Waitzia acuminata, Calotis multicaulis, Paspalidium basicladum, Lawrencella davenportii*

Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Calotis multicaulis
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Eremophila simulans subsp. simulans
Lawrencella davenportii
Paspalidium basicladum
Ptilotus schwartzii
Senna artemisioides subsp. filifolia
Senna glaucifolia
Solanum lasiophyllum
Stenopetalum filifolium
Waitzia acuminata



V42 31st July 2024 Haul road – ROM and stockpile area			
GPS: 580829 E/ 7025847 N Elevation: 519 m	Landform: Low rise between drainage lines; lower slope of range		
Land surface: Yellowish red silty clay loam; surface rock (gravel) > 60 %;			
Condition & disturbances: Very good; low pastoral impacts			
NVIS 6: *U1+^ Acacia incurvaneura, A. pruinocarpa\Acacia\^tree\6\r; M1^ Acacia incurvaneura, A. ramulosa var. linophylla, Grevillea berryana\Acacia\^shrub, tree\4\i; M2^ Eremophila forrestii subsp. forrestii, Senna artemisioides subsp. filifolia, Acacia ramulosa var. linophylla\Eremophila\^shrub\3\i; G1^ Eremophila forrestii subsp. forrestii, Ptilotus schwartzii, Eragrostis eriopoda, Eremophila jucunda subsp. jucunda\Eremophila\^shrub, forb, tussock grass\1\r*			
Vegetation: *Acacia incurvaneura, A. pruinocarpa low open woodland over Acacia incurvaneura, A. ramulosa var. linophylla, Grevillea berryana tall open shrubland over Eremophila forrestii subsp. forrestii, Senna artemisioides subsp. filifolia, Acacia ramulosa var. linophylla open shrubland over Eremophila forrestii subsp. forrestii, Ptilotus schwartzii, Eragrostis eriopoda low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
5 – 8	2 – 10	T	*Acacia incurvaneura, A. pruinocarpa*
2 – 4	10 – 20	S, T	*Acacia incurvaneura, A. ramulosa var. linophylla, Grevillea berryana*
1 – 2	10 – 20	S	*Eremophila forrestii subsp. forrestii, Senna artemisioides subsp. filifolia, Acacia ramulosa var. linophylla*
< 0.5	2 – 10	S, F, G	*Eremophila forrestii subsp. forrestii, Ptilotus schwartzii, Eragrostis eriopoda, Eremophila jucunda subsp. jucunda*
Other species: Hakea lorea, Eremophila simulans subsp. simulans, E. latrobei subsp. latrobei			
Acacia incurvaneura *Acacia pruinocarpa* *Acacia ramulosa var. linophylla* *Eragrostis eriopoda* *Eremophila forrestii subsp. forrestii* *Eremophila jucunda subsp. jucunda* *Eremophila latrobei subsp. latrobei* *Eremophila simulans subsp. simulans* *Grevillea berryana* *Hakea lorea* *Ptilotus schwartzii* *Senna artemisioides subsp. filifolia*			

V43 1st August 2024 11.35 am Haul road and infrastructure	
GPS: 580642 E/ 7026199 N Elevation: 545 m	Landform: Hill; midslope; colluvium;
Land surface: Yellowish red silty clay loam; surface rock (gravel and small rocks) > 80 %; litter < 10 % (mostly concentrated under larger shrubs); fallen timber < 2 %; bare ground < 10 %	
Condition & disturbances: Good to very good; historic mining activities – old drill locations and rehab; current pastoral impacts; active erosion – rills, small gullies from run-off from access track; some drought deaths	
NVIS 6: *U1+^ Acacia rhodophloia, A. incurvaneura\Acacia\^shrub, tree\4\i; M1^ Eremophila latrobei subsp. latrobei, Acacia incurvaneura\Eremophila\^shrub\3\bi; G1^ Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Goodenia tenuiloba, Erodium cygnorum, Cheilanthes sieberi subsp. sieberi\Eremophila\^shrub, forb, fern\1\r*	
Vegetation: *Acacia rhodophloia, A. incurvaneura tall open shrubland over Eremophila latrobei subsp. latrobei, Acacia incurvaneura isolated shrubs over Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Goodenia tenuiloba low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
3 – 6	10 – 20	S, T	*Acacia rhodophloia, A. incurvaneura*
1 – 2	< 2	S	*Eremophila latrobei subsp. latrobei, Acacia incurvaneura*
< 0.6	2 – 10	S, F, E, G	*Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Goodenia tenuiloba, Erodium cygnorum, Cheilanthes sieberi subsp. sieberi, Sida ectogama, Eragrostis eriopoda*

Other species: Acacia speckii

Acacia incurvaneura
Acacia rhodophloia
Acacia speckii P4
Cheilanthes sieberi subsp. sieberi
Eragrostis eriopoda
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Goodenia tenuiloba
Sida ectogama



V44 1st August 2024 12.02 pm Haul road and infrastructure	
GPS: 580077 E/ 7025341 N Elevation: 529 m	Landform: Plain; alluvium; gentle slope; broad drainage line, channel to east; aspect SSE
Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 20 – 30 %; fallen timber 10 – 20 %; bare ground < 10 %	
Condition & disturbances: Good; moderate to high pastoral impacts; soil erosion in area; sheet wash and minor rills	
NVIS 6: *U1+^ Acacia fuscaneura, A. ramulosa var. linophylla\Acacia\^tree, shrub\6\i; M1^ Acacia ramulosa var. linophylla, Rhagodia eremaea, Psydrax latifolia, Eremophila simulans subsp. simulans \Acacia\3\i; M2^ Eremophila forrestii subsp. forrestii, Ptilotus obovatus\Eremophila\^shrub\2\i; G1^ Tetragonia cristata, Erodium cygnorum, Maireana georgei, Stenopetalum filifolium, Calotis multicaulis\Tetragonia\^forb, chenopod shrub\1\c*	
Vegetation: *Acacia fuscaneura, A. ramulosa var. linophylla low woodland over Acacia ramulosa var. linophylla, Rhagodia eremaea, Psydrax latifolia open shrubland over Eremophila forrestii subsp. forrestii, Ptilotus obovatus low open shrubland over Tetragonia cristata, Erodium cygnorum, Maireana georgei low forbland*	

Height (m)	Crown cover %	Habit	Species
5 – 10	10 – 30	T, S	*Acacia fuscaneura, A. ramulosa var. linophylla*
1 – 2	10 – 20	S, C	*Acacia ramulosa var. linophylla, Rhagodia eremaea, Psydrax latifolia, Eremophila simulans subsp. simulans*
0.3 – 0.9	10 – 20	S	*Eremophila forrestii subsp. forrestii, Ptilotus obovatus*
< 0.3	40 – 50	F, C, S, G, L	*Tetragonia cristata, Erodium cygnorum, Maireana georgei, Stenopetalum filifolium, Calotis multicaulis, Calandrinia sp., Acacia fuscaneura, Monachather paradoxus, Vincetoxicum lineare, Lawrencella davenportii*

Acacia fuscaneura
Acacia ramulosa var. linophylla
Calandrinia sp.
Calotis multicaulis
Eremophila forrestii subsp. forrestii
Eremophila simulans subsp. simulans
Erodium cygnorum
Lawrencella davenportii
Maireana georgei
Monachather paradoxus
Psydrax latifolia
Ptilotus obovatus
Rhagodia eremaea
Stenopetalum filifolium
Tetragonia cristata
Vincetoxicum lineare



V45 1st August 2024 12.15 pm Haul road and infrastructure	
GPS: 579967 E/ 7025320 N Elevation: 528 m	Landform: Low rise; gravelly, gentle slope; aspect south east
Land surface: Reddish yellow (7.5YR6/8) fine sandy clay loam; surface rock (gravel) > 50 %; litter	
Condition & disturbances: Very good; lower pastoral impacts; some drought impacts	
NVIS 6: *U1+^ Acacia caesaneura, A. fuscaneura, Grevillea berryana\Acacia\^tree, shrub\6\i; M1^ Acacia ramulosa var. linophylla, A. caesaneura\Acacia\^shrub\4\r; M2^ Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, E. latrobei subsp. latrobei, E. jucunda subsp. jucunda\ Eremophila\^shrub\3\r; G1^ Eremophila jucunda subsp. jucunda, E. simulans subsp. simulans, Ptilotus schwartzii, Eragrostis eriopoda, Erodium cygnorum\Eremophila\^shrub, tussock grass, forb\ 1\r*	
Vegetation: *Acacia caesaneura, A. fuscaneura, Grevillea berryana low woodland over Acacia ramulosa var. linophylla, A. caesaneura tall sparse shrubland over Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, E. latrobei subsp. latrobei sparse shrubland over Eremophila jucunda subsp. jucunda, E. simulans subsp. simulans, Ptilotus schwartzii low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
4 – 7	20 – 30	T, S	*Acacia caesaneura, A. fuscaneura, Grevillea berryana*
2 – 3	2 – 10	S	*Acacia ramulosa var. linophylla, A. caesaneura*
0.5 – 1.2	2 – 10	S	*Eremophila forrestii subsp. forrestii, E. simulans subsp. simulans, E. latrobei subsp. latrobei, E. jucunda subsp. jucunda*
< 0.5	2 – 10	S, G, F	*Eremophila jucunda subsp. jucunda, E. simulans subsp. simulans, Ptilotus schwartzii, Eragrostis eriopoda, Erodium cygnorum, Goodenia berardiana, Sida sp. golden calyces*

Other species: Helipterum craspedioides

Acacia caesaneura
Acacia fuscaneura
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila forrestii subsp. forrestii
Eremophila jucunda subsp. jucunda
Eremophila latrobei subsp. latrobei
Eremophila simulans subsp. simulans
Erodium cygnorum
Goodenia berardiana
Grevillea berryana
Helipterum craspedioides
Ptilotus schwartzii
Sida sp. golden calyces glabrous



V46 1st August 2024 2.26 pm Haul road and infrastructure	
GPS: 579194 E/ 7025058 N Elevation: 536 m	Landform: Low rise, gravelly colluvial outwash , gentle slope
Land surface: Strong brown (7.5YR6/8) silty clay loam; surface rock (gravel) > 70 %; litter – mostly < 1 % to > 90 % under tree	
Condition & disturbances: Good to very good; pastoral impacts; historic mining impacts	
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\7\r; M1^ Acacia aptaneura, A. ramulosa var. linophylla, A. incurvaneura\Acacia\^shrub\4\i; M2^ Eremophila forrestii subsp. forrestii, A. incurvaneura, A. aptaneura, Senna glaucifolia, Eremophila glutinosa\Eremophila\^shrub\3\r; G1^ Erodium cygnorum, Goodenia berardiana, Stenopetalum filifolium, Eremophila forrestii subsp. forrestii, Eragrostis eriopoda\Erodium\^forb, shrub, tussock grass\1\bi*	
Vegetation: *Acacia pruinocarpa isolated trees over Acacia aptaneura, A. ramulosa var. linophylla, A. incurvaneura tall open shrubland over Eremophila forrestii subsp. forrestii, A. incurvaneura, A. aptaneura sparse shrubland over Erodium cygnorum, Goodenia berardiana, Stenopetalum filifolium isolated forbs*	

Height (m)	Crown cover %	Habit	Species
10 – 12	2 – 10	T	*Acacia pruinocarpa*
3 – 6	10 – 20	S	*Acacia aptaneura, A. ramulosa var. linophylla, A. incurvaneura*
1 – 2	2 – 10	S	*Eremophila forrestii subsp. forrestii, A. incurvaneura, A. aptaneura, Senna glaucifolia, Eremophila glutinosa*
< 0.5	< 2	F, S, G	*Erodium cygnorum, Goodenia berardiana, Stenopetalum filifolium, Eremophila forrestii subsp. forrestii, Eragrostis eriopoda, Monachather paradoxus, Waitzia acuminata, Ptilotus schwartzii, Psydrax latifolia*

Acacia aptaneura
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Eragrostis eriopoda
Eremophila forrestii subsp. forrestii
Eremophila glutinosa
Erodium cygnorum
Goodenia berardiana
Monachather paradoxus
Psydrax latifolia
Ptilotus schwartzii
Senna glaucifolia
Stenopetalum filifolium
Waitzia acuminata



V47 1st August 2024 Haul road and infrastructure			
GPS: 578245 E/ 7024730 N Elevation: 535 m	Landform: Alluvial plain; broad drainage area with groves of mulga; unincised; almost level; aspect ?west		
Land surface: Yellowish red clay loam; surface rock < 1 %; litter 20 – 30 %; fallen timber 5 – 10 %			
Condition & disturbances: Poor, some patches good; moderate to high pastoral impacts			
NVIS 6: *U1+^ Acacia incurvaneura, Psydrax latifolia\Acacia\^tree\6\i; M1^ Eremophila forrestii subsp. forrestii, E. georgei, Brachychiton gregorii, Acacia incurvaneura\Eremophila\^shrub\3\c; G1^ Eremophila forrestii subsp. forrestii, E. georgei, Maireana georgei, Stenopetalum filifolium, Thyridolepis multiculmis\Eremophila\^shrub, chenopod shrub, forb, tussock grass\1\r*			
Vegetation: *Acacia incurvaneura, Psydrax latifolia low woodland over Eremophila forrestii subsp. forrestii, E. georgei, Brachychiton gregorii shrubland over Eremophila forrestii subsp. forrestii, E. georgei, Maireana georgei low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
4 – 9	10 – 30	T	*Acacia incurvaneura, Psydrax latifolia*
1 – 2	30 – 40	S	*Eremophila forrestii subsp. forrestii, E. georgei, Brachychiton gregorii, Acacia incurvaneura*
< 0.6	2 – 10	S, C, F, G	*Eremophila forrestii subsp. forrestii, E. georgei, Maireana georgei, Stenopetalum filifolium, Thyridolepis multiculmis, Ptilotus polystachyus, Erodium cygnorum*
Other species: Eremophila granitica			

Acacia incurvaneura
Brachychiton gregorii
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila granitica
Erodium cygnorum
Maireana georgei
Psydrax latifolia
Ptilotus polystachyus
Stenopetalum filifolium
Thyridolepis multiculmis



V48 3.00 pm 1st August 2024 Haul road and infrastructure			
GPS: 578249 E/ 7024621 N Elevation: 535 m			Landform: Stony hardpan plain, alluvium; almost level; aspect south
Land surface: Yellowish red fine sandy clay loam; surface rock fine gravel 10 – 20 %, rocks 2 – 8 cm 20 – 30 %; litter < 5 %; fallen timber < 1 %			
Condition & disturbances: Poor; pastoral impacts; erosion – sheet, pedestalling			
NVIS 6: *G1+^ Eremophila jucunda subsp. jucunda, E. georgei, Ptilotus schwartzii, Eragrostis eriopoda, Eriochiton sclerolaenoides\Eremophila\^shrub, tussock grass, chenopod shrub\1\r; G2^ Erodium cygnorum, Ptilotus schwartzii\Erodium\^forb, shrub\1\bi*			
Vegetation: *Eremophila jucunda subsp. jucunda, E. georgei, Ptilotus schwartzii low sparse shrubland over Erodium cygnorum, Ptilotus schwartzii low isolated forbs*			
Height (m)	Crown cover %	Habit	Species
0.1 – 0.6	2 – 10	S, G, C	*Eremophila jucunda subsp. jucunda, E. georgei, Ptilotus schwartzii, Eragrostis eriopoda, Eriochiton sclerolaenoides*
< 0.1	< 2	F, S	*Erodium cygnorum, Ptilotus schwartzii*
Other species: Acacia incurvaneura, A. tetragonophylla			
Acacia incurvaneura *Acacia tetragonophylla* *Eragrostis eriopoda* *Eremophila georgei* *Eremophila jucunda subsp. jucunda* *Eriochiton sclerolaenoides* *Erodium cygnorum* *Ptilotus schwartzii*			

V49 1st August 2024 3.25 pm Haul road and infrastructure	
GPS: 577478 E/ 7024031 N Elevation 528 m	Landform: Alluvial plain; broad unincised drainage line, depression; very gentle slope; aspect south
Land surface: Reddish brown clay loam; surface rock < 5 %; litter 20 – 30 %; fallen timber variable 2 – 20 %; bare ground < 10 %	
Condition & disturbances: Very good to excellent; more impacts (pastoral) around edges and within low forest with sparse understorey; vegetation variable with areas of dense vine thicket present; several sandalwood present, very healthy with excellent crop of fruit.	
Vine forest NVIS 6: *U1+^Acacia pruinocarpa, A. incurvaneura\Acacia\^tree\7\c; U2^ Glycine canescens, Santalum spicatum, Psydrax latifolia, Acacia ramulosa var. linophylla, Acacia pruinocarpa\Glycine\^vine, tree, shrub\4\c; M1^ Acacia ramulosa var. linophylla, Glycine canescens, Psydrax latifolia, Acacia incurvaneura, A. tetragonophylla\Acacia\^shrub, vine\3\i; G1^ Sida ectogama, Glycine canescens, Rhagodia eremaea, Acacia ramulosa var. linophylla, Cheilanthes sieberi subsp. sieberi\Sida\^shrub, vine, chenopod shrub, fern\2\c*	
Vegetation vine forest area: *Acacia pruinocarpa, A. incurvaneura open forest over Glycine canescens, Santalum spicatum, Psydrax latifolia vineland over Acacia ramulosa var. linophylla, Glycine canescens, Psydrax latifolia open shrubland over Sida ectogama, Glycine canescens, Rhagodia eremaea low shrubland*	

Vine forest

Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 50	T	*Acacia pruinocarpa, A. incurvaneura*
3 – 7	30 – 40	L, T, S	*Glycine canescens, Santalum spicatum, Psydrax latifolia, Acacia ramulosa var. linophylla, Acacia pruinocarpa, A. incurvaneura*
1 – 2	10 – 30	S, L	*Acacia ramulosa var. linophylla, Glycine canescens, Psydrax latifolia, Acacia incurvaneura, A. tetragonophylla*
< 1	30 – 40	S, L, C, E, F, G	*Sida ectogama, Glycine canescens, Rhagodia eremaea, Acacia ramulosa var. linophylla, Cheilanthes sieberi subsp. sieberi, Nicotiana obliqua, Teucrium teucriiflorum, Thyridolepis multiculmis, Eremophila forrestii subsp. forrestii, Goodenia tenuiloba, Psydrax latifolia*
Other species: Calotis multicaulis, Chorizema genistoides, Grevillea deflexa, Eremophila georgei, E. sp. Weld Range, Eragrostis falcata, Oxalis ?corniculata (not in flower), Ptilotus obovatus*			

Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Calotis multicaulis
Cheilanthes sieberi subsp. sieberi
Chorizema genistoides
Eragrostis falcata
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila sp. Weld Range
Glycine canescens
Goodenia tenuiloba
Grevillea deflexa
Nicotiana obliqua
*Oxalis ?corniculata**
Psydrax latifolia
Ptilotus obovatus
Rhagodia eremaea
Santalum spicatum
Sida ectogama
Teucrium teucriiflorum
Thyridolepis multiculmis



<table>
<tr><td colspan="2">Vegetation – more open woodland areas: Acacia incurvaneura, A. pruinocarpa, Psydrax latifolia low woodland over Acacia ramulosa var. linophylla tall open shrubland over Acacia ramulosa var. linophylla, A. incurvaneura sparse shrubland over Eremophila forrestii subsp. forrestii, Acacia incurvaneura, Eremophila sp. Weld range low sparse shrubland</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Eremophila sp. Weld Range; very few records</td><td>More open woodland areas; vines sparse or absent</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Chorizema genistoides – mostly on edges of woodland/ forest</td><td>Glycine canescens (vine) – dominant understorey in some areas</td></tr>
</table>

V50 2nd August 2024 7.15 am Haul road and infrastructure	
GPS: 577241 E/ 7023373 N Elevation: 520 m	Landform: Ironstone gravel plain; Very gentle slope; aspect ?west
Land surface: Strong brown (7.5YR5/8) silty clay loam; surface rock (fine ironstone gravel) > 70 %; litter < 5 %; fallen timber < 1 %	
Condition & disturbances: Poor; pastoral impacts; drought impacts	
NVIS 6: *U1^ Acacia pruinocarpa\Acacia\^tree\6\bi; M1+^ Acacia incurvaneura, A. tetragonophylla\ Acacia\^shrub\4\r; M2^ Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila latrobei subsp. latrobei, Acacia tetragonophylla\Acacia\^shrub\3\r; M3^ Eremophila forrestii subsp. forrestii, Acacia ramulosa var. linophylla, Eremophila georgei, Acacia incurvaneura, Solanum lasiophyllum\ Eremophila\^shrub\2\bi; G1^ Stenopetalum filifolium, Menkea villosula, Isoetopsis graminifolia, Cephalipterum drummondii, Cheilanthes sieberi subsp. sieberi\Stenopetalum\^forb, fern\1\i*	
Vegetation: *Acacia pruinocarpa low isolated trees over Acacia incurvaneura, A. tetragonophylla tall sparse shrubland over Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila latrobei subsp. latrobei sparse shrubland over Stenopetalum filifolium, Menkea villosula, Isoetopsis graminifolia low open forbland*	

Height (m)	Crown cover %	Habit	Species
9 – 10	< 2	T	*Acacia pruinocarpa*
3 – 6	2 – 5	S	*Acacia incurvaneura, A. tetragonophylla*
1 – 2	2 – 10	S	*Acacia incurvaneura, A. ramulosa var. linophylla, Eremophila latrobei subsp. latrobei, Acacia tetragonophylla*
0.3 – 1	< 2	S	*Eremophila forrestii subsp. forrestii, Acacia ramulosa var. linophylla, Eremophila georgei, Acacia incurvaneura, Solanum lasiophyllum, Ptilotus obovatus, P. schwartzii*
< 0.3	10 – 20	F, E	*Stenopetalum filifolium, Menkea villosula, Isoetopsis graminifolia, Cephalipterum drummondii, Cheilanthes sieberi subsp. sieberi, Ptilotus aervoides*

Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Cephalipterum drummondii
Cheilanthes sieberi subsp. sieberi
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila latrobei subsp. latrobei
Isoetopsis graminifolia
Menkea villosula
Ptilotus aervoides
Ptilotus obovatus
Ptilotus schwartzii
Stenopetalum filifolium
Solanum lasiophyllum



V51 2nd August 2024 7.40 am Haul road and infrastructure	
GPS: 577125 E/ 7022254 N Elevation: 520 m	Landform: Alluvial plain within ironstone plain; water gaining area; almost level, aspect south
Land surface: Strong brown fine sandy clay loam; surface rock < 2 %; litter < 10 %; fallen timber 2 – 5 %; bare ground 40 – 60 %	
Condition & disturbances: Good; structure mostly intact; historic mining activities adjacent to area – old tracks, drill locations and some rehabilitation (ripping). Pastoral impacts.	
NVIS 6: *U+^ Acacia pruinocarpa, A. aptaneura, A. caesaneura\Acacia\^tree, shrub\7\i; M1^ Acacia ramulosa var. linophylla, A. caesaneura\Acacia\^shrub\4\r; M2^ Eremophila georgei, E. forrestii subsp. forrestii, Acacia aptaneura\Eremophila\^shrub\3\i; G1^ Eremophila georgei, E. foliosissima, Ptilotus schwartzii, Thyridolepis multiculmis, Ptilotus obovatus\Eremophila\^shrub, tussock grass\ 1\r*	
Vegetation: *Acacia pruinocarpa, A. aptaneura, A. caesaneura open woodland over Acacia ramulosa var. linophylla, A. caesaneura tall sparse shrubland over Eremophila georgei, E. forrestii subsp. forrestii, Acacia aptaneura open shrubland over Eremophila georgei, E. foliosissima, Ptilotus schwartzii low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
6 – 14	10 – 20	T, S	*Acacia pruinocarpa, A. aptaneura, A. caesaneura*
2 – 5	2 – 10	S	*Acacia ramulosa var. linophylla, A. caesaneura*
1 – 2	20 – 30	S	*Eremophila georgei, E. forrestii subsp. forrestii, Acacia aptaneura*
< 0.5	2 – 10	S, G, E, F, C	*Eremophila georgei, E. foliosissima, Ptilotus schwartzii, Thyridolepis multiculmis, Ptilotus obovatus, Cheilanthes sieberi subsp. sieberi, Erodium cygnorum, Eragrostis eriopoda, Maireana georgei*

Other species: Eremophila jucunda subsp. jucunda

Acacia aptaneura
Acacia caesaneura
Acacia ramulosa var. linophylla
Acacia pruinocarpa
Cheilanthes sieberi subsp. sieberi
Eragrostis eriopoda
Eremophila foliosissima
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila jucunda subsp. jucunda
Erodium cygnorum
Maireana georgei
Ptilotus obovatus
Ptilotus schwartzii
Thyridolepis multiculmis



Adjacent open ironstone plain area
Acacia aptaneura tall open to sparse shrubland over *Eremophila jucunda* subsp. *jucunda, Ptilotus schwartzii* low isolated to sparse shrubland

APM site E6 within 200 m



V52 2nd August 2024 8.00 am Haul road and infrastructure	
GPS: 576430 E/ 7020972 N Elevation 509 m	Landform: Ironstone plain; almost level; drainage to south west; narrow denser patch of vegetation within very sparse area
Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 40 – 50 %; litter	
Condition & disturbances: Good; understorey mostly intact under tree canopy.	
NVIS 6: *U1+^ Acacia pruinocarpa, A. caesaneura, A. aptaneura\Acacia\^tree, shrub\6\i; M1^ Eremophila forrestii subsp. forrestii, Acacia tetragonophylla, Sida ectogama, Rhagodia eremaea, Hibiscus sp.\Eremophila\^shrub, chenopod shrub\3\i; M2^ Ptilotus obovatus, Maireana georgei, Eremophila georgei, Sida ectogama, Enchylaena tomentosa\Ptilotus\^shrub, chenopod shrub\2\i; G1^ Erodium cygnorum, Eremophila georgei, Sida ectogama, Solanum lasiophyllum, Calandrinia sp.\Erodium\^forb, shrub\1\r*	
Vegetation: *Acacia pruinocarpa, A. caesaneura, A. aptaneura low woodland over Eremophila forrestii subsp. forrestii, Acacia tetragonophylla, Sida ectogama open shrubland over Ptilotus obovatus, Maireana georgei, Eremophila georgei low open shrubland over Erodium cygnorum, Eremophila georgei, Sida ectogama low sparse forbland*	

Height (m)	Crown cover %	Habit	Species
6 – 10	10 – 30	T, S	*Acacia pruinocarpa, A. caesaneura, A. aptaneura*
1 – 2	20 – 30	S, C	*Eremophila forrestii subsp. forrestii, Acacia tetragonophylla, Sida ectogama, Rhagodia eremaea, Hibiscus sp., Eremophila latrobei subsp. latrobei*
0.2 – 1	10 – 30	S, C, G	*Ptilotus obovatus, Maireana georgei, Eremophila georgei, Sida ectogama, Enchylaena tomentosa, Hibiscus sp., Eremophila latrobei subsp. latrobei, Austrostipa elegantissima*
< 0.2	2 – 10	F, S, L, C, E	*Erodium cygnorum, Eremophila georgei, Sida ectogama, Solanum lasiophyllum, Calandrinia sp., Leichhardtia australis, Maireana georgei, Cheilanthes sieberi subsp. sieberi, Thyridolepis multiculmis*

Other species: Psydrax latifolia (4 m), Teucrium teucriiflorum, Eragrostis eriopoda

Acacia aptaneura
Acacia caesaneura
Acacia pruinocarpa
Acacia tetragonophylla
Austrostipa elegantissima
Calandrinia sp.
Cheilanthes sieberi subsp. sieberi
Eragrostis eriopoda
Enchylaena tomentosa
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Hibiscus sp.
Leichhardtia australis
Maireana georgei
Psydrax latifolia
Ptilotus obovatus



Rhagodia eremaea
Sida ectogama
Solanum lasiophyllum
Teucrium teucriiflorum
Thyridolepis multiculmis

V53 2nd August 2024 8.50 am Haul road and infrastructure			
GPS: 576462 E/ 7020007 N Elevation 514 m	Landform: Low stony hill, minor chert outcrops; gentle slope; aspect north; patches of low trees, tall shrubs within shrubland		
Land surface: Strong brown (7.5YR5/6) silty clay loam; surface rock (chert, quartz, other) > 95 %, 2 – 5 cm 80%; litter < 10 %; fallen timber 2 – 3 %; bare ground < 1 %			
Condition & disturbances: Very good; pastoral impacts lower than valley areas; signs of cattle in area; drought impacts – vegetation recovering			
NVIS 6: *U1+^ Acacia aptaneura, A. grasbyi\Acacia\6\r; M1^ Acacia aptaneura, Senna glaucifolia, Eremophila forrestii subsp. forrestii, E. pantonii\Acacia\^shrub\3\r; G1^ Maireana thesioides, M. triptera, Senna glaucifolia, Solanum lasiophyllum, Acacia aptaneura\Maireana\^chenopod shrub, shrub\2\i*			
Vegetation: *Acacia aptaneura, A. grasbyi low open woodland over Acacia aptaneura, Senna glaucifolia, Eremophila forrestii subsp. forrestii sparse shrubland over Maireana thesioides, M. triptera, Senna glaucifolia low open chenopod shrubland*			
Height (m)	Crown cover %	Habit	Species
3 – 5	2 – 10	T, S	*Acacia aptaneura, A. grasbyi*
1 – 2	2 – 5	S	*Acacia aptaneura, Senna glaucifolia, Eremophila forrestii subsp. forrestii, E. pantonii*
< 0.9	10 – 20	C, S, F	*Maireana thesioides, M. triptera, Senna glaucifolia, Solanum lasiophyllum, Acacia aptaneura, Cephalipterum drummondii, Sclerolaena sp.*
Other species: Calandrinia sp., Helipterum craspedioides, Ptilotus exaltatus, P. obovatus, Sida calyxhymenia, S. ectogama, Abutilon sp., Stenopetalum filifolium. Stackhousia muricata			

Abutilon sp.
Acacia aptaneura
Acacia grasbyi
Calandrinia sp.
Cephalipterum drummondii
Eremophila forrestii subsp. forrestii
Eremophila pantonii
Helipterum craspedioides
Maireana thesioides
Maireana triptera
Ptilotus exaltatus
Ptilotus obovatus
Sclerolaena sp.
Senna glaucifolia
Sida calyxhymenia
Sida ectogama
Stenopetalum filifolium
Solanum lasiophyllum
Stackhousia muricata



V54 2nd August 2024 9.15 am Haul road and infrastructure	
GPS: 576461 E/ 7020071 N Elevation 512 m	Landform: Valley; broad drainage line, slight channelling
Land surface: Strong brown clay loam; surface rock – gravel patches 10 – 20 %; small granitic rock outcrop at edge of vegetation; litter 10 – 20 %; fallen timber < 5 %	
Condition & disturbances: Very good; pastoral impacts	
NVIS 6: *U1+^ Acacia fuscaneura, A. incurvaneura, A. aptaneura\Acacia\^tree\6\i; M1^ Acacia grasbyi, A. tetragonophylla, A. craspedocarpa, A. fuscaneura, A. ramulosa var. linophylla\Acacia\ ^shrub, tree\4\i; M2^ Acacia ramulosa var. linophylla, Acacia fuscaneura, Eremophila forrestii subsp. forrestii, Acacia aptaneura, Sida ectogama\Acacia\^shrub\3\i; G1^ Roepera lobulata, Solanum lasiophyllum, Erodium cygnorum, Cheilanthes sieberi subsp. sieberi, Maireana triptera\ Roepera\^forb, shrub, fern, chenopod shrub\1\i*	
Vegetation: *Acacia fuscaneura, A. incurvaneura, A. aptaneura low woodland over Acacia grasbyi, A. tetragonophylla, A. craspedocarpa tall open shrubland over Acacia ramulosa var. linophylla, Acacia fuscaneura, Eremophila forrestii subsp. forrestii open shrubland over Roepera lobulata, Solanum lasiophyllum, Erodium cygnorum low open forbland*	

Height (m)	Crown cover %	Habit	Species
5 – 9	20 – 30 (40)	T	*Acacia fuscaneura, A. incurvaneura, A. aptaneura*
2 – 5	20 – 30	S, T	*Acacia grasbyi, A. tetragonophylla, A. craspedocarpa, A. fuscaneura, A. ramulosa var. linophylla, Hakea preissii*
1 – 2	10 – 30	S	*Acacia ramulosa var. linophylla, Acacia fuscaneura, Eremophila forrestii subsp. forrestii, Acacia aptaneura, Sida ectogama, Eremophila pantonii*
< 0.6	10 – 30	F, S, E, C	*Roepera lobulata, Solanum lasiophyllum, Erodium cygnorum, Cheilanthes sieberi subsp. sieberi, Maireana triptera, M. georgei, Ptilotus obovatus*

Acacia aptaneura
Acacia fuscaneura
Acacia grasbyi
Acacia incurvaneura
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Cheilanthes sieberi subsp. sieberi
Eremophila forrestii subsp. forrestii
Eremophila pantonii
Erodium cygnorum
Hakea preissii
Maireana georgei
Maireana triptera
Ptilotus obovatus
Roepera lobulata
Sida ectogama
Solanum lasiophyllum



V54 Rocky outcrop area – granitic 	

V55 2nd August 2024 10 am Haul road and infrastructure			
GPS: 576334 E/ 7019443 N Elevation: 507 m	Landform: Stony plain at lower slope of low hills; gentle slope; aspect south; patches of open shrubland in very sparse vegetation		
Land surface: Reddish brown clay loam; surface rock (dolerite, quartz) 30 – 50 %; litter < 5 %; fallen timber < 1 %; bare ground 30 – 40 %			
Condition & disturbances: Poor; pastoral impacts; drought impacts – few deaths of shrubs			
NVIS 6: *U1^ Acacia ?aneura, A. sp. Weld Range\Acacia\^shrub, tree\4\bi; M1+^ Eremophila macmillaniana, Acacia sp. Weld Range, Acacia speckii, A. ?aneura, Ptilotus rotundifolius\ Eremophila\^shrub\r; G1^ Cephalipterum drummondii, Sida ectogama, Aristida contorta, Eremophila macmillaniana, Maireana sp.\Cephalipterum\^forb, shrub, tussock grass, chenopod shrub\1\r*			
Vegetation: *Acacia ?aneura, A. sp. Weld Range tall isolated shrubs over Eremophila macmillaniana, Acacia sp. Weld Range, Acacia speckii sparse shrubland over Cephalipterum drummondii, Sida ectogama, Aristida contorta low sparse forbland*			
Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	S, T	*Acacia ?aneura, A. sp. Weld Range*
1 – 2	2 – 10	S	*Eremophila macmillaniana, Acacia sp. Weld Range, Acacia speckii, A. ?aneura, Ptilotus rotundifolius*
< 0.5	2 – 10	F, S, G, C, E	*Cephalipterum drummondii, Sida ectogama, Aristida contorta, Eremophila macmillaniana, Maireana sp., Sclerolaena diacantha, Helipterum craspedioides, Cheilanthes sieberi subsp. sieberi, Erodium cygnorum*
Other species: Brachychiton gregorii			

Acacia ?aneura
Acacia speckii P4
Acacia sp. Weld Range
Aristida contorta
Brachychiton gregorii
Cephalipterum drummondii
Cheilanthes sieberi subsp. sieberi
Eremophila macmillaniana
Erodium cygnorum
Helipterum craspedioides
Maireana sp.
Ptilotus rotundifolius
Sclerolaena diacantha
Sida ectogama





V56 2nd August 2024 10.45 am Haul road and infrastructure			
GPS: 575645 E/ 7018931 N Elevation: 512 m		Landform: Gravelly low hills; gentle slope; aspect north Potential gravel source	
Land surface: Reddish yellow fine sandy clay loam; surface rock (lateritic gravel) 30 – 40 %; litter 5 – 10 %; fallen timber 1 – 2 %; bare ground 30 – 40 %			
Condition & disturbances: Good; low recruitment; pastoral impacts; drought impacts			
NVIS 6: *U1^ Acacia caesaneura\Acacia\^shrub\4\r; M1+^ Acacia ramulosa var. linophylla\Acacia\^shrub\3\i; G1^ Ptilotus schwartzii, Sida ectogama, Eremophila forrestii subsp. forrestii\Ptilotus\^shrub\1\bi*			
Vegetation: *Acacia caesaneura tall sparse shrubland over Acacia ramulosa var. linophylla open shrubland over Ptilotus schwartzii, Sida ectogama, Eremophila forrestii subsp. forrestii low isolated shrubs*			
Height (m)	Crown cover %	Habit	Species
3 – 4	2 – 4	S	*Acacia caesaneura ?*
1 – 2	20 – 30	S	*Acacia ramulosa var. linophylla*
< 0.5	< 1	S, G	*Ptilotus schwartzii, Sida ectogama, Eremophila forrestii subsp. forrestii*
Other species: Maireana georgei, Eremophila latrobei subsp. latrobei, Acacia pruinocarpa (low tree, upslope)			

Acacia caesaneura ? – much insect damage to new shoots and phyllodes; new shoots not resinous, phyllodes with rounded tips

Acacia pruinocarpa
Acacia ramulosa var. linophylla
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Maireana georgei
Ptilotus schwartzii
Sida ectogama



V57 2nd August 2024 11.03 am Haul road and infrastructure			
GPS: 575356 E/ 7018979 N Elevation: 505 m		Landform: Hill; minor drainage line Trapdoor spiders present	
Land surface: Yellowish red clay loam; surface rock < 10 %; litter 10 – 30 % (mostly under larger shrubs); fallen timber < 2 %; cryptogams (lichen, liverworts) 2 – 10 %; bare ground < 10 %			
Condition & disturbances: Very good; pastoral impacts – moderate – cattle tracks, grazing, ground disturbances; drought impacts - some deaths – would have been tall shrubland now tall open shrubland, part crown deaths			
NVIS 6: *U1+^ Acacia incurvaneura, A. tetragonophylla\Acacia\^shrub, tree\4\i; M1^ Eremophila forrestii subsp. hastieana, E. latrobei subsp. latrobei\Eremophila\^shrub\3\i; G1^ Waitzia acuminata, Erodium cygnorum, Panaetia lessonii, Cheilanthes sieberi subsp. sieberi, Helipterum craspedioides\Waitzia\^forb, fern\1\c*			
Vegetation: *Acacia incurvaneura, A. tetragonophylla tall open shrubland over Eremophila forrestii subsp. hastieana, E. latrobei subsp. latrobei open shrubland over Waitzia acuminata, Erodium cygnorum, Panaetia lessonii low forbland*			
Height (m)	Crown cover %	Habit	Species
3.5 – 5	10 – 30	S, T	*Acacia incurvaneura, A. tetragonophylla*
1 – 2	20 – 30	S	*Eremophila forrestii subsp. hastieana, E. latrobei subsp. latrobei*
< 0.5	50 – 70	F, E, G	*Waitzia acuminata, Erodium cygnorum, Panaetia lessonii, Cheilanthes sieberi subsp. sieberi, Helipterum craspedioides, Stenopetalum filifolium, Cephalipterum drummondii, Eragrostis dielsii, Euphorbia boophthona, Menkea villosula, Isoetopsis graminifolia*	

Acacia incurvaneura
Acacia tetragonophylla
Cephalipterum drummondii
Cheilanthes sieberi subsp. sieberi
Eragrostis dielsii
Eremophila forrestii subsp. hastieana
Eremophila latrobei subsp. latrobei
Erodium cygnorum
Euphorbia boophthona
Helipterum craspedioides
Isoetopsis graminifolia
Panaetia lessonii
Stenopetalum filifolium
Waitzia acuminata



V58 2nd August 2024 Haul road and infrastructure			
GPS: 574750 E/ 7018889 N Elevation: 511 m	Landform: Low hills; mid slope; gentle slope; aspect north		
Land surface: Reddish yellow (7.5YR6/6) fine sandy clay loam; surface rock (lateritic gravel) 60 – 70 %; litter 5 – 10 %; fallen timber 1 – 2 %; cryptogams – negligible; bare ground 10 – 20 %; erosion – sheet wash; drought impacts – some deaths and part crown deaths, ground cover very sparse			
Condition & disturbances: Good; drought and pastoral impacts			
NVIS 6: *U1^ Acacia incurvaneura, Psydrax latifolia\Acacia\^tree, shrub\6\bi; M1+^ Acacia ramulosa var. linophylla\Acacia\^shrub\4\i; M2^ Eremophila forrestii subsp. forrestii\Eremophila\^shrub\3\bi; G1^ Sida sp. Golden calyces glabrous, Ptilotus schwartzii, Eremophila forrestii subsp. forrestii, Waitzia acuminata, Erodium cygnorum \Sida\^shrub, forb\1\r*			
Vegetation: *Acacia incurvaneura, Psydrax latifolia low isolated trees over Acacia ramulosa var. linophylla tall open shrubland over Sida sp. Golden calyces glabrous, Ptilotus schwartzii, Eremophila forrestii subsp. forrestii low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
4 – 6	< 2	T, S	*Acacia incurvaneura, Psydrax latifolia*
2 – 3.5	10 – 20	S	*Acacia ramulosa var. linophylla*
1 – 2	< 2	S	*Eremophila forrestii subsp. forrestii*
< 0.6	2 – 10	S, F, L	*Sida sp. Golden calyces glabrous, Ptilotus schwartzii, Eremophila forrestii subsp. forrestii, Waitzia acuminata, Erodium cygnorum, Stenopetalum filifolium, Thysanotus manglesianus*
Other species: Grevillea berryana (4 – 8m), Menkea villosula			
Acacia incurvaneura *Acacia ramulosa var. linophylla* *Eremophila forrestii subsp. forrestii* *Erodium cygnorum* *Grevillea berryana* *Menkea villosula* *Psydrax latifolia* *Ptilotus schwartzii* *Sida sp. Golden calyces glabrous* *Stenopetalum filifolium* *Thysanotus manglesianus* *Waitzia acuminata*			
Extinct mallee fowl mound GPS: 574735 E/ 7018873 N Elevation: 510 m			

V59 2nd August 2024 12.38 pm Haul road and infrastructure	
GPS: 574600 E/ 7019045 N Elevation: 508 m	Landform: Broad drainage line; unincised area; hardpan plain Almost level; aspect north; drains into incised drainage line (V60)
Land surface: Reddish brown clay loam; surface rock (gravel) < 10 %; litter 10 %; fallen timber 2 – 10 %; bare ground 2 – 20 %; moist	
Condition & disturbances: Very good to excellent; some pastoral impacts; structure appears mostly intact; grasses present but sparse	
NVIS 6: *U1+^ Acacia pruinocarpa, A. incurvaneura\Acacia\^tree\7\c; U2^ Psydrax suaeveolens\ Psydrax\^tree\6\r; M1^ Eremophila forrestii subsp. hastieana, E. georgei, Sida ectogama, Psydrax suaveolens, P. latifolia\Eremophila\^shrub\3\c; G1^ Ptilotus obovatus, Eremophila georgei, Acacia incurvaneura, Erodium cygnorum, Arthropodium sp.\Ptilotus\^shrub, forb\1\i*	
Vegetation: *Acacia pruinocarpa, A. incurvaneura open forest over Psydrax suaeveolens low open woodland over Eremophila forrestii subsp. hastieana, E. georgei, Sida ectogama shrubland over Ptilotus obovatus, Eremophila georgei, Acacia incurvaneura low open shrubland*	

Height (m)	Crown cover %	Habit	Species
9 – 12	30 – 50	T	*Acacia pruinocarpa, A. incurvaneura*
3 – 5	2 – 10	T	*Psydrax suaeveolens*
1 – 1.6	30 – 40	S	*Eremophila forrestii subsp. hastieana, E. georgei, Sida ectogama, Psydrax suaveolens, P. latifolia, Acacia incurvaneura*
< 0.6	10 – 30	S, F, G, L	*Ptilotus obovatus, Eremophila georgei, Acacia incurvaneura, Erodium cygnorum, Arthropodium sp., Brachyscome iberidifolia*

Other species: Acacia craspedocarpa, Eragrostis eriopoda, Eremophila foliosissima, Helipterum craspedioides, Thyridolepis multiculmis

Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Arthropodium sp.
Brachyscome iberidifolia
Eragrostis eriopoda
Eremophila foliosissima
Eremophila forrestii subsp. hastieana
Eremophila georgei
Erodium cygnorum
Helipterum craspedioides
Psydrax suaeveolens
Psydrax latifolia
Ptilotus obovatus
Sida ectogama
Thyridolepis multiculmis



V60 2nd August 2024 Relevé Haul road and infrastructure	
GPS: 574618 E/ 7019128 N Elevation 503 m	Landform: Hardpan plain; incised ephemeral drainage line; drainage to west; pools present, sandy banks and exposed hardpan
Land surface:	
Condition & disturbances: Good to very good; pastoral impacts; erosion	
Vegetation: *Acacia caesaneura, A. tetragonophylla, Hakea preissii tall shrubland over Acacia ramulosa var. linophylla, Eremophila fraseri subsp. fraseri, Acacia tetragonophylla, Glycine canescens shrubland over Chorizema genistoides, Hakea preissii, Grevillea deflexa, low open shrubland*	
	
Pools present to depth ~ 0.8 m; dense vegetation on creek banks with pockets of vegetation on islands; few aquatic plants present; many insects	Pockets of shrubland dominated by Acacia and Hakea spp., with understorey of Chorizema genistoides, Grevillea deflexa and Glycine canescens (vine)
Acacia aptaneura *Acacia caesaneura* *Acacia ramulosa var. linophylla* *Acacia tetragonophylla* *Aristida contorta* *Calandrinia sp. (sterile)* *Chorizema genistoides* *Cymbopogon ambiguus* *Dysphania rhadinostachya subsp. rhadinostachya* *Eremophila forrestii subsp. hastieana*	*Eremophila fraseri subsp. fraseri* *Eremophila georgei* *Glycine canescens* *Grevillea deflexa* *Haloragis odontocarpa* *Marsilea hirsuta* *Nicotiana obliqua* *Rhodanthe ?sterilescens (in bud)* *Sida ectogama*

V61 2nd August 2024 1.27 pm Relevé Haul road and infrastructure	
GPS: 573866 E/ 7018932 N Elevation 508 m	Landform: Broad, channelled drainage line with gravel banks; signs of flooding, debris; aspect SW
Land surface: Deep gravel banks, scattered rocks	
Condition & disturbances: Good; signs of high flows through area – main drainage line; erosion, old tracks; pastoral impacts	
Vegetation: *Acacia pteraneura, A. fuscaneura* tall open shrubland (3 – 5 m) over Acacia fuscaneura, *Grevillea deflexa, Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Calytrix desolata, Grevillea deflexa* low sparse shrubland	
Acacia fuscaneura *Acacia pruinocarpa* *Acacia pteraneura (tentative)* *Acacia tetragonophylla* *Androcalva luteiflora* *Calandrinia sp. (sterile)* *Calytrix desolata* *Chorizema genistoides* *Cymbopogon ambiguus* *Eremophila forrestii subsp. forrestii* *Eremophila forrestii subsp. hastieana* *Eremophila fraseri subsp. fraseri* *Grevillea deflexa* *Hakea preissii* *Ptilotus exaltatus*	 

<table>
<tr><th colspan="2">V62 2nd August 2024 Relevé 1.50 pm Haul road and infrastructure</th></tr>
<tr><td>GPS: 573149 E/ 7018896 N
Elevation: 508 m</td><td>Landform: Hardpan plain wit fine ironstone gravel mantle; almost level; aspect SW</td></tr>
<tr><td colspan="2">Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 60 – 70 %</td></tr>
<tr><td colspan="2">Condition & disturbances: Degraded to poor; high pastoral impacts</td></tr>
<tr><td colspan="2">Vegetation: Acacia incurvaneura isolated tall shrubs over Acacia ramulosa var. linophylla , Eremophila forrestii subsp. forrestii isolated shrubs over Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Acacia tetragonophylla, Psydrax latifolia low sparse shrubland</td></tr>
<tr><td>Acacia incurvaneura
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila latrobei subsp. latrobei
Monachather paradoxus
Psydrax latifolia
Ptilotus aervoides</td><td></td></tr>
</table>

V63 2nd August 2024 2.05 pm Haul road and infrastructure	
GPS: 571925 E/ 7019056 N Elevation 502 m	Landform: Hardpan plain, alluvium; ephemeral drainage line/ depression; very gentle slope; aspect south
Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 10 – 30 %; fallen timber 2 – 3 %; bare ground 30 – 40 %	
Condition & disturbances: Very good; denser patch of woodland within sparsely vegetated ironstone plain; grasses absent; pastoral impacts more at edges; drought impacts – some deaths and part crown death; trapdoor spiders present	
NVIS 6: *U+^ Acacia pruinocarpa\Acacia\^tree\7\i; U2^ Acacia incurvaneura, A. ramulosa var. linophylla, A. tetragonophylla, Psydrax suaveolens, Acacia aptaneura\Acacia\^shrub, tree\4\c; M1^ Eremophila forrestii subsp. forrestii, E. georgei, Acacia aptaneura, Psydrax latifolia\Eremophila\ ^shrub\3\c; G1^ Sida ectogama, Cheilanthes sieberi subsp. sieberi, Erodium cygnorum, Eremophila georgei\Sida\ ^shrub, fern, forb\1\i*	
Vegetation: *Acacia pruinocarpa woodland over Acacia incurvaneura, A. ramulosa var. linophylla, A. tetragonophylla tall shrubland over Eremophila forrestii subsp. forrestii, E. georgei, Acacia aptaneura shrubland over Sida ectogama, Cheilanthes sieberi subsp. sieberi, Erodium cygnorum low open shrubland*	

Height (m)	Crown cover %	Habit	Species
10 – 16	10 – 30	T	*Acacia pruinocarpa*
3 – 10	30 – 40	S, T	*Acacia incurvaneura, A. ramulosa var. linophylla, A. tetragonophylla, Psydrax suaveolens, Acacia aptaneura, A. craspedocarpa*
1 – 2	30 – 40	S	*Eremophila forrestii subsp. forrestii, E. georgei, Acacia aptaneura, Psydrax latifolia*
< 0.5	10 – 30	S, E, F	*Sida ectogama, Cheilanthes sieberi subsp. sieberi, Erodium cygnorum, Eremophila georgei*

Acacia aptaneura
Acacia craspedocarpa
Acacia incurvaneura
Acacia pruinocarpa
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Cheilanthes sieberi subsp. sieberi
Eremophila forrestii subsp. forrestii
Eremophila georgei
Erodium cygnorum
Psydrax latifolia
Psydrax suaveolens
Sida ectogama



Edge of woodland/ tall shrubland patch – many deaths of medium to tall shrubs



V64 2nd August 2024 Relevé Haul road and infrastructure	
GPS: 572029 E/ 7018992 N Elevation: 502 m	Landform: Plain, hardpan; alluvial; almost level; aspect south
Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 50 – 60 %	
Condition & disturbances: Poor; pastoral impacts high – many tracks, land surface disturbance; sheet erosion	
Vegetation: *Acacia aptaneura, A. incurvaneura, A. pruinocarpa tall sparse shrubland over Acacia incurvaneura, A. craspedocarpa, Eremophila forrestii subsp. forrestii, E. jucunda subsp. jucunda sparse shrubland*	
Other species: *Eremophila georgei, Erodium cygnorum, Calandrinia sp., Acacia ramulosa var. linophylla, Grevillea berryana (4m)*	
Acacia aptaneura *Acacia craspedocarpa* *Acacia incurvaneura* *Acacia pruinocarpa* *Acacia ramulosa var. linophylla* *Calandrinia sp.* *Eremophila forrestii subsp. forrestii* *Eremophila georgei* *Eremophila jucunda subsp. jucunda* *Erodium cygnorum* *Grevillea berryana*	

V65 2nd August 2024 Relevé Haul road and infrastructure	
GPS: 571519 E/ 7019026 N Elevation 505 m	Landform: Stony hardpan plain; gentle slope; aspect south – SW
Land surface: Surface rock fine ironstone gravel 30 – 40 %; rocks (2 – 10 cm) 30 – 40 %; bare ground 10 %	
Condition & disturbances: Degraded; high pastoral impacts; drought impacts	
Vegetation: *Acacia aptaneura, A. incurvaneura* tall sparse shrubland to south; *Ptilotus rotundifolius, Eremophila jucunda* subsp. *jucunda, E. forrestii* subsp. *forrestii* low isolated shrubs	
Acacia aptaneura *Acacia incurvaneura* *Eragrostis eriopoda* *Eremophila forrestii* subsp. *forrestii* *Eremophila jucunda* subsp. *jucunda* *Ptilotus aervoides* *Ptilotus rotundifolius*	

<table>
<tr><th colspan="2">V66 2nd August 2024 Relevé Haul road and infrastructure</th></tr>
<tr><td>GPS: 571243 E/ 7018975 N
Elevation: 499 m</td><td>Landform: Ironstone hardpan plain; almost level; aspect south</td></tr>
<tr><td colspan="2">Land surface: Yellowish red silty clay loam; surface rock fine ironstone gravel 30 – 50 %; rocks (2 – 10 cm) 20 %; bare ground 20 – 30 %</td></tr>
<tr><td colspan="2">Condition & disturbances: Poor; high pastoral impacts; sheet erosion, hummocking</td></tr>
<tr><td colspan="2">Vegetation: Eremophila punicea, Eragrostis eriopoda low open shrubland</td></tr>
<tr><td>Acacia ramulosa var. linophylla (isolated shrub)
Eragrostis eriopoda
Eremophila jucunda subsp. jucunda
Eremophila punicea
Erodium cygnorum</td><td></td></tr>
</table>

The following are survey sites from October 2023

<table>
<tr><th colspan="4">V67 22/10/2023 9.22 am Haul Road western end</th></tr>
<tr><td colspan="2">GPS: 571097 E/ 7018946 N
Elevation: 504 m</td><td colspan="2">Landform: Stony plain</td></tr>
<tr><td colspan="4">Land surface: Yellowish red clay loam; surface rock (ironstone gravel40 – 50 %; BIF, quartz rocks 5 – 10 %) 40 – 60 %</td></tr>
<tr><td colspan="4">Condition & disturbances: Poor; pastoral impacts, timber cutting; erosion sheet wash – hardpan exposed</td></tr>
<tr><td colspan="4">NVIS 6: U1^ Acacia aptaneura, A. pruinocarpa\Acacia\^shrub\4\r; M1^ Acacia aptaneura, A. pruinocarpa, Eremophila fraseri subsp. fraseri, A. tetragonophylla\Acacia\^shrub\3\r; G1^ Acacia aptaneura, Eremophila punicea, Ptilotus rotundifolius, Senna artemisioides subsp. helmsii, Ptilotus schwartzii\Acacia\^shrub\2\bi</td></tr>
<tr><td colspan="4">Vegetation: Acacia aptaneura, A. pruinocarpa tall sparse shrubland over Acacia aptaneura, A. pruinocarpa, Eremophila fraseri subsp. fraseri sparse shrubland over Acacia aptaneura, Eremophila punicea, Ptilotus rotundifolius low isolated shrubs</td></tr>
<tr><td>Height (m)</td><td>Crown cover %</td><td>Habit</td><td>Species</td></tr>
<tr><td>2 – 5</td><td>2 – 10</td><td>S</td><td>Acacia aptaneura, A. pruinocarpa</td></tr>
<tr><td>1 – 2</td><td>2 – 10</td><td>S</td><td>Acacia aptaneura, A. pruinocarpa, Eremophila fraseri subsp. fraseri, A. tetragonophylla</td></tr>
<tr><td>< 1</td><td>< 2</td><td>S</td><td>Acacia aptaneura, Eremophila punicea, Ptilotus rotundifolius, Senna artemisioides subsp. helmsii, Ptilotus schwartzii</td></tr>
<tr><td colspan="4">Other species: Eremophila foliosissima</td></tr>
<tr><td colspan="2">Acacia aptaneura
Acacia pruinocarpa
Acacia tetragonophylla
Eremophila foliosissima
Eremophila fraseri subsp. fraseri
Eremophila punicea
Ptilotus rotundifolius
Ptilotus schwartzii
Senna artemisioides subsp. helmsii</td><td colspan="2"></td></tr>
</table>

V 68 22/10/2023 9.00 am Haul Road western end	
GPS: 570854 E/ 7018905 N Elevation: 502 m	Landform: Plain, hardpan; low rise; aspect south to south west
Land surface: Yellowish red fine sandy clay loam; surface rock 0 %; litter 30 – 40 %; fallen timber < 2 %; cryptogams (lichen) 5 – 10 %	
Condition & disturbances: Very good; pastoral impacts	
NVIS 6: *U1+^ Acacia aptaneura, A. caesaneura, Brachychiton gregorii, Hakea lorea\Acacia\^tree\6\i; M1^ Brachychiton gregorii, Acacia tetragonophylla, Psydrax latifolia, Acacia caesaneura\ Brachychiton\^shrub, tree\4\r; M2^ Eremophila forrestii subsp. forrestii, Psydrax suaveolens, Pittosporum angustifolium\Eremophila\^shrub\3\i; G1^ Eremophila forrestii subsp. forrestii, E. georgei, Eragrostis falcata, Ptilotus polystachyus, Stenopetalum filifolium\Eremophila\^shrub, tussock grass, forb\2\c*	
Vegetation: *Acacia aptaneura, A. caesaneura, Brachychiton gregorii low woodland over Brachychiton gregorii, Acacia tetragonophylla, Psydrax latifolia tall sparse shrubland over Eremophila forrestii subsp. forrestii, Psydrax suaveolens, Pittosporum angustifolium open shrubland over Eremophila forrestii subsp. forrestii, E. georgei, Eragrostis falcata low shrubland*	

Height (m)	Crown cover %	Habit	Species
8 – 10	20 – 30	T	*Acacia aptaneura, A. caesaneura, Brachychiton gregorii, Hakea lorea*
4 – 5	2 – 10	S, T	*Brachychiton gregorii, Acacia tetragonophylla, Psydrax latifolia, Acacia caesaneura*
0.7 – 1.5	10 – 20	S	*Eremophila forrestii subsp. forrestii, Psydrax suaveolens, Pittosporum angustifolium*
< 0.7	30 – 40	S, G, F, L	*Eremophila forrestii subsp. forrestii, E. georgei, Eragrostis falcata, Ptilotus polystachyus, Stenopetalum filifolium, Cephalipterum drummondii, dried off forbs, Ptilotus obovatus, Leichhardtia australis*

Other species: Thysanotus manglesianus, Acacia ramulosa var. linophylla, Eremophila glutinosa, E. serrulata, Rhodanthe sp., Roepera sp., Hakea lorea (0.5 m), Ptilotus exaltatus, Teucrium teucriiflorum

Acacia caesaneura
Acacia ramulosa var. linophylla
Acacia tetragonophylla
Brachychiton gregorii
Cephalipterum drummondii
Eragrostis falcata
Eremophila forrestii subsp. forrestii
Eremophila georgei
Eremophila glutinosa
Eremophila serrulata
Hakea lorea
Leichhardtia australis
Pittosporum angustifolium
Psydrax latifolia
Psydrax suaveolens
Ptilotus exaltatus
Ptilotus obovatus
Ptilotus polystachyus



Rhodanthe sp.
Roepera sp.
Stenopetalum filifolium
Teucrium teucriiflorum
Thysanotus manglesianus

V 69 22/10/2023 8.23 am Haul Road western end			
GPS: 570041 E/ 7018530 N Elevation: 501 m	Landform: Gravel plain with rocky patches		
Land surface: Red (2.5YR4/8) clay loam; surface rock (gravel, rocks – BIF, dolerite, quartz; ironstone gravel) 50 – 70 %; litter < 2 %; fallen timber < 1 %; cryptogams (lichen) < 1 %; bare ground 5 – 20 %			
Condition & disturbances: Degraded - Poor; high pastoral impacts; hard pan exposed; sheet erosion; rilling and back-cutting; pedestalling and hummocking			
NVIS 6: *U1^ Acacia aptaneura\Acacia\^shrub\4\bi; M1+^ Senna artemisioides subsp. helmsii, Acacia ramulosa var. linophylla\Senna\^shrub\3\r; G1^ Eremophila compacta, Ptilotus polystachyus, Solanum lasiophyllum, Monachather paradoxus, Eragrostis eriopoda\Eremophila\ ^shrub, tussock grass\2\r*			
Vegetation: *Acacia aptaneura isolated tall shrubs over Senna artemisioides subsp. helmsii, Acacia ramulosa var. linophylla sparse shrubland over Eremophila compacta, Ptilotus polystachyus, Solanum lasiophyllum low sparse shrubland*			
Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	S	*Acacia aptaneura*
1 – 2	2 – 4	S	*Senna artemisioides subsp. helmsii, Acacia ramulosa var. linophylla*
< 0.7	5 – 10	S, G	*Eremophila compacta, Ptilotus polystachyus, Solanum lasiophyllum, Monachather paradoxus, Eragrostis eriopoda, E. falcata, Ptilotus obovatus*
Other species: Acacia incurvaneura, Amphipogon caricinus var. caricinus, Aristida contorta, Eremophila exilifolia, Maireana triptera, Ptilotus rotundifolius, Stenopetalum filifolium, Sclerolaena diacantha			

Acacia aptaneura
Acacia incurvaneura
Acacia ramulosa var. linophylla
Amphipogon caricinus var. caricinus
Aristida contorta
Eragrostis eriopoda
Eragrostis falcata
Eremophila compacta
Eremophila exilifolia
Maireana triptera
Monachather paradoxus
Ptilotus obovatus
Ptilotus polystachyus
Ptilotus rotundifolius
Sclerolaena diacantha
Senna artemisioides subsp. helmsii
Solanum lasiophyllum
Stenopetalum filifolium



V70 22/10/2023 7.59 am Woodland patch Haul Road western end			
GPS: 569661 E/ 7018198 N Elevation: 493 m		Landform: Plain, small grove of vegetation Gentle slope; aspect south	
Land surface: Red fine sandy clay loam; surface rock < 1 %; litter > 80 % ^ 3 – 4 cm; fallen timber 1 – 2 %			
Condition & disturbances: Very good; pastoral impacts, rubbish; vegetation mostly intact			
NVIS 6: *U1+^ Acacia pruinocarpa\Acacia\^tree\7\i; M1^ Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia\Acacia\^tree, shrub\6\c; M2^ Sida ectogama, Pittosporum angustifolium, Eremophila georgei, Acacia tetragonophylla, Psydrax suaveolens \Sida\^shrub\3\c; G1^ Sida ectogama, Psydrax latifolia, Acacia aptaneura, Pittosporum angustifolium, Eremophila georgei \Sida\^shrub*			
Vegetation: *Acacia pruinocarpa woodland over Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia low woodland over Sida ectogama, Pittosporum angustifolium, Eremophila georgei shrubland over Sida ectogama, Psydrax latifolia, Acacia aptaneura low open shrubland*			
Height (m)	Crown cover %	Habit	Species
12	25 – 30	T	*Acacia pruinocarpa*
4 – 6	30 – 40	T, S	*Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia*
1 – 2	30 – 40	S	*Sida ectogama, Pittosporum angustifolium, Eremophila georgei, Acacia tetragonophylla, Psydrax suaveolens*
0.3 – 1	10 – 15	S, C	*Sida ectogama, Psydrax latifolia, Acacia aptaneura, Pittosporum angustifolium, Eremophila georgei, Ptilotus obovatus, Enchylaena tomentosa, Teucrium teucriiflorum*
Other species: Maireana triptera, M. georgei, Ptilotus polystachyus, Senna artemisioides subsp. filifolia, S. artemisioides subsp. artemisioides, Abutilon sp., Sclerolaena eurotioides, Leichhardtia australis, Ptilotus exaltatus			

Abutilon sp.
Acacia aptaneura
Acacia pruinocarpa
Acacia tetragonophylla
Enchylaena tomentosa
Eremophila georgei
Leichhardtia australis
Maireana georgei
Maireana triptera
Pittosporum angustifolium
Psydrax latifolia
Psydrax suaveolens
Ptilotus exaltatus
Ptilotus obovatus
Ptilotus polystachyus
Sclerolaena eurotioides
Senna artemisioides subsp. artemisioides
Senna artemisioides subsp. filifolia
Sida ectogama
Teucrium teucriiflorum



V 71 22/10/2023 7.33 am Haul Road western end	
GPS: 569290 E/ 7017878 N Elevation: 494 m	Landform: Plain; small patch of denser vegetation
Land surface: Yellowish red (5YR5/6) fine sandy clay loam; surface rock (BIF, ironstone gravel, siltstone, quartz) 0.5 – 6 cm, 10 – 20 % with some denser patches	
Condition & disturbances: Good; less disturbances than surrounding plain	
NVIS 6: *U1+^ Acacia aptaneura, Psydrax suaveolens, P. latifolia, Acacia tetragonophylla\Acacia \^tree, shrub\6\c; M1^ Eremophila georgei, E. forrestii subsp. forrestii, Sida ectogama, Leichhardtia australis, Acacia aptaneura\Eremophila\^shrub, climber\3\c; M2^ Ptilotus obovatus, Monachather paradoxus, Psydrax rigidula, Eremophila georgei, Psydrax suaveolens\Ptilotus\^shrub, tussock grass\2\i; G1^ Dried off forbs, Solanum lasiophyllum, Psydrax latifolia, Sclerolaena sp., Sida ectogama\Forbs\^forb, shrub\1\i*	
Vegetation: *Acacia aptaneura, Psydrax suaveolens, P. latifolia tall shrubland over Eremophila georgei, E. forrestii subsp. forrestii, Sida ectogama shrubland over Ptilotus obovatus, Monachather paradoxus, Psydrax rigidula low open shrubland over Dried off forbs, Solanum lasiophyllum, Psydrax latifolia low open forbland*	

Height (m)	Crown cover %	Habit	Species
4 – 6	30 – 40	T, S	*Acacia aptaneura, Psydrax suaveolens, P. latifolia, Acacia tetragonophylla*
1 – 2.5	50 – 60	S, L	*Eremophila georgei, E. forrestii subsp. forrestii, Sida ectogama, Leichhardtia australis, Acacia aptaneura, P. latifolia, Solanum lasiophyllum, Acacia tetragonophylla*
0.2 – 1	10 – 30	S, G	*Ptilotus obovatus, Monachather paradoxus, Psydrax rigidula, Eremophila georgei, Psydrax suaveolens*
< 0.2	10 – 20	F, S	*Dried off forbs, Solanum lasiophyllum, Psydrax latifolia, Sclerolaena sp., Sida ectogama*

Other species: Acacia pruinocarpa low tree stand with A. caesaneura; Eremophila compacta, Senna artemisioides subsp. xsturtii, Eremophila eriocalyx, E. foliosissima, Teucrium teucriiflorum

Acacia aptaneura
Acacia caesaneura
Acacia pruinocarpa
Acacia tetragonophylla
Eremophila eriocalyx
Eremophila foliosissima
Eremophila forrestii subsp. forrestii
Eremophila georgei
Leichhardtia australis
Monachather paradoxus
Psydrax latifolia
Psydrax rigidula
Psydrax suaveolens
Ptilotus obovatus
Sclerolaena sp.
Senna artemisioides subsp. xsturtii



Sida ectogama
Solanum lasiophyllum
Teucrium teucriiflorum

V72 22/10/23 7.00 am Haul Road western end	
GPS: 568940 E/ 7017390 N Elevation: 488 m	Landform: Stony plain; almost level; aspect south
Land surface: Yellowish red (5YR5/6) fine sandy clay loam; surface rock (BIF, ironstone gravel, siltstone, quartz) 0.5 – 6 cm, 10 – 50 %; litter < 5 %; bare ground 40 – 50 %	
Condition & disturbances: Degraded; tracks, roads, pastoral and mining impacts; erosion active – sheet, pedestalling and hummocking	
NVIS 6: *U1^ Acacia aptaneura\Acacia\^tree\6\bi; M1^ Eremophila fraseri subsp. fraseri, Acacia pruinocarpa, A. tetragonophylla\Eremophila\^shrub\3\bi; G1+^ Eremophila punicea, E. fraseri subsp. fraseri, Ptilotus schwartzii, P. obovatus, Amphipogon caricinus\Eremophila\^shrub, tussock grass, forb\1\r*	
Vegetation: *Acacia aptaneura low isolated trees over Eremophila fraseri subsp. fraseri isolated shrubs over Eremophila punicea, E. fraseri subsp. fraseri, Ptilotus schwartzii low sparse shrubland*	

Height (m)	Crown cover %	Habit	Species
> 2	< 2	T	*Acacia aptaneura*
0.9 – 1.5	< 2	S	*Eremophila fraseri subsp. fraseri, Acacia pruinocarpa, A. tetragonophylla*
< 0.6	2 – 10	S, G, F	*Eremophila compacta, E. fraseri subsp. fraseri, Ptilotus schwartzii, P. obovatus, Amphipogon caricinus var. caricinus, Monachather paradoxus, Sclerolaena eurotioides, S. fusiformis, Stenopetalum filifolium*

Other species: Acacia craspedocarpa, A. fuscaneura, Eremophila forrestii subsp. forrestii, E. georgei, Maireana thesioides, M. georgei, M. carnosa, Psydrax suaeveolens

Acacia aptaneura
Acacia craspedocarpa
Acacia fuscaneura
Acacia pruinocarpa
Acacia tetragonophylla
Amphipogon caricinus var. caricinus
Eremophila compacta
Eremophila forrestii subsp. forrestii
Eremophila fraseri subsp. fraseri
Eremophila georgei
Maireana carnosa
Maireana georgei
Maireana thesioides
Monachather paradoxus
Psydrax suaeveolens
Ptilotus obovatus
Ptilotus schwartzii
Sclerolaena eurotioides
Sclerolaena fusiformis
Stenopetalum filifolium



Invertebrate Solutions

30th August 2024

Dr Tim Moulds
Director Invertebrate Solutions Pty Ltd
PO Box 14
Victoria Park, WA 6979

Reference: 2024ISJ10-F01-20240830

Review of *Cethegus* species limits and SRE status in Western Australia.

Attention Goran Seat
General Manager Projects
Fenix Resources Ltd

Dear Goran

In response to your request on behalf of Fenix Resources Ltd (Fenix) on 26th July 2024 to provide an assessment of the mygalomorph spider *Cethegus fugax* with regard to its status as a potential short range endemic (SRE) invertebrate in Western Australia, Invertebrate Solutions Pty Ltd (Invertebrate Solutions) makes the following response in the form of a technical memorandum.

Technical Memorandum Scope

Invertebrate Solutions has been requested by Fenix to review the mygalomorph spider *Cethegus fugax* and specifically address the following:

- Assess the species limits for *C. fugax* based upon morphological and genetic data as contained in published and unpublished literature.
- Provide an assessment for the distribution of *C. fugax* in the Mid West region of Western Australia and determine if it is considered to be an SRE.
- Provide recommendations and any suggested requirements for further work to comply with relevant legislation.
- Provide a written report containing the above items.

Arachnida: Mygalomoprhae: Euagridae: *Cethegus*

Mygalomorph spiders of the genus *Cethegus* are restricted to Australia, and have recently been transferred from the family Dipluridae to Euagridae, which was elevated from a subfamily based upon a multigene genetic analysis (Opatova et al. 2020). The genus currently contains 12 recognised species that occur from rainforest on Cape York in Queensland, through open forest to the west of the Great Dividing Range in Queensland and NSW and in desert areas of South Australia, to semi-arid habitats in inland southern Western Australia (Raven 1984).

Cethegus fugax

Cethegus fugax is one of two species of *Cethegus* that occurs in Western Australia and is found in subcoastal areas along the Nullarbor Plain, in the south-western corner, and near the west coast about as far north as Geraldton, W.A. (Main 1960, Figure 1). The species is not known to occur in the mesic forests of the South West. Although Main (1960) records the species as occurring as far east as South Australia, Raven (1984) remains doubtful of these records being *C. fugax* without further detailed examination to determine their conspecificity.

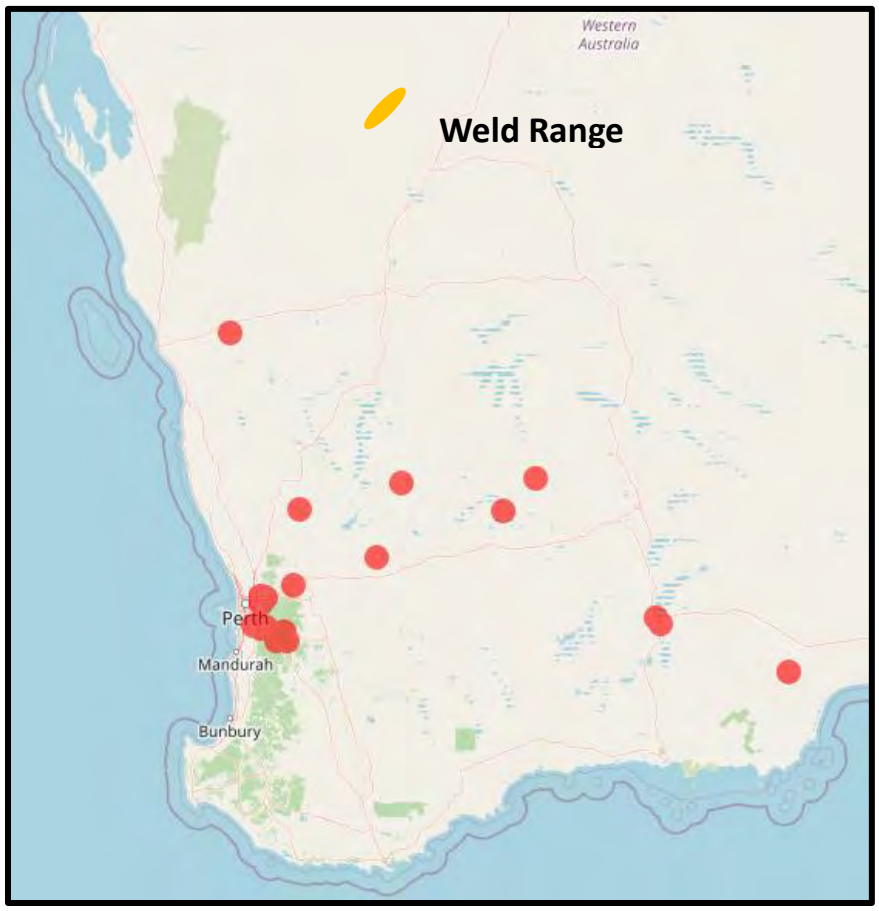


Figure 1.The distribution of *Cethegus fugax* in Western Australia from ALA.org.au and the approximate position of Weld Range.

Invertebrate surveys in the Mid West as part of environmental assessments for mining projects have recorded *C. fugax* much further north than Geraldton and they are known to occur throughout the Mid West, with populations known from Weld Range and Robinson Range (Ecologia 2009a) and Jack Hills (GHD 2011).

The genetic diversity of *Cethegus fugax* records were examined by Ecologia (2009b), in order to provide additional information to compliment the morphological characters that had previously been investigated by Main (1960) and Raven (1985). Ecologia (2009b) sought to determine, using a multigene analysis of C*ethegus fugax* represented a species complex or a single widespread species. The study used three different genes, 16S, CO1 and ITS1. Thirty-eight individuals from the Midwest were sequenced (15 Weld Range, 10 Jack Hills, 12 Robinson Range, 1 Morawa), along with four specimens from the type locality at Mt Helena, in the Perth Hills and 3 individuals of *C. ischnotheloides* from the Great Victorian Desert, which is the closest geographical species to *C. fugax* and was used for comparison of results and to determine intra and interspecific variation.

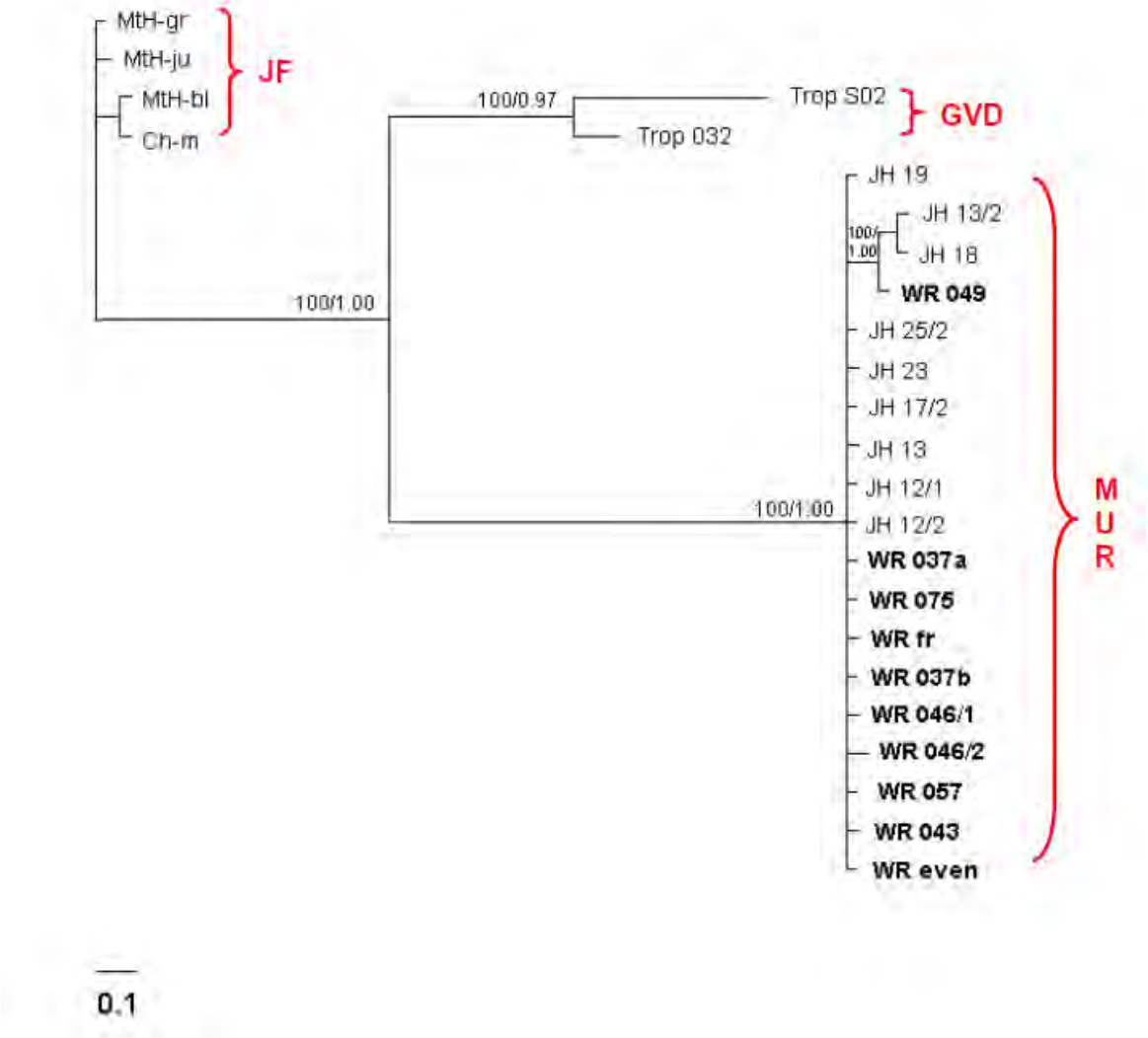


Figure 2 Maximum Likelihood phylogenetic tree based on ITS1 (after Ecologia 2009b Figure 3-2). The scale bar represents 0.1 substitutions per site. JF – Jarrah Forrest; GVD – Great Victoria Desert; MUR – Murchison / Mid West.

The subsequent analysis of the genetic data showed distinctive and well supported clades of *C. ischnotheloides, C. fugax* from the Jarrah forest (type locality) and *C. fugax* from the Midwest (Ecologia 2009b, Figure 2). This high level grouping was evident in both the Maximum Likelihood and Bayesian Inference analysis techniques on multiple different genes, that provides a high degree of confidence in the results. This data would therefore support the hypothesis that the individuals of *C. fugax* from the Midwest are a different, undescribed species of *Cethegus*, and do not represent *C. fugax*.

The populations of Mid West C. 'fugax' show some genetic structuring by geographical location (Figure 2, Figure 3), however, the assertion from Ecologia (2009b) that these represents distinct subspecies is not supported by the data, as the analysis shows weak support for most of the clades and no morphological differences were evident. It is to be expected that some genetic structuring over the wide geographical distances between population in the Mid West would be present, and a similar pattern of genetic structuring was found with the widespread *Idiosoma clypeatum* (Rix et al. 2018) occurring throughout the midwest (including Weld Range and Jack Hills) when the genus was revised. *Idiosoma clypeatum* shows similar clumped distributions around Weld Range and Jack Hills with similar levels of genetic structuring to that seen in C. 'fugax – Mid west' and was ultimately described as a single widespread species due to the similar morphological characters of the populations and the genetic distances being below interspecific variation, as is shown in the Ecologia (2009b) data.

The data, both genetic and morphologic obtained by Ecologia (2009b) support the existence of an undescribed species of *Cethegus* in the Mid West, however the species is widespread, and based upon current records is not considered to be an SRE according to the definition of Harvey 2002).

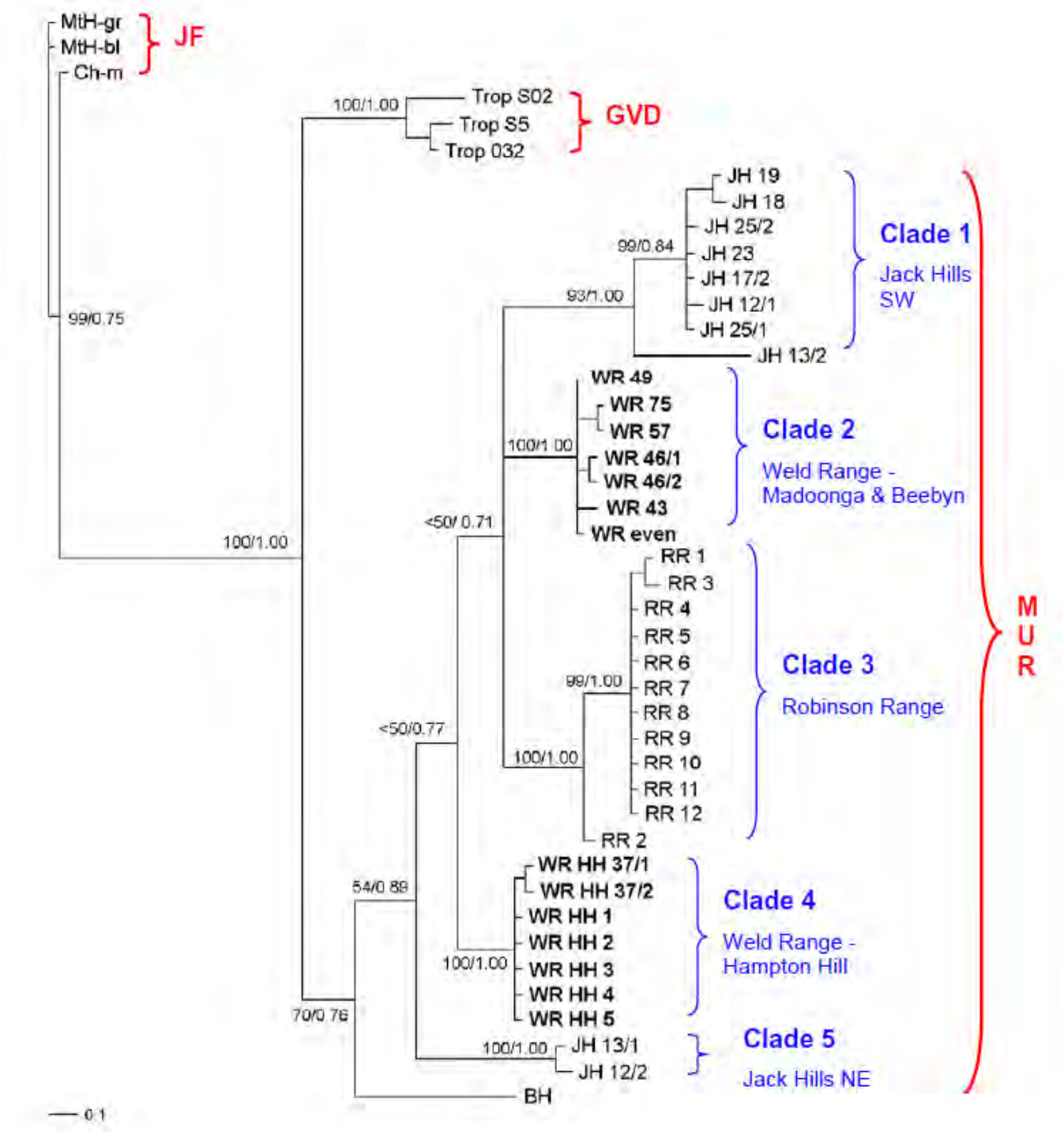


Figure 3 Maximum Likelihood phylogenetic tree based on 16S (after Ecologia 2009b Figure 3-3). The scale bar represents 0.1 substitutions per site. JF – Jarrah Forrest; GVD – Great Victoria Desert; MUR – Murchison / Mid West. Support for individual structuring of Murchison clades is weak (<95) and does not support species level separation.

Conclusions and Recommendations

The mygalomorph spider *C. fugax* occurs in southern and coastal Western Australia. The specimens from the Mid West that have been recorded at Weld Range, Jack Hills and Robinson Range have nominally been identified previously as C. fugax. The genetic and morphological study undertaken by Ecologia (2009b) shows the individuals from the Mid-West region are an undescribed species of Cethegus, but differ genetically from *C. fugax* and the other closest geographical representative of the genus *C. ischnotheloides* enough to warrant being classified as a distinct species in their ow right. The species *C.* "midwest" does exhibit some internal genetic structuring related to its geographical distribution, however, these differences are not large enough to justify splitting the taxa into multiple species. *Cethegus* 'midwest' is therefore a widespread species and is not considered to be a SRE according to the definition of Harvey (2002).

As *Cethegus* 'midwest' is not considered a SRE, nor a conservation significant species, no further survey work or management actions are deemed necessary.

Sincerely



Dr Tim Moulds

Director and Principal Ecologist

Invertebrate Solutions Pty Ltd

0429792834

tim@invertebratesolutions.com

Limitations and Exclusions

This study was limited to the extent of information made available to Invertebrate Solutions at the time of undertaking the work. Information not made available to this study, or which subsequently becomes available may alter the conclusions made herein.

The opinions, conclusions and any recommendations in this report are based on information available, including published species distribution records and reviewed at the date of preparation of the report. Invertebrate Solutions has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by Invertebrate Solutions described in this report (this section and throughout this report). Invertebrate Solutions disclaims liability arising from any of the assumptions being incorrect.

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Appendix 2

Iron Ridge Stygofauna Assessment - ecologia Environment 2020

463 SCARBOROUGH BEACH ROAD, OSBORNE PARK, WA 6004
PH: +61 (08) 6168 7200
ACN 088 821 425 • ABN 63 088 821 425
www.ecologia.com.au

2 April 2020

Jeremy Shepherdson
c/o Fenix Resources

jeremy@ecotecwa.com.au

RE: IRON RIDGE STYGOFAUNA ASSESSMENT

Dear Jeremy,

ecologia Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a stygofauna survey to support environmental approvals, including a Mining Proposal, for the proposed Iron Ridge Project over tenement M20/118 (the 'study area'). The study area is located approximately 55 km northwest of Cue in the Murchison region (**Figure 1**)**.** Where new bores are installed within an aquifer that has not yet been surveyed for stygofauna, baseline stygofauna sampling should be undertaken to determine the stygofauna assemblage within the aquifer, including for the presence of any stygofauna species of conservation significance.

ecologia conducted a stygofauna survey over two phases (six months apart) conforming to the requirements of a pilot study outlined in EPA Factor Guideline: *Subterranean Fauna* and EPA Technical Guidance: *Sampling Methods for Subterranean fauna*. The initial phase (stygofauna fauna trap establishment) was conducted in conjunction with the Level 1 fauna and fauna habitat assessment (2-4 September 2019) and the second (trap retrieval) on March 9th, 2020. Three bores were sampled for subterranean fauna, including two production bores and one monitoring bore. Bore hole drilling and water quality data is provided in Table 1.

Table 1: Stygofauna sample bore locations and drilling information.

ecologia Bore ID	Bore Id	Coordinates (GDA94, Zone 50)		Drilled Depth (m)	Reamed Depth (m)	Cased Depth (m)	Slotted Interval (m bgl)	Static water level	Electrical conductivity	Temperature (˚C)	pH	Salinty (mg/L TDS)
		Easting	Northing									
WB01	IRPB01	567584	7019374	174	174	170	68-170	44.78	924	24.8	8.06	585
WB02	IRPB02	567775	7019516	120	122	122	14-122	65.52	967	24.9	6.81	544
WB03	IRMB-C	567802	7019436	115	**115**	115	54-114	55.33	1047	25.2	7.7	ND

Desktop Assessment

A number of bores have previously been sampled for stygofauna in the Weld Range and surrounding area. In 2009 *ecologia* (2009) conducted a baseline stygofauna survey at the Weld Range and surrounding pastoral land, which included sampling 84 drill holes (26 at Beebyn, 40 at Madoonga and 18 at the surrounding pastoral land outside the area of impact), laboratory identifications and reporting, interpretation of the potential impacts and an associated risk assessment of the various project components on stygofauna communities or species. The Beebyn and Madoonga survey areas are within close proximity to the Iron Ridge

463 SCARBOROUGH BEACH ROAD, OSBORNE PARK, WA 6004
PH: +61 (08) 6168 7200
ACN 088 821 425 • ABN 63 088 821 425
www.ecologia.com.au

study area and the surrounding pastoral bores provide good contextual information on a local and sub-regional scale.

No stygobitic species/communities were identified during the previous stygofauna surveys within the Beebyn impact area or in the regional pastoral bores, although stygophylic representatives of two crustacean orders (Ostracoda and Copepoda) and one annelid sub-class were recorded from nine pastoral wells (ecologia 2009).

One stygobitic copepod from the order Calanoida found in a troglofauna trap at Madoonga suggests that stygofauna may be present in the wider area, though this was not able to be confirmed by stygofauna sampling in nearby bores. The stygophilic copepod found in regional bores, *Mesocyclops brooksi,* is known from both surface waters and ground waters, and it is widespread in Western Australia. The ostracods, *Cypridopsis vidua* and *Sarscypridopsis oschracea* are often found in wells in arid Western Australia but are typically surface species inhabiting open freshwater bodies in southern Western Australia.

The results of this survey suggest that the groundwater habitat in and around the Beebyn impact area is depauperate of true stygofauna and therefore no risk assessment or management recommendations were conducted (ecologia 2009).

Methodology

Stygofauna haul nets

Sampling for stygofauna at Iron Ridge was conducted using haul nets of appropriate diameter (depending on water bore diameter). The net is lowered slowly into the bore using handle and rope and reel to ensure net does not fall freely to the bottom of bore. A minimum of three hauls are performed with a 150 µm mesh net and further three hauls are performed with a 50 µm mesh net. All samples are washed in 50µm sieve and preserved in a vial with 100% ethanol. All vials are labelled with date, bore name and replicate number. Samples are kept in cool, dark place and transported back to Perth for sorting and identification. Specimens were sent to Bennelongia Environmental stygofauna taxonomic specialists for identification.

Standing water level

Standing water level dipper is used to determine the standing water level in each water bore/ drill hole. This provides information on the local aquifers for stygofauna.

Water chemistry

Water parameters such as salinity and/or conductivity, pH, turbidity, temperature, dissolved oxygen and redox potential are collected *in situ* using portable water quality meter to assess stygobiotic habitat related to water quality.

Results

No stygobitic species were collected from the two production bores sampled (WB01 and WB02) at Iron ridge during either phase of the survey. One very juvenile stygobitic Crustacea from the Class Ostracoda was recorded at WB03 (Bore ID: IRMB-C) during phase one.

463 SCARBOROUGH BEACH ROAD, OSBORNE PARK, WA 6004
PH: +61 (08) 6168 7200
ACN 088 821 425 • ABN 63 088 821 425
www.ecologia.com.au

Non-stygofaunal bycatch from the order Collembola (Springtails) were recorded from both WB01 and WB02 during phase one. WB01 also recorded one non-stygofaunal bycatch from the order Acarina (mites). WB02 recorded one mite from the Order Trombidiformes during the March 2020 trap retrieval.

Sample analysis results are provided in Table 2.

463 SCARBOROUGH BEACH ROAD, OSBORNE PARK, WA 6004
PH: +61 (08) 6168 7200
ACN 088 821 425 • ABN 63 088 821 425
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Table 2: Sample analysis results (Bennelongia)

Project	Orebody	Field Bore Code	Cleint Bore ID	Easting	Northing	Visit Date	Sample Type	Sample Notes	Kingdom	Phylum	Subphylum	Class	Subclass	Order_	Genus	Species	Lowest ID
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	03-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	03-Sep-19	Net	150um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	05-Sep-19	Net	50um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	150um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	50um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	50um	Animalia	Arthropoda	Chelicerata	Arachnida	Acari	Acarina		sp.	Acarina sp.
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	05-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	03-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	03-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	05-Sep-19	Net	50um	Animalia	Arthropoda	Crustacea	Ostracoda				sp. unident.	Ostracoda sp. unident.
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	9/03/2020	Net	150 um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	9/03/2020	Net	150 um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	9/03/2020	Net	150um	Animalia	Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes		sp.	Trombidiformes sp.
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	9/03/2020	Net	50um									No Invertebrates

463 SCARBOROUGH BEACH ROAD, OSBORNE PARK, WA 6004
PH: +61 (08) 6168 7200
ACN 088 821 425 • ABN 63 088 821 425
www.ecologia.com.au

Conclusions

The results of this survey, combined with the results of previously stygofauna surveys within and surrounding the Iron Ridge project area and the Weld Range, indicate that the groundwater habitat within the study area is depauperate in stygofauna diversity.

One juvenile ostracod was collected on one occasion from the monitoring bore (WB03). This specimen was unidentifiable to species level (due to absence of mature morphological features); however, it is potentially from the family Cyprididae which is one of the most diverse group of freshwater ostracods (Atlas of Living Australia 2020).

It is unlikely that impacts from the proposal at Iron Ridge will have any significant impacts on local stygofauna communities.

Best Regards,



Shaun Grein

Managing Director/Principal Scientist

shaun.grein@ecologia.com.au

Tel: +61 8 6168 7208

Figures

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565000 566000 567000 568000 569000 570000

7020000 7019000 7018000 7017000

NANNINE
PORLELL
TUCKANARRA
REEDY
BIG BELL
CUDDINGWARRA
CUE
DAY DAWN
MAINLAND
AUSTIN

Study area (surveyed by ecologia 2019)
Study area (surveyed by Biologic 2009 and Woodman 2009, 2012)
Proposed infrastructure
Town

ecologia ENVIRONMENT

Project: 1796
Date: 19 March 2020
Author: AC
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:15,000 @A3

Figure 1: Study area and proposed mining related infrastructure.

0 0.5 1
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

565500 567000 568500 570000

7020000

7018500

7017000

Study area
Bore hole

WB01
WB02
WB03

Project: 1796
Date: 17 October 2019
Author: TM
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Absolute Scale: 1:12,669 @A3

Figure 2: Bore hole locations

0 0.325 0.65
Kilometers

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix 3

Hydrogeology and Hydrology Assessment – Pentium 2024

PENTIUM
WATER

FENIX RESOURCES W11 DEPOSIT

Hydrogeology and Hydrology Assessment

Rev 0
09/05/2024



Document Status

Version	Purpose of document	Author	Reviewed by	Review Date
Rev A	Early draft for information	R Swift, J Hollander,R Wright, Ella Robson	R Swift, R Wright	24/04/24
Rev B	Draft for comment	R Swift, J Hollander, R Wright	R Swift, R Wight	02/05/24
Rev C	Updated bore locations, general layout	R Swift, J Hollander, R Wright	R Swift, R Wright	07/05/24
Rev 0	Final	R Swift, J Hollander, R Wright	R Swift, R Wright	09/05/24

Approval for Issue

Name	Signature	Date
Rob Swift		09/05/2024

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Prepared By

Pentium Water Pty Ltd

Level 1, 640 Murray Street
West Perth, Western Australia 6005

Phone: +61 (0) 8 6182 1790

Email: rswift@pentiumwater.com.au

Author: Rob Swift

Reviewer:

Approved by: Rob Swift

Version: Rev 0

Date: 09 May 2024

Prepared For

Fenix Resources

Level 33, Mia Yellagonga Tower 3,

1 Spring Street

Perth, Western Australia, 6000

Phone:

Email: goran@fenixresources.com.au

Contact: Goran Seat

General Manager - Projects

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1. Introduction

1.1. Background

Fenix have secured the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range. Beebyn-W11 is located approximately 20 km east of existing mining operations at Iron Ridge. Currently Fenix are looking to develop the W11 pit.

Resources WA are assisting Fenix with the development of the mine plan (MP) and closure mine plan (CMP) for the deposit. This document provides an assessment of the hydrogeology and hydrology associated with the W11 pit based on historical reports and data available for the site.

1.2. Locality

W11 pit is situated approximately 70 km west-southwest of Meekatharra and 50 km north-northwest of Cue in the Shire of Meekatharra (Figure 1).

1.3. Land Use

The major land use in the area is sheep and cattle grazing on pastoral leases.

1.4. W11 Development

The general layout of the area close to the W11 pit is shown in Figure 2. The pit is planned to progress to a depth of approximately 135 mbgl (~395 mAHD).

1.5. Scope of work

Pentium Water was commissioned by Resources WA to undertake hydrogeological and hydrological assessments of the proposed W11 pit development to inform on the mine plan (MP) and closure mine plan (CMP). This included:

- Hydrogeology
  - Summarise test work / data sources relevant to the 2024 MP and MCP for W11
  - Recommendations and commentary regarding:
    - Dewatering requirements
    - Monitoring and production bore location
    - Pit lake formation post-mining
- Hydrology
  - Assessment of the impacts on site hydrology with regards the proposed mine pit, waste dump layout, including recommendations regarding appropriate management strategies.
  - Flood risk assessment for the mine
  - Surface water management assessment of the proposed miscellaneous licence path from Beeby to Iron Ridge for an access road.

1.6. Document structure

This report captures the hydrogeological and hydrological aspects of the study in the following broad structure:

- Hydrogeology – main body of the report
- Hydrology –Appendix A (Hydrology)



Figure 1 W11 location

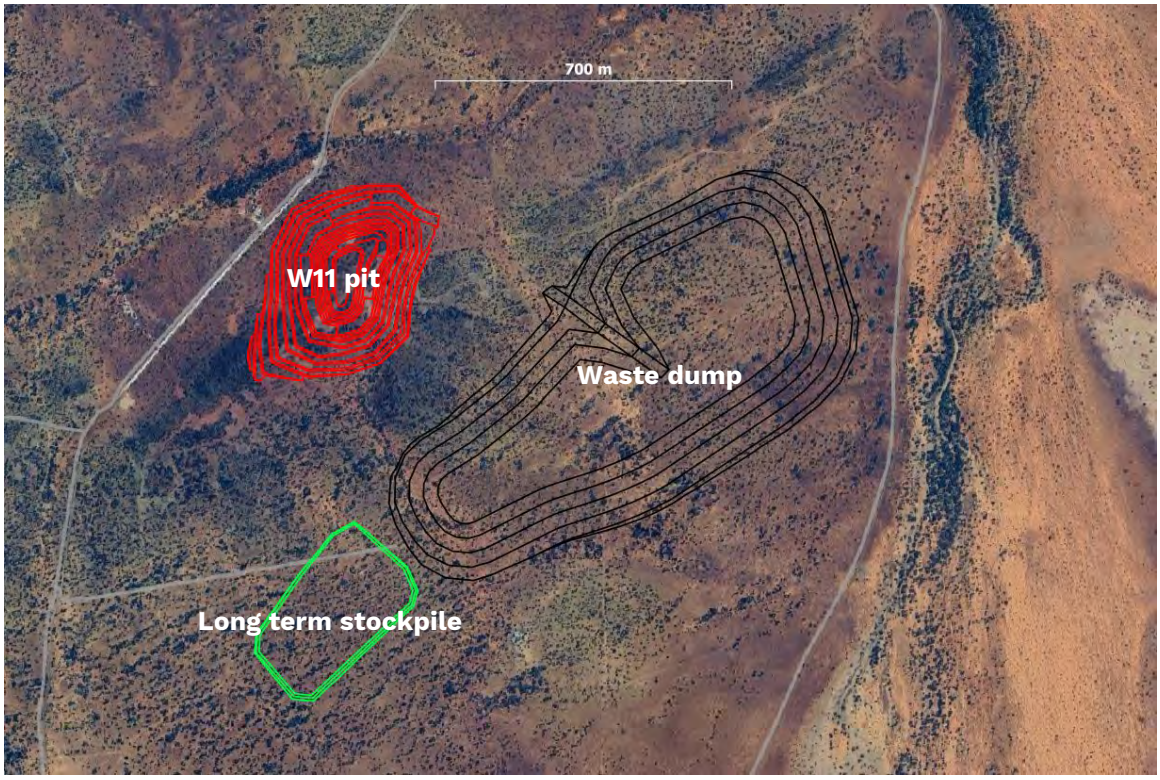


Figure 2 W11 general layout

2. Climate / rainfall

2.1. Climate

The region is semi-arid, characterised by low rainfall and high evaporation. Rainfall tends to be irregular and is greatly exceeded by evaporation. Winters are cool to mild; summers are hot and temperatures regularly exceed 40 °C. Monthly average rainfall and evaporation data from the Bureau of Meteorology's weather station at Meekatharra Airport (site number 007045) is presented in Figure 3.

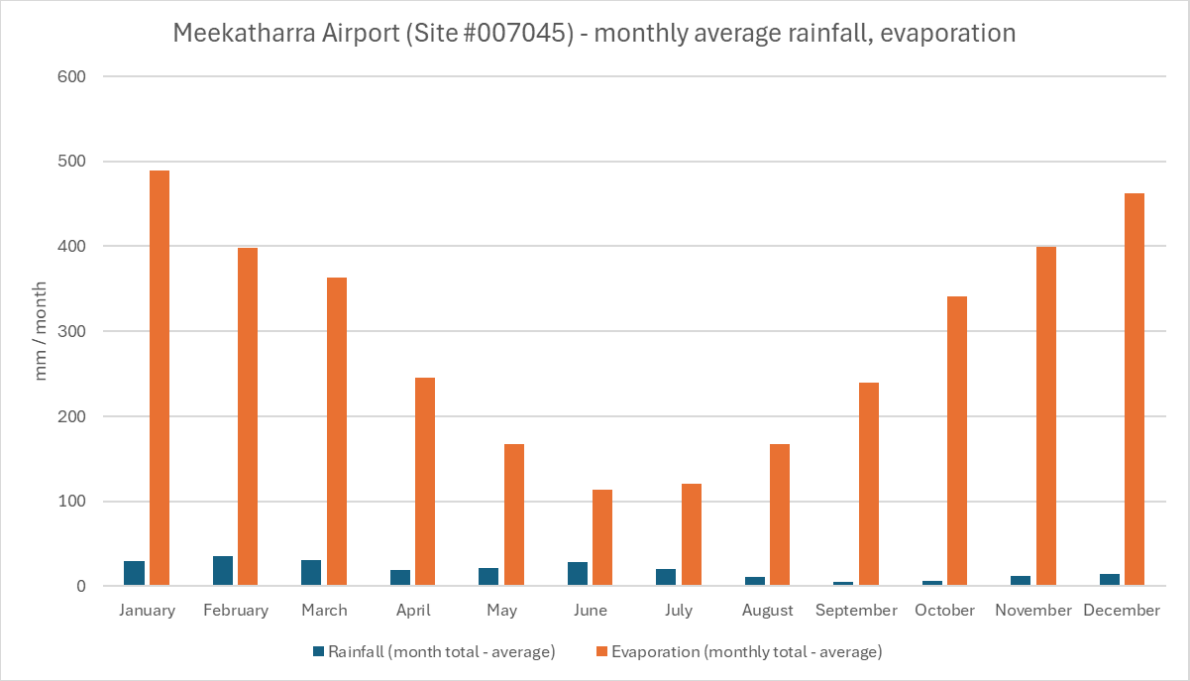


Figure 3 Meekatharra Airport summary rainfall and evaporation data (BOM station 007045)

2.2. Local hydrology

W11 is situated to the east of an unnamed tributary of Jungar Creek, which drains towards the south-southeast. W11 lies at the crest close to the eastern end of the Weld Range, which rise locally to an elevation of 551 mAHD approximately 50 m above the surrounding gently sloping terrain of a broad alluvial valley.



Figure 4 W11 site hydrology

3. Geology

W11 is situated on the northern extent of the Yilgarn Craton within the Meekatharra – Mount Magnet greenstone belt. Basement rock underlays extensive laterite which has in places been eroded along current and historical drainage lines. In such areas, the basal rock has been overlain by colluvial and alluvial deposits of sand and clay of up to 20 m thick (Water and Rivers Commission, 2001).

W11 is one of several identified lenses of iron ore mineralisation identified in the Weld Range (Figure 5). The Weld Range comprises a series of steeply dipping jaspilite interlayered with dolerite (Jones, 1962). On a regional scale, the Weld Range is an east-northeasterly striking greenstone belt, which forms part of the Archaean supra-crustal sequences of the Murchison Domain in the Yilgarn Craton which are intruded by granitic plutons and separated by extensive areas of massive to gneissic granite. Local geology is summarised in Table 1.

The Weld Range is segmented by a well-developed fault system, which is described by Jones (1962) as having 'strongly affected the iron ore bodies'. Essentially, the BIF is offset, by upto 100 m, along its strike, leading to BIF abutting the surrounding dolerite in places.

Two main deposit areas have been named: Madoonga to the west and Beebyn to the east (Figure 7).

The Beebyn Deposit contains several steeply south-easterly dipping banded iron formations (BIFs) interlayered with dolerite.

Table 1 Geology - W11 and surrounds (Based on GWSA, 1983)

Unit	Geology code	Description
Alluvium	Qa	Alluvium, unconsolidated sand, silt and gravel in drainage lines and adjacent floodplains.
Eolian sand	Czs	Eolian sand overlying laterite (Czl)
Jaspillite, Banded iron formation	Aij	Jaspilite, banded iron formation; red, black and white banded
Banded Iron Formation	Aiw	Banded iron formation, black and white banded
Dolerite	Add	Dolerite, medium grained, intruded between beds of Banded Iron Formation.
Granite	Agb	Biotite granite
Granodiorite	Agln	Biotite adamellite and granodiorite

The mineralised zones are offset by up to 100 m by sub-vertical north-west striking faults.

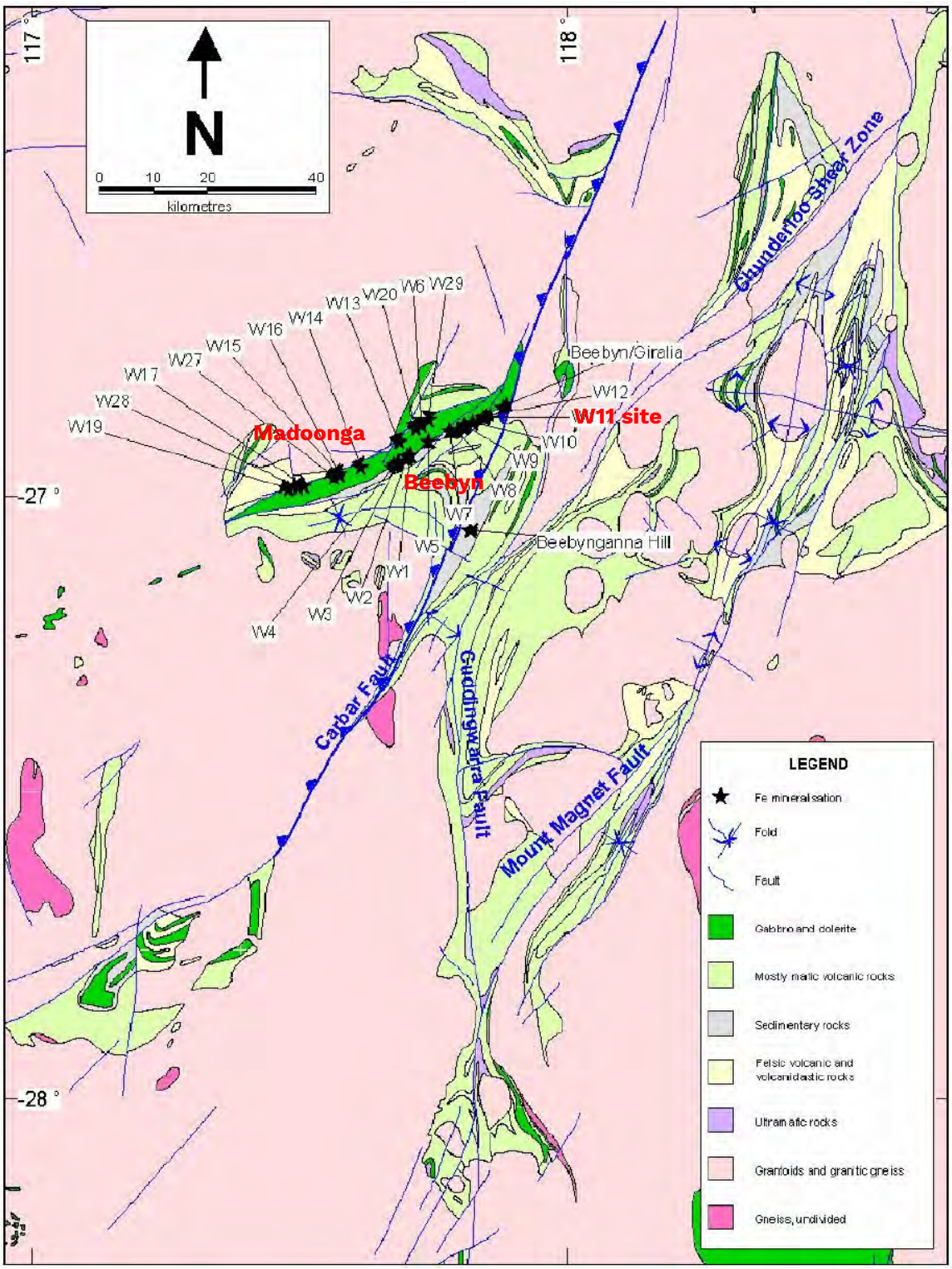


Figure 5 Regional geology of the Weld Range iron ore mineralisation (based on SRK, 2010)

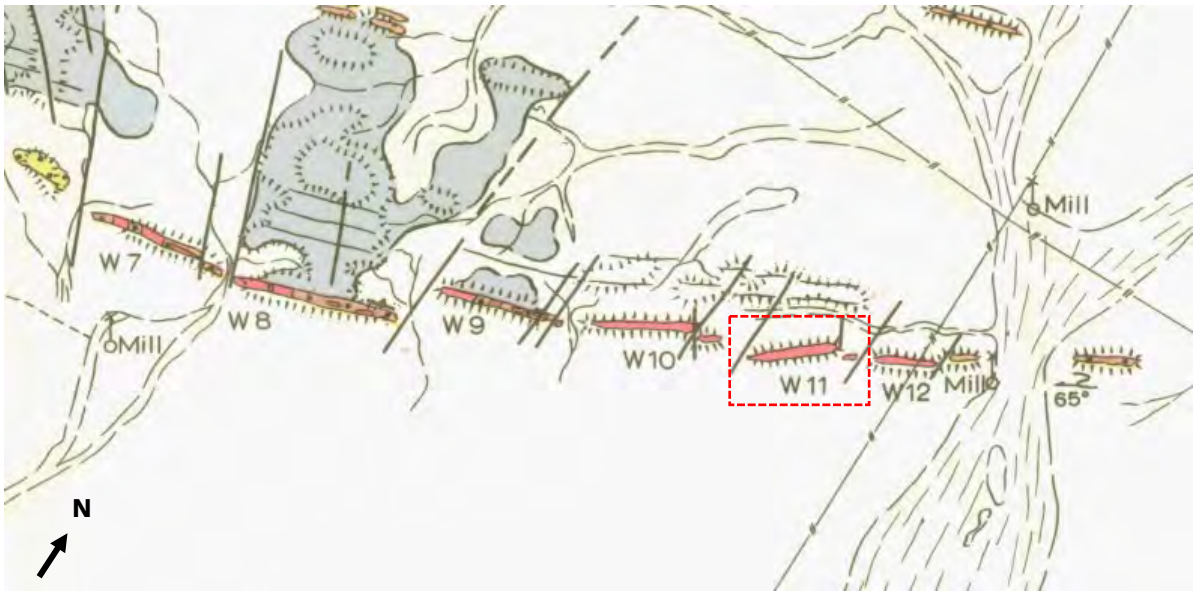


Figure 6 Faulting bisecting the BIF at W11 and along strike (from Jones, 1962)

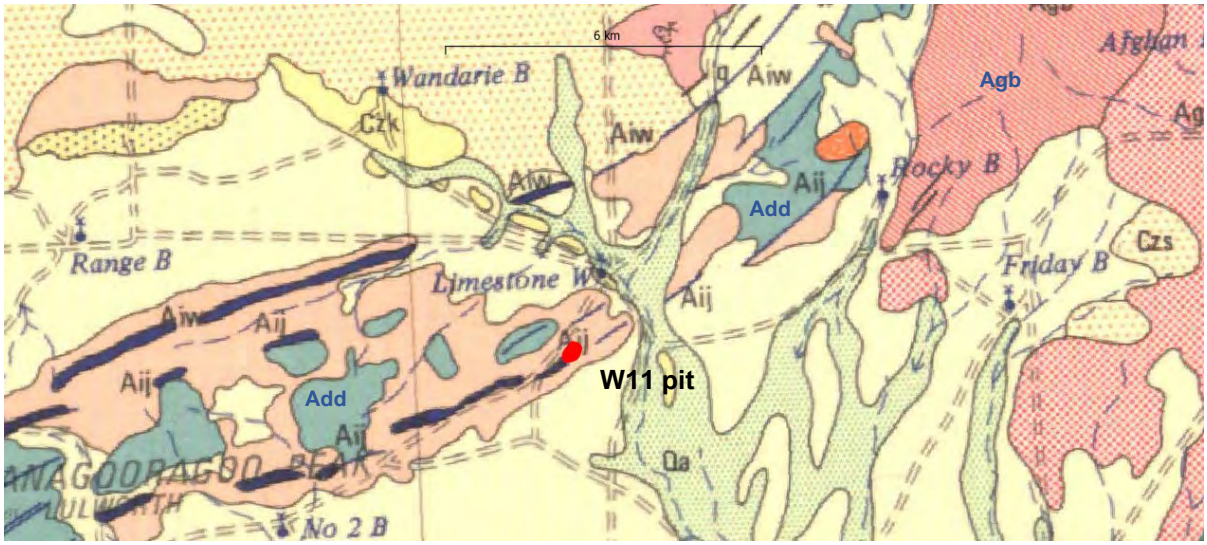


Figure 7 Geology of W11 and surrounds (based on GSWA, 1983) – for stratigraphy codes refer Table 1.

4. Hydrogeology

4.1. Aquifers

4.1.1. Overview

The Weld Range is stated within the East Murchison Groundwater Management unit. Groundwater typically is found at depths of between 5 to 50 mbgl beneath the alluvial plain surrounding the Weld Range. Groundwater is also encountered in bedrock material that forms the Weld Range. Close to W11 groundwater occurs at ~490 mRL (B_WB_02, April 2024)

Recharge to the system is anticipated to be limited, occurring from rainfall infiltration mainly along ephemeral creeks.

4.1.2. W11

At W11 mineralised Banded Iron Formation forms the most prospective aquifer and is surrounded by low permeability dolerite and saprock. Furthermore, northwesterly faults offset the BIF such that along strike it may form partially to completely isolated compartments.

Historically there has been limited drilling within the faulted compartment in which W11 sits as shown on Figure X. B_WB2_01 has been subject to a 72-hour constant rate test, during which time it was able to sustain a yield of 0.99 L/s. B_WB2_03 was unable to sustain a significant yield and was installed as a monitoring bore. Noting the potentially compartmentalised nature of the orebodies it is considered that connectivity between orebodies may be limited.

Packer test data indicates generally low permeability units are encountered in the area, again suggesting that regional connectivity may be limited and that long term yields are likely to be low in bores installed into basement rock.

4.2. Groundwater recharge

Recharge to the system is anticipated to be limited, occurring from rainfall infiltration mainly along ephemeral creeks and direct recharge to outcrop.

4.3. Groundwater throughflow

In the W11 area, groundwater throughflow is anticipated to be limited and preferentially occur along strike of the mineralised BIF. Northwesterly striking faults have offset the BIF locally, displacing it against low permeability dolerite – it is anticipated that this would reduce connectivity between the faulted units, limiting throughflow.

4.4. Groundwater users

Locally, groundwater is targeted by shallow wells or water supply bores for domestic and / or stock watering purposes. Existing bores are typically drilled along existing creek lines, and are anticipated to be targeting the shallow alluvial aquifer. The closest bore is Limestone Bore, approximately 1.6 km to the north-northeast of W11.

SRK undertook a bore audit during 2008, the nearby results for which are summarised in Figure 8. The regional groundwater gradient is from northwest to southeast, broadly consistent with contemporary hydrology. Groundwater elevation close to W11 has been measured at approximately 490 mAHD, consistent with regional groundwater.

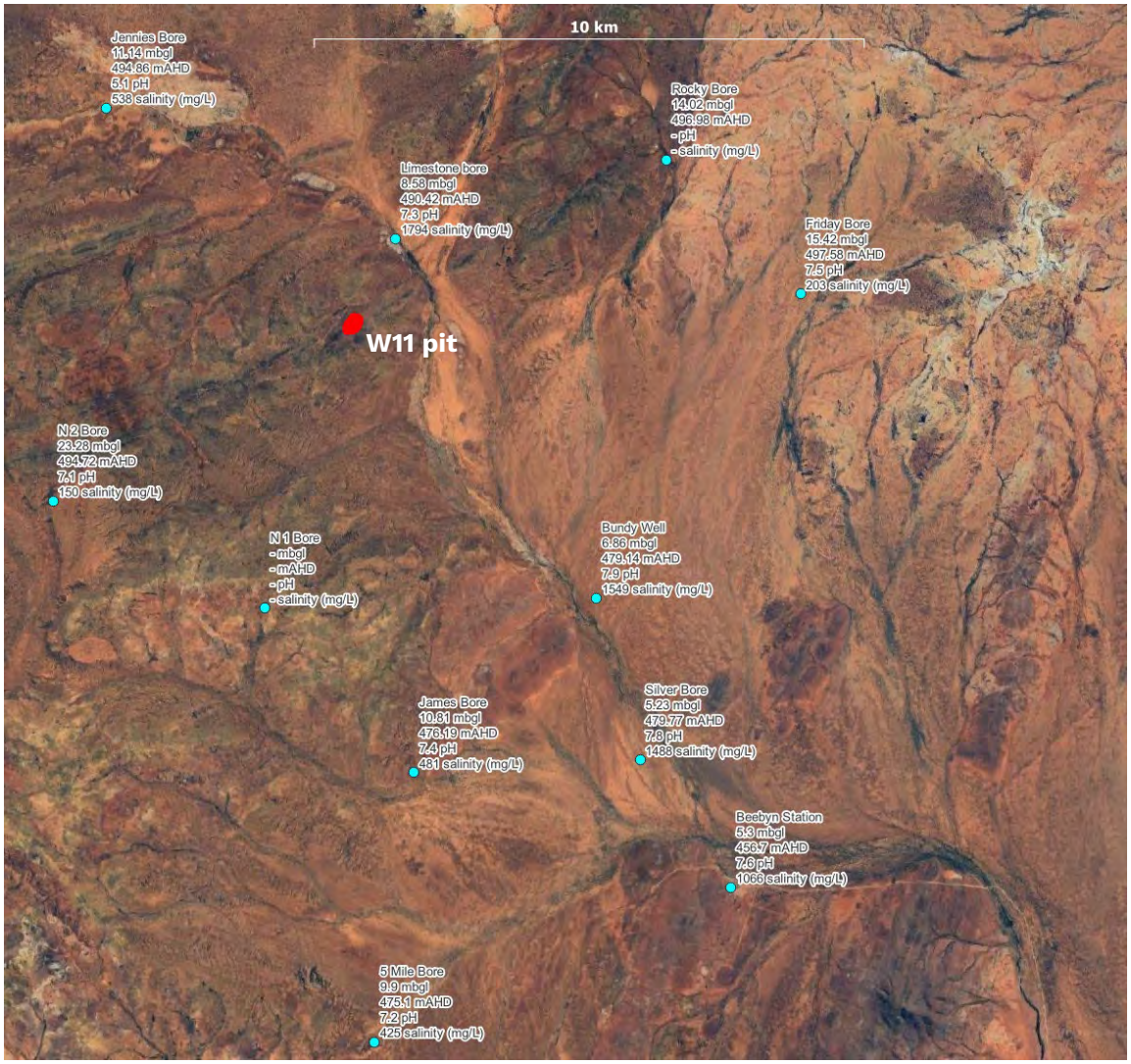


Figure 8 Bores close to W11 - including results of a bore audit in 2008 (data from SRK, 2008)

4.5. Groundwater dependent ecosystems

Potential groundwater dependent ecosystems have been identified and mapped on a national scale by the Bureau of Meteorology (Doody, et. al, 2017). BOM's GDE database indicates that potential terrestrial GDEs have been identified on the alluvial flood plains and surrounding hard pans of the low-lying terrain near W11 (Figure 9).

- Low potential GDE (blue in Figure 9) –
  - identified along the alluvial flood plain /creek line associated with minor ephemeral creeks in the area; described as: flat hardpan wash plains;
  - supporting groved mulga shrublands and occasssional wanderrie grasses.
  - Approximately 1.3 km east of W11
- Medium potential GDE (green on Figure 9)
  - identified on the laterite / hardpan surfacre away from creeklines;
  - described as: gently undulating gravelley plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowg
  - Approximately 350 m south of W11; and ~1 km north of W11.

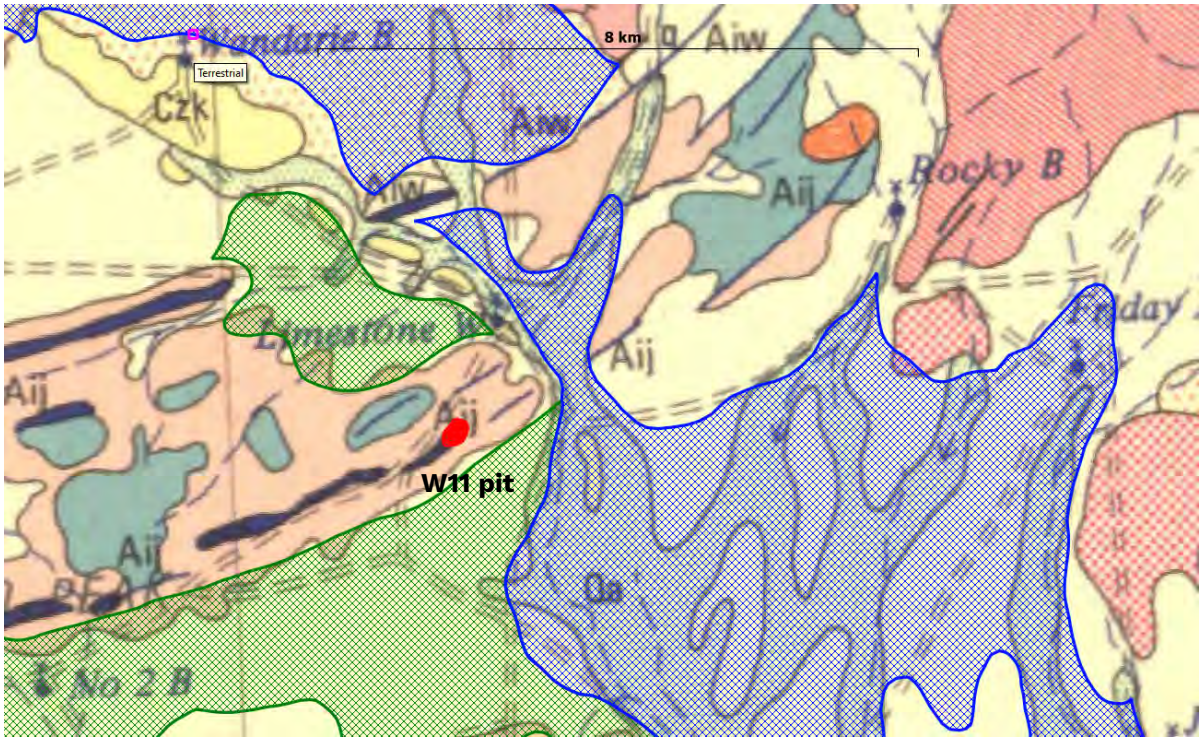


Figure 9 Potential groundwater dependent ecosystems near W11 (based on BOM, 2024)

4.6. Previous Groundwater Investigations

4.6.1. Overview

There have been limited groundwater investigations in the immediate environs of the W11 Pit. Several studies have considered the broader Breebyn-W11 area. Relevant reports are summarised in Table 2.

Table 2 Summary of previous studies

Author	Title	Comment
Worley Parsons, 2008	Weld Range Iron Ore Pre-Feasibility Study – Mine Site Infrastructure Hydrology Study	Hydrology and surface water assessment of the then mine plan.
SRK, 2010	Weld Range Iron Ore Project – Bankable Feasibility Study (BFS) - Hydrogeological Investigation and Modelling	Regional scale model for Beebyn and Madoonga deposits; calibrated to single high yielding bore; indicative dewatering rates of up to ~2.7 GL/a and ~8.6 GL/a
		Reports that original (Pre-feasibility study) predictions for dewatering at Beebyn and Madoonga were ~11 GL/a and 20 GL/a
		Packer testing indicated hydraulic conductivities of key units as: Dolerite ~0.001 m/d Orebody ~0.01 m/d Saprock ~0.0004 m/d Saprolite ~0.001 m/d
SRK, 2012	Weld Range model rerun	Update on earlier model; still based on very high volumes
Rockwater, 2019	Iron Ridge Project – Bore Completion and Hydrogeological Assessment	Recent aquifer testing and modelling for the nearby Iron Ridge deposit. Broadly comparable, if slightly larger, to the W11 deposit.

Author	Title	Comment
		Estimated dewatering rates of ~10 L/s, for a period of approximately 7 years.

Noting the very high predicted dewatering volumes predicted at the pre-feasibility study and bankable feasibility study stage it is considered that although these values related to a much larger final pit, the values are nonetheless high for the hydrogeological setting and based on available drilling data from both Iron Ridge and W11 areas. The outcomes associated with recent testing and modelling at Iron Ridge are more consistent with what would be expected based on the hydrogeological setting – i.e., narrow BIF aquifers surrounded by low permeability dolerite or saprock.

Site specific investigation of the W11 area is recommended to confirm the current conceptualisation and further inform on dewatering and water management strategies.

4.6.2. Previous hydraulic testing

The results of 92 packer tests from 19 geotechnical bores drilled across the Beebyn and Madoonga areas are plotted in SRK, 2008 and summarised in Table 3.

Table 3 Packer testing results (based on SRK, 2010)

	Unit	Permeability (m/d)
Packer testing	Dolerite	0.001
	Orebody	0.01
	Saprock	0.0004
	Saprolite	0.001

4.6.3. Previous groundwater exploration

4.6.3.1. W11

Drilling of hydrogeological exploration bores in the environs of W11 are summarised in Table 4 and Figure 10. During previous studies, 5 production bores have been installed in the Beebyn area together with 6 long term monitoring bores. Available bore details are summarised in Table 4.

No hydrogeological investigation bores have successfully targeted the BIF in the environs of W11, with long term monitoring bores and the closest production bores being installed in low permeabilty saprock or dolerite.

B_WB02_03 was drilled targeting the BIF close to the planned W11 pit but did not encounter BIF until ~140 mbgl. B_WB02_03 was installed to ~113 mbgl, within saprolite material and yielded only 0.99 L/s during a pumping test of 72 hours duration.

Water chemistry data from the 2009/10 investigations is summarised in Table 4. The chemistries are broadly similar, and all representative of water within the dolerite surrounding W11. The water is fresh to brackish in nature, consistent with that observed during the regional monitoring undertaken in 2008 (SRK, 2008).

Overall, the available bore data indicates material surrounding W11 to be low permeability in nature.

4.6.3.2. Iron Ridge

The nearby Iron Ridge deposit (~20 km west south-west, along strike of W11) was investigated in 2019 (Rockwater, 2019) and included two production bores targeting the BIF. Iron Ridge targets a similar orebody (steeply dipping BIFs flanked by dolerite) to that encountered at W11 – therefore is considered a suitable proxy. Key findings from Rockwater, 2019 include:

- IRPB01 (production bore)

  - drilled and installed within BIF; airlift development (post construction) yields of ~24 L/s; pumping testing at 33 L/s, results indicated that these rates were not sustainable and water levels would reach aquifer base after 180 days.
- IRPB02 (production bore)
  - Drilled and installed in BIF, air lift development (post construction) yields of ~3 L/s; pumping testing at 9 L/s was achieved.
- The site conceptualisation identifies that the BIF beds are moderately to highly permeable, whilst the surrounding dolerite is low permeability. This is consistent with the setting at W11.
- Dewatering rates of ~10 L/s are predicted over the approximately 7-year life of mine.

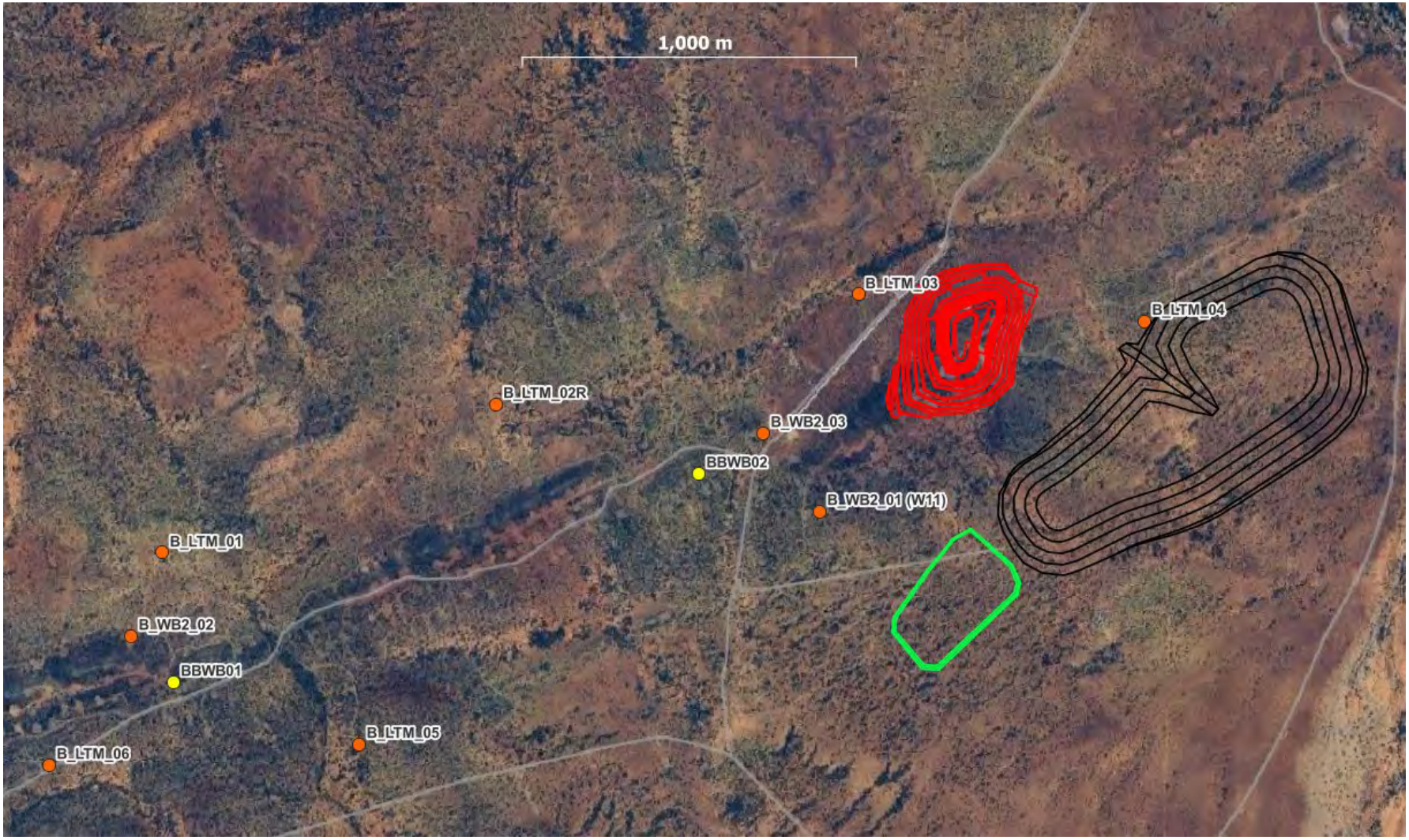


Figure 10 Historical drilling locations near W11 (W11 shown in red; PFS drilling in yellow; BFS drilling (2009) in orange)

Table 4 Test production bores near W11 (from SRK, 2008)

Bore ID	Easting (MGA Z50)	Northing (MGA Z50)	Ground level (mAHD)	Collar height (magl)	Casing	Drilled depth (m)	Slotted interval (mbgl)	Geology encountered	Water level (mbtoc)	(mAHD)	pH	Salinity (mg/L TDS)	Yield (L/s)	Transmissivity (m2/d)
									2024	2024	2009	2009	2009	
Feasibility Study (2008)														
B_WB2_01 (W11)	582645.79	7026807.51	517.79	0.5	50 mm uPVC	148	120-144	0-14 canga; 14 -103 saprolite (clay); 103-150 (dolerite)	29.6	488.69	8.6	1400		
B_WB2_02	580582.96	7026433.98	541.04	0.8	50 mm uPVC	150	108-114; 120-126; 132-138; 144-150	0-1 canga; 1-124 saprolite (clay); 124-150 (dolerite)	49.7	492.14	7.6	950		
B_WB2_03	582476.71	7027041.12	525.36	0.24	200 mm uPVC	150	47-113	0-9 canga; 9-109 saprolite (clay); 109-142 dolerite; 142-150 interbedded orebody and ultramafic	35.0	490.6	7.1	670	0.99 (pumping test)	0.9 (recovery data)
Prefeasibility study bores														
BBWB01	580712	7026294	-	-	-	-	-	Bore log not sighted as part of this report [anticipated to be targeting BIF]	35.2	~490	-	-	12.4	148
BBWB02	582288	7026916	-	-	-	-	-	Bore log not sighted as part of this report [anticipated to be targeting BIF]	49.7	~490	-	-	1.79	3.6

Table 5 Long term monitoring bores near W11 (from SRK, 2008)

Bore ID	Easting (MGA Z50)	Northing (MGA Z50)	Ground level (mAHD)	Collar height (magl)	Casing	Drilled depth (m)	Slotted interval	Geology encountered	Water level (mbgl)	(mAHD)	pH	Salinity (mg/L TDS)
Bores near W11									2024	2024	2009	2009
B_LTM_02R	581686	7027118	524.3	0.59	50 mm uPVC	84	44.5-80.5	0-4 canga; 4-52 saprolite (sand / silt) 52-84 dolerite	33.2	491.86	8.4	680
B_LTM_03	582768	7027451	514.92	0.6	50 mm uPVC	90	47-83	0-1 canga; 1-21 saprolite 21-90 dolerite	25.9	489.62	7.8	690
B_LTM_04	583631	7027376	508.47	0.46	50 mm uPVC	78	41-71	0-8 unconsolidated sediment 8-37 saprolite (clay) 37-78 dolerite	22.2	486.73	7.6	830
Bores to the southeast												
B_LTM_01	580676	7026679	528.76	0.72	50 mm uPVC	108	71-101	0-28 saprolite (clay) 28-110 dolerite	37.7	491.78	8.9	1000
B_LTM_05	518282	7026100	513.7	0.6	50 mm uPVC	90	48-84	0-2 canga 2-5 dolerite 5-20 saprolite 20-90 dolerite	22.8	491.5		
B_LTM_06	580335	7026038	524.69	0.6	50 mm uPVC	84	47-77	0-20 saprolite 20-73 dolerite 73-84 no return	32.8	492.49		

Table 6 Water quality samples near W11 (extracted from SRK, 2010)

Bore ID		B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02
Date		15/07/2009	16/07/2009	17/07/2009	18/07/2009
pH		7.8	7.6	8.6	7.6
Conductivity @ 25	uS/cm	1200	1400	2300	1600
TDS calculated	mg/L	690	830	1400	950
Hardness (as CaCO3)	mg/L	250	330	500	310
Carbonate, CO3	mg/L	<1	<1	14	<1
Bicarbonate, HCO3	mg/L	290	370	380	370
Chloride, Cl	mg/L	180	220	450	260
Sulphate, SO4	mg/L	88	130	190	160
Nitrate, NO3	mg/L	55	28	<0.2	14
Sodium, Na	mg/L	170	180	190	230
Potassium, K	mg/L	11	14	180	12
Calcium, Ca	mg/L	37	45	50	39
Magnesium, Mg	mg/L	38	54	92	52
Soluble Iron, Fe	mg/L	<0.02	<0.02	<0.02	<0.02
Fluoride, F	mg/L	0.4	0.3	0.5	0.3
Free Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01
Aluminium, Al	mg/L	<0.02	<0.02	<0.02	<0.02
Arsenic, As	mg/L	0.005	<0.002	0.24	<0.002
Manganese, Mn	mg/L	0.007	0.007	0.074	0.29
Lead, Pb	mg/L	<0.005	<0.005	<0.005	<0.005
Cadmium, Cd	mg/L	<0.001	<0.001	<0.001	<0.001
Copper, Cu	mg/L	<0.005	<0.005	<0.005	<0.005
Antimony, Sb	mg/L	<0.0005	<0.0005	0.05	<0.05
Mercury, Hg	mg/L	<0.05	<0.05		
Silver, Ag	mg/L	<0.005	<0.005	<0.005	<0.005
Boron, B	mg/L	1	0.9	0.7	1.2
Barium, Ba	mg/L	<0.005	<0.005	0.02	<0.01
Beryllium, Be,	mg/L	<0.005	<0.005	<0.005	<0.005
Cobalt, Co	mg/L	<0.01	<0.01	<0.01	<0.01
Chromium, Cr	mg/L	<0.005	<0.005	<0.005	<0.005
Molybdenum, Mo	mg/L	<0.01	<0.01	<0.01	<0.01
Nickel, Ni	mg/L	0.007	0.005	0.06	0.008
Phosphorous, P	mg/L	0.08	0.25	<0.05	<0.05
Selenium, Se	mg/L	0.004	0.004	0.048	0.007
Sulphur, S	mg/L	28	41	64	52
Silicon, Si	mg/L	18	19	30	26
Tin, Sn	mg/L	<0.05	<0.05	<0.05	<0.05
Strontium, Sr	mg/L	0.25	0.32	0.45	0.28
Thallium, Tl	mg/L	<0.02	<0.02	<0.02	<0.02
Titanium, Ti	mg/L	<0.005	<0.005	<0.005	<0.005
Vandium, V	mg/L	<0.02	<0.01	0.03	<0.01
Zinc, Zn	mg/L	0.043	0.03	0.42	0.68

5. Pit progression and dewatering

5.1. Pit progression

W11 is planned to progress to a depth of approximately 125 mbgl (excavation from ~520 mAHD to ~395 mAHD) over a period of 3 years (between 2025 to 2028), as approximated in Table 7.

Table 7 W11 bench progression (estimated)

Pre-mining	**Initial ground level**		**Initial groundwater level**	
	~520 mAHD		~490 mAHD	
Mine progression				
Year of operation	Lowest bench (mAHD)	Approximate radius of pit (m)	Estimated volume of progression	Estimated volume of water (m3) based on Sy of 0.05
1	500	Above water table		
1	490	167	2927310	790736
1	480	150	2180239	633726
1	470	134	1578906	498820
2	460	117	1109326	375607
2	450	87	754897	277473
2	440	75	495161	207273
2	430	62	301376	149333
3	420	49	163372	98282
3	410	33	73935	54130
3	400	30	24792	16107
3	395			

5.2. Analytical model setup

A simple analytical model was considered appropriate to provide a high-level assessment of potential dewatering volumes and associated impacts. It is recommended that site specific hydrogeological investigations are undertaken to validate the conceptualisation and associated assumptions.

Water associated with pit dewatering comprises:

- Radial inflow from surrounding aquifers
- Water stored within the pit footprint

These two sources are considered further below and summarised in Figure 11.

5.2.1. Radial flow into a circular excavation

Based on the Dupuit-Theim equation for unconfined aquifer conditions (below) Fetter, 1988; Powers et. al, 2007) mine inflows to maintain dry mining have been estimated based on a life of mine of 3 years.

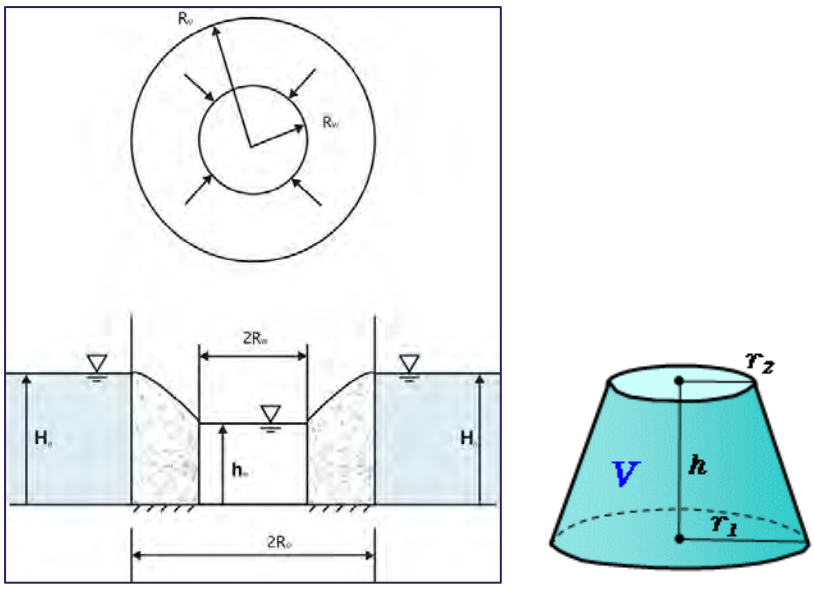


Figure 11 Analytical model geometry (left) and bench volume (right)

Q = abstraction volume

K = hydraulic conductivity (m/d) (0.03 m/d, based on SRK, 2008 ('Geometric mean of orebody'))

ho = height of SWL above base of aquifer (assumed to be ~390 mAHD (5m below base of pit))

hw = height of water level in pit (490 mAHD, based on historical and recent measurement)

rw = equivalent radius of pit

ro = maximum extent of cone of drawdown (SQRT(2.25 k.ho.t/Sy)

t = time since pumping or inflow started

Sy = specific yield, 0.05 (5%)

The radius of influence (ro, above) is calculated based on a rearrangement of the Jacob equation (Powers et al. 2007). The most reliable means of defining this is through a pumping test which would help identify potential recharge from other aquifers and recharge boundaries, but in the absence of this it is considered to provide a reasonable initial estimation of the likely radius of influence. The results of this are summarised in Table 6.

5.2.2. Volume of water within each bench

To include the volume of water within the pit shell itself a calculation considering the pit as a simple truncated cone was used (see Figure 6). The estimated total volume of water within each bench progression is presented in Table 5 and summarised as an equivalent rate (assuming the whole bench is removed in one year, for simplicity) in Table 6.

r_1 = radius of upper surface (upper bench)

r_2 = radius of lower surface (lower bench)

h = difference in bench elevation

The volume is calculated based on:

$$1/3 \times Volume = \frac{1}{3}\pi r^2.H - \frac{1}{3}\pi r^2.(H-h)$$

5.3. Analytical model results

For simplicity the mine progression is assumed to take place at 10 m increments on an approximately quarterly basis. A summary of results are presented in Table 8, with a more detailed breakdown in Table 9.

A dewatering requirement of ~10 L/s is anticipated across the life of the pit, potentially declining over time as the pit progress into less weathered and / or fractured material.

Table 8 Approximate annual abstraction rates from W11 pit (L/s)

	Base case	Sensitivity 1	Sensitivity 2	Within pit material
Year 1 (mainly above WT)	~10+	~10+		0.04
Year 2	~9	~10	~7	0.1
Year 3	5	7	3	0.03
Average	~7	~10	~5	
	~0.2 GL/a	~0.3 GL/a	~0.16 GL/a	~0.2 GL (over life of operation)

Table 9 Analytical model summary

						Base case (k = 0.02)		Sensitivity 1 (k = 0.04)		Sensitivity 2 (k = 0.01)		Water from pit void
Year / quarter	Bench elevation	Step (days)	Elapsed time (days)	Hw-end of step (m)	Equivalent radius of pit (m)	Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k = 0.02)	Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k=0.04)	Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k=0.01)	Water removed from storage (L/s)
Y1 Q1	510	Above WT										
Y1 Q2	500											
Y1 Q3	490											
Y1 Q4	480	91.25		90	150	91	*	128	*	64	*	5
Y2 Q1	470	91.25		80	134	128	*	181	17.4**	91	*	4
Y2 Q2	460	91.25		70	117	157	12.8**	222	11.7**	111	*	3
Y2 Q3	450	91.25		60	101	181	7.9	256	10	128	9.7	2.4
Y2 Q4	440	91.25		50	87	203	6.4	287	9.1	143	5.5	1.8
Y3 Q1	430	91.25		40	75	222	5.7	314	8.6	157	4.2	1.3
Y3 Q2	420	91.25		30	62	240	4.9	339	7.8	170	3.3	0.9
Y3 Q3	410	91.25		20	49	256	4.2	362	7.0	181	2.7	0.6
Y3 Q4	400	91.25		10	33	272	3.4	384	5.9	192	2	0.3
							5.4		8.1		4.6	

* calculated extent of cone of depression within pit radius, model not valid

** caution – radius of influence is close to pit radius, likely overestimating inflow volumes

Based on current data, indicating low prevailing permeability of material surrounding the W11 pit, inflows are anticipated to be limited. The extent of drawdown is also expected to be limited, not extending a significant distance from the pit, and focussed on fracture aquifer networks.

Note the calculated radius of influence in Table 8 assumes radial inflow (a simplification of the model assumptions) which is unlikely since the BIF is surrounded by low permeability dolerite – drawdown is expected to propagate along the BIF units. Noting also that the BIF units are faulted and offset against the dolerite, extensive drawdown along the BIF, across separate faulted units is considered unlikely.

Due to the low permeability and reducing pit dimensions with progression to depth as the radius of influence expands the volume of incoming water is anticipated to reduce over time.

During mining the cone of depression is anticipated to extend along strike of the Banded Iron Formation, with limited drawdown occurring outside the orebody due to the low permeability of the surrounding dolerite. It is unlikely that any measurable drawdowns associated with W11 would be observed at nearby receptors. Noting the proximity of potential GDEs to the north, east and south, assessment based on site specific data (e.g., drilling and test pumping to assess local groundwater response to pumping, installation of a monitoring network of bores) is recommended.

5.4. Dewatering bores

Noting the anticipated limited volumes of water it is considered that dewatering of the W11 pit would be managed using 2 to 3 dewatering bores together with sump pumping as required.

The Banded Iron Formation forms the main aquifer in the W11 area, dewatering bores targeting this unit along strike of the W11 pit (within the same faulted block of BIF) would be expected to manage dewatering, along with in pit sump pumping, as W11 progresses. Recommended bore locations are identified as part of further investigations to assess the hydrogeological setting of W11 (See Section 8.2).

5.5. Existing Groundwater Licence

GWL165387(5) is an existing groundwater licence that covers the W11 area. The purpose of the licence is for:

- Dust suppression of earthworks and construction purposes
- Exploration drilling operations
- Mining camp purposes

The groundwater licence capacity is planned to be increased to meet anticipated demand / dewatering requirements of up to 500,000 kL/a.

6. Water balance

A high-level water balance for the W11 deposit is summarised in Table 10 (based on Pers. Comms., L.Romero (01/05/2024)). Demand is essentially driven by dust suppression and other local operational water requirements.

Table 10 Annual water balance for operations near W11 pit

Year	Demand	Dewatering	Comment
Construction	< 1 L/s		Local supply
Y1	~11 L/s	~10+ L/s	Surplus possible
Y2	~11 L/s	~10 L/s	Potentially balanced supply vs. demand
Y3	~11 L/s	~5 L/s	Deficit possible

Based on the analytical modelling completed to date, and consistent with the current conceptualisation and observation from the nearby Iron Ridge deposit, dewatering volumes are anticipated to be low, and decline as mining progresses. Consequently, there may be a need to obtain additional water to meet demand requirements, particularly during Year 3 of operations. Such a demand may be met by installing an additional bore(s) along strike (to the southwest) within the Banded Iron Formation (i.e., the most prospective aquifer, locally) – away from the pit footprint and area of dewatering.

Further investigation is required to quantify the dewatering volumes at W11 with a greater degree of certainty.

7. Pit closure

It is understood that the pit is to remain as a pit void at closure. The pit is surrounded by low permeability units, and in an area of high evaporation and low rainfall – therefore it is considered that the pit would form a terminal pit lake. Noting a key recommendation of this report is to obtain site specific data, a simple scenario is considered with regards the post-closure water balance.

The water balance for the pit was developed using GoldSim, with the pit characterised using the stage curve below (Figure 12).

Annual average rainfall was applied to the pit area, with annual average evapotranspiration applied to the pit lake area – (based on data from the nearby BOM Meekatharra weather station) – Figure 3.

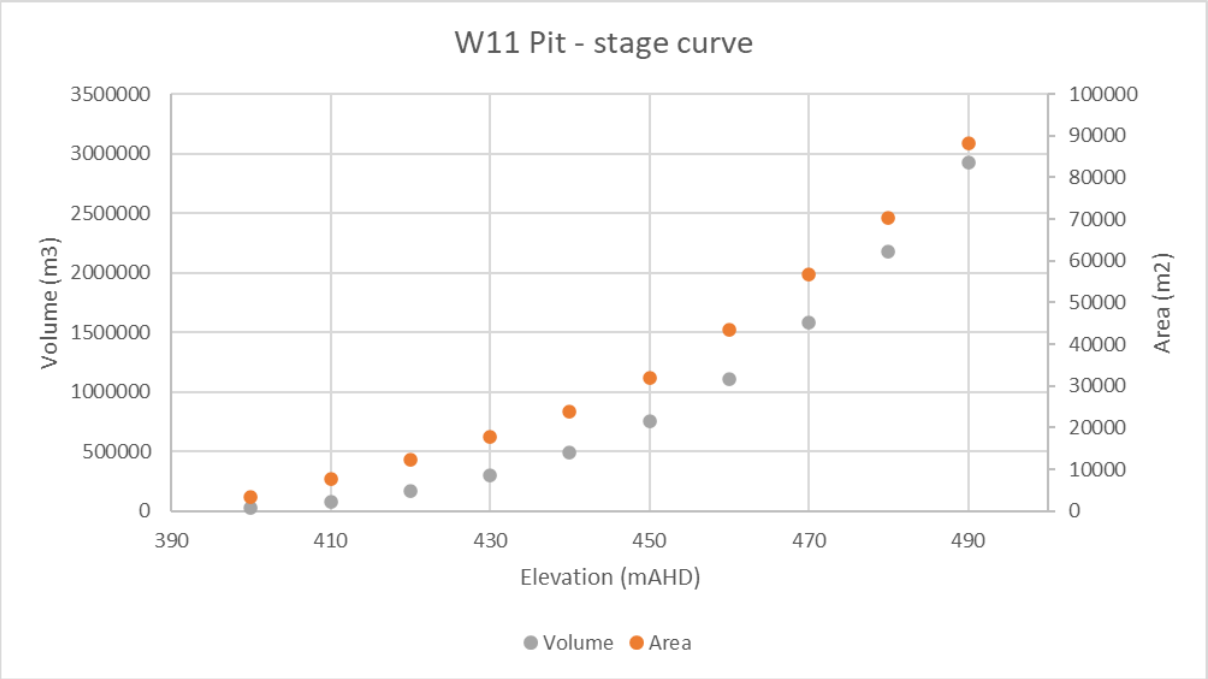


Figure 12 W11 stage curve

In the example presented (Figure 13), a nominal inflow of 5 L/s from groundwater is assumed, equivalent to the late time dewatering volumes. At such rates, recovery is incomplete reaching only ~465 mRL compared to pre-mining water levels of ~490 mRL. As water levels recover, evaporation losses increase and eventually the system equilibrates (i.e., inflows = outflows). If inflows are higher, then water levels would be expected to recover further and conversely if inflows are low (i.e., very limited inflow from the surrounding low permeability dolerite – as is likely) then the recovered water level would be lower.

Since the only outflow of water is evaporation, over time the water becomes increasingly saline – as shown in Figure 14. Under the modelled scenario concentrations of approximately 12,000 mg/L TDS are predicted after ~100 years, compared to prevailing concentrations of ~1,000 mg/L (from bores in the nearby surrounds).

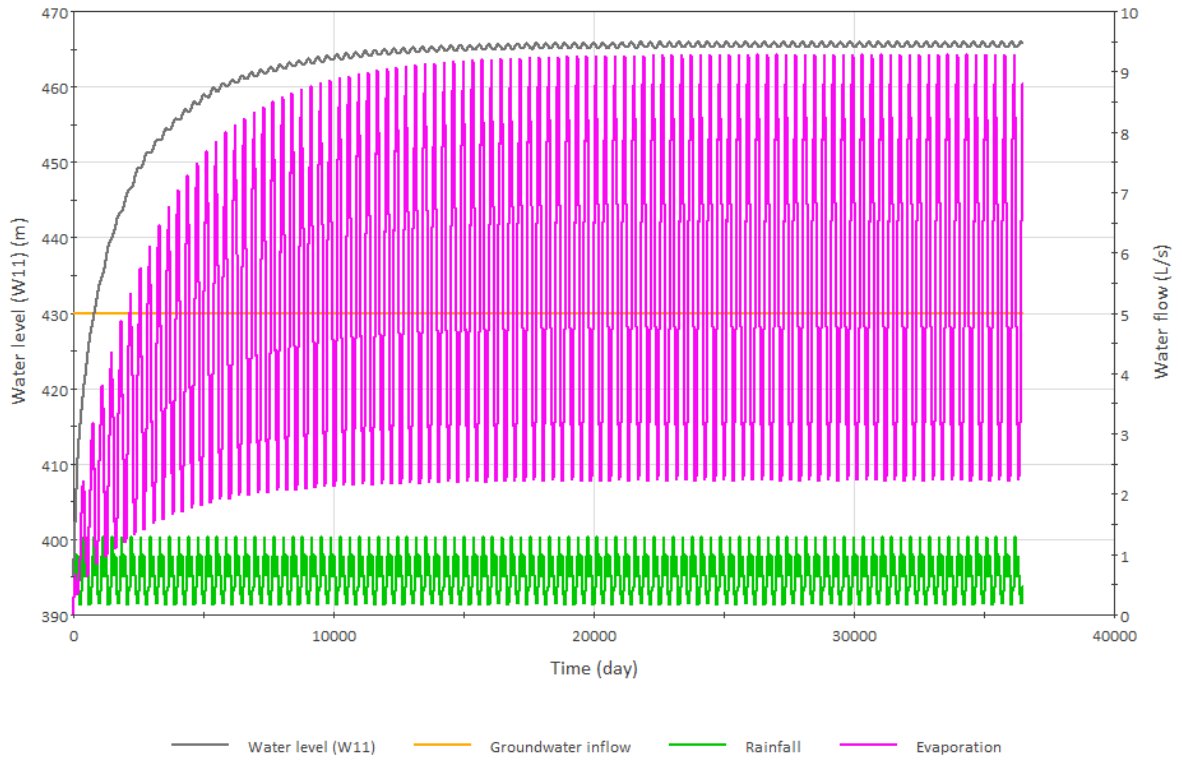


Figure 13 W11 - post closure water level recovery – ~5 L/s (i.e., as per late time dewatering)

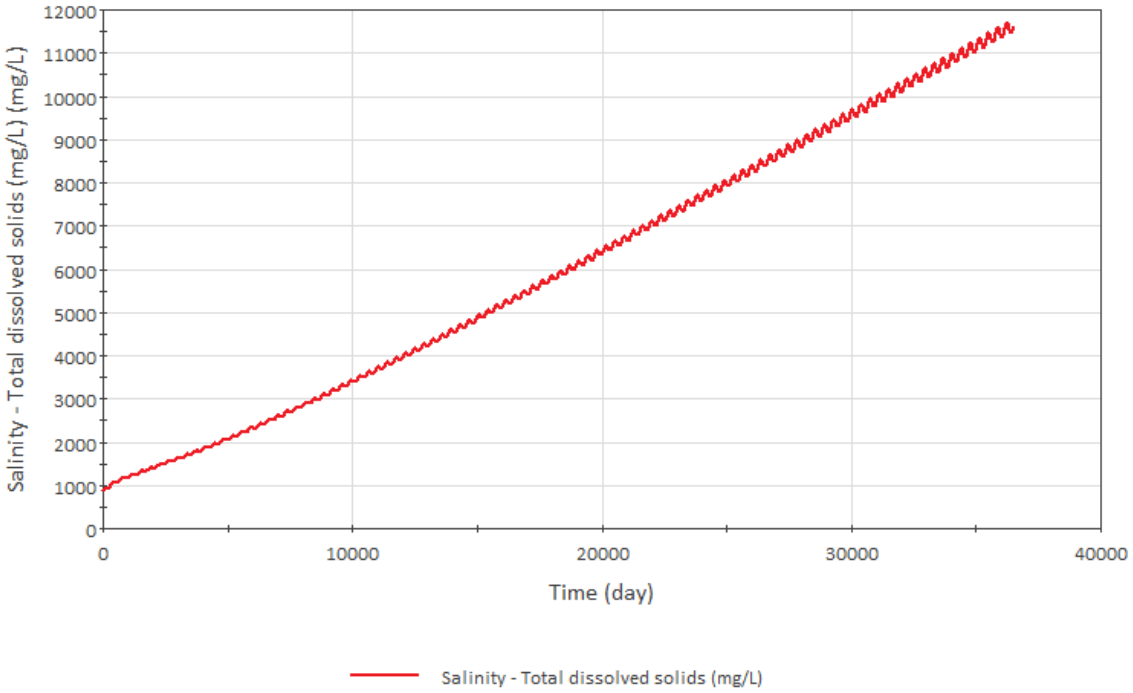


Figure 14 W11 post-closure salinity – increasing over time

8. Conclusions and recommendations

8.1. Groundwater

- W11 pit is planned to progress to a depth of 130 mbgl, approximately 90 m below the prevailing water table in an area flanked by a low permeability aquifer.
- Groundwater levels in the environs of W11 are approximately 490 mRL.
- There are no site-specific hydrogeological testing data relating to the W11 pit – nearby test production bores were very low yielding. The assessment undertaken provides an indication of potential groundwater responses, but further investigation is required to obtain site specific data and test the assumptions made herein.
- Long term dewatering requirements are anticipated to be of the order of 10 L/s.
- Drawdown is anticipated to propagate along strike within the Banded Iron Formation.
- There are GDEs of moderate to low potential to the north (1km), east (1.3 km) and south (0.3 km) of W11.
- At closure, the pit is anticipated to become a saline pit lake, with water becoming increasingly saline over time.

8.2. Further investigation recommendations

The collection of site-specific data relating to the W11 pit is recommended with regards:

- Validating dewatering yields.
- Assessing local groundwater response to pumping – e.g., connectivity within the BIF, nature of connectivity with surrounding dolerite.
- Inform post-closure groundwater recovery rates.
- Expansion of the current monitoring network to provide baseline data in the W11 area, in particular in areas between W11 and nearby potential GDEs.

To inform on the above a hydrogeological investigation, incorporating 3 production bores, is recommended, as summarised in Table 11 and Figure 15. The overarching objective of the investigation is to obtain site specific data relating to the groundwater environment at W11. The three production bore locations may, if considered appropriate, be suitable for use for dewatering of the pit.

Test pumping of the production bores is recommended to obtain site specific hydraulic parameters and inform on the conceptualisation, for example connectivity between the BIF (orebody) and the surrounding dolerite. The recommended test pumping program for each production bore comprises:

- Step testing
  - 5 x 80-minute steps at different rates to inform on likely bore performance and to select an appropriate rate for the constant rate test (CRT)
- Constant rate test
  - 24-to-72-hour test at a constant rate, monitoring of nearby monitoring bores to inform on connectivity within and between different hydrostratigraphic units at W11.
- Recovery test
  - Monitoring of water levels post-CRT – obtain further information on the hydraulic parameters and aquifer connectivity.

Table 11 Proposed hydrogeological investigation bore locations and objectives

Label	Easting	Northing	Target depth (mbgl)	Nominal completion Diameter	Anticipated geology	Objective
Production bores						
PW_2024_PB1	583283	7027306	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting main unit of Banded Iron Formation (BIF)
PW_2024_PB2	582986	7027086	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting faulted and offset main unit of BIF
PW_2024_PB3	582852	7027121	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting minor unit of BIF
	Monitoring bores					
PW_2024_MB01	582954	7026815	~130	50 mm uPVC	Dolerite	ex-pit; groundwater connectivity between orebody and dolerite to the south of the pit
PW_2024_MB02	582738	7027027	~130	50 mm uPVC	Dolerite	Monitoring bore -ex-pit; groundwater connectivity between orebody and dolerite to the south of the pit.
PW_2024_MB03	583303	7027041	~130	50 mm uPVC	Dolerite / BIF	Monitoring bore – along strike within the main unit of BIF; monitor propagation of dewatering within the BIF
PW_2024_MB04	583382	7027323	~130	50 mm uPVC	Dolerite / BIF	Monitoring bore; targeting BIF unit (same as ..PB1) – monitor propagation of dewatering within the BIF
PW_2024_MB05	583253	7027553	~130	50 mm uPVC	Dolerite / Fault	Monitoring bore – ex-pit; connectivity across potential fault structure and within dolerite adjacent to the pit.
PW_2024_MB06	583005	7027528	~130	50 mm uPVC	Dolerite	Monitoring – dolerite north of the pit; monitoring of propagation of dewatering to the north

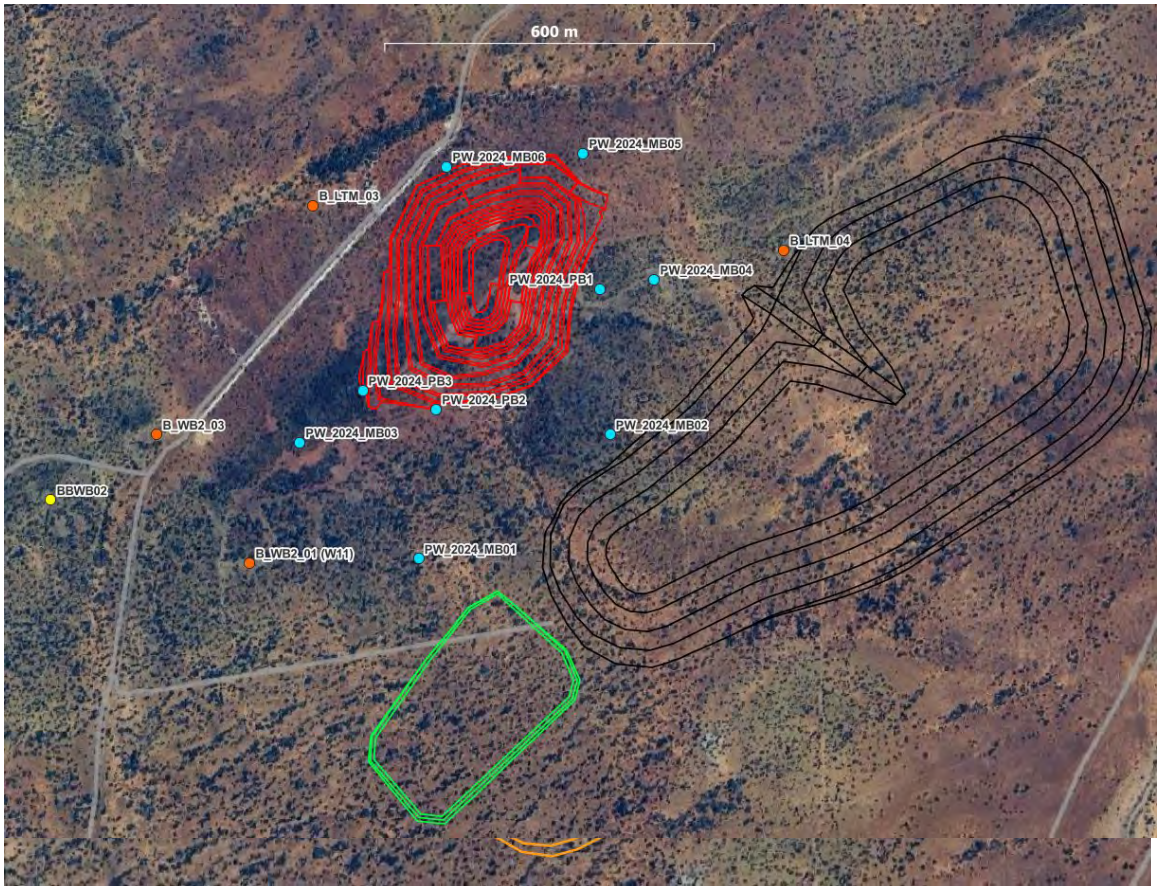


Figure 15 Recommended W11 hydrogeological investigation bore locations

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Appendix A: W11 Hydrology Assessment

Memo

Date: 9 May 2024
To: Leonardo Romero
From: Ella Robson
Pages: 9 + 13 Figures
Regarding: Fenix – W11 Hydrology Study

Background

Fenix have secured the exclusive right to mine and export up to 10 million tonnes (Mt) of iron ore from the high-grade Beebyn-W11 Iron Ore Deposit. Beebyn-W11 is ~20km east of the existing Fenix mining operation at Iron Ridge (refer Fig. A). The initial proposal is to mine 4Mt at a rate of 1.5Mtpa over a 3 year period. The life of mine may be extended in the future.

A hydrology study is required to support the mining proposal (MP) and mine closure plan (MCP). Worley Parsons undertook a mine site infrastructure hydrology study ("Weld Range Iron Ore Pre-Feasibility Study: Mine Site Infrastructure Hydrology Study") in 2008; however as the layout has now changed, an updated review of the hydrology is required.

Scope

The scope is as follows:

- Review of previous report
- Characterisation and description of existing drainage conditions
- Delineation of catchments that impinge on mine infrastructure and access / haul roads
- Calculation of flood flow estimates for a range of AEPs (annual exceedance probabilities), including the PMP (probable maximum flood)
- 2D flood modelling of the predevelopment, post development (operational) and closure mine site using the latest drone survey
- Recommendations of surface water management strategies (bunds, diversions, culverts etc.)

Climate and Topography

General

Rainwater falling in the area drains quickly off the Weld Range ridges through narrow channels which widen substantially as the water drains onto the flatter areas. In the flatter areas, the flow of water can become ambiguous with streams dividing, in some cases the divisions flow in quite different directions. The beds of the main channels of the water courses comprise coarse sand, rocks and cobbles; with silty sand banks which are easily eroded.

The project lies on the southern end of one major catchment (Beebyn Creek). The ephemeral watercourse draining this catchment flows south through Beebyn Gap. The Beebyn-W11 site sits near the top of a ridgeline within the Beebyn Creek catchment, with elevations ranging from ~RL495m to RL550m.

The area has a semi-arid climate with hot summers and mild to cool winters. The closest Bureau of Meteorology (BoM) gauging station is in Cue (site number 007017), about 59km south of site. The average annual rainfall at Cue is 231mm. Most rainfall typically occurs January – July, with low rainfall in September - November, but highly variable.

Temperatures vary from minimum - maximum averages of 7°- 20°C in winter, and 20°- 38°C in summer. The average annual pan evaporation is ~3,500mm.

Western Australia is already experiencing the impacts of climate change. All of WA has warmed, with an average temperature rise of 1.3°C since 1910. Rainfall has increased over most of WA, other than the far west and southwest where it has declined (at a rate faster than anywhere else in Australia). Projections are that WA will continue to get hotter, drier, extreme rain events will become more intense, and the number of tropical cyclones in north-west WA will continue to decrease.

However, the projected life of mine is sufficiently short that these mooted changes will have no significant impact on the project.

Rainfall Intensity-Frequency-Depth

The Bureau of Meteorology (BoM) website provides probabilistic or statistically based Intensity Frequency Duration (IFD) rainfall characteristics. IFD rainfall depths represent design rainfalls for events of frequent and infrequent occurrence, for various annual exceedance probabilities (AEP). IFD data for the site and selected durations is shown in Table 1 (BOM, 2016). Design temporal rainfall distributions are available in the Australian Rainfall and Runoff (ARR) data hub, and describe how rainfall falls over time.

Table 1: Intensity-Frequency-Duration (IFD) Rainfalls (mm)

Duration	Annual Exceedance Probabilities (AEP)								
(hrs)	63%	50%	20%	10%	5%	2%	1%	0.01%	PMP
1	13	16	25	32	40	51	61	122	305
4.5	22	26	41	52	65	83	99	198	495
12	31	37	58	74	91	114	134	268	670
24	38	46	73	92	113	140	162	324	810
36	42	51	81	103	126	156	179	358	895
72	48	59	94	119	144	177	202	404	1,010

It can be noted that 63% AEP is equivalent to 1 year ARI (average recurrence interval, the (average period between exceedances); 50% AEP = 1.44 year ARI; 39% AEP = 2 year ARI, 18% AEP = 5 year ARI and so on up to 1% AEP = 100 year ARI.

Probable Maximum Precipitation

In addition, closure of mines requires consideration of rare storms that could occur at an undefined time after closure. The upper limit for extreme rainfalls can reasonably be represented by the 10,000 year rainfalls, or up to the Probable Maximum Precipitation (PMP). The PMP is theoretically the greatest depth of precipitation meteorologically possible for a given duration over a defined size storm area, at that specific location – as a reasonable indication of the upper limit on rainfall that could be anticipated.

Based on statistical extrapolation, the 10,000 year rainfalls are ~2x 1% AEP rainfalls. By rule of thumb, the PMP is typically ~2-2.5x 10,000 year rainfalls i.e. ~5x 1% AEP rainfalls.

PMP estimates were also made using BOM deterministic methods, GTSMR (Generalised Tropical Storm Method, relevant for durations of 24 hours or more), and the GSDM (Generalised Short Duration Method, based on convective thunderstorms of 6 hours duration or less). The same PMP estimates are used over large areas of Australia, in more southern and inland locations, can tend to provide relatively larger rainfall intensities than statistical extrapolation suggests.

The adopted PMPs have been nominally taken as 5x 1% AEP rainfalls.

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Hydrology

General

XP-RAFTS was used to estimated design flows from catchments external to the mine site. RAFTS is a nonlinear rainfall - runoff program, with the relevant catchments subdivided into sub-catchments with routing links between with appropriate input data (terrain slopes, roughness, rainfall data and rainfall losses). Rainfall losses were calculated using the SCS method based on sandy clay loam soils, with brush vegetation at <50% ground cover. The program then simulates design rainfall with time over a catchment, removing losses to calculate rainfall excess or runoff, and then routes this runoff through the links, to generate flood runoff hydrographs at specified nodes across the watershed.

Beebyn Creek

Beebyn Creek flows south east, before turning south and along the east side of the proposed mine site. Catchment delineation was undertaken (refer Fig. B) and a catchment area of 225km² estimated. A 1% AEP peak flow of 312m³/s was calculated (critical duration 36hr). The 5% and 2% AEP flows are 150m³/s and 235m³/s.

Hydraulic modelling was carried out using the hydraulic model, HECRAS. The model simulates hydraulic flow behaviour within a 2D grid domain based on topography (i.e. based on a digital terrain model). Flow hydrographs for external peak flows were exported out of RAFTS and applied as input to the edges of the model; coupled with direct rainfall or RoG (rain-on-grid) modelling over the local area of the survey (refer Fig. B). A RoG model is a distributed model where the runoff processes are simulated by applying rainfall to each cell in the 2D grid or mesh, and the 2D hydraulic solver is used to route the water down the catchment.

The modelling shows that Beebyn Creek floods to about 1m deep, and the 1% AEP flood extents do not impact mine infrastructure (encroach to within~170m). Refer Fig. C & Fig. D.

Mine Area – Local Flooding

The mining area generally lies near the top of a ridge and on the edge of catchment boundaries (refer Figure B). As a result, catchments impacting site infrastructure are relatively small.

RoG modelling (1% AEP 4.5hr duration) was carried out over the mining area using HECRAS, for pre-development (existing conditions) and post development (proposed infrastructure in place, blocking off flow paths). The resulting flooding is shown in Fig. E, F, G and H.

Most of the mine site flooding is shallow sheet flow <50mm (not shown on the figures) with some natural shallow waterways across the site. One flow path runs west to east towards Beebyn Creek and flows up to 1m deep.

The modelling shows minor flow paths that impact the processing area and waste dump. The pit is outside of any major flooding. Surface water flows from the north pond ~0.9m deep against the Processing Area, before flowing around to the south west. Surface water also ponds with a max depth ~1.5m at a trapped low point on the northern side of the waste dump.

Surface Water Management

General and Sediment Control

Objectives for water quality are outlined in “Water Quality Protection Guidelines”, Department of Water and Environment, 2000. This is a series of 11 guidelines for water quality management in mining and mineral processing (those relating to water, water quality monitoring, stormwater, mechanical servicing and workshop facilities, laboratory waste, and fuelling chemical storage are relevant to this project). Various other guidelines and standards may be applicable, including for example DWER Guidelines and ANZECC Guidelines for Fresh and Marine Water Quality.

Heavy rainfall over disturbed land (due to mining and construction activities) brings the risk of erosion, particularly from waste dumps and stockpiles. Surface water management requires consideration of each drainage path to prevent sediment and other contaminants from washing into natural flow paths. Stormwater run-off from disturbed mining infrastructure can

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be captured behind demarcation bunds, collected in evaporation ponds, or captured in sedimentation basins.

Mine Area

Pit

Based on modelling, there are no major surface water impacts on the pit, a standard pit bund will be sufficient to prevent minor surface water flows from entering the pit.

Waste Dump

The waste dump outline blocks a natural flow path to the south (refer Fig. G), trapping runoff from a ~12ha catchment at a low point RL503m, between higher terrain and the waste dump haul road (which will form a barrier to flow). In the 1% AEP rainfall event, ponding is to ~1.5m deep (refer Fig. G). Some of the catchment could be diverted higher up, to direct some flow eastward, and reduce the impacting catchment area and subsequent ponding against the waste dump by 50%. In a short Life of Mine, this ponding is considered acceptable, noting a lower chance of a 1% AEP rainfall, and less ponding. The ponded water will dissipate by evaporation and infiltration.

Waste dumps need to be shaped to drain internally, with crest bunds to retain water on the top and reduce run-off and erosion down the batter faces. Where run-off from the dump sides can escape into the environment, then a capture bund should be installed at the toe of the dump to retain (sediment laden) dirty water runoff.

Processing Area

The road joining the Processing Area to the mining area runs downhill to the west. Natural flow paths up to 0.2m deep (1% AEP) across the road alignment. The lowest point in the road is adjacent to the Processing Area, where drainage would be directed across the road.

The area occupies about 50ha and lies across the general fall of the site cutting off natural drainage. Minor flow paths run through the area and in a 1% AEP rainfall event, there is a buildup of water (refer Fig. G). The Processing Area needs to be raised or bunded off, and minor diversion drains installed to direct water west around or through the area.

Closure

General

Mining is a temporary land use and rehabilitation need to be consistent with projected future land use (such as pastoralism and heritage conservation). The objective is to ensure an effective planning process is in place over the life of mine, so closure is achieved in an environmentally sustainable manner, and without unacceptable liability to the State (refer “Mine Closure Plan Guidance”, Department of Mines, Industry Regulation and Safety, 2020).

DMIRS MCP guidance includes desirable mine closure principles, such as no adverse impact on surface and groundwater hydrological patterns, water quality, water levels and water chemistry; and no long-term reduction in base flows and availability of water to meet local environmental values.

It is not proposed to backfill the pit as part of the closure plan. The pit and waste dump landforms will therefore remain after mine closure, while the rest of the site will be decommissioned. This includes removal of infrastructure, and rehabilitation of disturbed areas (including tanks, wastes, contaminated soil, compacted surfaces such as old roadways, site compounds, etc). The area is graded to direct surface water off site, into natural drainage paths, and leaving no water trapped upstream of final landforms.

Post closure surface water modelling results are shown in Figures I, J, K & L.

Waste Dump

Waste dumps can consist of unconsolidated, dispersive, and erodible materials, which when combined with steep and / or long slopes, result in a potential for erosion and sediment run-off. The main rehabilitation consideration is the projected land use and long-term stability of landforms - with visual amenity, erodibility, stability and dust management as the key drivers,

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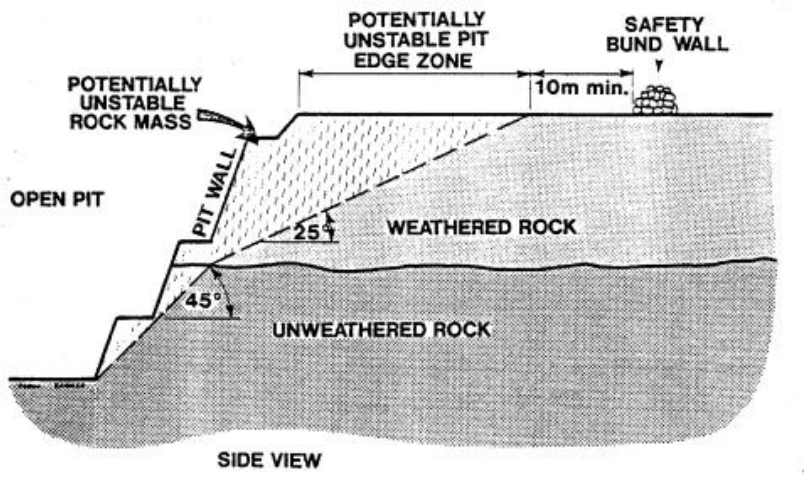
while biophysical appearance and vegetation (endemic plant communities that approximate the natural surrounds) a secondary driver.

Outer exposed surfaces should be provided with a rocky substate to prevent erosion on slopes (gullying, loss of surface material and vegetation). The waste dump surfaces may be designed to hold water on the top, to prevent it running down the sides, or include cross slope berm cell bunds to retain water on the dump sides.

However, externally surface water run-off is trapped against the northern side of the dump, up to 4.5m deep in a PMP event, and results in a loss of run-off volume downstream. It is largely impractical to construct an open excavated drain around the ends of the dump, to the east or west. Other options at closure include filling the impacting catchment area with waste, shaped to a finished free draining surface; or changing the final alignment of the northern edge to better follow natural surface contours, and allowing free surface drainage toward the west. At closure, the waste dump will be configured to prevent ponding against the toe.

Pit Abandonment Bund

As the pit will remain open at closure (i.e. will not be backfilled), the method generally preferred to minimise inadvertent public access involves the construction of an abandonment bund wall around the perimeter of the open pit void, 10m outside the area designated as being susceptible to wall collapse (refer "Safety Bund Walls Around Abandoned Open Pit Mines", DMIRS, Doc No: ZMA048HA, Dec. 1997). DMIRS (Figure 4) below defines pit wall stability, relating to walls excavated in unweathered or weathered rock, or both.



The bund is required to have minimum dimensions of 2m high, 5m base width. As the pit is located towards the top of a ridge line, there is no requirement for the abandonment bund to also act as a flood bund against external flooding. The bunds are subject to raindrop erosion and fresh competent rock, for example, is preferred, as this determines the long-term integrity of the structure (expected to remain functional for hundreds of years). Materials are best produced before excavation equipment is removed from the site, and final blasting provides a source of suitable unweathered material. Where oxide or weathered material only is available, a larger cross-sectional area of bund is required.

Road Train Haul Road

General

Ore is currently trucked with quad road trains 490 km from the Iron Ridge mine site to the Beringarra – Cue Road and then to Geraldton Port, via Cue and Mt Magnet. The new Beebyn-W11 mine site is 20 km east of the existing Iron Ridge mining operation, and a new bitumen (2-coat) sealed haul road is to be constructed to connect to the existing road. A number of flow paths cross the proposed road route.

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Design Flows

The catchments impacting the proposed road route are shown in Fig. M. The catchment boundaries and streamlines have been approximated with digital terrain modelling using SRTM (Shuttle Radar Topography Mission) data. Design flows for each estimated catchment are shown in Appendix.

Road Drainage

Road drainage provisions typically comprise pavement cross fall, table drains, floodways, culverts, and rock protection. The type of structure at waterway crossings is generally determined by the level of immunity from flooding that is required, and the time of closure acceptable due to over-road flooding. Floodways are level stretches of road at flood crossings, and are particularly suitable in flat or gently undulating terrain, where drainage patterns are less well defined. Due to the short life of mine, and relatively small catchments, floodways are considered suitable. Culverts may be included, particularly if required to maintain road geometry across the waterway. In sheet flow areas, upstream diversions (bunds) may be used to direct flows towards particular floodways in order to minimise the number of crossings.

The permissible trafficable depth of water through which the haul trucks may operate should be established, as a direct determinant of Average Annual Time of Closure / AATOC. The average closure times are typically small (hours) in small catchments, but may persist for longer than average, and become disruptive, in larger creeks. For a mine haul road, an acceptable “out of service time” (days per annum of road outage) can be based on internal risk analysis i.e. size of plant and port stockpiles.

Main Roads WA highways in the north are typically low formation roads, with a low level of flood immunity. The roads may be closed to traffic for some period (days) in most years, when water is deeper than 200mm (conventional vehicles) and 500mm (heavy vehicles). Subject to risk analysis, the haul road may similarly have a low level of flood design immunity.

It is noted that a single break in a long road will result in a failure of the whole system, and the true flood risk is higher than might otherwise be expected (common practice is to assess each individual waterway crossing in isolation and adopt that flood immunity as the flood immunity for the entire road).

Summary

Fenix propose a new mining operation at Beebyn-W11 deposit, ~20km east of the existing Iron Ridge mining operation.

The 1% AEP 24 hour rainfall in the area is estimated as 162mm, the 24 hour PMP is about 800mm. XP-RAFTS was used to estimated design flows.

Beebyn Creek has a catchment area of 225km² and flows past the site, but does not impact mine infrastructure. The mine generally lies near the top of a ridge and catchments and surface water flows impacting site infrastructure are relatively small.

Minor flow paths run through the site and the proposed pit, waste dump and processing area boundaries, and infrastructure in this area needs to be bunded off and stormwater diverted through or around as required, to prevent ponding. Diversion channels and bunds required are all minor. A standard pit bund will be sufficient to prevent surface water flows from entering the pit. Ponding against the northern side of the waste dump may occur, depending on the development and configuration of the waste dump, and in the operational phase, will be permitted to evaporate and infiltrate in situ.

A Road Train Haul Road is to be constructed to connect to the existing haul road. A number of flow paths cross the proposed road route, the impacting catchments are based on SRTM data, and design flows have been estimated for each catchment. Fenix is currently in the process of undertaking a lidar survey to a high level of accuracy for purposes of road and waterway design. Due to the short life of mine, and relatively small catchments, floodways (with culverts if required) are considered suitable. The length of floodways may be determined by the selected design flood event and permissible water depth.

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Adherence to surface water protection principles and implementation of environmental control measures is required to mitigate risk of erosion and sedimentation from construction and mining activities.

Mining is a temporary land use and after closure of the mine, the area requires rehabilitation consistent with future land uses, and not adversely impact surface and groundwater hydrological patterns and water quality. Waste dumps and sloping surfaces in particular need to be stabilised against erosion as a potential source of sediment.

Extreme rainfall in Beebyn Creek and over the mine site will cause shallow flooding around remnant mine infrastructure (pit abandonment bund and waste dump). The final abandonment bund and waste dump should be configured such that surface run-off is not trapped behind these landforms, but that the site retains free draining characteristics.

Kind Regards



Ella Robson

Senior Water Resource Engineer

erobson@pentiumwater.com.au

+61 8 6182 1790

Appendix: Road Train Haul Road Surface Water

- A new access Road Train Haul Road will connect to the Iron Ridge haul road to Geraldton
- Catchments (refer Fig. M) impacting the road route is based on SRTM topographical data
- For catchments (Ac measured in km²) less than 10km²:
    - 1% AEP flows may be estimated as 3.5 x $Ac^{0.9}$
    - <1% AEP flows may be estimated as 'K' x $Ac^{0.9}$. See Table 2
    - E.g. 10% AEP flow may be estimated by 1.11 x $Ac^{0.9}$
- Road route 20km long crosses some significant waterways
- The impacting catchments run-off from the ridgeline to the north, and total ~40km²
- There are 2 larger catchments >10 km², CS04 and CS09.

Table 2: Table of Annual Exceedance Probabilities versus Flood Flow Estimation

AEP	Fraction of 1% AEP flood flow	K (Q = K x Ac^0.9)
63.21%	0.03	0.11
50%	0.06	0.19
20%	0.18	0.64
10%	0.32	1.11
5%	0.48	1.69
2%	0.75	2.64
1%	1.00	3.50

Table 3: Peak Flows (m³/s) using Nominal Catchments (SRTM) (Fig. M)

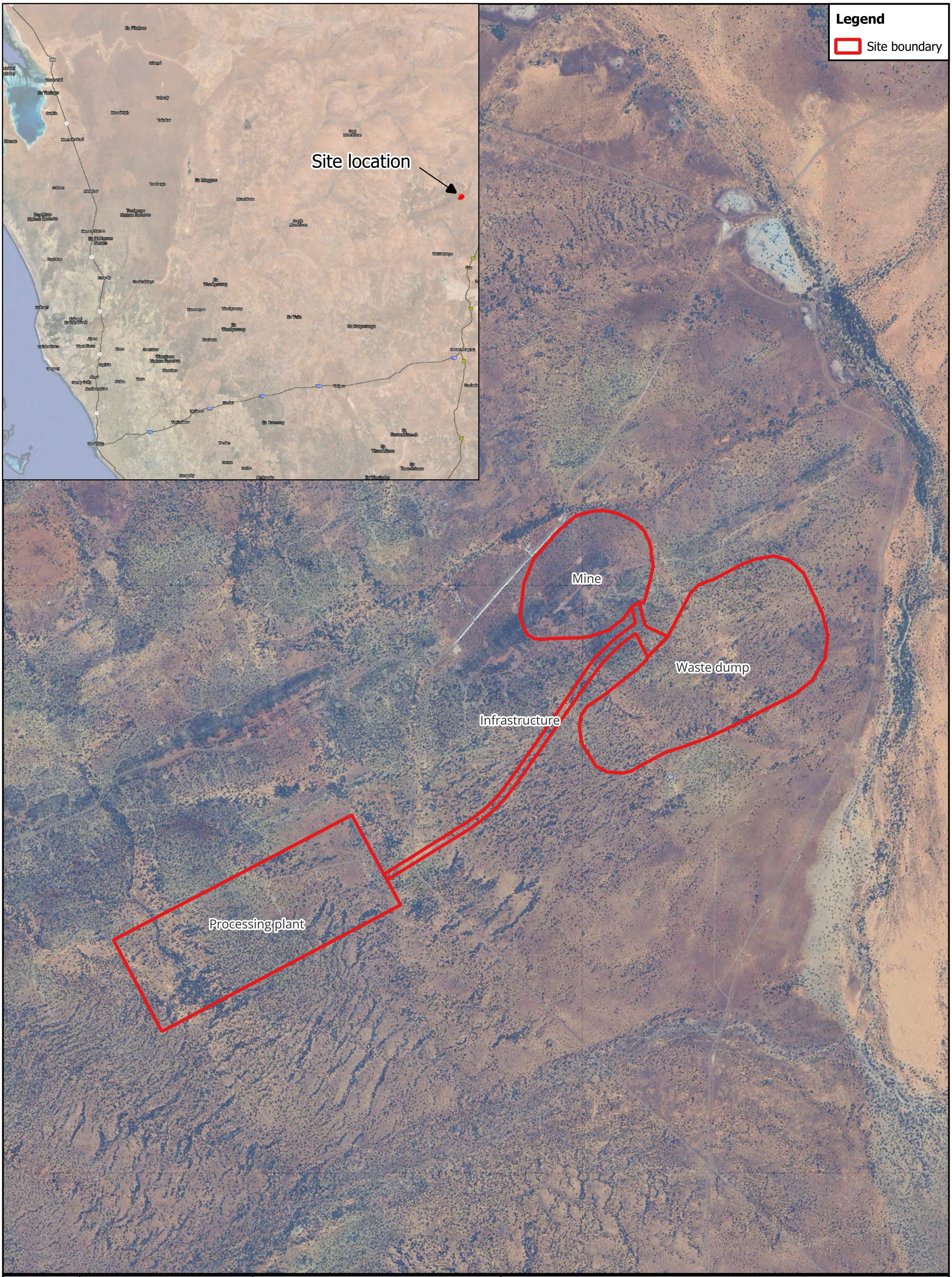
Catchment		Annual Exceedance Probabilities (AEP)						
ID	Ac (km²)	63.2%	50%	20%	10%	5%	2%	1%
CS_01	0.46	0.1	0.1	0.3	0.5	0.8	1.3	1.7
CS_02	2.33	0.2	0.4	1.4	2.4	3.6	5.6	7.5
CS_03	0.17	0.0	0.0	0.1	0.2	0.3	0.5	0.7
CS_04	14.29	0.9	1.5	5.2	8.9	14	21	28
CS_05	4.09	0.4	0.7	2.3	3.9	6.0	9.4	12.5
CS_06	2.55	0.2	0.4	1.5	2.6	3.9	6.1	8.1
CS_07	7.26	0.6	1.1	3.8	6.6	10.0	15.7	20.9
CS_08	0.17	0.0	0.0	0.1	0.2	0.3	0.5	0.7
CS_09	21.42	1.2	2.2	7.3	13	19	30	40
CS_10	1.84	0.2	0.3	1.1	1.9	2.9	4.6	6.1
CS_11	0.80	0.1	0.2	0.5	0.9	1.4	2.2	2.9
CS_12	0.54	0.1	0.1	0.4	0.6	1.0	1.5	2.0
CS_13	5.45	0.5	0.9	3.0	5.1	7.8	12.1	16.2
CS_14	4.80	0.4	0.8	2.6	4.5	6.9	10.8	14.4
CS_15	0.30	0.0	0.1	0.2	0.4	0.6	0.9	1.2
CS_16	1.11	0.1	0.2	0.7	1.2	1.9	2.9	3.9
CS_17	1.17	0.1	0.2	0.7	1.3	1.9	3.0	4.0
CS_18	0.80	0.1	0.2	0.5	0.9	1.4	2.1	2.9

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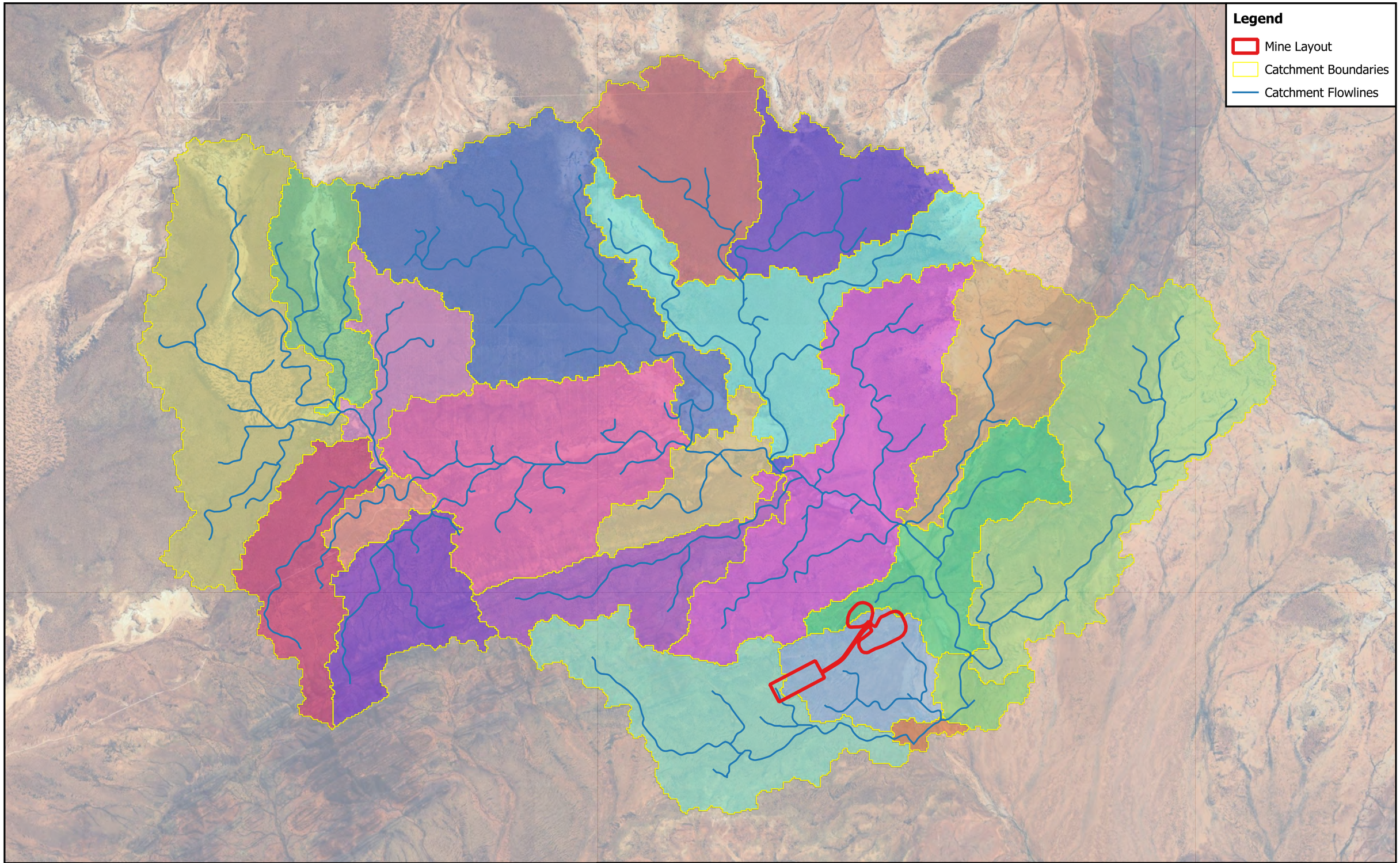
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GDA94 / MGA zone 50

Figure A

Beebyn W11 Mine - Site location



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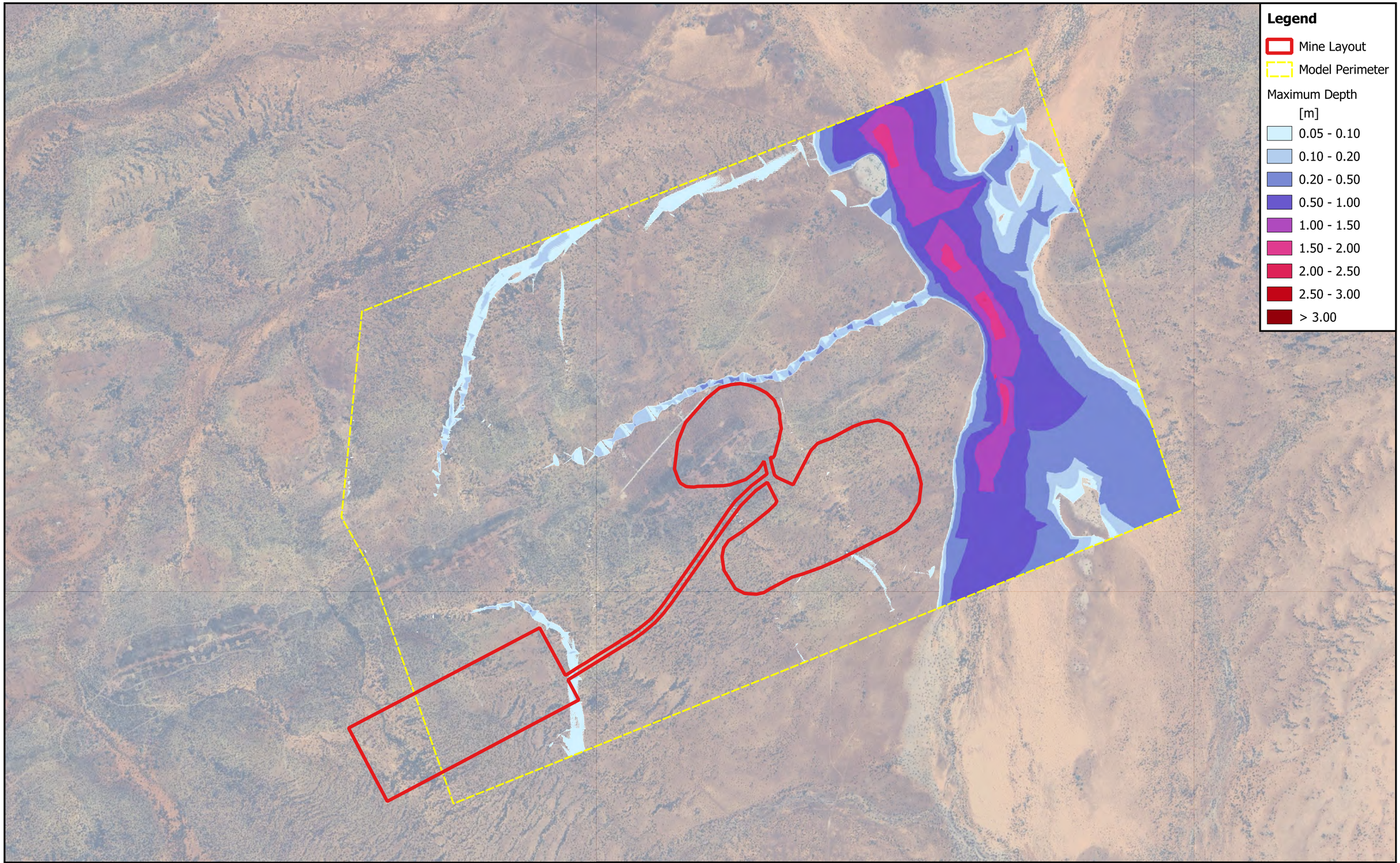
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GDA94 / MGA zone 50

Figure B

Beebyn W11 Mine - Catchments



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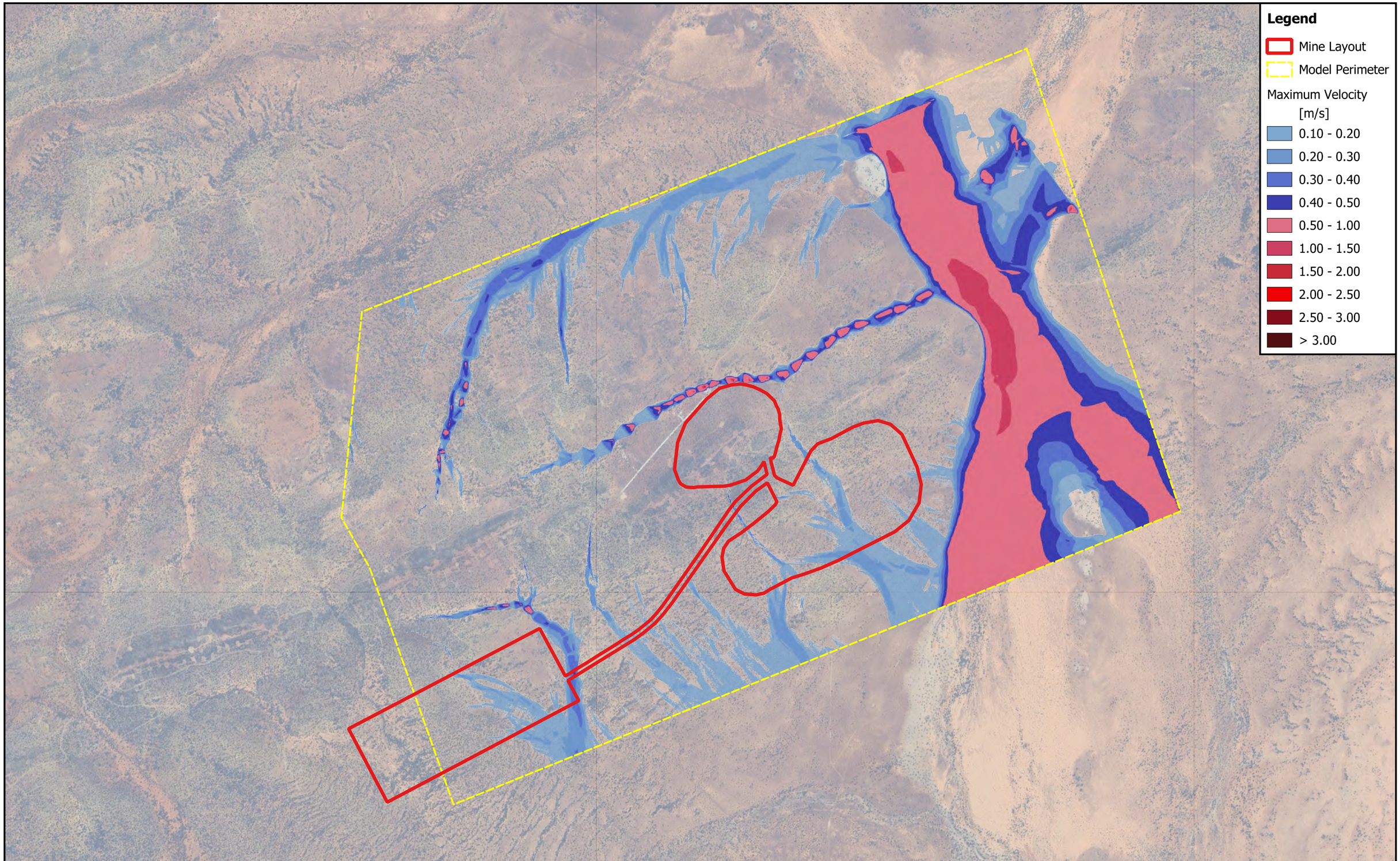
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure C

Beebyn W11 Mine - Beebyn Creek Pre-development
Maximum Depth - 1% AEP - 36 hr



PENTIUM WATER

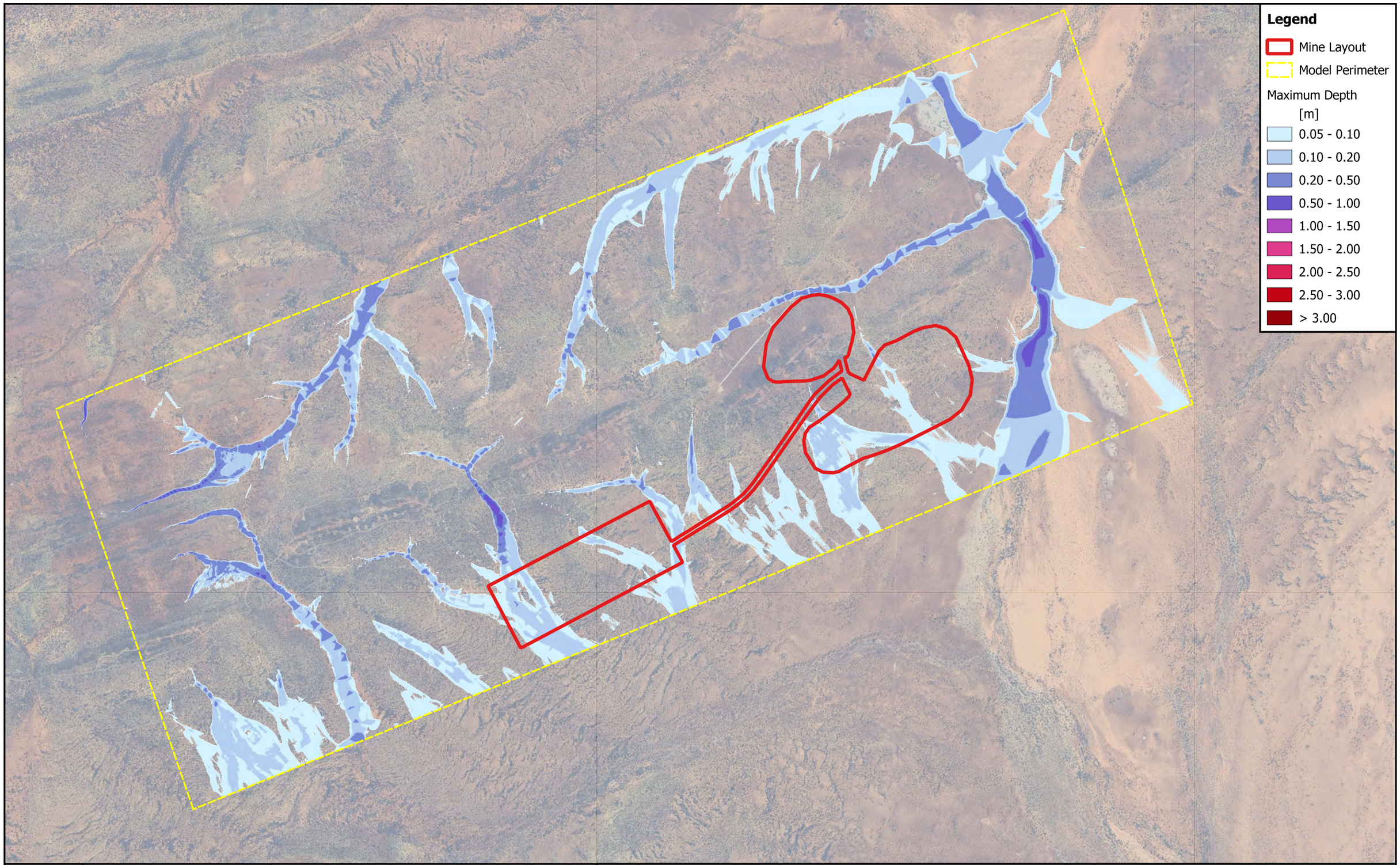
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure D

Beebyn W11 Mine - Beebyn Creek Pre-development
Maximum Velocity - 1% AEP - 36 hr



PENTIUM WATER

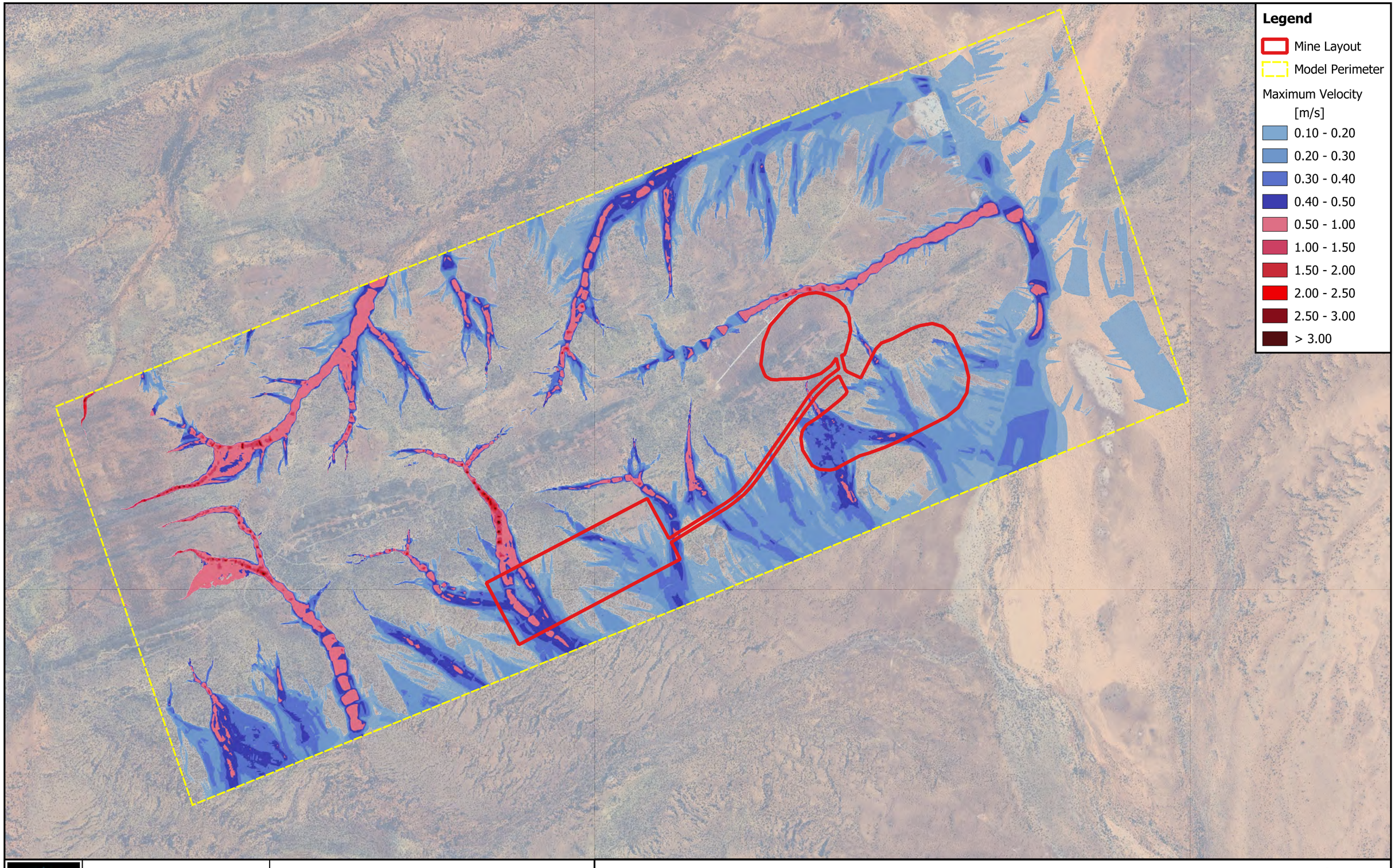
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure E

Beebyn W11 Mine - Mine Site Pre-Development
Maximum Depth - 1% AEP - 4.5 hr



PENTIUM WATER

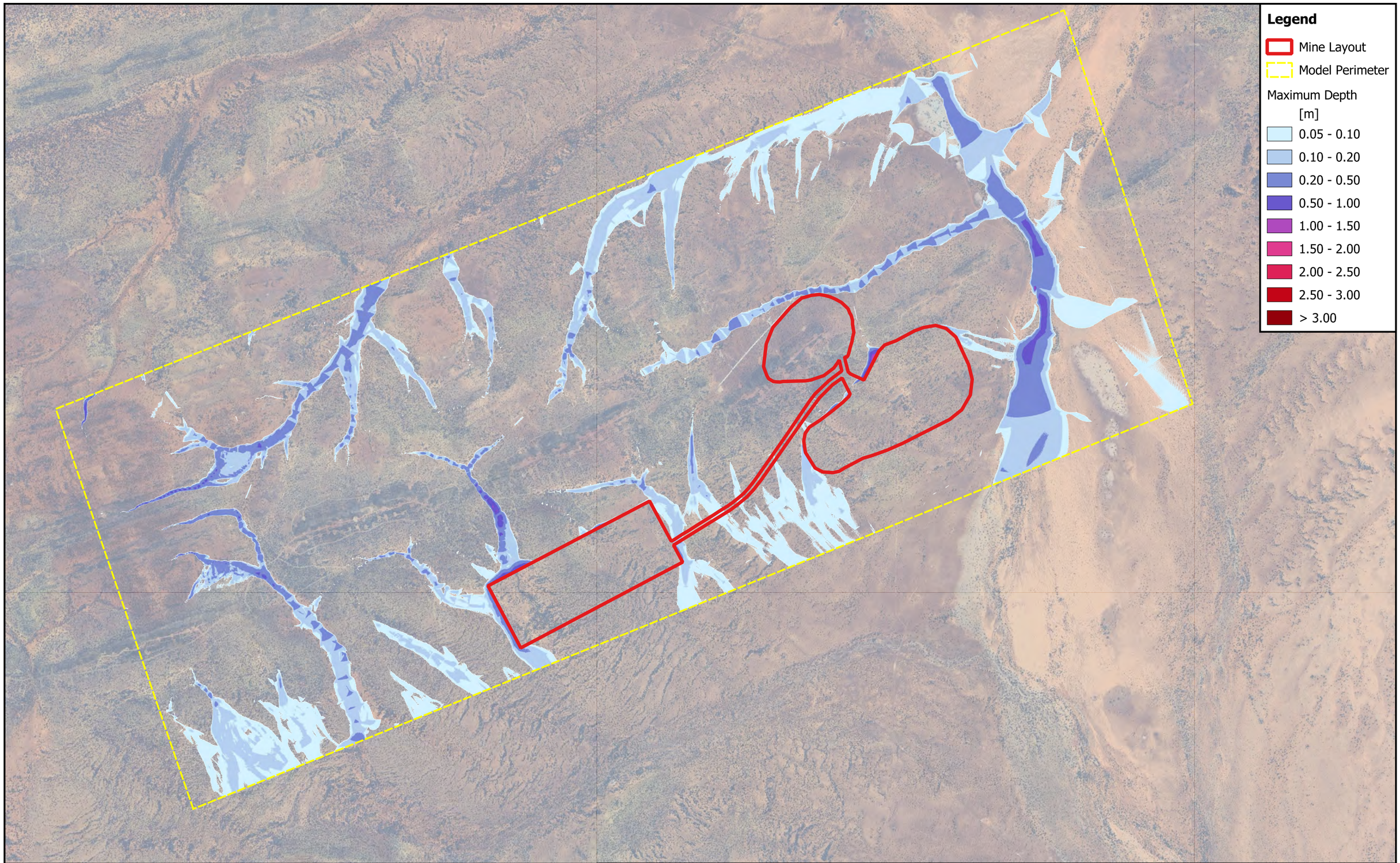
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure F

Beebyn W11 Mine - Mine Site Pre-Development
Maximum Velocity - 1% AEP - 4.5 hr



PENTIUM WATER

Project code:
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure G

Beebyn W11 Mine - Mine Site Post-Development
Maximum Depth - 1% AEP - 4.5 hr



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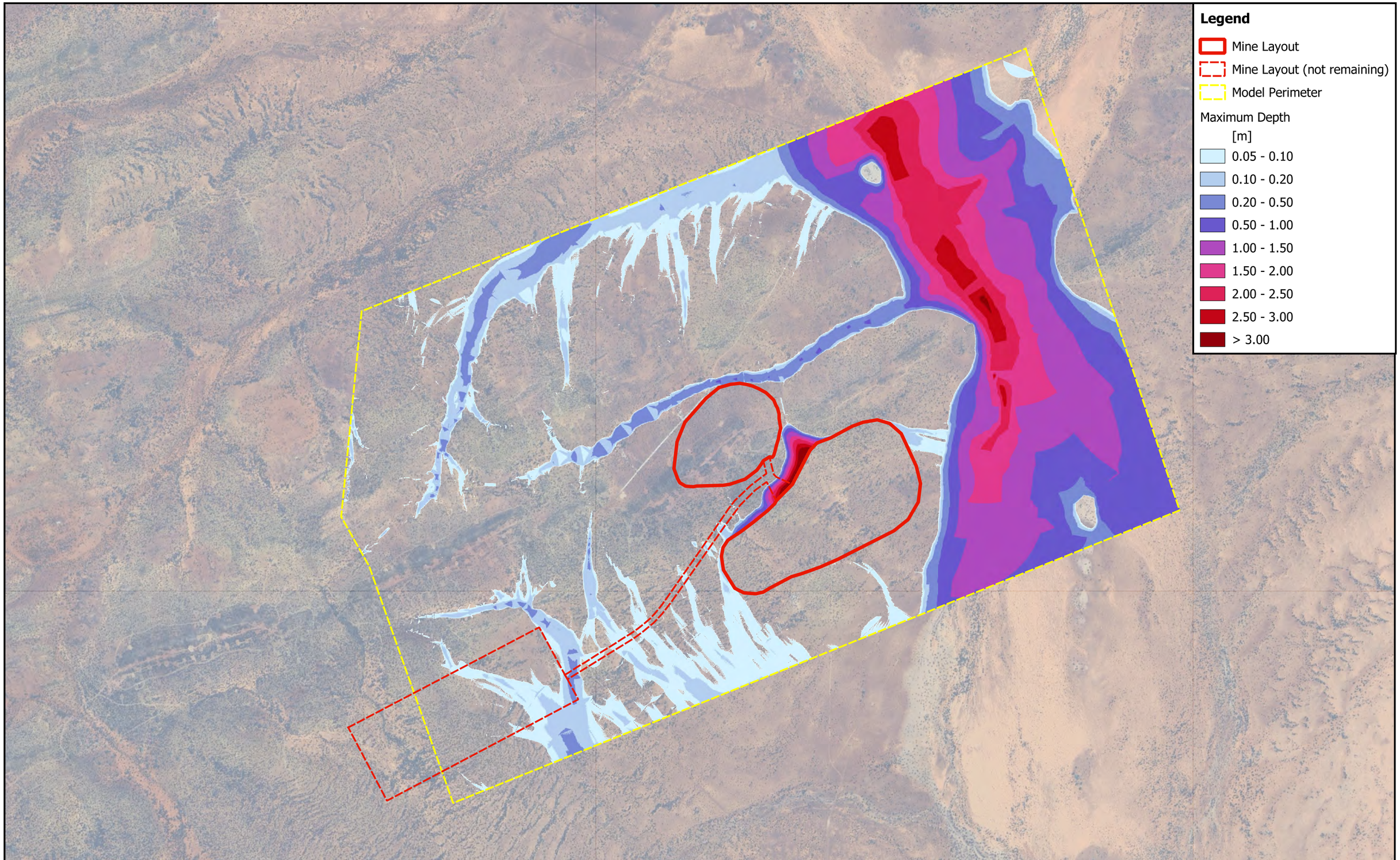
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure H

Beebyn W11 Mine - Mine Site Post-Ddevelopment
Maximum Velocity - 1% AEP - 4.5 hr



PENTIUM WATER

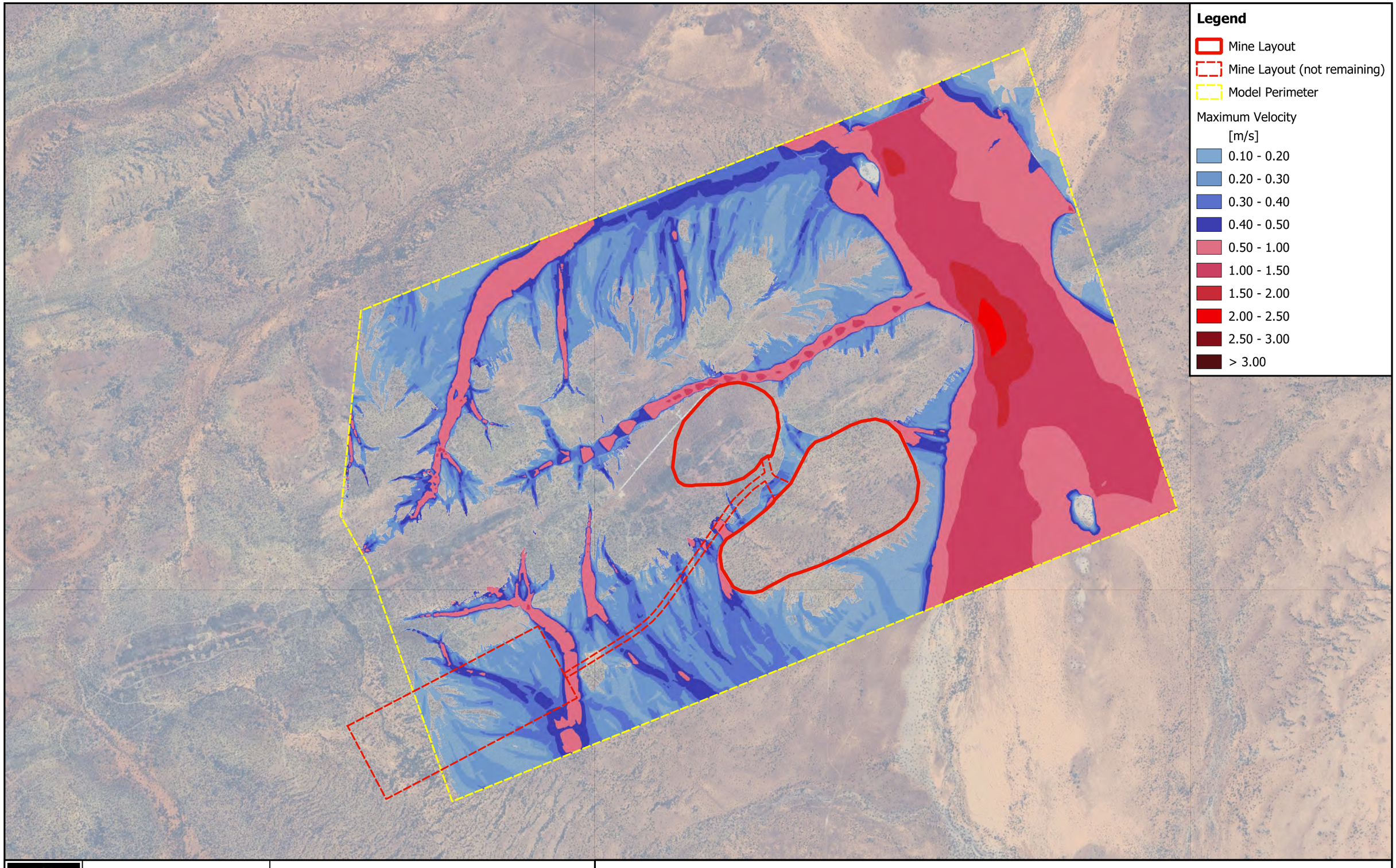
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Sources: data.gov.au, DWER, landgate

0 0.75 1.5 km

GDA94 / MGA zone 50

Figure I

Beebyn W11 Mine - Beebyn Creek Closure
Maximum Depth - PMF - 36 hr



PENTIUM WATER

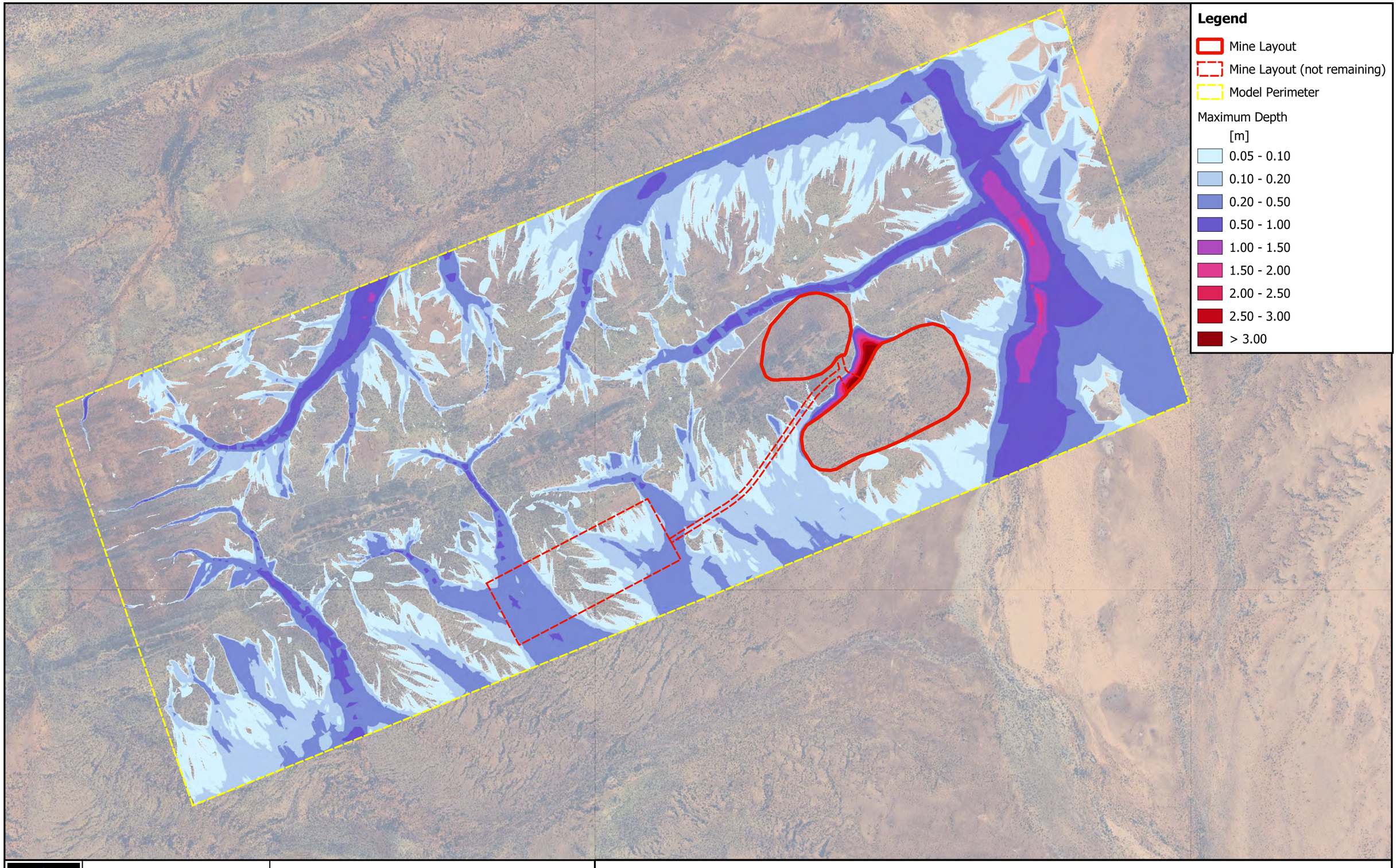
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0 0.75 1.5 km

GDA94 / MGA zone 50

Figure J

Beebyn W11 Mine - Beebyn Creek Closure
Maximum Velocity - PMF - 36 hr



PENTIUM WATER

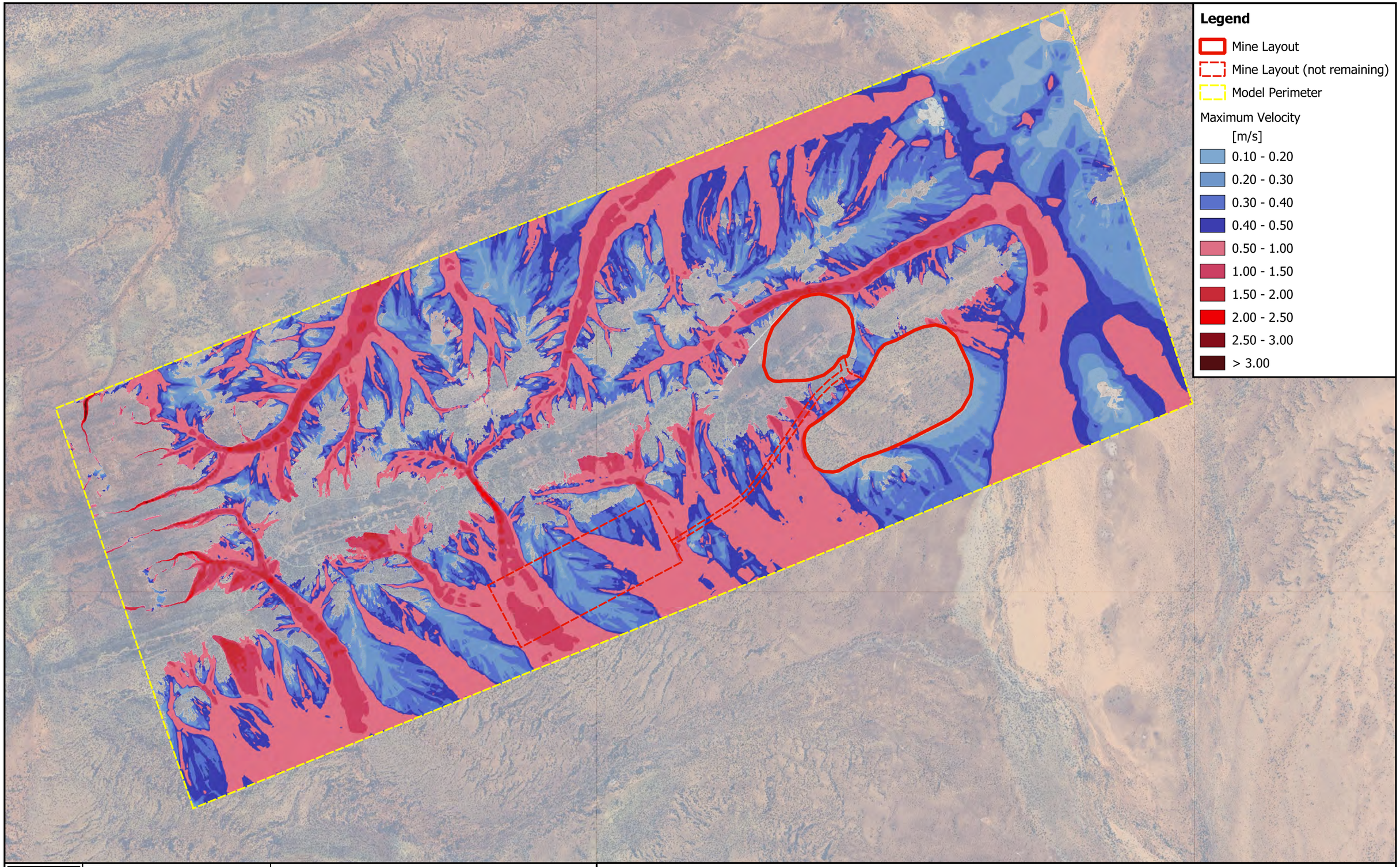
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Sources: data.gov.au, DWER, landgate

0 0.75 1.5 km

GDA94 / MGA zone 50

Figure K

Beebyn W11 Mine - Mine Site Closure
Maximum Depth - PMF - 4.5 hr



PENTIUM WATER

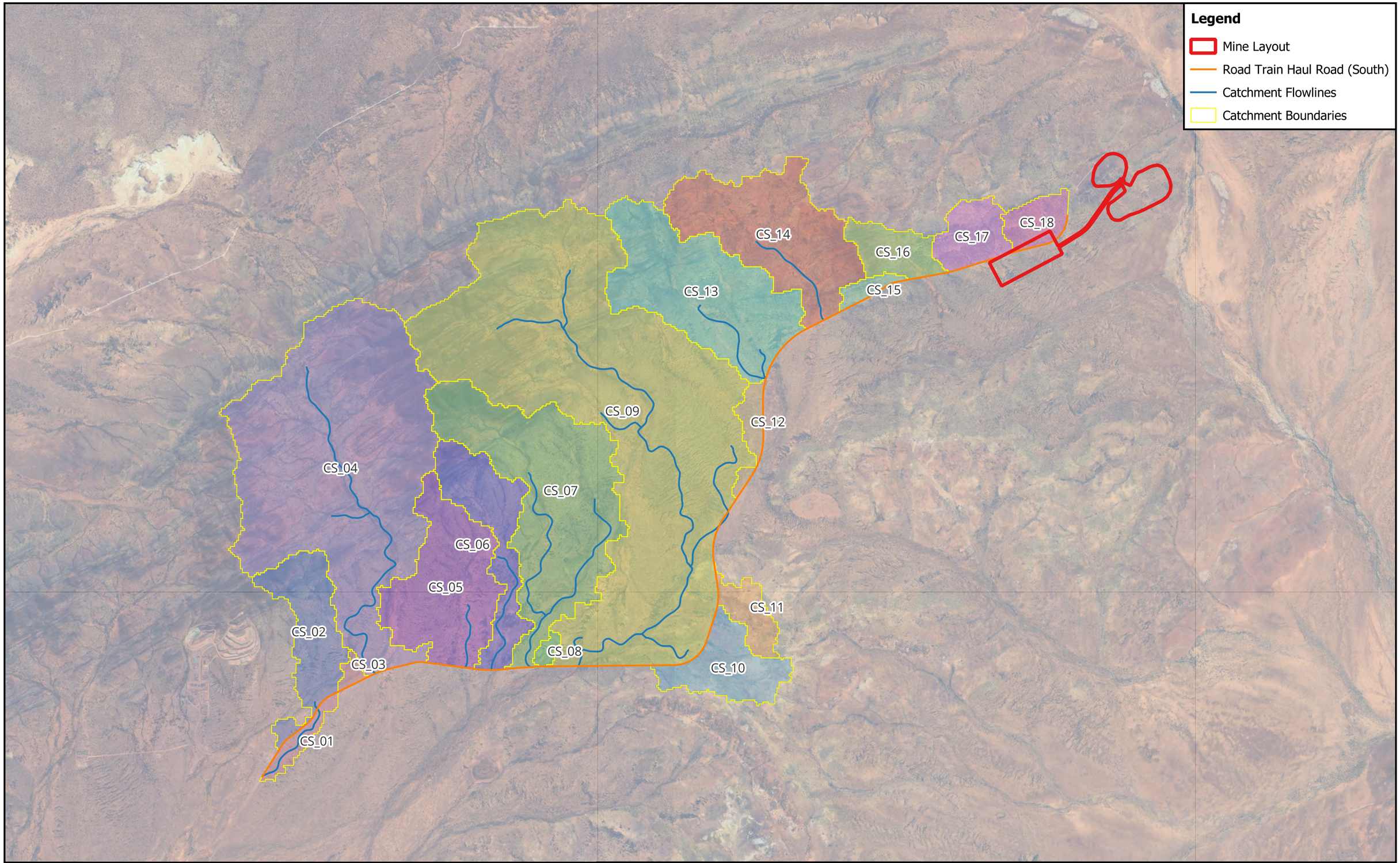
Project code:
Drawn by: Joost Hollander
Date: 01/05/2024
Scale: 1:22500
Page size: A3
Sources: data.gov.au, DWER, landgate

0 0.75 1.5 km

GDA94 / MGA zone 50

Figure L

Beebyn W11 Mine - Mine Site Closure
Maximum Velocity - PMF - 4.5 hr



PENTIUM WATER

Project code:
Drawn by: Joost Hollander
Date: 06/05/2024
Scale: 1:60000
Page size: A3
Sources: data.gov.au, DWER, landgate

0 1 2 km

GDA94 / MGA zone 50

Figure M

Beebyn W11 Mine - Road Train Haul Road

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ATTACHMENT 2

PROOF OF OWNERSHIP FOR L20/92

Government of Western Australia
Department of Mines, Industry Regulation and Safety

eMiTS MINERAL TITLES ONLINE

MINING TENEMENT SUMMARY REPORT

MISCELLANEOUS LICENCE 20/92

Status: Pending

TENEMENT SUMMARY

Area: 620.00000 HA
Death Reason :
Mark Out : N/A
Death Date :
Received : 15/03/2024 08:41:55
Commence :
Term Granted :

CURRENT HOLDER DETAILS

Name and Address
FENIX BEEBYN PTY LTD
MCMAHON MINING TITLE SERVICES PTY LTD, C/- MCMAHON MINING TITLE SERVICES PTY LTD, PO BOX 6301, EAST PERTH, WA, 6892, xxxx@mmts.net.au, xxxxx997

DESCRIPTION

Locality: KYARRA
Datum: Datum situated at GDA co-ordinates in zone 50
7,017,633.549 mN 568,791.721 mE
Boundary: From Datum: 7,018,255.259 mN 569,401.687 mE
7,018,506.206 mN 569,570.841 mE 7,018,719.901 mN
569,913.355 mE 7,019,124.474 mN 570,827.338 mE
7,019,238.410 mN 571,318.153 mE 7,019,116.315 mN
572,436.901 mE 7,019,172.493 mN 573,754.573 mE
7,019,193.470 mN 575,723.265 mE 7,019,326.414 mN
575,978.977 mE 7,019,625.275 mN 576,095.878 mE
7,019,982.500 mN 576,206.843 mE 7,020,328.693 mN
576,198.582 mE 7,020,891.708 mN 576,130.778 mE
7,021,254.693 mN 576,192.216 mE 7,021,865.642 mN
576,542.359 mE 7,022,537.856 mN 576,941.913 mE
7,022,905.640 mN 576,984.361 mE 7,022,850.124 mN
577,484.715 mE 7,022,440.737 mN 577,434.169 mE
7,021,831.911 mN 577,119.246 mE 7,021,360.593 mN
576,807.663 mE 7,021,030.649 mN 576,648.464 mE
7,020,792.072 mN 576,634.108 mE 7,020,085.430 mN
576,719.983 mE 7,019,484.051 mN 576,575.583 mE
7,018,960.401 mN 576,323.562 mE 7,018,835.481 mN
576,177.436 mE 7,018,705.566 mN 575,853.417 mE
7,018,687.955 mN 575,199.792 mE 7,018,637.602 mN
573,010.252 mE 7,018,612.558 mN 572,476.528 mE
7,018,642.753 mN 572,193.358 mE 7,018,728.126 mN
571,313.787 mE 7,018,543.064 mN 570,680.145 mE
7,018,228.020 mN 570,047.082 mE 7,017,726.984 mN
569,602.560 mE 7,017,383.885 mN 569,225.192 mE
7,016,802.789 mN 568,826.562 mE 7,016,842.221 mN
568,575.560 mE 7,017,051.798 mN 568,467.917 mE
BACK TO DATUM

Area :	Type	Dealing No	Start Date	Area
	Applied For		15/03/2024	620.00000 HA

SHIRE DETAILS

Shire	Shire No	Start	End	Area

ATTACHMENT 3

LETTER OF CONSENT FOR M51/869

Department of Mines, Industry Regulation and Safety
Minerals House
100 Plain Street
East Perth WA 6004

20 March 2024

To whom it may concern,

LETTER OF AUTHORISATION – MINING LEASE M51/869

Pursuant to an agreement with Fenix Resources Ltd (Fenix) for mining rights over a section of Mining Lease M51/869, Sinosteel Midwest Corporation Ltd consents to Fenix applying for and operating under any approvals granted.

Should you have any questions regarding this authorisation, please contact Peter Jones by email at pjones@smcl.com.au.

Kind Regards,

Xiaoxuan Sun (David)
Managing Director

ATTACHMENT 4

AERIAL IMAGE OF THE SITE

Source:

Pnt	MGA_East	MGA_North
1	568467.92	7017051.80
2	568791.72	7017633.55
3	569401.69	7018255.26
4	569570.84	7018506.21
5	569913.35	7018719.90
6	570827.34	7019124.47
7	571318.15	7019238.41
8	572436.90	7019116.31
9	573754.57	7019172.49
10	575723.26	7019193.47
11	575978.98	7019326.41
12	576095.88	7019625.27
13	576206.84	7019982.50
14	576198.58	7020328.69
15	576130.78	7020891.71
16	576192.22	7021254.69
17	576542.36	7021865.64
18	576941.91	7022537.86
19	576960.24	7022696.69
20	576984.28	7022904.98
21	576981.69	7023194.37
22	576981.80	7023194.83
23	577027.35	7023538.23
24	577165.39	7023855.94
25	577408.85	7024144.65
26	577642.23	7024305.99
27	578852.51	7024951.76
28	580547.43	7025620.73
29	580331.85	7026169.64
30	580825.33	7026363.45
31	581065.77	7026240.54
32	581141.54	7026049.22

Pnt	MGA_East	MGA_North
33	581950.06	7026189.62
34	582357.62	7026384.54
35	582578.31	7026353.93
36	582676.57	7026419.98
37	582724.90	7026645.50
38	582628.25	7026709.94
39	582386.61	7026753.43
40	582204.54	7026917.14
41	582093.95	7027239.59
42	581978.96	7027537.20
43	582083.51	7027922.43
44	582387.88	7028441.86
45	583169.81	7028986.77
46	583537.75	7028460.97
47	582999.72	7028088.86
48	582825.74	7028066.30
49	582588.94	7027626.53
50	582519.07	7026971.55
51	582684.35	7026970.02
52	582722.86	7027063.71
53	582816.34	7027150.94
54	582817.53	7027327.03
55	582730.86	7027391.49
56	582706.87	7027470.10
57	582790.82	7027526.07
58	583230.90	7027625.59
59	584042.93	7027678.08
60	584300.76	7027728.29
61	584385.29	7027639.34
62	584318.43	7027142.74
63	584136.41	7026891.08
64	583774.42	7026700.89

Pnt	MGA_East	MGA_North
65	583535.18	7026604.79
66	583437.41	7026595.30
67	583318.08	7026461.14
68	581136.06	7025314.74
69	579115.70	7024521.25
70	577878.05	7023865.10
71	577656.25	7023684.66
72	577525.83	7023457.03
73	577481.79	7023198.40
74	577481.67	7023198.86
75	577484.95	7022833.52
76	577465.34	7022693.18
77	577434.17	7022440.74
78	577119.25	7021831.91
79	576807.66	7021360.59
80	576648.46	7021030.65
81	576634.11	7020792.07
82	576719.98	7020085.43
83	576575.58	7019484.05
84	576323.56	7018960.40
85	576177.44	7018835.48
86	575853.42	7018705.57
87	575199.79	7018687.96
88	573010.25	7018637.60
89	572476.53	7018612.56
90	572193.36	7018642.75
91	571313.79	7018728.13
92	570680.14	7018543.06
93	570047.08	7018228.02
94	569602.56	7017726.98
95	569225.19	7017383.88
96	568826.56	7016802.79
97	568575.56	7016842.22

565000 570000 575000 580000 585000

7025000

7020000

M 51/869-I

L 20/92

Notes
Development Envelope area 1297 ha

Legend
W11 Proposed Infrastructure
Tenements 06/04/2024
Proposed Development Envelope

N

0 2,000 m
Scale: 1:85,000
MGA94 (Zone 50)

Author: G. Seat, J. Shepherdson
Date: May 2024 | Rev: B | A4

Fenix Beebyn Pty Ltd.
Lv 33, 1 Spring St Perth, WA 6000
Head Office: + 61 (0)8 9226 2011
https://fenixresources.com.au

CAD Ref: a3028_Env_07_12_01
Drawn: CAD Resources
www.cadresources.com.au ~ Tel: (08) 9246 3242

Beebyn-W11 Iron Ore Deposit
Development Envelope