OB29, 30 & 35 EXPANSION AND NEWMAN SURPLUS WATER

RECONNAISSANCE FLORA & VEGETATION ASSESSMENT

PREPARED FOR: BHP WAIO

Spectrum ECOLOGY & SPATIAL

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EXECUTIVE SUMMARY

BHP Western Australian Iron Ore (BHP WAIO) engaged Spectrum Ecology & Spatial to undertake a single-season reconnaissance flora and vegetation survey covering the Orebody 29, 30, 35 and Newman surplus water expansions (hereafter referred to as the Survey Area). The Survey Area commences at Orebody 35 and extends in a general easterly direction to approximately 10 km north-east of Newman. The Survey Area covers an area of 5,223.65 ha. The project objective was to undertake a desktop assessment and single-season reconnaissance flora and vegetation survey to describe flora and vegetation values in the Survey Area.

The single-phase (post-wet season) reconnaissance flora and vegetation survey was undertaken over seven days from the 21st to the 27th of March 2024, following a period of higher than usual median rainfall for the region. During the survey, a total of 67 relevés and 75.6 km of targeted traverses were sampled.

A total of 197 taxa from 33 families and 95 genera were recorded from the Survey Area. Of the 197 taxa, nine were introduced, all of which are classified as permitted s11 weeds under the *Biosecurity and Agriculture Management Act 2007* (Government of Western Australia, 2007). The most species rich family was Poaceae with 47 species. The most species rich genera were *Acacia*, with 23 species, followed by *Eremophila* with 11 species.

No Threatened flora were recorded or considered likely to occur within the Survey Area. No range extensions were recorded. Two Priority Flora taxa were recorded within the Survey Area:

- Priority 2 (P2): *Ipomoea racemigera*
- Priority 3 (P3): *Eremophila naaykensii*

A total of nine vegetation types were described and mapped within the Survey Area. The majority of the Survey Area was mapped as *Triodia wiseana* and *Triodia vanleeuwenii* hummock grassland, with *Eucalyptus leucophloia* subsp. *leucophloia* open woodland and mixed tall Acacia open shrublands (H1), occurring on the upper slopes and at the crests of low hills. Clay plains were grouped into one vegetation type (CC1), and it resembles the Priority Ecological Community West Angelas Cracking-Clays (Environmental Protection Authority, 2016a) but lacked the cover and some of the characteristic species to define it. Vegetation type D2 was classed as a potential Groundwater Dependent Ecosystem (GDE) characterised by *Eucalyptus victrix* and *Eucalyptus camaldulensis*; these vegetation types are susceptible to impacts associated with changes in ground water or surface water flow. D3 appears to be the preferred habitat for *Eremophila naaykensii* (P3), which is not considered locally or regionally significant due to the relatively widespread distribution of the species. H3 has the most restricted extent in the Survey Area (13.04 ha; 0.25%) and may be considered regionally significant. P1 has a restricted extent at the Survey Area (56.76 ha; 1.09%). P1 is restricted to the Spearhole Land System which is limited in distribution across the Pilbara (132,535.2 ha) and Gascoyne (31,879.7 ha) and therefore, may be considered regionally significant.

The majority of the Survey Area was mapped as 'Good' (23.22%) and 'Excellent' (23.15%) condition. Most of the low-lying vegetation of the Survey Area was mapped as 'Good' with disturbances including moderate weed cover and some grazing evident. Areas mapped as 'Excellent' were recorded across the entire Survey Area and found to have no obvious disturbance. Areas mapped as Very Good (13.29%) included mostly the floodplains which have scattered weeds, low levels of grazing and low dust. Areas cleared of vegetation, including roads and infrastructure were mapped as 'Cleared / Completely Degraded' (38.79%).

1. INTRODUCTION

1.1. Project Background

BHP Western Australian Iron Ore BHP (WAIO) operates the Orebody (OB) 29, 30 and 35 mining area in the vicinity of Newman, in the Pilbara bioregion of Western Australia. BHP WAIO engaged Spectrum Ecology & Spatial (Spectrum) to undertake a single-season reconnaissance flora and vegetation survey covering the OB 29, 30, 35 and Newman surplus water expansions (hereafter referred to as the Survey Area). The Survey Area commences at OB35 and extends in a general easterly direction to approximately 10 km north-east of Newman, covering an area of 5,223.65 ha (Map 1.1). In addition, a desktop assessment was undertaken of the wider Study Area (Survey Area with a buffer of 50 km) (Map 1.1).

1.2. Project Scope

The project objective was to undertake a desktop assessment and single-phase reconnaissance and targeted flora and vegetation assessment of the Survey Area, in order to inform future environmental approvals.

1.3. Legislation & Guidelines

Flora in Western Australia is protected by various legislation, including:

- *Biodiversity Conservation Act 2016* (BC Act; Department of Biodiversity Conservation and Attractions, 2016);
- *Environmental Protection Act 1986* (EP Act; Western Australian Government, 1986); and
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act; Australian Government, 1999).

The survey was compliant with survey guidelines, as outlined in:

- EPA Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority, 2016a);
- EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2016b);
- Department of Biodiversity Conservation and Attractions (DBCA) Threatened and Priority Flora Report Form – Field Manual (Department of Biodiversity Conservation and Attractions, 2017b);
- National Vegetation Information System (NVIS) Australian Vegetation Attribute Manual (ESCAVI, 2003);
- BHP WAIO's Biological Survey Spatial Data Requirements (SPR-IEN-EMS-015); and
- BHP WAIO's Vegetation and Flora Survey Procedure (0124627).

Map 1.1. Survey Area Location

1.4. Bioregion

The Interim Biogeographic Regionalisation for Australia (IBRA) classified Australia into regions based on the dominant landscape, climate, lithology, geology, landform, and vegetation (Thackway and Cresswell, 1995).

The Survey Area is mostly located within the Pilbara IBRA bioregion (76.3%), which is divided into four sub-regions: Chichester, Fortescue Plains, Hamersley, and Roebourne. The Survey Area is located in the Hamersley subregion. The Survey Area briefly crosses into the Augustus subregion of the Gascoyne IBRA bioregion (23.7%). The Hamersley subregion is characterised as being a mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by basalt, shale and dolerite gorges (Kendrick, 2001a; McKenzie, May and McKenna, 2003). The valley floors of this subregion support low mulga woodland over bunch grasses on fine textured soils, and ranges have *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils (Kendrick, 2001a; McKenzie, May and McKenna, 2003). The Augustus subregion is the northern section of the Gascoyne and is described as rugged, low Proterozoic sedimentary and granite ranges divided by broad, flat valleys (Kendrick, 2001b).

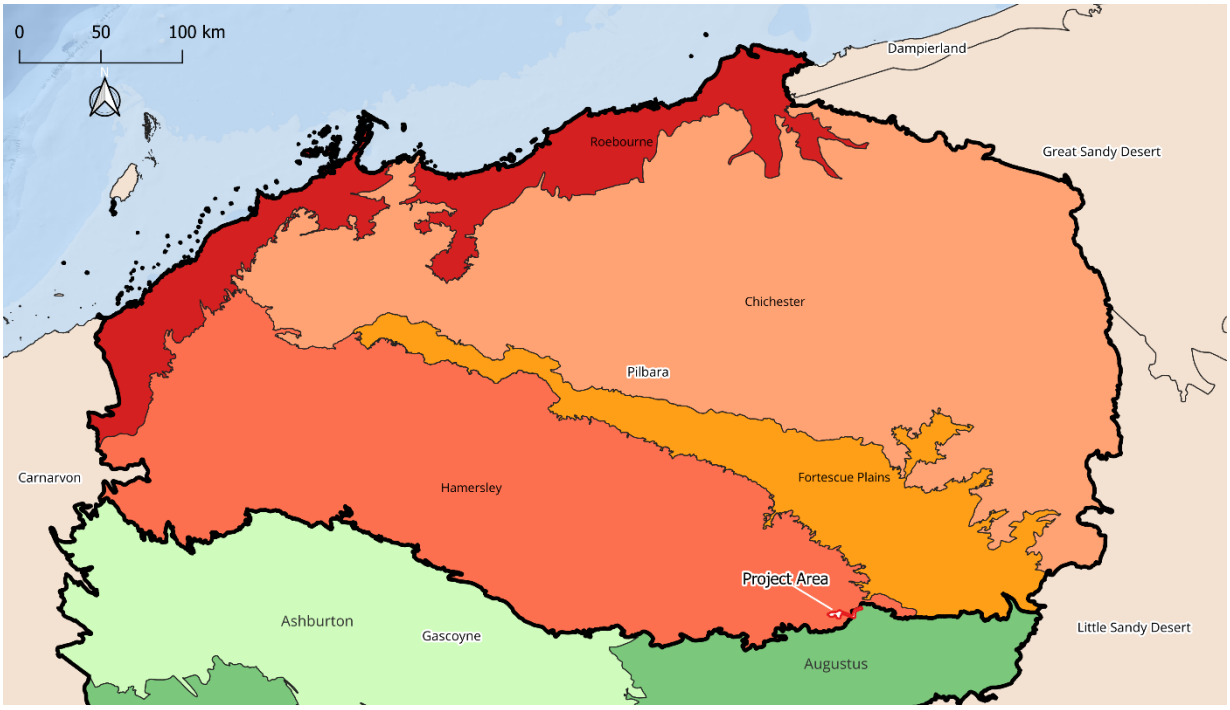


Figure 1.1: IBRA Classification

1.5. Climate

The climate of the Pilbara bioregion is classified as tropical, arid to semi-arid, with a median annual rainfall of 300 mm. Rainfall for the region can be variable, falling mainly in summer cyclonic events from December to February (Thackway and Cresswell, 1995)

Two broad climatic zones occur across the Pilbara region. Semi-desert tropical climatic conditions occur in coastal areas, as well as some higher-rainfall inland areas, which experience 9-11 months of dry weather, with hot humid summers and warm winters. Dry desert climatic conditions occur across the remaining inland areas, which typically experience higher temperatures and lower rainfall, with hot dry summers and mild winters with up to 12 months of dry weather (Leighton, 2004). The Survey Area is located within the dry inland area.

Annual rainfall is highly variable, but generally follows an inland to coastal and southern to northern increasing trend (Leighton, 2004). The driest months are in spring (September to October) with tropical cyclones and local thunderstorms producing much of the summer and early autumn rainfall (Mckenzie, Van Leeuwen and Pinder, 2009). Winter rainfall is also highly variable, generally decreasing from the coast through to inland areas (Leighton, 2004).

Monthly maximum temperatures in the Pilbara region range from an average of 25°C in July to 37°C in January, while minimum temperatures range between 12°C in July and 25°C in January (Mckenzie, Van Leeuwen and Pinder, 2009). Newman Airport (# 007176) recorded monthly average maximum temperatures ranging from 23.1°C in June to 39.4°C in December, while average minimum temperatures range between 6.5°C in July and 25.1°C in January (Bureau of Meteorology, 2024)

According to the Köppen-Geiger climate classification, the Survey Area has a hot desert climate (Class BWh) (Peel, Finlayson and McMahon, 2007). This classification includes arid regions where annual evaporation exceeds annual precipitation and have a mean annual temperature ≥18°C.

1.6. Disturbance History

The dominant current and historical land uses across the Pilbara region involves grazing of native pasture, conservation, crown reserves, mining leases, and Aboriginal lands and reserves. Historically pastoralism has been the most significant land use within the Pilbara. Since the 1960's mining, predominantly iron ore, has become a significant land use with much of the Pilbara now under mining tenure (Kendrick, 2001b).

1.7. Geology

The geology of Western Australia has been mapped at a scale of 1:50,000, 1:100,000,1:250,000, and 1:500,000. The Survey Area occurs in the central west of the 1:500,000 scale geological mapping (Department of Energy, Mines, Industry, Regulation and Safety (DEMIRS), 2024), which is the finest-scale digital mapping available for the area mapped to the state extent.

Six units were mapped within the Survey Area; none of the geological units have over 1.0% of their total extent within the Survey Area and none of the geological units appear to be restricted. The units are listed in Table 1.1 and mapped on Map 1.2.

Table 1.1: Surface Geology

Unit Code	Landform	Description	Area in Survey Area (ha)	% of Survey Area	Total WA Extent (ha)	Total Pilbara Extent (ha)	% of Pilbara Extent Within Survey Area	Total Gascoyne Extent (ha)	% of Gascoyne Extent Within Survey Area
A-PIP	Alluvial/fluvial unit	Clay, silt, sand, and gravel in channels and on floodplains	2,108.0	40.4	2,147,172.5	689,834.7	0.3	1,428,532.3	0.2
X-PIP	Exposed unit	Exposed bedrock	2,093.2	40.1	14,351,073.7	8,412,613.3	<0.1	5,480,323.2	<0.1
C-PIP	Colluvial unit	Colluvium derived from different rock types; includes gravel, sand, silt and clay	502.3	9.5	2,737,565.2	1,218,679.9	<0.1	1,455,973.9	<0.1
Rr-k-PIP	Residual or relict unit	Calcrete duricrust (residual or relict)	427.3	8.2	148,229.4	59,908.7	0.7	73,322.0	0.6
Aa-PIP	Alluvial/fluvial unit	Sand- or clay-rich alluvium on alluvial plain	91.4	1.8	942,921.3	356,816.6	<0.1	5,845,23.6	<0.1
Ed-PIP	Eolian unit	Eolian sand, silt and clay in dunefield	1.5	<0.1	139,691.3	75,473.7	-	56,449.3	<0.1

Map 1.2: Surface Geology

1.8. Pre-European Vegetation Association Mapping

Pre-European vegetation mapping was originally undertaken by Beard at various scales across the state and has since been updated to be consistent with the NVIS descriptions at a scale of 1:250,000 (Department of Primary Industries and Regional Development, 2019). State-wide vegetation statistics are available from 2018 for these associations which lists pre-European extent, current extent, area in DBCA managed lands and is a useful tool to determine if a vegetation association is rare or otherwise significant (Department of Biodiversity Conservation and Attractions, 2019a).

Three Beard vegetation associations (BVAs) have been mapped within the Survey Area (Table 1.2; Map 1.3). The most common was BVA82, which was mapped as 61.9% of the Survey Area. The remaining two BVAs covered less than 40% of the Survey Area. None of the BVAs appear restricted in the Pilbara, Gascoyne or in Western Australia. Over 99% of the pre-European vegetation extent remains for all BVAs.

Table 1.2: Beard Vegetation Associations

BVA	NVIS Level V Description	Area in Survey Area (ha)	% of Survey Area	Pre-European Extent WA (ha)	Current Extent WA (ha)	Current Pilbara Region Extent WA (ha)	Current Gascoyne Region Extent WA (ha)	% Remaining	% of Current WA Extent in Survey Area	% Current Pilbara Extent in Survey Area	% Current Gascoyne Extent in Survey Area
18	Mulga *Acacia aneura* and associated species.	693.8	13.3	580,556.0	575,851.6	575,807.9	43.8	99.2	0.1	0.1	<0.1
29	Mulga *Acacia aneura* and associated species.	1,295.6	24.8	3,530,311.5	3,529,439.9	902,864.4	785,062.7	100.0	<0.1	0.1	0.2
82	Hummock grassland with scattered bloodwoods & snappy gum *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*.	3,234.3	61.9	2,169,996.6	2,157,841.5	2,156,547.0	1,294.5	99.4	0.2	0.2	<0.1

Map 1.3: Beard Vegetation Associations

1.1. Land Systems

The land systems of Western Australia have been mapped at a scale of 1:250,000 (DAFWA 2016).

Seven land systems were mapped across the Survey Area, one of which - the Elimunna land system, was dominant covering 32.2% of the Survey Area (Table 1.3, Map 1.4). Other large areas of the Newman land system (21.0%) and Rocklea land system (16.5%) were also widespread in the Survey Area. Approximately 14.4% of the total Survey Area did not have a land system allocated as this area is comprised of the Mt Whaleback Mine pit which has been excavated since the 1960's, prior to the original rangeland surveys. All land systems are well represented in the region with the Survey Area covering less than 2.5% of the land systems extent in WA (Table 1.3).

Table 1.3: Land Systems

Description	Area in Survey Area (ha)	% of Survey Area	Total WA Extent (ha)	% Of Total Extent Within Survey Area	Total Pilbara Extent (ha)	% of Pilbara Extent Within Survey Area	Total Gascoyne Extent (ha)	% of Gascoyne Extent Within Survey Area
Elimunna Land System: Stony plains on basalt supporting sparse *Acacia* and *Cassia* (*Senna*) shrublands and patchy tussock grasslands.	1,682.8	32.2	65,547.8	2.5	62,850.5	1.3	2,697.2	31.8
Newman Land System: Rugged jaspilite plateau, ridges and mountains supporting hard spinifex grasslands.	1,099.0	21.0	2,000,360.5	<0.1	1,994,338.7	0.1	6,021.1	0.9
Rocklea Land System: Basalt hills, plateau, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	861.4	16.5	2,891,992.4	<0.1	2,880,023.5	<0.1	7,109.5	0.1
River Land System: Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of Acacias and fringing communities of Eucalypts sometimes with tussock grasses or spinifex.	338.2	6.5	595,308.2	<0.1	481,994.1	<0.1	73,008.4	0.2
Boolgeeda Land System: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	210.2	4.0	999,835.4	<0.1	961,847.5	<0.1	37,021.7	<0.1
McKay Land System: Hills, ridges, plateau remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with Acacias and occasional Eucalypts.	175.3	3.4	427,291.1	<0.1	425,967.1	<0.1	1,323.9	6.9
Spearhole Land System: Gently undulating gravelly hardpan plains and dissected slopes supporting groved mulga shrublands and hard spinifex.	104.3	2.0	164,414.9	<0.1	132,535.2	<0.1	31,879.7	0.3
Cleared	752.5	14.4	-	-	-	-	-	-

Map 1.4: Land Systems

1.2. Significant Lands

Twenty significant lands are located in the desktop Study Area (within 50 km of the Survey Area). These are listed in Table 1.4 and displayed on Map 1.5 and are described in the following sections.

Table 1.4: Environmentally Significant Areas within the Study Area

Reserve Name (Protected Area ID)	Distance from Survey Area (km)
Conservation Estate	
None	Not Applicable
TECs/PECs	
Ethel Gorge aquifer stygobiont community (Critically Endangered)	0 km
Vegetation of sand dunes of the Hamersley Range/Fortescue Valley (P3)	31 km N
Coolibah - Lignum Flats: sub-type 1: Coolibah and mulga woodland over lignum and tussock grasses on clay plains (Coondewanna and Wanamunna flats and Mt Bruce Flats) (P3)	37 km NW
Kumina Land System (P3)	45 km NW
West Angelas Cracking-Clays (P1)	49 km W
Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region (P2)	50 km NW
Environmentally Sensitive Areas (ESAs)	
Ethel Gorge (ESA 10169)	0 km
Various ESAs (Threatened flora) within 50 km	2.7 - 46 km NE
Wetlands	
Lake Disappointment (Savoury Creek) System	38 km SE

1.2.1. 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 generally managed by the DBCA to protect Western Australia's biodiversity and includes national parks, Nature Reserves, Conservation Reserves, and other areas managed primarily for biodiversity conservation (Department of the Environment and Energy, 2016). No Conservation Reserves occur within the desktop Study Area. (Table 1.4; Map 1.1). The nearest gazetted Conservation Reserve to the Survey Area is Karijini National Park, which is approximately 110 km to the north-west.

1.2.2. Environmentally Sensitive Areas

Environmentally Sensitive Areas are defined by the Department of Water and Environmental Regulation (Department of Water and Environmental Regulation, 2019) as:

- A defined wetland and the area within 50 m of a wetland;
- The area covered by vegetation within 50 m of Threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the Threatened flora is located;
- The area covered by a Threatened Ecological Community (TEC);
- A Bush Forever site;
- Areas covered by the Gnangara Mound Crown Land Policy and Western Swamp Tortoise Policy; and
- Areas covered by lakes, wetlands, and fringing vegetation of the Swan Coastal Plain Lakes Policy, including South-west Agricultural Zone Wetlands Policy and Swan and Canning Rivers Policy.

There is one ESA located within the Survey Area; Ethel Gorge (Table 1.4; Map 1.5).

1.2.3. Australian Wetlands Database

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 (Department of the Environment and Energy, 2019).

Nationally significant wetlands, including Ramsar wetlands, were mapped within the desktop Study Area. The closest wetland of national significance is the Lake Disappointment (Savoury Creek) System which is located approximately 38 km to the south-east (Table 1.4).

Map 1.5. Desktop Assessment: Significant Lands

2. METHODS

2.1. Desktop Assessment

A desktop review of relevant and available biological data sources of the desktop Study Area was undertaken prior to the field survey, to assess the flora and vegetation likely to occur across the Survey Area. The desktop Study Area includes a buffer of approximately 50 km surrounding the Survey Area, or as listed in Table 2.1, and displayed on Map 1.5.

2.1.1. Biological Database Searches

The following databases were searched and incorporated into the desktop assessment (Table 2.1).

Table 2.1: Summary of Database Searches

Data Source	Custodian	Details	Buffer
Commonwealth Protected Matters Search Tool	Department of the Environment and Energy (DoEE)	Date: 31/01/2024	50 km
Dandjoo	Department of Parks and Wildlife / Western Australian Museum (WAM)	Date: 31/01/2024	<1 km
DBCA Threatened & Priority Flora Databases (TPFL / WA Herbarium)	DBCA	Date: 8/11/2023 Reference: 17-1123FL	50 km
DBCA Communities Database	DBCA	Date: 8/11/2023 Reference: 10-1123EC	50 km
Index of Biodiversity Surveys and Assessments (IBSA) Database	Department of Water and Environmental Regulation (DWER)	Date: 31/01/2024	10 km
Previously conducted biological assessments	Various sources	Date: 31/01/2024	50 km

2.1.2. Literature Review

Previously conducted assessments within the desktop Study Area were reviewed for significant flora and vegetation. Reports were incorporated if they were provided by BHP WAIO, or if they were publicly available. The 35 reports incorporated into the desktop assessment are listed in Table 2.2

Table 2.2: Previously Conducted Biological Assessments

Biological Assessment Name	Survey Level	Survey Timing	Distance to Survey Area
Western Ridge Pipeline Reconnaissance Flora and Vegetation Survey (Biologic, 2022)	Reconnaissance flora and vegetation survey	March 2021 & March 2022	0 km
OB32 Surplus Water & Homestead Creek Wetting Front Flora and Vegetation Assessment (Spectrum Ecology & Spatial, 2021)	Detailed flora and vegetation survey	March, August – September 2021, February 2022	0 km
OB32 Surplus Water & Riparian Vegetation Monitoring Program (Astron, 2021)	Targeted flora survey	April – May & October – November 2021	0 km
Flora & Vegetation and Vertebrate Fauna Review - Mt Whaleback AML 7/244 (Onshore Environmental Consultants, 2013)	Desktop review	March 2013	0 km
BHP Newman Powerline Corridor Level 1 Flora and Fauna Survey (Ecological, 2011)	Single-season, flora, and vegetation survey	August 2011	0 km
Eastern Mines Weed Survey Mt Whaleback (Astron, 2011a)	Single-season weed survey	August 2010	0 km
Eastern Mines Weed Survey Eastern Ridge (Astron, 2011b)	Single-season weed survey	August 2010	0 km
Orebody 35 Surrounds Flora and Vegetation Survey (GHD, 2011)	Detailed flora and vegetation survey	May & August 2010	0 km
Mt Whaleback East Flora, Vegetation and Fauna Assessment (ENV, 2011)	Single-season flora and vegetation survey	January 2011	0 km
Eastern Ridge (OB23/24/25) Flora and Vegetation Assessment (ENV Australia, 2012)	Single-season, flora, and vegetation survey	April & July 2011	0 km
Orebody 42/43 Flora, Vegetation and Fauna Assessment, ENV Australia Pty. Ltd. (ENV Australia, 2011)	Detailed flora survey	December 2010	0 km
Mt Whaleback TSF Flora, Vegetation and Fauna Assessment (Astron, 2010)	Single-season flora and vegetation survey	March 2010	0 km
ENV Orebody 35 Vegetation Clearing Permit Area Flora and Fauna Assessment (ENV Australia, 2010)	Single-season flora and vegetation assessment	December 2009	0 km
Orebody 25 to Newman Flora and Vegetation Assessment (ENV, 2009)	Level One flora and vegetation assessment	July 2009	0 km
Newman Powerline Network Level 2 Flora and Level 1 Fauna Survey (Biologic, 2009)	Single-season flora and vegetation assessment	July 2009	0 km
Newman Water Pipeline Enhancement Project: Vegetation and Flora Survey (Ecologia, 2008)	Single-season flora and vegetation assessment	April 2008	0 km
RGP4 Newman Hub Topsoil Stockpile and Borrow Areas for Construction Flora and Vegetation Assessment (ENV, 2006)	Single-season flora and vegetation assessment	October 2006	0 km
Mt Whaleback Flora and Vegetation Assessment - Phase III Summary Report (ENV Australia, 2006)	Single-season flora and vegetation assessment	August 2006	0 km
BHPBIO Rail Sidings Flora and Vegetation Assessment (Ecologia Environment, 2005)	Single-season flora and vegetation assessment	March 2005	0 km
BHPB Ongoing Works Newman Hub Final Report (Ecologia, 2004)	Single-season flora and vegetation assessment	June 2004	0 km
Baseline Biological and Soil Surveys and Mapping for ML244SA West of the Fortescue River (Biota, 2001)	Single-season flora and vegetation assessment	September 2000	0 km

Biological Assessment Name	Survey Level	Survey Timing	Distance to Survey Area
Mt Whaleback / OB29 Soil & Vegetation Mapping Addendum B: 1999 Orebody 30 and Orebody 35 Soil & Biological Survey (HGM, 1999)	Single-season flora and vegetation assessment	August 1999	0 km
Newman to MAC Powerline Corridor Basic/Reconnaissance (Onshore Environmental Consultants, 2017)	Reconnaissance flora and vegetation survey	July 2017	1 km N
Hibiscus aff. campanulatus Targeted Survey – Cathedral Gorge (Spectrum Spatial & Ecology, 2022)	Targeted flora survey	July 2022	4 km NW
Fortescue River Riparian Flora and Vegetation Survey (Onshore Environmental Consultants, 2015a)	Single-season flora and vegetation survey	Jul 2015	4 km E
Cathedral Gorge Level 2 Flora and Vegetation Survey (Onshore Environmental, 2016)	Single-season flora and vegetation survey	September & October 2015	5 km N
Jimblebar Iron Ore Project Flora and Vegetation Assessment (Outback Ecology Services, 2009)	Detailed flora and vegetation survey	May 2009 & November 2009	5 km E
Myopic Exploration Lease Basic/Reconnaissance; (Onshore, 2009)	Reconnaissance flora and vegetation survey	June 2009	8 km N
Rhodes Ridge Detailed Flora and Vegetation Survey - Field Visit 1 Summary Report (Astron Environmental Services, 2020)	Targeted flora survey	July – August 2019	10 km NW
Rhodes Ridge Detailed Flora and Vegetation Survey - Field Visit 2 (Astron, 2020)	Single-season flora and vegetation survey	July 2019	10 km NW
Orebody 19 Level 2 Flora and Vegetation Survey (Onshore Environmental Consultants, 2014)	Detailed flora survey	March & September 2013	15 km E
Targeted Survey for Acacia sp. East Fortescue (surrounding OB31) (Onshore Environmental Consultants, 2015b)	Targeted flora survey	March 2015	25 km E
Jimblebar North Reconnaissance Flora and Vegetation Survey (Onshore Environmental Consultants, 2019)	Reconnaissance flora and vegetation survey	September 2018	30km E
East Jimblebar & Caramulla Detailed Flora and Vegetation Assessment BHP Western Australian Iron Ore (Biologic, 2019)	Single-season flora and vegetation survey	April 2019	35 km E
Vegetation Survey and Desktop Assessment Caramulla Creek (Onshore Environmental Consultants, 2018)	Reconnaissance vegetation survey	June 2018	35 km E

2.1.3. Likelihood of Occurrence of Significant Flora

The following information was collated for each significant flora taxon or TEC/PEC identified during the desktop assessment:

- Conservation status (EPBC Act, BC Act, DBCA listing);
- Description of species and flowering period (flora only);
- Description of habitat requirements;
- Description of previous records; and
- Distance of record to the project.

A likelihood of occurrence assessment was then conducted using the criteria listed in Table 2.3. This included assessing the distance of the record from the project (historical database records considered not accurate were excluded if required), presence of appropriate habitats within the Survey Area (using geology, vegetation mapping, and/or aerial imagery).

Table 2.3: Likelihood of Occurrence Criteria

Likelihood	Flora & Vegetation
Recorded	Species or vegetation community accurately recorded within the Survey Area during the literature review (includes TEC/PEC buffers that intersect).
High	Species or vegetation community recorded within 10 km of the Survey Area, and suitable habitat does, or is likely, to occur.
Medium	Species or vegetation community recorded outside the Survey Area but within 30 km and suitable habitat may occur.
Low	Species or vegetation community rarely or not recorded within 50 km of the Survey Area and suitable habitat is not likely to occur within the Survey Area.

2.2. Survey Timing

The assessment was undertaken over a single phase between the 21st to the 27th of March 2024. Monthly climate data was sourced from the nearest Bureau of Meteorology (BOM) station with complete data (Newman Aero # 007176), located approximately 1.5 km south-west of the Survey Area (Bureau of Meteorology, 2024). Rainfall recorded 12 months prior to the survey, median monthly rainfall, are presented in Figure 2.1

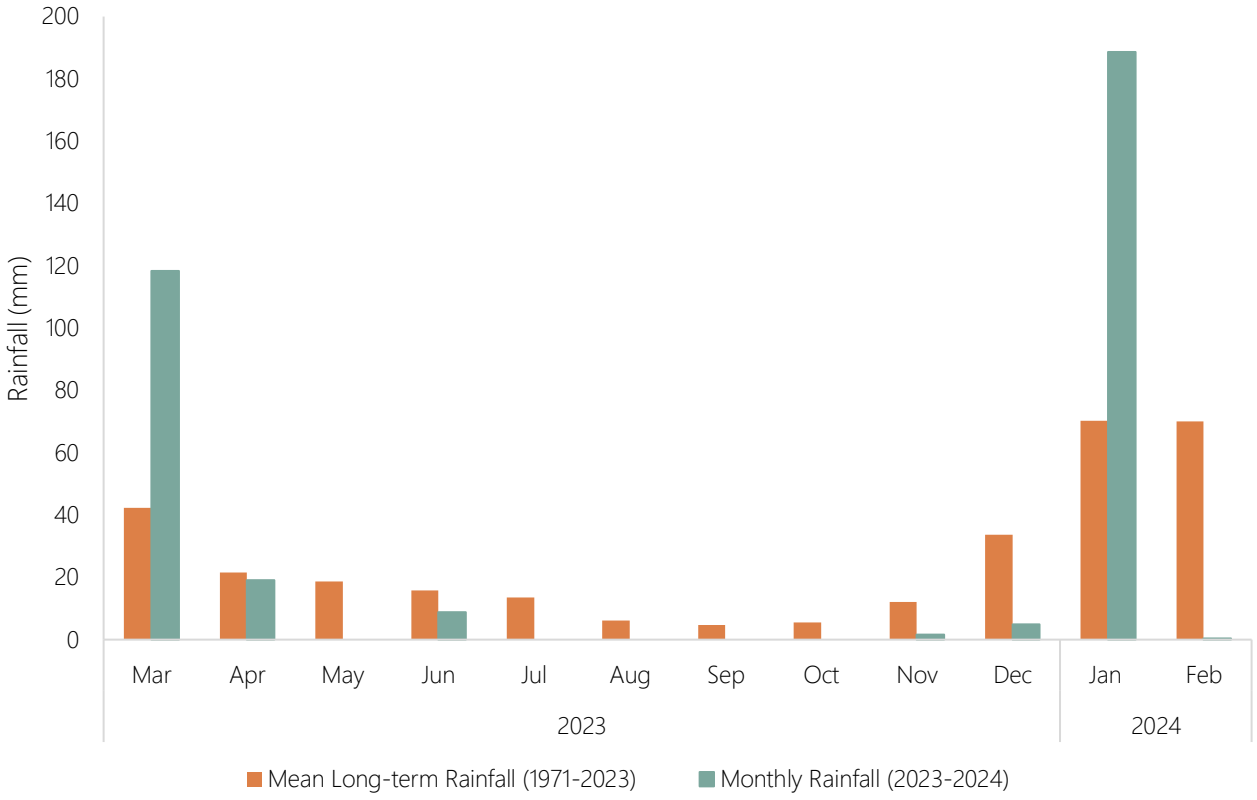


Figure 2.1: Mean Rainfall for the 12 Months Preceding the Surveys

The following rainfall was recorded at Newman Aero prior to the survey:

- The 12 months preceding the field survey (March 2023 to Feb 2024) recorded 341.6 mm of rainfall, 27.6 mm higher than the sum of the long-term annual median of 314 mm; and
- The three months preceding the field survey (Dec 2023 – Feb 2024) recorded 193.8 mm of rainfall, 169.6 mm higher than the sum of the long-term annual median for the same three months (24.2 mm).

2.2.1. Flora

The Pilbara bioregion is considered part of the Eremaean Botanical Province and recommendations are to conduct the primary flora and vegetation survey in autumn from March – June (EPA 2016b). The field survey timing was conducted in accordance with EPA recommended timing for the March survey following a period of higher than three-month median rainfall for the region.

2.3. Field Methods & Sampling Effort

A single-phase reconnaissance flora and vegetation assessment and targeted flora survey was undertaken at the Survey Area. The survey was competed by two botanists over five days and three botanists over two days (16 person days).

Sixty-seven relevés and 75.6 km of targeted traverses were sampled during the assessment (Map 2.1). This is considered appropriate for a reconnaissance level survey as stipulated in the technical guidance (Environmental Protection Authority, 2016b); these techniques are described in Table 2.4. Comprehensive flora site data collection information is included in Appendix B.

Table 2.4: Flora & Vegetation Survey Technique

Technique	Application & Purpose
Relevés	Relevés are a survey technique for gathering information for low-intensity reconnaissance flora and vegetation surveys. Information collected at each relevé includes: • Site code, date, location, botanist; • A photograph; • Vegetation condition and disturbances (including fire); • Landform including; slope, soil, rock type, aspect; • Flora and vegetation information including; dominant species cover and structure; and • Significant and introduced flora species and counts.
Mapping Notes	Note taken with the location and vegetation community present. Can include photographs or descriptions.
Opportunistic Sampling	Flora species not recorded through other sampling methods can be opportunistically sampled as encountered in the Survey Area. Opportunistic sampling also included recording locations of significant, introduced (weed) and unknown species.
Targeted Sampling	Areas likely to support significant flora or vegetation were targeted during the survey. Including areas with existing records of significant flora (salt lake habitat types, Gypsum dunes, and sandy plains close to the salt lakes). Areas were selected based on existing records from previous surveys, database searches, geology, vegetation mapping and known ESAs. Where possible, unusual, and restricted geological features within the Survey Area were sampled.

2.3.1.1. Targeted Survey – Significant Flora & Vegetation

The following targeted flora and vegetation survey effort was undertaken for the assessment:

Potential habitat and previous records were targeted, and opportunistic collections were recorded of any known significant flora taxa as encountered (Map 2.1).

When significant flora taxa were recorded, sufficient information was recorded to complete Threatened and Priority Flora Report Form and detailed counts were undertaken except where populations were large or widespread, in which case the population was estimated using methods consistent with the Threatened and Priority Flora Report Form – Field Manual (Department of Biodiversity Conservation and Attractions, 2017b).

Map 2.1: Survey Effort

2.4. Reporting & Data Analysis

2.4.1. Flora Nomenclature, Taxonomy & Lodgement

Flora nomenclature used in this report is consistent with the Western Australian Herbarium's plant census, provided on FloraBase (Western Australian Herbarium, 2024) and is current at the time of report preparation.

Specimens were collected of any suspected or known significant flora and to confirm species recorded from the relevés and opportunistic records for vegetation mapping purposes and to compile a species list.

Specimens were identified using the appropriate taxonomic keys and where required, relevant taxonomic experts at the Western Australian Herbarium were consulted. Specimens were vouchered with the Western Australian Herbarium as per guidance; when they represent new populations of Threatened or Priority Flora, new occurrences of TECs or PECs, individuals that have atypical characteristics, or bioregional range extensions.

2.4.2. Vegetation Mapping

The data collected from relevés, and traverses, as well as general field notes, observations and aerial photography were used to map the vegetation across the Survey Area. The vegetation was described to NVIS Level V – association (referred to as 'Vegetation Types (VTs)' for the local scale in this report). This level of description provides information on the dominant growth form, height, and cover for up to three species for each of the upper, mid, and ground strata (ESCAVI, 2003).

The VTs were defined structurally using data from relevés and the dominant species present at each, as is appropriate for a reconnaissance level survey.

2.4.3. Vegetation Condition

Vegetation condition was recorded at relevés and while walking traverses. The vegetation condition was updated during the current survey using the scale recommended for the Eremaean Botanical Province as shown in Table 2.5 (Environmental Protection Authority, 2016b). Areas with no vegetation present (roads, tracks, infrastructure areas) have been mapped as 'Cleared / Completely Degraded'. The dominant vegetation condition of relevés from the same vegetation unit was used to map the generalised condition of the entire unit.

Table 2.5: Vegetation Condition Scale & Criteria

Condition	Disturbance Criteria – Eremaean Botanical Province
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 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 multiple weed species present including very aggressive species.
Cleared	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.

2.4.4. Significant Flora & Vegetation Definitions

As defined by the (Environmental Protection Authority, 2016a) Environmental Factor Guideline, flora and vegetation can be considered significant for a range of reasons (Table 2.6; Appendix A). In addition to these definitions, flora and vegetation that are susceptible to impacts are included and discussed as significant, this can include Groundwater Dependant Ecosystems (GDE), and Banded Mulga vegetation.

Table 2.6: Flora & Vegetation Significance Definitions

Significant Definitions (EPA 2016a)	
Flora	• Being identified as Threatened (state listed WC Act and/or nationally listed EPBC Act). • Being identified as Priority species: Priority 1 to 4, (Department of Biodiversity Conservation and Attractions, 2019b). • Locally endemic or association with a restricted habitat type (e.g. surface water or GDEs). • New species or anomalous features that indicate a potential new species. • 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. • Relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.
Vegetation	• Identified as TEC (state listed WC Act and/or nationally listed EPBC Act). • Identified as PEC (Department of Biodiversity Conservation and Attractions, 2017a). • Restricted distribution. • Degree of historical impact from threatening processes. • A role as a refuge. • Providing an important function required to maintain ecological integrity of a significant ecosystem. • Vegetation that is highly disturbed can reduce the significance.

2.4.5. Local & Regional Context of Flora & Vegetation

Flora and vegetation recorded during the assessment are then further considered at a local and regional scale. The local area includes the Survey Area and near vicinity, and the regional area includes the IBRA region or subregion. Considerations used to determine the local and regional context of flora and vegetation recorded at the Survey Area are listed in Table 2.7.

Table 2.7: Local & Regional Context Definitions

Group	Local & Regional Context Considerations	
Flora	**Local**	
	Not locally significant	• Flora taxon well known from the local area. • Landforms/habitat the flora taxon occurs on are widespread through the local area. • Flora taxon may occur across multiple landforms and habitats.
	Locally significant	• Flora taxon not well known from the local area. • Landforms/habitat the flora taxon occurs are restricted through the local area. • Flora taxon may occur on restricted habitat type.
	Regional	
	Not regionally significant	• Flora taxon's known distribution extends over the region or subregion. • Flora taxon's known distribution may span over multiple IBRA regions.
	Regionally significant	• Flora taxon's known distribution is only known from few locations across the IBRA region or subregion. • May be common in the local area, but only known from the Survey Area within the IBRA region or subregion.

Group	Local & Regional Context Considerations	
Vegetation	**Local**	
	Not locally significant	• VTs mapped extent is widespread across the Survey Area or local area. • Landforms/habitat the VT occurs on are widespread in the local area, despite a low mapped area in the Survey Area.
	Locally significant	• VTs mapped extent is restricted in the Survey Area. • Landforms/habitat the VT occurs on are restricted in the local area. • VT provides habitat for locally significant flora taxa.
	Regional	
	Not regionally significant	• Determined by comparing VTs to the best available data source. This can include state-wide vegetation mapping (Beard), region specific (if available), land system and/or geology mapping. • VTs are matched with regional mapping units (listed above) that are widespread throughout the IBRA region or subregion.
	Regionally significant	• VTs are matched with regional mapping units (listed above) that are restricted throughout the IBRA region or subregion. • VT provides habitat for regionally significant flora taxa.

2.4.6. Introduced Flora, WoNS & Declared Plant Categories

The Department of Primary Industries and Regional Development (DPIRD) keeps a database of organisms that are Declared Pests in Western Australia. This database is regulated under the Biosecurity and Agricultural Management Act (Government of Western Australia, 2007). The legal status and control requirements for these environmentally significant pests are provided in Appendix A.

There are 32 Weeds of National Significance (WoNS) listed for Australia that have been identified based on their invasive tendencies, impact, potential for spread, and socioeconomic and environmental impacts (Invasive Plants and Animals Committee, 2017). Each species has a national management strategy and manual available.

2.5. Data for the Index of Biodiversity Surveys for Assessment (IBSA)

The EPA has given instruction that all biological surveys collecting data on biodiversity will submit the report and associated raw data to IBSA as an IBSA data package. All survey data collected at the Survey Area has been provided electronically to comply with IBSA and BHP WAIO data standards.

2.6. Project Team & Licences

Spectrum personnel involved with this assessment are listed in Table 2.8, along with their role and years of experience.

Table 2.8: Project Team & Licences

Staff	Qualification	Role	Project Tasks	Years of Experience	Flora Licence
Adam Crosby-Clark	BSc	Botanist	Field Survey/ Data Management / Reporting	4	FB620000349
Raimond Orifici	BSc (Hons)	Principal botanist	Field Survey/ Specimen Identification	20	FB62000158-2
Susan Murray	BSc, MSc	Senior Botanist	Reporting	7	FB62000101-1b
Scott Hitchcock	BSc	Principal Botanist	Reporting	19	FB62000561
Tia Berard	BSc	Botanist	Reporting	3	FB62000578

2.7. Limitations & Constraints

Survey specific limitations and constraints for the flora assessment at the Survey Area are discussed in Table 2.9.

Table 2.9: Survey Limitations & Constraints

Limitation	Constraint	Comment
Availability of the contextual information at a regional and local scale.	No	Beard vegetation and land system mapping were used to determine regional significance of VTs. Database searches provided detailed information, adequate to guide field survey design and effort for the flora and vegetation survey. There were multiple assessments conducted within and in the vicinity of the Survey Area and have been included in this report.
Competency/experience of the consultant carrying out the survey including experience in bioregion surveyed.	No	Principal Botanist Raimond Orifici has extensive knowledge and experience conducting botanical surveys and plant identifications in the Pilbara region of Western Australia.
Timing/weather/season/cycle.	No	The field survey timing was considered appropriate for a flora and vegetation survey conducted in the Pilbara region, where the appropriate timing is autumn (March to May). There was higher than median rainfall at the Survey Area in the three months prior to the survey, providing optimal conditions for flora species growth.
Disturbances (e.g., fire, flood, accidental human intervention) which affected results of survey.	No	No disturbances were recorded at the Survey Area that have affected the results of the flora assessment.
Remoteness and/or access problems.	Limited	There were minor access restrictions at the Survey Area, reducing the team's effectiveness to survey particular sections of the Survey Area including: - Flooding around the Ophthalmia Dam to the north-east of the Survey Area - Restricted access to the north-west of Whaleback Mine - Restricted access to the area directly east of R-103 and west of R-127. - Heritage exclusion zone between R-159 & R-111.
Flora Specific		
Survey effort and extent.	No	Sixty-one relevés were sampled in the Survey Area and these were sufficient to map and classify the vegetation for a reconnaissance survey. The targeted flora assessment was conducted along 75.6 km of traverses at a spacing of approximately 20 m through all identified potential habitat for Priority Flora.
Proportion of flora recorded and/or collected, any identification issues.	No	Specimens of unknown or difficult taxa were collected and these were identified by Principal Botanist Raimond Orifici who has extensive botanical and taxonomic experience throughout Western Australia and is particularly experienced around the Newman area.

3. RESULTS & DISCUSSION

3.1. Desktop Assessment

No Threatened flora species were reported from within the Survey Area or Study Area during the desktop assessment.

A total of 51 Priority Flora taxa were identified in the desktop assessment; four have previously been recorded in the Survey Area, six are considered to have a 'High' likelihood and six a 'Medium' likelihood of occurrence within the Survey Area (Table 3.1; Map 3.1). The remaining 35 taxa have been assigned a 'Low' likelihood of occurrence and are listed in Appendix C.

Table 3.1: Desktop Significant Flora – Recorded, High & Medium Likelihood of Occurrence

Likelihood	Status	Taxa	Lifeform	Flowering Period
Recorded	P3	*Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727)	Herb	Feb to May
	P2	*Ipomoea racemigera*	Climber	Mar to Aug
	P3	*Swainsona thompsoniana*	Herb	Apr to Aug
	P3	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	Other Grass	August
High	P3	*Aristida jerichoensis* var. *subspinulifera*	Herb	In response to rain
	P3	*Eremophila naaykensii*	Shrub	Aug to Oct
	P3	*Gymnanthera cunninghamii*	Shrub	Jan to Dec
	P3	*Indigofera gilesii*	Shrub	May or Aug
	P3	*Isotropis parviflora*	Shrub	March
	P3	*Rhagodia* sp. Hamersley (M. Trudgen 17794)	Shrub	March
Medium	P2	*Aristida lazaridis*	Herb	April
	P4	*Eremophila magnifica* subsp. *magnifica*	Shrub	Aug to Nov
	P3	*Eremophila magnifica* subsp. *velutina*	Shrub	Aug to Sep
	P2	*Euphorbia inappendiculata* var. *inappendiculata*	Herb	August
	P4	*Lepidium catapycnon*	Shrub	October
	P3	*Streptoglossa* sp. Cracking clays (S. van Leeuwen *et al.* PBS 7353)	Herb	June

Map 3.1: Desktop Assessment – Significant Flora Likelihood

3.2. Flora

A total of 197 taxa from 33 families and 95 genera were recorded within the Survey Area and are listed in Appendix D. The most species rich families were Poaceae and Fabaceae with 46 species each. The most species rich genera were *Acacia* with 23 species, followed by *Eremophila* with 11 species. Of the 197 taxa recorded, nine were introduced flora species and two were significant flora species (Table 3.2).

Table 3.2: Number of Flora Taxa Recorded

Total Taxa	Native	Introduced	Total Families	Most Common Families	Total Genera	Most Common Genera	Most Common Taxa Based on % of Relevé s
197	188	9	33	Poaceae – 47 Fabaceae – 46 Amaranthaceae – 13 Scrophulariaceae – 11	95	*Acacia* – 23 *Eremophila* – 11 *Ptilotus* – 10 *Senna* – 9	*Triodia pungens* – 56.7 % **Cenchrus ciliaris* – 50.7 % *Acacia tetragonophylla* – 46.3 % *Acacia aptaneura* – 41.8 % *Arivela viscosa* – 40.3 %

3.3. Significant Flora

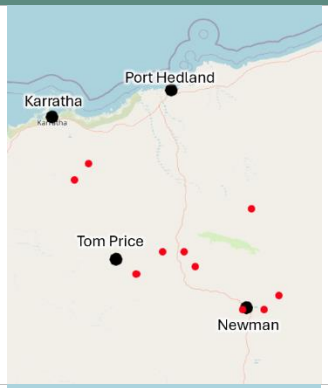
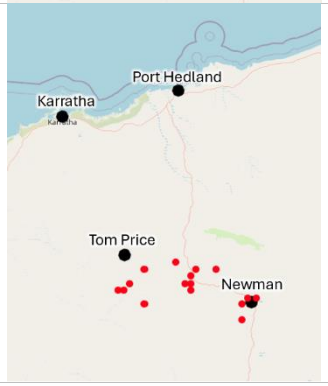
No Threatened flora taxa were recorded or considered likely to occur in the Survey Area.

Two Priority Flora taxa were recorded from the Survey Area (Table 3.3, Map 3.2):

- Priority 2 (P2): *Ipomoea racemigera*
- Priority 3 (P3): *Eremophila naaykensii*

No range extension species were recorded. No other significant flora taxa, as listed in Section 3.1, were recorded within the Survey Area during the assessment. Coordinates of all significant flora taxa have been provided electronically with this report.

Table 3.3: Significant Flora

Status	Taxon	Description of Plants in Survey Area	Description of Habitat in Survey Area	# of Individuals	Pilbara Distribution Map^	Local & Regional Distribution	Photograph
P2	*Ipomoea racemigera*	Creeping annual, herb or climber. Flowers, white.	Fringing vegetation of creek.	D2: 1 (100%) **Total: 1**		**Local**: Known from multiple locations in the local area. **Regional**: Known from many scattered locations throughout Western Australia: Gascoyne, Ord Victoria Plain, Pilbara.	
P3	*Eremophila naaykensii*	Shrub to 2m tall. Rounded crowded canopy. Flowers white-cream-yellow-pink-purple.	Hill crest. Creek embankments. Gullies.	D3: 270 (100%) **Total: 270**		**Local**: Known from multiple locations in the local area. **Regional**: Known from many scattered locations throughout Western Australia: Gascoyne & Pilbara.	

^Maps supplied by The Australasian Virtual Herbarium (Council of Heads of Australian Herbaria, 2024)

Map 3.2. Significant Flora Recorded

3.3.1. Local & Regional Context of Significant Flora

One individual of *Ipomoea racemigera* (P2) was recorded from one location within the Survey Area. It was found growing on the bank of an inundated creek line comprising of *Eucalyptus victrix* over *Acacia citrinoviridis* and **Cenchrus ciliaris* (represented by D2). This habitat is consistent with that of vouchered specimens previously collected which indicate an affinity for sandy soils along watercourses (Western Australian Herbarium, 2024). The species has historically been recorded at two locations within the Survey Area and an additional three locations within 40 km of the Survey Area. *Ipomoea racemigera* is known to be common across the Northern Territory and Queensland and in Western Australia it is known from several locations across two IBRA regions (Pilbara and Ord Victoria Plain).

An estimated 270 individuals of *Eremophila naaykensii* (P3) were recorded at the western edge of the Survey Area. It was found growing in rocky ironstone drainage areas / gullies of lower hill slopes dominated by VT D3. This habitat is consistent with historic records which indicate an affinity for ironstone slopes and rocky gullies and gorges associated with low open *Eucalyptus leucophloia* and *Corymbia ferriticola* woodlands with mixed *Acacia* spp. open shrublands and tall shrublands (Curtis *et al.*, 2022). The species is known only from the Pilbara IBRA region in Western Australia with current records indicating a geographic range of approximately 200 km from west to east in the southern half of the Hamersley Ranges and occurring from the vicinity of Paraburdoo to north-west of Newman (Western Australian Herbarium, 2024). A large population of *Eremophila naaykensii* was identified and mapped by Biologic in 2022 in the rolling hills directly west of the Survey Area (Map 3.1). The records identified by Spectrum during this survey are therefore likely to be a continuation of this known population.

3.3.2. Post Survey Review of Desktop Assessment Flora Taxa

Four Priority Flora, *Goodenia sp.* East Pilbara (A.A. Mitchell PRP 727; P3), *Ipomoea racemigera* (P2), *Swainsona thompsoniana* (P3), and *Themeda sp.* Hamersley Station (M.E. Trudgen 11431; P3), were previously recorded in the Survey Area (Appendix C). These records were visited by botanists during the survey; however no individuals were found at or near the locations. Recorded species pre-survey not found during the survey were assigned a post-survey likelihood 'High'. Suitable habitat for conservation significant flora was traversed within the Survey Area with one individual of *Ipomoea racemigera* recorded during the survey.

All Priority Flora assigned a pre-survey likelihood of 'High' and 'Medium' retained their likelihood post survey as matching habitat was found for all species in the Survey Area. This excludes *Eremophila naaykensii* which was initially assigned a 'High' likelihood but was marked as Recorded during the Survey.

3.4. Introduced Flora

Nine introduced flora species were recorded within the Survey Area, none of which are Declared Pests or WoNS. All are listed as permitted (s11) in Western Australia (Government of Western Australia, 2007).

Of the introduced flora species recorded, **Cenchrus ciliaris* was the most prevalent across the Survey Area, especially along road verges and drainage lines where disturbance by cattle was recorded. **Cenchrus ciliaris* formed the dominant understory species in four vegetation types (H2, FP1, D1 and D2).

All introduced flora species are listed in Table 3.4. Locations have been provided on Map 3.3 and are provided electronically with the report.

Table 3.4: Introduced Flora Recorded

Species	Common Name	Legal Status
**Bidens bipinnata*	Bipinnate Beggartick	s11 - Permitted
**Cenchrus ciliaris*	Buffel Grass	s11 - Permitted
**Cenchrus setiger*	Birdwood Grass	s11 - Permitted
**Cynodon dactylon*	Couch Grass	s11 - Permitted
**Echinochloa colona*	Awnless Barnyard Grass	s11 - Permitted
**Malvastrum americanum*	Spiked Malvastrum	s11 - Permitted
**Setaria verticillata*	Whorled Pigeon Grass	s11 - Permitted
**Tribulus terrestris*	Caltrop	s11 - Permitted
**Vachellia farnesiana*	Mimosa Bush	s11 - Permitted

Map 3.3: Introduced Flora Recorded

4. RESULTS & DISCUSSION – VEGETATION

4.1. Desktop Assessment

4.1.1. TEC/PECs

No commonwealth or state listed TECs or PECs relating to terrestrial flora and vegetation were identified within the Survey Area.

4.1.2. Literature Review Significant Vegetation

Previously undertaken assessments were reviewed for significant vegetation. Vegetation analogous with any TEC or PECs that were recorded in the Study Area are discussed below (Table 4.1).

Table 4.1: Literature Review Significant Vegetation

Pre-survey Likelihood	Report	Description	Significance	Distance from Survey Area
Recorded	Western Ridge Pipeline Reconnaissance Flora and Vegetation Survey (Biologic, 2022)	MA EcrEv AciAcp CcCsEuaMahElp	Considered to be Groundwater Dependent Vegetation, which could pose an ecosystem at risk.	Recorded within Survey Area.
High		Vegetation type GP ErlcSeao ErfcEnpoDish(±AselAspe) AaAte	Shares affinities with Priority one PEC, 'West Angelas Cracking-Clays'.	Within 1 km South of the Survey Area.
		SP AinAaAsu(±GrbAprCocd) ErffSegfSeah EnpoArcAri	Displays mulga groving and is analogous with 'Grove/ inter-grove mulga of the eastern Hamersley Range'.	Within 5 km South of the Survey Area.

4.2. Vegetation Types

A total of nine VTs were described from the Survey Area, based on the growth forms, and cover of dominant stratum using the relevé data (Table 4.2; Map 4.1). These vegetation types comprised approximately 3,197.38 ha (approximately 61.21%) of the Survey Area, with the remaining area being Cleared / Completely Degraded.

The hills and slopes of the Survey Area were grouped into two vegetation types (H1 – H2). H1 was characterised by *Triodia wiseana* and *Triodia vanleeuwenii*, with *Eucalyptus leucophloia* subsp. *leucophloia* open woodland and mixed tall *Acacia* open shrublands, occurring on the upper slopes and at the crests of low hills. H2 was characterised by a *Triodia pungens* hummock grasslands with *Acacia aptaneura* and *Acacia incurvaneura* low woodland on lower slopes and forming the larger more open gullies. H1 was the most common vegetation unit spanning the range of hills within the Survey Area (17.74%). H3 was characterised by *Triodia vanleeuwenii* hummock grassland with *Melaleuca eleuterostachya* found on a low calcrete hill and comprises the least common unit within the Survey Area (0.25%).

The floodplains were combined into a single unit of *Triodia pungens* open hummock grassland or *Cenchrus ciliaris* closed tussock grassland with a low woodland / shrubland of *Acacia aptaneura* and tall open shrubland of *Acacia maitlandii*, *Acacia bivenosa* and *Acacia synchronicia*.

The drainage lines were grouped into three vegetation types: D1, D2, and D3. One major creek, Coondiner Creek, occurred in the Survey Area and the main channel was mapped as vegetation type D2. This vegetation type was characterised by *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Acacia citrinoviridis* mid woodland. D1 was a minor drain vegetation type often branching off from the main D2 units; characterised by *Corymbia candida*, *Acacia citrinoviridis* and *Acacia aptaneura* over *Triodia pungens*. D3 was characterised by *Eucalyptus gamophylla* and *Acacia pruinocarpa* open woodland over *Triodia pungens* and *Triodia vanleeuwenii* occurring as floodplains within and alongside the low hills surrounding the south side of Whaleback mine.

Plains or flat landforms were comprised of one vegetation type (P1). P1 plains were characterised by *Triodia pungens* open hummock grassland with *Acacia aptaneura* and *Hakea preissii* open low woodland over a sparse shrubland of *Acacia synchronicia*.

Claypans of the Survey Area were grouped into one vegetation type (CC1). They were characterised by *Iseilema vaginiflorum*, *Cynodon convergens* and *Dichanthium sericeum* subsp. *humilius* low grassland. The unit closely resembles the PEC West Angelas Cracking-Clays but lacked the consistency and cover of characteristic species to define it.

Table 4.2: Vegetation Types

VT	Vegetation Description (NVIS)	Associated Species	Landform & Condition	Sites	Area & %	Representative Photo
Hills						
H1	**BHP: HC TwTvTp Ell AmaAbAi** Hummock Grassland of *Triodia wiseana*, *Triodia vanleeuwenii* and *Triodia pungens* with a Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* with an Open Shrubland of *Acacia maitlandii*, *Acacia bivenosa* and *Acacia inaequilatera* on red-orange loam on hill crests. **NVIS**: Low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* over, tall open shrubland of *Acacia bivenosa*, *Acacia inaequilatera* and *Acacia maitlandii* over, open hummock grassland of *Triodia wiseana*, *Triodia vanleeuwenii* and *Triodia pungens*.	*Acacia synchronicia* *Eremophila fraseri* subsp. *fraseri* *Triodia angusta*	Red-orange loam on hill crests. Dominant condition: Excellent Condition ranged: Very good – Excellent.	R-112, R-117, R-118, R-119, R-120, R-121, R-122, R-124, R-125, R-128, R-160	926.70 ha 17.74%	
H2	**BHP: FS TpTvCc AaAprAin AsiAteAme** Hummock Grassland of *Triodia pungens* and *Triodia vanleeuwenii* with a Tussock Grassland of **Cenchrus ciliaris*, with a Woodland of *Acacia aptaneura*, *Acacia pruinocarpa* and *Acacia incurvaneura* with Scattered Tall Shrubs of *Acacia sibirica*, *Acacia tetragonophylla* and *Acacia melleodora* on red-orange clay loam soils on gravel foot slopes. **NVIS**: Low woodland of *Acacia incurvaneura*, *Acacia aptaneura* and *Acacia pruinocarpa* over, tall isolated shrubs of *Acacia sibirica*, *Acacia tetragonophylla* and *Acacia melleodora* over, low open hummock grassland of *Triodia pungens* and *Triodia vanleeuwenii* or mid tussock grassland of *Cenchrus ciliaris*.	*Acacia ayersiana* *Acacia catenulata* subsp. *occidentalis*	Red-orange clay loam soils on gravel foot slopes. Dominant condition: Good Condition ranged: Very Poor - Excellent	R-101, R-102, R-103, R-104, R-105, R-126, R-127, R-137, R-138, R-139, R-146	736.65 ha 14.10%	
H3	**BHP: HS Tv Me** Open Hummock Grassland of *Triodia vanleeuwenii* with Scattered Mid Shrubs of *Melaleuca eleuterostachya* on red-orange clay loam soils on calcrete hillslopes. **NVIS**: Mid sparse shrubland of *Melaleuca eleuterostachya* over, low hummock grassland of *Triodia vanleeuwenii*.	None	Red-orange clay loam soils on calcrete hillslopes. Dominant condition: Excellent	R-132	13.04 ha 0.25%	

VT	Vegetation Description (NVIS)	Associated Species	Landform & Condition	Sites	Area & %	Representative Photo
Flood Plain						
FP1	**BHP: FP TpCc AmaAsyAb AaHallCh** Hummock Grassland of *Triodia pungens* with Sparse Tussock Grassland of **Cenchrus ciliaris*, with Open Shrubland of *Acacia maitlandii*, *Acacia synchronicia* and *Acacia bivenosa* with Low Open Woodland of *Acacia aptaneura*, *Hakea lorea* subsp. *lorea* and *Corymbia hamersleyana* on red-orange clay loam to sandy loam floodplain. **NVIS**: Low woodland of *Acacia aptaneura*, *Corymbia hamersleyana* and *Hakea lorea* subsp. *lorea* over, tall open shrubland of *Acacia maitlandii*, *Acacia bivenosa* and *Acacia synchronicia* over, low open hummock grassland of *Triodia pungens* or mid sparse tussock grassland of **Cenchrus ciliaris*.	*Senna artemisioides* subsp. x *artemisioides* *Senna glutinosa* subsp. x *luerssenii* *Senna artemisioides* subsp. *helmsii Acacia sclerosperma* subsp. *sclerosperma* *Corymbia candida*	Red-orange clay loam to sandy loam floodplain. Dominant condition: Very Good Condition ranged: Good – Excellent	R-115, R-129, R-130, R-131, R-134, R-135, R-136, R-141, R-142, R-144, R-148, R-151, R-156	694.29 ha 13.29%	
Drainage						
D1	**BHP: MI AaCocAci CcTp AteAprAsy** Low Woodland of *Acacia aptaneura*, *Corymbia candida* and *Acacia citrinoviridis* with Open Tussock Grassland of **Cenchrus ciliaris* with Very Open Hummock Grassland of *Triodia pungens* with High Open Shrubland of *Acacia tetragonophylla*, *Acacia pruinocarpa* and *Acacia synchronicia* on red-orange to red-brown clay to clay loam soils on minor drainage lines. **NVIS**: Low woodland of *Corymbia candida*, *Acacia aptaneura* and *Acacia citrinoviridis* over, tall, isolated shrubs of *Acacia tetragonophylla*, *Acacia pruinocarpa* and *Acacia synchronicia* over, low sparse hummock grasses of *Triodia pungens* or mid tussock grassland of **Cenchrus ciliaris*.	*Acacia incurvaneura* *Eremophila fraseri subsp. fraseri*	Red-orange to red-brown clay to clay loam soils on minor drainage lines. Dominant condition: Good Condition ranged: Poor - Very Good	R-111, R-113, R-133, R-140	263.35 ha 5.04%	
D2	**BHP: MA EvEcAci CcErbTp AsyPlAa** Woodland of *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Acacia citrinoviridis* with Open Tussock Grassland of **Cenchrus ciliaris* and *Eriachne benthamii* with Open Hummock Grassland of *Triodia pungens* with High Open Shrubland of *Acacia synchronicia*, *Petalostylis labichioides* and *Acacia aptaneura* on red-orange clay loam to sandy clay loam on major drainage lines.**NVIS**: Mid woodland of *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Acacia citrinoviridis* over, tall sparse shrubland of *Acacia aptaneura*, *Petalostylis labichioides* and *Acacia synchronicia* over, open hummock grassland of	*Ipomoea racemigera* (P2) *Petalostylis labicheoides*	Red-orange clay loam to sandy clay loam on major drainage lines. Dominant condition: Good Condition ranged: Poor - Very Good	R-114, R-147, R-149, R-153, R-155, R-157, R-158, R-161	293.99 ha 5.63%	

VT	Vegetation Description (NVIS)	Associated Species	Landform & Condition	Sites	Area & %	Representative Photo
	Triodia pungens or closed tussock grassland of **Cenchrus ciliaris* and *Eriachne benthamii*.					
D3	**BHP: FS TpTv EgAprAi AmeSalAsi** Hummock Grassland of *Triodia pungens* and *Triodia vanleeuwenii* with Low Open Woodland of *Eucalyptus gamophylla*, *Acacia pruinocarpa* and *Acacia inaequilatera* with Scattered Shrubs of *Acacia melleodora*, *Santalum lanceolatum* and *Acacia sibirica* on red-orange loam soils on minor drainage of lower foot slopes. **NVIS**: Low open woodland of *Eucalyptus gamophylla*, *Acacia pruinocarpa* and *Acacia inaequilatera* over, tall isolated shrubs of *Acacia melleodora*, *Acacia sibirica* and *Santalum lanceolatum* over low hummock grassland of *Triodia pungens* and *Triodia vanleeuwenii*.	**Cenchrus ciliaris* *Eremophila naaykensii* (P3)	Red-orange loam soils on minor drainage of lower foot slopes. Dominant condition: Excellent Condition ranged: Very good – Excellent	R-106, R-108, R-107, R-109, R-110, R-116, R-145, R-159	132.15 ha 2.53%	
Cracking Clay						
CC1	**BHP: CY CyconDishIsv PtgoOpa Seao** Tussock Grassland of *Cynodon convergens*, *Dichanthium sericeum* subsp. *humilius* and *Iseilema vaginiflorum* with Very Open Herbs of *Ptilotus gomphrenoides* and *Operculina aequisepala* with Low Scattered Shrubs of *Senna artemisioides* subsp. *oligophylla* on red-orange clay loam on cracking clay plains. **NVIS**: Low isolated shrubs of *Senna artemisioides* subsp. *oligophylla* over, low isolated forbs of *Operculina aequisepala* and *Ptilotus gomphrenoides* over, low grassland of *Cynodon convergens*, *Dichanthium sericeum* subsp. *humilius* and *Iseilema vaginiflorum*.	None	Red-orange clay loam on cracking clay plains. Dominant condition: Excellent Condition ranged: Very good – Excellent	R-123, R-143	80.46 ha 1.54%	
Plains						
P1	**BHP: SP AsyAteAb Tp HapAaGrst** High Open Shrubland of *Acacia synchronicia*, *Acacia tetragonophylla* and *Acacia bivenosa* with Very Open Hummock Grassland of *Triodia pungens* and Low Open Woodland of *Hakea preissii*, *Acacia aptaneura* and *Grevillea striata* on red-orange to red-brown sandy loam to sandy clay loam soils on gravel plains. **NVIS**: Low isolated trees of *Acacia aptaneura*, *Grevillea striata* and *Hakea preissii* over, tall sparse shrubland of *Acacia synchronicia*, *Acacia bivenosa* and *Acacia tetragonophylla* over, low open hummock grassland of *Triodia pungens*.	None	Red-orange to red-brown sandy loam to sandy clay loam soils on gravel plains. Dominant condition: Excellent Condition ranged: Very good – Excellent	R-150, R-152, R-154	56.76 ha 1.09%	

Map 4.1: Vegetation Types

4.3. Significant Vegetation

Based on the definitions of significant vegetation listed in section 4.1 (Environmental Protection Authority, 2016a), three VTs may be considered significant within the Survey Area. These are discussed in Table 4.3.

The VT CC1 shares some similarities with the Priority 1 PEC West Angeles Cracking-Clays which is described as "Open tussock grasslands of *Astrebla pectinata*, *A. elymoides*, *Aristida latifolia*, in combination with low scattered shrubs of *Sida fibulifera*, on basalt (Jerrinah formation) derived cracking-clay loam depressions and flowlines. Occurs throughout the central and eastern Hamersley Range from near Tom Price east to Newman" (DBCA, 2023). However, with the lack of characteristic species dominance and the VT not directly fitting within the previously mapped Jerrinah formation; it is unlikely to constitute as the West Angelas Cracking-Clays PEC.

Table 4.3: Potential Significant Vegetation Discussion

Significance	VT	Details
Restricted distribution	CC1	CC1 (80.46 ha, 1.54%) has a restricted extent in the Survey Area. The cracking clay depressions that this VT occurs on are common but not widespread in the Pilbara. Due to its low extent in the Survey Area and potential limited regional distribution, this VT may be considered significant.
A role as a refuge	D3	D3 may provide a role as refuge for the significant flora taxon: *Eremophila naaykensii* (P3) which was only found growing in this VT. However, the recorded population has been mapped to a much larger extent previously in areas adjacent of the Study Area and therefore is considered not regionally significant.
Vegetation at risk from mining activities	D2	D2 is a potential GDE as it contains the phreatophytic species *Eucalyptus camaldulensis* and potential phreatophytic species *Eucalyptus victrix*. GDEs are susceptible to impacts associated with groundwater draw down and may be considered regionally significant.

4.3.1. Post Survey Review of Desktop Assessment Vegetation

The significant vegetation identified during the desktop assessment, were assigned a 'Low' likelihood of occurrence post survey, as the survey effort was sufficient and there were no limitations and constraints for the detailed assessment (Table 1.4; Map 1.5).

4.3.2. Local & Regional Context of Vegetation Types

The VTs have been further considered at a local and regional context in Table 4.4. Local significance was determined if the VTs were locally restricted (by using vegetation mapping and/or landforms in the local vicinity). Regional significance was determined if the VTs were regionally restricted (by using BVAs and/or land system mapping to determine a potential regional extent). VTs were matched using the approximate spatial extent of the land systems and BVAs. The following VTs may be considered significant at a local or regional scale:

- H3 is restricted within the survey area (13.04 ha; 0.25%), however BVA 29 and Elimunna land system, on which it occurs, are both widespread throughout the Survey Area and local vicinity. Regionally, BVA 29 is widespread in the Pilbara and Gascoyne, however the Elimunna land system has a fairly limited extent across the Pilbara (62,850.5 ha) and Gascoyne (2,697.2 ha). This VT may be considered regionally significant.
- P1 has a restricted extent at the Survey Area (56.76 ha; 1.09%). However, the dominant and associated species of this vegetation type are common throughout the Pilbara and Gascoyne bioregions, indicating that it is likely to occur outside of the Survey Area. P1 is restricted to the

Spearhole Land System which is limited in distribution across the Survey Area and in the Pilbara (132,535.2 ha) and Gascoyne (31,879.7 ha), and therefore may be considered regionally significant.

- FP1 is not considered to be locally significant as it is mapped over a moderate area and the BVAs and land system it occurs in are widespread throughout the Survey Area. Regionally, BVAs 29 and 18 are both widespread in the Pilbara, however BVA 18 is mapped over a small area of the Gascoyne (43.8 ha) and the Elimunna land system has a limited extent in the Pilbara (62,850.5 ha) and Gascoyne (2,697.2). This VT may be considered regionally significant.

Table 4.4: Local & Regional Context & Discussion of Vegetation Types

Vegetation Type	Associated BVA	Associated Land System	Local Context & Discussion	Regional Context & Discussion
H1: Low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* over, tall open shrubland of *Acacia bivenosa*, *Acacia inaequilatera* and *Acacia maitlandii* over, low open hummock grassland of *Triodia wiseana*, *Triodia vanleeuwenii* and *Triodia pungens*.	**82.3:** *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland.	**McKay:** Hills, ridges, plateaux remnants, and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with *Acacia* and occasional *Eucalyptus*. **Newman:** Rugged jaspilite plateau, ridges and mountains supporting hard spinifex grasslands. **Rocklea:** Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	H1 was the most common VT in the Survey Area. The associated BVA and land systems are widespread in the local area, this vegetation type is therefore not considered locally significant.	Associated with multiple widespread land systems: McKay, Newman & Rocklea; this VT is not considered regionally significant.
H2: Low woodland of *Acacia incurvaneura*, *Acacia aptaneura* and *Acacia pruinocarpa* over, tall isolated shrubs of *Acacia sibirica*, *Acacia tetragonophylla* and *Acacia melleodora* over, low open hummock grassland of *Triodia pungens* and *Triodia vanleeuwenii* or mid tussock grassland of *Cenchrus ciliaris*.	**18.11:** *Acacia aneura*, *Eremophila fraseri,* and *Acacia pruinocarpa* tall open shrubland, over *Ptilotus drummondii*, *Eremophila lanceolata*, and *Brachyscome* sp. low open shrubland. **82.3:** *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland.	**Boolgeeda:** Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or Mulga shrublands. **Elimunna:** Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands. **Rocklea:** Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	H2 was the second most common VT in the Survey Area. The associated BVAs and land systems are widespread in the local area, therefore this VT is not considered locally significant.	Associated with widespread BSAs 82.3 & 18.11 and widespread land systems Boolgeeda and Rocklea; this VT is not considered regionally significant.
H3: Mid sparse shrubland of *Melaleuca eleuterostachya* over, low hummock grassland of *Triodia vanleeuwenii*.	**29:** *Acacia aneura* mid sparse shrubland.	**Elimunna:** Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands.	H3 has the most restricted extent in the Survey Area (13.0 ha; 0.2%), however the dominant species of this VT are common throughout the Pilbara and Gascoyne bioregions. Spectrum has mapped similar vegetation types associated with calcrete hills outside of the Survey Area	BVA 29 is widespread in the Pilbara, however the Elimunna land system has a fairly limited extent in the Pilbara (62,850.5 ha) and Gascoyne (2,697.2 ha), and this VT may be considered regionally significant.

Vegetation Type	Associated BVA	Associated Land System	Local Context & Discussion	Regional Context & Discussion
			around Newman, therefore the unit is not considered locally significant. Furthermore, BVA 29 and the Elimunna land system are both widespread throughout the Survey Area, therefore this VT is not considered locally significant.	
FP1: Low woodland of *Acacia aptaneura*, *Corymbia hamersleyana* and *Hakea lorea* subsp. *lorea* over, tall open shrubland of *Acacia maitlandii*, *Acacia bivenosa* and *Acacia synchronicia* over, low open hummock grassland of *Triodia pungens* or mid sparse tussock grassland of *Cenchrus ciliaris*.	**29:** *Acacia aneura* mid sparse shrubland. **18.11:** *Acacia aneura*, *Eremophila fraseri,* and *Acacia pruinocarpa* tall open shrubland, over *Ptilotus drummondii*, *Eremophila lanceolata*, and *Brachyscome* sp. low open shrubland.	**Elimunna:** Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands.	The associated BVAs and land systems are widespread in the local area, this vegetation type is therefore not considered locally significant.	BVAs 29 and 18.11 are both widespread in distribution. The Elimunna land system has a limited regional extent in the Pilbara (62,850.5 ha) and Gascoyne (2,697.2 ha), and this VT may be considered regionally significant.
D1: Low woodland of *Corymbia candida*, *Acacia aptaneura* and *Acacia citrinoviridis* over, tall isolated shrubs of *Acacia tetragonophylla*, *Acacia pruinocarpa* and *Acacia synchronicia* over, low sparse hummock grasses of *Triodia pungens* or mid tussock grassland of *Cenchrus ciliaris*.	**18.11:** *Acacia aneura*, *Eremophila fraseri,* and *Acacia pruinocarpa* tall open shrubland, over *Ptilotus drummondii*, *Eremophila lanceolata*, and *Brachyscome* sp. low open shrubland. **82.3:** *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland. **29:** *Acacia aneura* mid sparse shrubland.	**Elimunna:** Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands. **River:** Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex.	While mapped over a small extent within the Survey Area, this is expected due to the small size of the landforms they occur on. The associated BVAs and land systems are widespread in the local area, therefore, this vegetation type is not considered locally significant. Additionally, the dominant species recorded within them are widespread throughout the Pilbara and Gascoyne regions.	BVAs 82.3, 18.11 & 29 and the River land system are all widespread in the Pilbara and therefore this VT is not considered regionally significant.
D2: Mid woodland of *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Acacia citrinoviridis* over, tall sparse shrubland of *Acacia aptaneura* and *Acacia synchronicia* over, open hummock grassland of *Triodia pungens* or closed tussock	**82.3:** *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse	**River:** Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts	The associated BVAs and land systems are widespread in the local area, therefore, this vegetation type is not considered locally significant.	BVA 82.3 and the River land systems are both widespread in the Pilbara and this VT is therefore not considered regionally significant.

Vegetation Type	Associated BVA	Associated Land System	Local Context & Discussion	Regional Context & Discussion
grassland of *Cenchrus ciliaris* and *Eriachne benthamii*.	shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland. 29: *Acacia aneura* mid sparse shrubland.	sometimes with tussock grasses or spinifex. Elimunna: Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands.		
D3: Low open woodland of *Eucalyptus gamophylla*, *Acacia pruinocarpa* and *Acacia inaequilatera* over, tall isolated shrubs of *Acacia melleodora*, *Acacia sibirica* and *Santalum lanceolatum* over low hummock grassland of *Triodia pungens* and *Triodia vanleeuwenii*.	82.3: *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland.	Rocklea: Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	D3 has a restricted extent in the Survey Area (132.1 ha; 2.5%), however, this is expected due to the small size of the landforms they occur on. The associated BVA and land system are somewhat widespread in the local area. This VT is therefore not considered locally significant. Additionally, the dominant species recorded within them are widespread throughout the Pilbara and Gascoyne regions.	The Rocklea Land System has a widespread distribution in the Pilbara and BVA 82.3 is also relatively widespread in distribution. Therefore, this VT is not considered regionally significant.
CC1: Low isolated shrubs of *Senna artemisioides* subsp. *oligophylla* over, low isolated forbs of *Operculina aequisepala* and *Ptilotus gomphrenoides* over, low grassland of *Cynodon convergens*, *Dichanthium sericeum* subsp. *humilius* and *Iseilema vaginiflorum*.	82.3: *Eucalyptus leucophloia* and *Eucalyptus gamophylla* low open woodland, over *Senna artemisioides* subsp. x *sturtii*, *Dodonaea viscosa* and *Grevillea wickhamii* tall sparse shrubland, over *Triodia wiseana* mid open hummock grassland, with *Ptilotus rotundifolius* and *Acacia lycopodiifolia* low open shrubland. 18.11: *Acacia aneura*, *Eremophila fraseri,* and *Acacia pruinocarpa* tall open shrubland, over *Ptilotus drummondii*, *Eremophila lanceolata*, and *Brachyscome* sp. low open shrubland.	Rocklea: Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs. Elimunna: Stony plains on basalt supporting sparse *Acacia* and *Senna* shrublands and patchy tussock grasslands.	CC1 has a restricted extent in the Survey Area (80.46 ha; 1.54%), but the land systems and BVAs that this VT occurs on, appear widespread in the local area and therefore is not considered locally significant.	The Elimunna Land System has a limited distribution across the Pilbara. The Rocklea Land System however is widespread in distribution and the BVAs are also widespread, therefore this VT is not considered regionally significant.
P1: Low isolated trees of *Acacia aptaneura*, *Grevillea striata* and *Hakea preissii* over, tall sparse shrubland of *Acacia synchronicia*, *Acacia*	29: *Acacia aneura* mid sparse shrubland.	Spearhole: Gently undulating gravelly hardpan plains and dissected slopes	P1 has a restricted extent in the Survey Area (56.76 ha; 1.09%). However, the dominant and associated species of	P1 is restricted to the Spearhole Land System in the Survey Area which has limited distribution across the Pilbara (132,535.2 ha) and

Vegetation Type	Associated BVA	Associated Land System	Local Context & Discussion	Regional Context & Discussion
bivenosa and *Acacia tetragonophylla* over, low open hummock grassland of *Triodia pungens*.		supporting groved mulga shrublands and hard spinifex.	this vegetation type are common throughout the Pilbara and Gascoyne bioregions, indicating that it is likely to occur outside of the Survey Area. It is restricted to the Spearhole Land System which is locally widespread, therefore is not considered locally significant.	Gascoyne (31,879.7 ha). Therefore, this VT may be considered regionally significant.

4.4. Vegetation Condition

The majority of the vegetation within the Survey Area was mapped as 'Good' (23.22%), showing moderate weed cover and moderate levels of grazing. Weed cover was primarily dominated by an understorey of **Cenchrus ciliaris* and this included a large portion of low-lying vegetation across the Survey Area. Areas mapped as 'Excellent' (23.15%) were recorded across the entire Survey Area and were found to have no obvious disturbance. Areas mapped as 'Very Good' (13.29%) mainly consisted of floodplains and minor drainage lines around the central Survey Area, with scattered weeds, low levels of grazing and low dust. The remaining 38.79% of the Survey Area was mapped as 'Cleared / Completely Degraded'. Vegetation condition of the Survey Area is presented in Table 4.5 and mapped on Map 4.2. Weeds were common in the Survey Area, with **Cenchrus ciliaris* recorded consistently, especially along the roadside, and forming the dominant understory species in four VTs (H2, FP1, D1 & D2). Areas mapped as 'Poor' (1.55%), showing Medium grazing activity evident, high weed cover, little to no native understorey, vegetation structure altered, low dust. Poor condition vegetation identified throughout the Whaleback mine was separated from the averaging of D2 vegetation conditioning, in order to demonstrate a more accurate representation of conditions in the area (Map 4.2).

Table 4.5: Vegetation Condition

Condition	Area (ha)	%	Disturbance Detail in Survey Area
Excellent	1,209.10	23.15	No obvious disturbance.
Very Good	694.29	13.29	Scattered weeds, low levels of grazing, low dust.
Good	1,213.05	23.22	Moderate weed cover and moderate levels of grazing evident, primarily dominated by **Cenchrus ciliaris*.
Poor	80.94	1.55	Medium grazing activity evident, high weed cover, little to no native understorey, vegetation structure altered, low dust.
Degraded	-	-	-
Cleared / Completely Degraded	2,026.27	38.79	No vegetation or plant species present, including roads, tracks, and areas cleared for infrastructure.

Map 4.2: Vegetation Condition

5. CONCLUSION

5.1. Flora

No Threatened flora were recorded or considered likely to occur within the Survey Area. Two Priority Flora taxa were recorded:

- Priority 2: *Ipomoea racemigera* – recorded at one location (single individual) on a major drainage line;
- Priority 3: *Eremophila naaykensii* – recorded at multiple locations (totalling 270 individuals) across the hillslopes, drainage lines south-west of the Whaleback mine.

Of these taxa neither are considered to be locally or regionally significant with a single record of *Ipomoea racemigera* being found on an extensive drainage network; and *Eremophila naaykensii* likely being a small extension of a much larger population previously recorded in the hills to the south-west of the Whaleback operations.

5.2. Vegetation

Based on the definitions of significant vegetation listed in section 4.3 (Environmental Protection Authority, 2016a), three VTs in the Survey Area may be considered significant; CC1, D3 and D2. CC1 has a restricted extent in the Survey Area and also closely resembles the West Angelas Cracking-Clays (P1). However, with the lack of characteristic species dominance and the unit not directly fitting within the previously mapped Jerrinah formation, it is unlikely to constitute as the West Angelas Cracking-Clays PEC. A more detailed survey will likely be able to further define the VT and determine if it or part of it, represent the PEC. Drainage type vegetation D3 may provide a role as refuge for *Eremophila naaykensii* (P3), which was only found growing in this VT. However, the recorded population has been mapped to a much larger extent previously in areas adjacent of the Study Area and therefore is considered not regionally significant. Drainage vegetation type D2 supports riparian vegetation (*Eucalyptus victrix* and *Eucalyptus camaldulensis*) and is a potential GDE. GDEs are susceptible to impacts associated with changes in ground water or surface water flow.

H3 has the most restricted extent in the Survey Area (13.04 ha; 0.25%) and may be considered regionally significant. P1 has a restricted extent at the Survey Area (56.76 ha; 1.09%) and is restricted to the Spearhole Land System, which is regionally limited in distribution and therefore may be considered regionally significant. FP1 may be considered regionally significant as it only occurs on the Elimunna land system, which has a limited distribution in the Pilbara and Gascoyne.

Vegetation condition varied from poor to excellent within the VTs based on the level and proximity to previous disturbances. Weeds were common, with **Cenchrus ciliaris* (Buffel Grass) recorded commonly across the Survey Area, especially along the roadside and drainage areas, forming the dominant understory species in four vegetation types (H2, FP1, D1 & D2).

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Appendix A: Conservation Codes

Appendix A1: Definitions of Conservation Categories under the EPBC Act

Category	Definition
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) 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	A native species is eligible to be included in the critically endangered category 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.
Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) 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	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) 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 Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) 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 (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) 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; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Appendix A2: Definitions of Conservation Categories Under the BC Act

Code	Definition (BC Act)
Threatened Species (T) 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.	
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.
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.
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.
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.	

Code	Definition (BC Act)
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.
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.
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.	
Migratory species (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.
Conservation Dependent (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
Other specially protected fauna (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
Priority species (P) 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.	
Priority 1: Poorly-known species (P1)	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.
Priority 2: Poorly-known species (P2)	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.

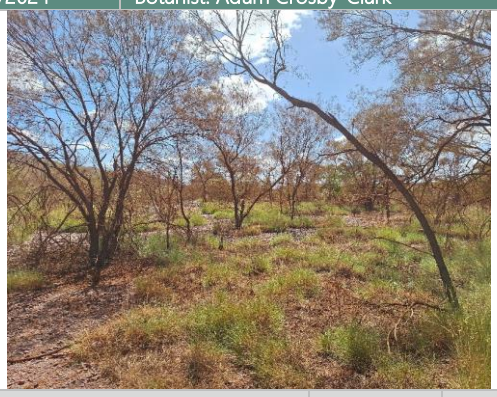
Code	Definition (BC Act)
Priority 3: Poorly-known species (P3)	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, 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.
Priority 4: Rare, Near Threatened and other species in need of monitoring (P4)	(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.

Appendix A3: Legal Status Definition of Listed Plants in Western Australia

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.
Declared Pest – s22(2)	Declared pests must satisfy any applicable import requirements when imported and may be subject to control keeping requirements.
Permitted – s11	Permitted organisms must satisfy applicable import requirements and import permits (where required).
Permitted, Requires Permit – r73	Regulation 73 permitted organisms may be subject to restriction under legislation other than the BAM Act (2007).
Unlisted	Unlisted organisms are prohibited in WA.
Control Categories	**Definition**
C1 Exclusion	Organisms should be excluded from parts or all of WA.
C2 Eradication	Organisms should be eradicated from all or parts of WA.
C3 Management	Organisms 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	Declared pest 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.
Keeping Categories	**Definition**
Prohibited keeping	Can only be kept under a permit for public display, education, or scientific purposes.
Restricted keeping	Kept under a permit by private individuals due to a low risk of becoming a problem for the environment.
Exempt keeping	No permit or conditions are required for keeping. Organism may be subject to restrictions under the Wildlife Conservation Act (WCA, 1950).

Appendix B: Flora Site Data

Site: R-101	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	3° - Gentle North			
Soil:	Clay loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low dust, tracks			
Veg Unit:	H2			
Location (NW):	50 770162 mE, 7410842 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	22	*Triodia vanleeuwenii*	0.2	0.4
Acacia incurvaneura	6.8	18	*Duperreya commixta*	1.2	0.1
Acacia pruinocarpa	3.8	4	*Eremophila latrobei* subsp. *glabra*	0.6	0.1
Acacia ayersiana	3.2	4	*Euphorbia australis* var. *hispidula*	0.2	0.1
Acacia paraneura	7.2	3	*Hibiscus burtonii*	0.3	0.1
Acacia synchronicia	0.4	2	*Solanum cleistogamum*	0.3	0.1
Senna glutinosa subsp. x *luerssenii*	1.4	2	*Solanum lasiophyllum*	0.3	0.1
Ptilotus obovatus	0.7	0.4			

Site: R-102	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle East			
Soil:	Clay loam, Red brown			
Rocks:	Ironstone			
Abundance:	20-50% Many			
Size:	20-60 mm - Coarse gravel			
Fire:	2-5 yrs			
Condition:	Very Good			
Notes:	Clearing, low dust			
Veg Unit:	H2			
Location (NW):	50 770381 mE, 7410544 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia ayersiana	3.5	40	*Senna artemisioides* subsp. *oligophylla*	0.8	0.5
Triodia pungens	0.5	35	*Senna glutinosa* subsp. x *luerssenii*	1.2	0.5
Acacia pruinocarpa	4	4	*Dactyloctenium radulans*	0.2	0.3
Eucalyptus gamophylla	3.2	2	*Hibiscus burtonii*	0.55	0.3
**Cenchrus ciliaris*	0.7	1	*Petalostylis labicheoides*	1.5	0.3
Acacia sibirica	3	0.5	*Ptilotus obovatus*	0.6	0.3
Acacia synchronicia	2	0.5	*Enneapogon polyphyllus*	0.2	0.2
Arivela viscosa	0.6	0.5	*Glycine canescens*	0.8	0.2
Duperreya commixta	1	0.5	*Vincetoxicum lineare*	0.5	0.1
Eremophila forrestii subsp. *forrestii*	1.7	0.5			

Site: R-103	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	1° - Very Gentle North			
Soil:	Clay loam, Red brown			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	H2			
Location (NW):	50 770689 mE, 7410314 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Aristida contorta	0.3	0.1	**Bidens bipinnata*	0.3	0.7
Tribulopis angustifolia	0.1	0.1	*Abutilon otocarpum*	0.4	1.5
Abutilon fraseri subsp. *fraseri*	0.6	0.2	*Chrysopogon fallax*	1.1	1.5
Sida fibulifera	0.3	0.2	*Triodia pungens*	0.8	3
Arivela viscosa	0.25	0.3	*Acacia pruinocarpa*	4	10
Dipteracanthus australasicus subsp. *australasicus*	0.75	0.3	**Cenchrus ciliaris*	0.7	20
Evolvulus alsinoides var. *villosicalyx*	0.3	0.3	*Acacia aptaneura*	4	50
Maireana villosa	0.5	0.3			

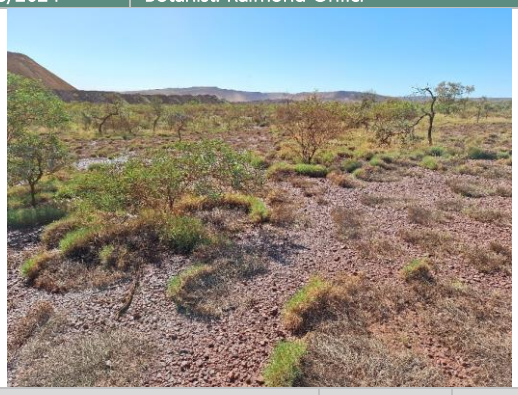
Site: R-104	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat, rocky outcrop			
Slope, aspect:	10° - Moderate East			
Soil:	Clay loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	60-200 mm – Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H2			
Location (NW):	50 770524 mE, 7410260 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia pruinocarpa	3.2	8	*Acacia ancistrocarpa*	3.1	0.8
Triodia pungens	0.4	7	*Eriachne mucronata*	0.3	0.6
Acacia ayersiana	2.4	2	*Eriachne lanata*	0.4	0.2
Petalostylis labicheoides	2.4	2	*Calytrix carinata*	1.2	0.1
Corymbia candida	5.8	1	*Themeda triandra*	0.5	0.1
Eucalyptus leucophloia subsp. *leucophloia*	3.8	1			

Site: R-105	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark
Landform:	Drainage line on flat			
Slope, aspect:	3° - Gentle North			
Soil:	Clay loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	2-10% Few			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium)			
Veg Unit:	H2			
Location (NW):	50 770455 mE, 7410282 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia catenulata subsp. *occidentalis*	8.2	60	*Arivela viscosa*	0.2	0.1
Triodia pungens	0.3	4	*Chrysopogon fallax*	0.3	0.1
Eucalyptus leucophloia subsp. *leucophloia*	9.2	2	*Duperreya commixta*	0.3	0.1
**Bidens bipinnata*	0.1	1	*Enneapogon polyphyllus*	0.2	0.1
Petalostylis labicheoides	2.4	0.8	*Evolvulus alsinoides* var. *villosicalyx*	0.1	0.1
Acacia pruinocarpa	0.6	0.2	*Hibiscus coatesii*	0.2	0.1
Acacia tetragonophylla	1.2	0.1	*Paspalidium clementii*	0.2	0.1
Aristida contorta	0.2	0.1	*Portulaca oleracea*	0.1	0.1
Aristida latifolia	0.3	0.1			

Site: R-106	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Raimond Orifici
Landform:	Lower hill slope			
Slope, aspect:	10° - Moderate East			
Soil:	Loam, Red orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	D3			
Location (NW):	50 769296 mE, 7411484 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.6	40	*Senna artemisioides* subsp. *helmsii*	1	0.5
Acacia inaequilatera	3	4	*Dicrastylis cordifolia*	0.6	0.3
Acacia pruinocarpa	4	4	*Goodenia stobbsiana*	0.4	0.3
Hakea chordophylla	4.5	3	*Grevillea wickhamii*	1	0.2
Acacia ancistrocarpa	3	1	*Cymbopogon obtectus*	0.7	0.2
Acacia kempeana	2.5	0.5	*Fimbristylis dichotoma*	0.2	0.2
Indigofera monophylla	0.5	0.5	*Senna glutinosa* subsp. x *luerssenii*	1	0.2
Paraneurachne muelleri	0.5	0.5	*Tribulus suberosus*	0.8	0.2

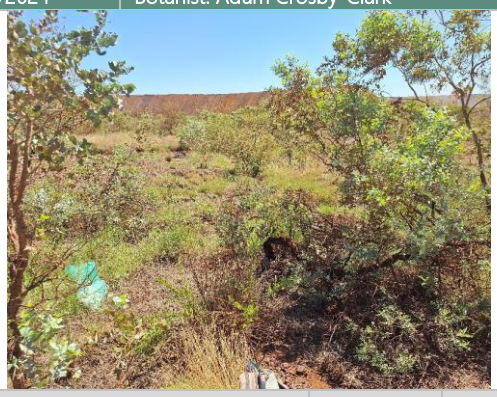
Site: R-107	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Raimond Orifici
Landform:	Lower hill slope			
Slope, aspect:	3° - Gentle North			
Soil:	Loam, Red orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Clearing, low dust			
Veg Unit:	D3			
Location (NW):	50 769776 mE, 7411193 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	25	*Indigofera monophylla*	0.6	0.5
Triodia vanleeuwenii	0.3	10	*Senna artemisioides* subsp. *helmsii*	1	0.5
Acacia pruinocarpa	3.5	8	*Senna artemisioides* subsp. *oligophylla*	1	0.5
Acacia sibirica	2.2	5	*Senna glutinosa* subsp. *pruinosa*	1	0.5
Acacia bivenosa	2.5	4	*Acacia tetragonophylla*	2.8	0.3
Eucalyptus gamophylla	2.5	0.5	*Psydrax suaveolens*	3.5	0.2
Hakea lorea subsp. *lorea*	4.5	0.5			

Site: R-108	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Raimond Orifici
Landform:	Lower hill slope			
Slope, aspect:	10° - Moderate North-east			
Soil:	Loam, Red orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	Low dust			
Veg Unit:	D3			
Location (NW):	50 769459 mE, 7411265 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	40	55	*Indigofera monophylla*	0.4	0.5
Acacia pruinocarpa	3	5	*Acacia tenuissima*	2	0.5
Acacia inaequilatera	3.5	3	*Goodenia stobbsiana*	0.7	0.5
Hakea chordophylla	4	2	*Duperreya commixta*	2	0.3
Grevillea wickhamii	3.5	2			

Site: R-109	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark
Landform:	Drainage line on lower slope			
Slope, aspect:	10° - Moderate North-east			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	Low dust			
Veg Unit:	D3			
Location (NW):	50 769396 mE, 7411293 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Eucalyptus gamophylla	3.4	6	*Corchorus lasiocarpus* subsp. *parvus*	0.4	0.4
Triodia pungens	0.4	6	*Afrohybanthus aurantiacus*	0.4	0.3
Acacia sibirica	4	3	*Acacia elachantha*	3.2	0.3
Grevillea wickhamii	3.4	3	*Cymbopogon obtectus*	0.4	0.2
Acacia pruinocarpa	3.8	2	*Duperreya commixta*	1.1	0.2
Themeda triandra	0.6	1	*Jasminum didymum*	0.2	0.2
Scaevola spinescens	1.1	0.5	*Tephrosia rosea* var. Fortescue creeks (M.I.H. Brooker 2186)	0.4	0.2
Acacia inaequilatera	4.2	0.5	*Santalum lanceolatum*	2.2	0.1
Paraneurachne muelleri	0.3	0.4	*Senna glutinosa* subsp. *glutinosa*	1.3	0.1

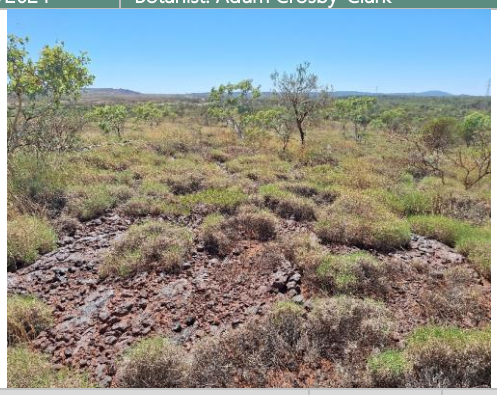
Site: R-110	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark
Landform:	Drainage line on lower slope			
Slope, aspect:	10° - Moderate North			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	200-600 mm - Stones			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	Low dust			
Veg Unit:	D3			
Location (NW):	50 769534 mE, 7411199 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Eremophila naaykensii	1.9	4	*Corchorus lasiocarpus* subsp. *parvus*	0.3	0.2
Triodia pungens	0.4	4	*Indigofera monophylla*	0.4	0.2
Acacia pruinocarpa	3.6	3	*Arivela viscosa*	0.3	0.1
Acacia inaequilatera	0.5	1	*Evolvulus alsinoides* var. *villosicalyx*	0.2	0.1
Eriachne mucronata	0.3	0.6	*Goodenia stobbsiana*	0.3	0.1
Themeda triandra	0.5	0.4	*Solanum lasiophyllum*	0.3	0.1
Acacia elachantha	2.4	0.2	*Tephrosia rosea* var. Fortescue creeks (M.I.H. Brooker 2186)	0.3	0.1

Site: R-111	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy clay loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Poor			
Notes:	Weeds (high), no native understorey			
Veg Unit:	D1			
Location (NW):	50 776615 mE, 7412876 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	1.3	50	*Cucumis variabilis*	1.1	0.3
Acacia incurvaneura	8.2	45	*Acacia pruinocarpa*	1.7	0.2
**Cenchrus setiger*	1.2	35	*Arivela viscosa*	0.3	0.2
**Bidens bipinnata*	0.6	8	*Duperreya commixta*	1.2	0.2
Eucalyptus xerothermica	11.2	2	*Santalum lanceolatum*	2.2	0.2
Acacia pruinocarpa	7.2	1.2	*Vigna* sp. Hamersley Clay (A.A. Mitchell PRP 113)	0.3	0.2
Triodia pungens	0.6	0.8	*Sida fibulifera*	0.3	0.1
Chrysopogon fallax	1.1	0.5	*Urochloa distachyos*	0.2	0.1
Abutilon fraseri subsp. *fraseri*	0.2	0.4			

Site: R-112	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Simple hill crest			
Slope, aspect:	10° - Moderate East			
Soil:	Clay loam, Red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 788607 mE, 7415448 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.4	60	*Acacia melleodora*	2.6	0.3
Eucalyptus leucophloia subsp. *leucophloia*	4.2	3	*Eremophila latrobei* subsp. *glabra*	1.4	0.3
Acacia citrinoviridis	2.5	1.8	*Acacia hilliana*	0.4	0.2
Acacia aptaneura	3.6	0.8	*Acacia tetragonophylla*	1.2	0.2
Acacia pruinocarpa	3.2	0.8	*Calytrix carinata*	1.1	0.2
Ptilotus rotundifolius	0.4	0.8	*Duperreya commixta*	1.2	0.2
Acacia bivenosa	2.2	0.6	*Hakea chordophylla*	2.4	0.2
Senna glutinosa subsp. x *luerssenii*	1.2	0.4	*Indigofera monophylla*	0.2	0.1
Triodia pungens	0.3	0.4			

Site: R-113	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat,Plain			
Slope, aspect:	3° - Gentle			
Soil:	Clay loam, Red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	<6 mm - Fine gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium)			
Veg Unit:	D1			
Location (NW):	50 788912 mE, 7415795 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	2.8	7	*Arivela viscosa*	0.4	0.2
**Cenchrus ciliaris*	0.3	4	*Dactyloctenium radulans*	0.1	0.2
Triodia pungens	0.3	4	*Portulaca oleracea*	0.1	0.2
Corymbia candida	5.2	3	*Sporobolus australasicus*	0.2	0.2
Acacia synchronicia	2.6	2	*Themeda triandra*	0.1	0.2
Chrysopogon fallax	1.4	0.6	*Evolvulus alsinoides* var. *villosicalyx*	0.2	0.1
Senna artemisioides subsp. *oligophylla*	1.4	0.6			

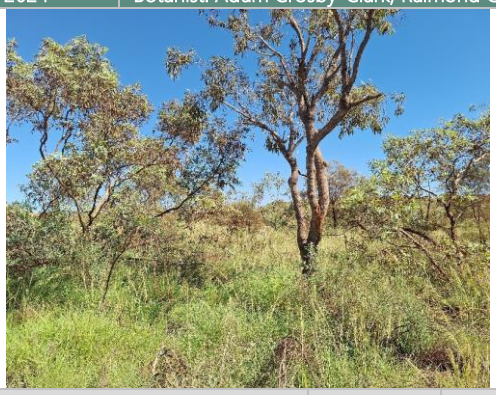
Site: R-114	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	3° - Gentle			
Soil:	Clay loam, Dark brown			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	D2			
Location (NW):	50 777183 mE, 7412662 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.7	70	*Themeda triandra*	0.8	4
Eucalyptus trivalva	6.2	8	*Triodia angusta*	0.6	4
Acacia aptaneura	9.2	7	**Bidens bipinnata*	0.2	0.2
Triodia pungens	0.6	5	*Duperreya commixta*	1.2	0.1

Site: R-115	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	FP1			
Location (NW):	50 779448 mE, 7412048 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia maitlandii	2.4	82	*Anthobolus leptomerioides*	0.5	0.1
Triodia pungens	0.4	40	*Bonamia erecta*	0.4	0.1
**Cenchrus ciliaris*	0.6	1.1	*Eragrostis eriopoda*	0.3	0.1
Acacia bivenosa	0.4	0.8	*Evolvulus alsinoides* var. *decumbens*	0.3	0.1
Senna artemisioides subsp. *oligophylla*	0.5	0.4	*Hibiscus sturtii* var. *platychlamys*	0.3	0.1
Corymbia hamersleyana	3.6	0.3	*Senna artemisioides* subsp. *helmsii*	0.4	0.1
Acacia inaequilatera	2.1	0.2	*Senna glutinosa* subsp. *glutinosa*	1.4	0.1
Eucalyptus gamophylla	1.4	0.2	*Senna glutinosa* subsp. x *luerssenii*	1.5	0.1
Hakea chordophylla	1.6	0.2	*Themeda triandra*	0.1	0.1
Paraneurachne muelleri	0.3	0.2	*Tribulus hirsutus*	0.1	0.1

Site: R-116	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy clay loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low grazing, weeds (low)			
Veg Unit:	D3			
Location (NW):	50 775754 mE, 7409961 mN			

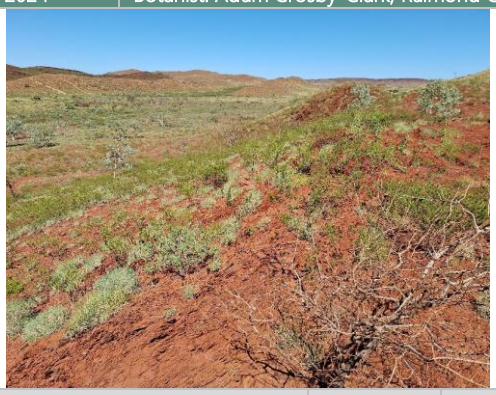


Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Chrysopogon fallax	0.8	22	*Acacia melleodora*	2.8	3
Triodia pungens	0.4	22	*Santalum lanceolatum*	2.3	2
**Cenchrus ciliaris*	0.5	12	*Senna artemisioides* subsp. x *artemisioides*	2.2	2
Eucalyptus gamophylla	5.8	7	*Paraneurachne muelleri*	0.2	1.2
Themeda triandra	0.3	6	*Aristida latifolia*	0.3	0.2
Acacia aptaneura	4.2	4	*Sida fibulifera*	0.2	0.2
Corymbia hamersleyana	7.2	4			

Site: R-117	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	23° - Steep South-west			
Soil:	Sandy loam, Light red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low grazing			
Veg Unit:	H1			
Location (NW):	50 779014 mE, 7412374 mN			

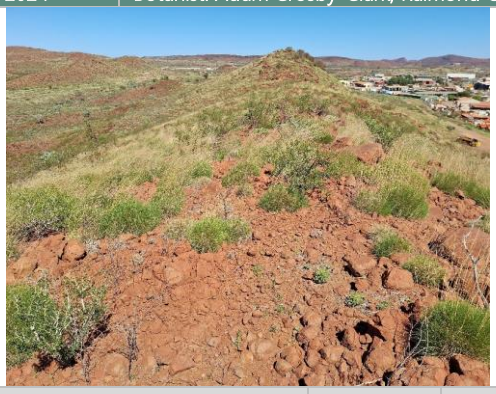
Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.3	15	**Cenchrus ciliaris*	0.3	0.2
Acacia maitlandii	2.4	13	*Eriachne mucronata*	0.2	0.2
Hakea lorea subsp. *lorea*	3.2	1	*Grevillea striata*	2.1	0.2
Themeda triandra	0.5	1	*Paraneurachne muelleri*	0.2	0.2
Triodia vanleeuwenii	0.4	1	*Santalum lanceolatum*	1.2	0.2
Acacia inaequilatera	1.2	0.4	*Ptilotus astrolasius*	0.3	0.1

Site: R-118	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	37° - Very steep South			
Soil:	Loam, Red-orange / light brown			
Rocks:	BIF			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 779941 mE, 7412467 mN			



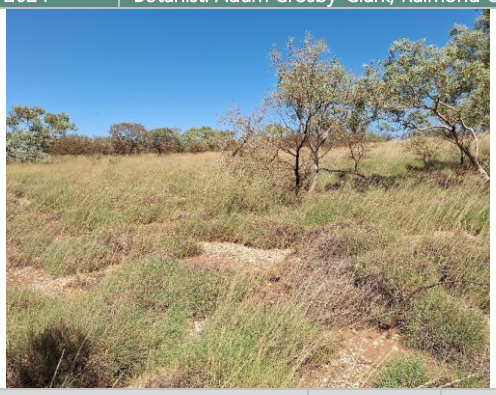
Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia spondylophylla	0.5	35	*Eriachne mucronata*	0.3	2
Triodia vanleeuwenii	0.4	30	*Petalostylis labicheoides*	1.4	0.6
Triodia wiseana	0.3	5	*Gompholobium oreophilum*	0.4	0.1
Eucalyptus leucophloia subsp. *leucophloia*	6.8	2	*Sida fibulifera*	0.2	0.1
Acacia maitlandii	2.2	2			

Site: R-119	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Hill crest, ridge			
Slope, aspect:	23° - Steep South			
Soil:	Sandy loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 779808 mE, 7412529 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.4	45	*Aristida contorta*	0.1	0.1
Acacia maitlandii	2.2	8	*Arivela viscosa*	0.4	0.1
Eremophila fraseri subsp. *fraseri*	1.6	0.8	*Codonocarpus cotinifolius*	1.2	0.1
Acacia bivenosa	1.2	0.6	*Enneapogon caerulescens*	0.1	0.1
Tribulus suberosus	0.5	0.4	*Ptilotus astrolasius*	0.3	0.1
Ptilotus rotundifolius	0.4	0.2	*Tribulus hirsutus*	0.1	0.1

Site: R-120	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Mid hill slope			
Slope, aspect:	10° - Moderate South-east			
Soil:	Loam, Light brown			
Rocks:	Quartz			
Abundance:	50-90% Abundant			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 776282 mE, 7409664 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia angusta	0.4	60	*Acacia bivenosa*	2.2	2
Eucalyptus leucophloia subsp. *leucophloia*	6.2	9	*Acacia tetragonophylla*	0.8	0.5
Acacia synchronicia	4.2	7	*Triodia wiseana*	0.2	0.4

Site: R-121	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	3° - Gentle North			
Soil:	Loam, Red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 775617 mE, 7409609 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.3	55	*Acacia tetragonophylla*	1.6	0.3
Acacia bivenosa	3.2	4	*Indigofera monophylla*	0.4	0.2
Acacia inaequilatera	2.5	1	*Ptilotus astrolasius*	0.4	0.2
Acacia sibirica	1.6	1			

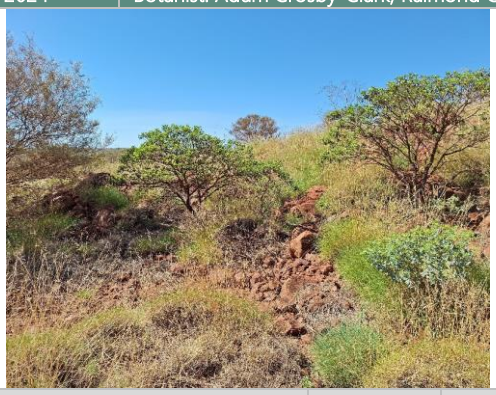
Site: R-122	Type: Releve	Size: Unbounded ~ 50 x 50 m	22/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	10° - Moderate North			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	Low dust			
Veg Unit:	H1			
Location (NW):	50 776014 mE, 7409720 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.4	45	*Enneapogon caerulescens*	0.2	0.1
Eucalyptus leucophloia subsp. *leucophloia*	4.2	6	*Eremophila cuneifolia*	0.4	0.1
Acacia synchronicia	4.8	6	*Ptilotus rotundifolius*	0.5	0.1
Senna glutinosa subsp. x *luerssenii*	2.2	1	*Sclerolaena eriacantha*	0.1	0.1
Senna glutinosa subsp. *pruinosa*	1.6	0.4	*Senna artemisioides* subsp. *helmsii*	0.5	0.1
Aristida contorta	0.2	0.1			

Site: R-123	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat crabhole clay plan			
Slope, aspect:	<1° - Level			
Soil:	Clay loam, Brown red-orange			
Rocks:	Basalt			
Abundance:	<2% Very few			
Size:	6-20 mm – Medium gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	CC1			
Location (NW):	50 777829 mE, 7412081 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Cynodon convergens	0.2	35	*Ptilotus gomphrenoides*	0.2	1
Dichanthium sericeum	0.2	35	*Aristida latifolia*	0.5	0.4
Operculina aequisepala	0.3	2	*Ipomoea lonchophylla*	0.2	0.2
Senna artemisioides subsp. *oligophylla*	0.5	1.5	*Corchorus tridens*	0.2	0.1
Senna artemisioides subsp. *helmsii*	0.4	1	*Euploca tanythrix*	0.2	0.1
Dolichocarpa crouchiana	0.2	1	*Ptilotus carinatus*	0.2	0.1

Site: R-124	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	23° - Steep South			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	50-90% Abundant			
Size:	200-600 mm - Stones			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 777712 mE, 7412236 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.4	20	*Acacia maitlandii*	1.8	0.4
Triodia pungens	0.6	15	*Acacia pruinocarpa*	3.4	0.4
Eremophila fraseri subsp. *fraseri*	2.2	4	*Acacia tetragonophylla*	1.6	0.4
Acacia sibirica	3.2	2	*Senna artemisioides* subsp. *helmsii*	0.4	0.2
Eriachne mucronata	0.3	1	*Senna glutinosa* subsp. *pruinosa*	0.5	0.2
Acacia aptaneura	4.2	0.7	*Arivela viscosa*	0.2	0.1
Hakea lorea subsp. *lorea*	2.4	0.7	*Indigofera monophylla*	0.2	0.1
Acacia inaequilatera	2.4	0.6			

Site: R-125	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	3° - Gentle North			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 775676 mE, 7409151 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.3	45	*Arivela viscosa*	0.1	0.1
Acacia bivenosa	2.1	3	*Euploca cunninghamii*	0.1	0.1
Acacia inaequilatera	2.6	1	*Euploca inexplicita*	0.1	0.1
Senna artemisioides subsp. *oligophylla*	0.8	1	*Tribulus hirsutus*	0.1	0.1
Acacia sibirica	0.6	0.5			

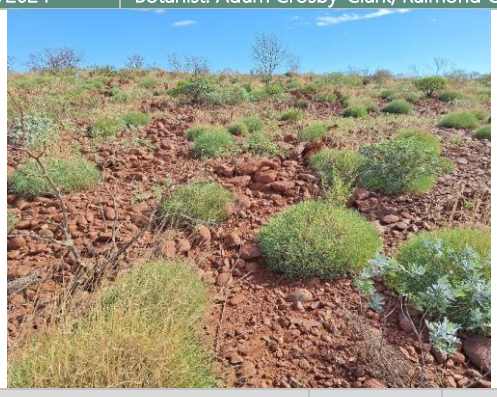
Site: R-126	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Light red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	H2			
Location (NW):	50 775518 mE, 7409004 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
*Cenchrus ciliaris	0.6	35	*Bidens bipinnata	0.2	0.1
Acacia aptaneura	6.8	31	*Dactyloctenium radulans*	0.1	0.1
*Cenchrus setiger	0.6	5	*Duperreya commixta*	1.2	0.1
Themeda triandra	1.4	3	*Enneapogon polyphyllus*	0.2	0.1
Triodia pungens	0.3	2	*Euploca cunninghamii*	0.1	0.1
Chrysopogon fallax	1.4	2	*Hibiscus sturtii* var. *campylochlamys*	0.3	0.1
Aristida latifolia	1.2	1	*Portulaca oleracea*	0.1	0.1
Acacia synchronicia	0.9	0.8	*Sclerolaena cornishiana*	0.2	0.1
Acacia sibirica	1.8	0.4	*Senna notabilis*	0.2	0.1
Ptilotus obovatus	1.2	0.2	*Tribulus astrocarpus*	0.1	0.1
Arivela viscosa	0.3	0.1			

Site: R-127	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle North-west			
Soil:	Clay loam, Red orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low grazing, weeds (low), recent fire			
Veg Unit:	H2			
Location (NW):	50 775445 mE, 7409420 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.6	55	*Digitaria brownii*	0.4	0.4
Acacia sibirica	3.6	9	*Paraneurachne muelleri*	0.4	0.3
**Cenchrus ciliaris*	0.4	4	*Cymbopogon obtectus*	0.6	0.2
Acacia tetragonophylla	2.2	3	*Rhagodia eremaea*	0.9	0.2
Acacia aptaneura	4.8	2	*Sida fibulifera*	0.2	0.2
Acacia melleodora	2.8	2	*Arivela viscosa*	0.2	0.1
Acacia pachyacra	3.8	1	*Hibiscus sturtii* var. *campylochlamys*	0.3	0.1
Chrysopogon fallax	0.6	1			

Site: R-128	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	10° - Moderate North			
Soil:	Sandy loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	2-5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 780347 mE, 7411074 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.4	12	*Triodia pungens*	0.4	1
Eremophila fraseri subsp. *fraseri*	1.2	5	*Enneapogon caerulescens*	0.2	1
Senna glutinosa subsp. x *luerssenii*	1.2	5	*Acacia sibirica*	0.4	0.2
Senna glutinosa subsp. *pruinosa*	1.2	4	*Aristida contorta*	0.3	0.2
Senna artemisioides subsp. *helmsii*	1.1	3	*Indigofera monophylla*	0.3	0.2
Senna artemisioides subsp. *oligophylla*	1	3	*Arivela viscosa*	0.2	0.1
Tribulus suberosus	1.4	2	*Ptilotus exaltatus*	0.2	0.1
Acacia tetragonophylla	1.1	1.4	*Ptilotus helipteroides*	0.2	0.1

Site: R-129	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy clay, Red-orange / light brown			
Rocks:	Ironstone Quartz			
Abundance:	2-10% Few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low grazing			
Veg Unit:	FP1			
Location (NW):	50 779517 mE, 7412209 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	50	*Paraneurachne muelleri*	0.4	0.2
Acacia bivenosa	1.8	18	*Ptilotus obovatus*	0.8	0.2
Acacia maitlandii	1.4	1	*Enneapogon caerulescens*	0.4	0.1
Eragrostis eriopoda	0.4	1	*Enneapogon robustissimus*	0.1	0.1
Acacia tetragonophylla	1.2	0.8	*Euphorbia australis* var. *hispidula*	0.1	0.1
**Cenchrus ciliaris*	0.4	0.6	*Indigofera monophylla*	0.3	0.1
Acacia sibirica	2.4	0.5	*Ptilotus astrolasius*	0.2	0.1
Acacia pachyacra	3.6	0.2	*Scaevola amblyanthera* var. *centralis*	0.1	0.1
Arivela viscosa	0.4	0.2	*Senna artemisioides* subsp. *oligophylla*	0.4	0.1
Hakea lorea subsp. *lorea*	2.4	0.2	*Tribulus hirsutus*	0.1	0.1

Site: R-130	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	3° - Gentle East			
Soil:	Sandy clay loam, Brown red-orange			
Rocks:	Quartz			
Abundance:	50-90% Abundant			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	FP1			
Location (NW):	50 782416 mE, 7410583 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia sibirica	3.2	21	*Acacia pruinocarpa*	2.2	0.4
Triodia pungens	0.4	18	*Senna artemisioides* subsp. *oligophylla*	0.4	0.4
Acacia synchronicia	2.2	6	*Chrysopogon fallax*	0.7	0.2
Ptilotus obovatus	0.5	6	*Hakea lorea* subsp. *lorea*	2.2	0.2
Senna artemisioides subsp. *helmsii*	0.6	6	*Senna glutinosa* subsp. x *luerssenii*	0.4	0.2
**Cenchrus ciliaris*	0.4	4	*Duperreya commixta*	0.5	0.1
Acacia tetragonophylla	3.4	2	*Enneapogon caerulescens*	0.2	0.1
Acacia inaequilatera	3.2	2	*Ptilotus exaltatus*	0.2	0.1
Indigofera monophylla	0.3	2	*Sporobolus australasicus*	0.3	0.1
Tribulus suberosus	0.4	1			

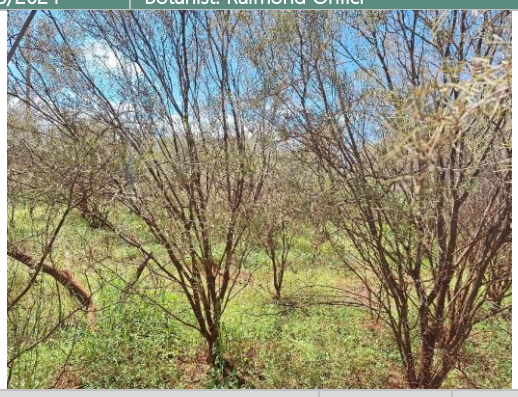
Site: R-131	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat, rocky outcrop			
Slope, aspect:	10° - Moderate North			
Soil:	Clay loam, Red-orange			
Rocks:	BIF			
Abundance:	>90% Continuous			
Size:	20-60 mm - Coarse gravel			
Fire:	2-5 yrs			
Condition:	Very Good			
Notes:	Tracks			
Veg Unit:	FP1			
Location (NW):	50 785198 mE, 7411896 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.3	18	*Ptilotus rotundifolius*	1.2	0.2
Acacia inaequilatera	1.8	0.4	*Senna glutinosa* subsp. *glutinosa*	1.4	0.2
Corymbia hamersleyana	7.4	0.3	*Eremophila latrobei* subsp. *glabra*	0.4	0.1
Senna glutinosa subsp. x *luerssenii*	1.3	0.3	*Ptilotus astrolasius*	0.3	0.1
Acacia tetragonophylla	0.8	0.2			

Site: R-132	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Red-orange			
Rocks:	Calcrete			
Abundance:	20-50% Many			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H3			
Location (NW):	50 785207 mE, 7412228 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	35	35	*Senna artemisioides* subsp. *oligophylla*	0.3	0.2
Melaleuca eleuterostachya	1.4	6	*Corchorus lasiocarpus* subsp. *parvus*	0.4	0.1
Acacia synchronicia	0.7	0.2			

Site: R-133	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	<1° - Level			
Soil:	Clay, Red brown			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	D1			
Location (NW):	50 784923 mE, 7409860 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	2.5	55	**Echinochloa colona*	0.4	0.3
Ptilotus gomphrenoides	0.15	8	*Neptunia xanthonema*	0.5	0.3
Corymbia candida	2	7	*Themeda triandra*	1.2	0.3
Cyperus iria	0.3	7	**Bidens bipinnata*	0.3	0.2
Chrysopogon fallax	1	3	**Malvastrum americanum*	0.35	0.2
**Setaria verticillata*	0.5	1	*Peplidium aithocheilum*	0.1	0.2
Themeda triandra	1.1	0.5	*Marsilea exarata*	0.15	0.1
Acacia tetragonophylla	2	0.4	*Rhynchosia minima*	1	0.1
Alternanthera denticulata var. *denticulata*	5	0.3	**Vachellia farnesiana*	1.1	0.1

Site: R-134	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy clay loam, Red-orange			
Rocks:	Ironstone			
Abundance:	10 -20% Common			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low), litter			
Veg Unit:	FP1			
Location (NW):	50 784593 mE, 7409659 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	26	*Acacia ancistrocarpa*	2.2	0.4
Acacia tetragonophylla	2.2	7	*Senna artemisioides* subsp. *helmsii*	0.3	0.2
**Cenchrus ciliaris*	0.4	6	*Aristida contorta*	0.2	0.1
Acacia aptaneura	2.4	5	*Arivela viscosa*	0.2	0.1
Acacia sibirica	1.8	4	*Evolvulus alsinoides* var. *villosicalyx*	0.2	0.1
Acacia pruinocarpa	4.2	2	*Ptilotus helipteroides*	0.2	0.1
Corymbia candida	6.4	1	*Themeda triandra*	0.2	0.1
Eragrostis eriopoda	0.3	1	*Tribulus hirsutus*	0.1	0.1

Site: R-135	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat, undulating plain			
Slope, aspect:	3° - Gentle West			
Soil:	Clay loam, Brown red-orange			
Rocks:	Calcrete Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	2-5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	FP1			
Location (NW):	50 784685 mE, 7410590 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia angusta	0.4	12	*Enneapogon polyphyllus*	0.3	0.2
Codonocarpus cotinifolius	4.8	5	*Eragrostis eriopoda*	0.3	0.2
Acacia aptaneura	4.2	4	*Indigofera monophylla*	0.3	0.2
Senna artemisioides subsp. *helmsii*	0.5	4	*Ptilotus exaltatus*	0.1	0.2
**Cenchrus ciliaris*	0.5	4	*Sida fibulifera*	0.3	0.2
Acacia sclerosperma subsp. *sclerosperma*	1.8	1	*Solanum lasiophyllum*	0.4	0.2

Site: R-136	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	3° - Gentle			
Soil:	Sandy loam, Brown red-orange			
Rocks:	Ironstone Quartz			
Abundance:	2-10% Few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	FP1			
Location (NW):	50 785215 mE, 7410604 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	30	*Aristida contorta*	0.2	0.2
**Cenchrus ciliaris*	0.8	25	*Portulaca oleracea*	0.1	0.2
Acacia sclerosperma subsp. *sclerosperma*	4.6	8	*Ptilotus exaltatus*	0.2	0.2
Chrysopogon fallax	1.4	5	*Sida fibulifera*	0.2	0.2
Acacia aptaneura	4.3	4	*Arivela viscosa*	0.3	0.1
Hakea lorea subsp. *lorea*	4.3	3	*Dactyloctenium radulans*	0.2	0.1
Corymbia candida	7.9	2			

Site: R-137	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Brown red-orange			
Rocks:	Ironstone Quartz			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Litter, tracks			
Veg Unit:	H2			
Location (NW):	50 780527 mE, 7412238 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.3	20	*Eremophila forrestii* subsp. *forrestii*	1.2	0.2
Acacia aptaneura	5.4	12	*Eremophila latrobei* subsp. *filiformis*	1.8	0.2
Triodia pungens	0.4	12	*Senna glutinosa* subsp. x *luerssenii*	0.5	0.2
Acacia aneura	5.4	6	*Duperreya commixta*	0.4	0.1
Acacia pruinocarpa	6.1	4	*Hibiscus burtonii*	0.4	0.1
Acacia sibirica	2.4	2	*Indigofera monophylla*	0.4	0.1
Acacia tetragonophylla	2.4	2	*Solanum cleistogamum*	0.2	0.1
Eremophila platycalyx subsp. *pardalota*	2.6	1.1			

Site: R-138	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on flat			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Poor			
Notes:	Litter, weeds (high), reduced native understorey			
Veg Unit:	H2			
Location (NW):	50 780596 mE, 7411981 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.6	70	*Acacia maitlandii*	1.7	0.3
Acacia incurvaneura	8.2	27	*Arivela viscosa*	0.2	0.2
Acacia pruinocarpa	4.7	4	**Bidens bipinnata*	0.2	0.1
Triodia pungens	0.4	4	*Duperreya commixta*	1.4	0.1
Paraneurachne muelleri	0.3	1.1	*Evolvulus alsinoides* var. *villosicalyx*	0.2	0.1
Acacia bivenosa	2.4	1	*Isotropis iophyta*	0.6	0.1
Chrysopogon fallax	0.7	0.8	*Ptilotus exaltatus*	0.3	0.1
Eucalyptus xerothermica	8.6	0.6	*Senna notabilis*	0.2	0.1
Themeda triandra	0.3	0.5	*Sida fibulifera*	0.2	0.1
Acacia tetragonophylla	2.2	0.4			

Site: R-139	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Dark red-orange			
Rocks:	Ironstone Quartz			
Abundance:	>90% Continuous			
Size:	20-60 mm - Coarse gravel			
Fire:	2-5 yrs			
Condition:	Good			
Notes:	Litter, tracks			
Veg Unit:	H2			
Location (NW):	50 780083 mE, 7411763 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	17	*Duperreya commixta*	0.2	0.1
Acacia aptaneura	6.2	6	*Evolvulus alsinoides* var. *villosicalyx*	0.2	0.1
Acacia paraneura	7.2	2	*Hibiscus burtonii*	0.3	0.1
Acacia sibirica	2.4	1.6	*Paraneurachne muelleri*	0.3	0.1
Acacia tetragonophylla	0.4	0.5	*Senna artemisioides* subsp. *helmsii*	0.4	0.1
Tribulus suberosus	1.2	0.4	*Senna artemisioides* subsp. *oligophylla*	0.4	0.1
Triodia vanleeuwenii	0.3	0.4	*Senna glutinosa* subsp. x *luerssenii*	0.5	0.1
Eremophila latrobei subsp. *filiformis*	0.5	0.2	*Solanum lasiophyllum*	0.2	0.1
Hibiscus coatesii	0.3	0.2	*Trichodesma zeylanicum* var. *zeylanicum*	0.2	0.1
Indigofera monophylla	0.3	0.2			

Site: R-140	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Raimond Orifici
Landform:	Drainage depression			
Slope, aspect:	<1° - Level			
Soil:	Clay, Red brown			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	D1			
Location (NW):	50 783974 mE, 7410208 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	7.7	50	*Arivela viscosa*	0.3	0.3
Acacia aptaneura	3.5	15	*Cucumis variabilis*	0.5	0.3
Dactyloctenium radulans	0.15	13	*Rhagodia eremaea*	0.6	0.3
Chrysopogon fallax	0.6	7	*Sida fibulifera*	0.4	0.3
Corymbia candida	8	4	*Corchorus tridens*	0.25	0.2
Acacia tetragonophylla	3.5	3	*Dichanthium sericeum*	0.7	0.2
Hakea lorea subsp. *lorea*	6.5	2	*Urochloa occidentalis* var. *occidentalis*	0.2	0.2
**Malvastrum americanum*	0.5	2	**Bidens bipinnata*	0.3	0.1
Themeda triandra	0.3	2	*Ptilotus polystachyus*	0.2	0.1
**Vachellia farnesiana*	1.7	1	*Eucalyptus xerothermica*	6.2	0

Site: R-141	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	3° - Gentle North-west			
Soil:	Clay loam, Red orange			
Rocks:	Quartz Ironstone			
Abundance:	20-50% Many			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Litter, tracks, weeds (medium)			
Veg Unit:	FP1			
Location (NW):	50 784576 mE, 7410068 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	2.3	5	*Paraneurachne muelleri*	0.3	0.2
Eremophila galeata	1.2	5	*Ptilotus helipteroides*	0.2	0.2
Triodia pungens	0.5	4	*Sclerolaena cornishiana*	0.5	0.2
Senna artemisioides subsp. *oligophylla*	1.7	3	*Tribulus astrocarpus*	0.1	0.2
**Cenchrus ciliaris*	0.7	2	*Dactyloctenium radulans*	0.15	0.1
Anthobolus leptomerioides	2	0.3	*Hibiscus burtonii*	1	0.1
Senna artemisioides subsp. *helmsii*	0.4	0.3	*Ptilotus schwartzii*	0.3	0.1
Aristida contorta	0.3	0.2	*Senna* sp. Meekatharra (E. Bailey 1-26)	0.2	0.1
Arivela viscosa	0.3	0.2	*Trianthema triquetra*	0.1	0.1

Site: R-142	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle South			
Soil:	Sandy loam, Red-orange			
Rocks:	Calcrete			
Abundance:	10 -20% Common			
Size:	200-600 mm - Stones			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	FP1			
Location (NW):	50 785490 mE, 7411402 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	25	*Rhagodia eremaea*	1.5	1
Senna artemisioides subsp. x *artemisioides*	2	15	*Sida fibulifera*	0.25	0.5
Fimbristylis dichotoma	0.2	12	*Ptilotus helipteroides*	0.2	0.2
Acacia sclerosperma subsp. *sclerosperma*	3	10	*Dactyloctenium radulans*	0.1	0.1
**Cenchrus ciliaris*	0.5	8	*Duperreya commixta*	1	0.1
Hakea lorea subsp. *lorea*	4	5	*Enneapogon caerulescens*	0.2	0.1
Ptilotus obovatus	1	2	*Eragrostis dielsii*	1	0.1
Arivela viscosa	0.3	1	*Eremophila margarethae*	1	0.1
Senna artemisioides subsp. *oligophylla*	0.7	1			

Site: R-143	Type: Releve	Size: Unbounded ~ 50 x 50 m	24/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage. Crabhole/quartz clay plains			
Slope, aspect:	1° - Very Gentle			
Soil:	Clay loam, Dark red-orange			
Rocks:	Bassalt Quartz			
Abundance:	20-50% Many			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	CC1			
Location (NW):	50 781378 mE, 7410989 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Iseilema vaginiflorum	0.2	65	*Panicum laevinode*	0.2	0.2
Aristida latifolia	0.5	4	*Senna artemisioides* subsp. *helmsii*	0.2	0.2
Cynodon convergens	0.2	4	*Vigna* sp. Hamersley Clay (A.A. Mitchell PRP 113)	0.2	0.2
Ptilotus gomphrenoides	0.2	4	*Astrebla pectinata*	0.2	0.1
Dichanthium sericeum subsp. *humilius*	0.2	3	*Dolichocarpa crouchiana*	0.2	0.1
Sclerolaena bicornis	0.3	0.4	*Operculina aequisepala*	0.3	0.1
Indigofera linifolia	0.2	0.2	*Sida fibulifera*	0.2	0.1
Ipomoea lonchophylla	0.2	0.2	*Tephrosia* sp. clay soils (S. van Leeuwen et al. PBS 0273)	0.2	0.1

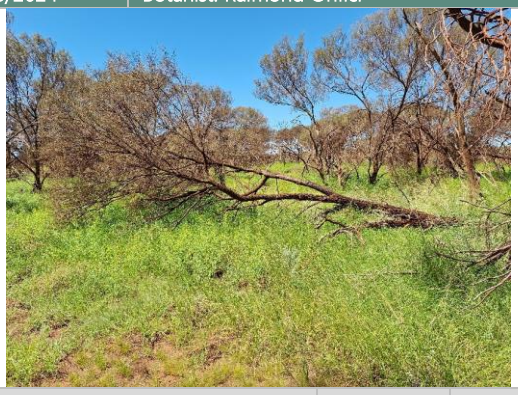
Site: R-144	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle South-west			
Soil:	Clay loam, Red brown			
Rocks:	Quartz Ironstone			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium), tracks			
Veg Unit:	FP1			
Location (NW):	50 782607 mE, 7411189 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Senna glutinosa subsp. x *luerssenii*	1.6	15	*Rhagodia eremaea*	1.5	1
Acacia aptaneura	5	10	*Aristida contorta*	0.25	0.3
**Cenchrus ciliaris*	0.7	4	*Arivela viscosa*	0.3	0.3
Acacia tetragonophylla	3.5	3	*Enneapogon polyphyllus*	0.2	0.3
Indigofera monophylla	0.7	3	*Sida fibulifera*	0.25	0.3
Chrysopogon fallax	1	2	*Tragus australianus*	0.2	0.3
Senna artemisioides subsp. *helmsii*	0.7	2	*Ptilotus helipteroides*	0.25	0.2
Tribulus suberosus	1	2	*Tribulus astrocarpus*	0.1	0.2
Hibiscus burtonii	0.8	1	*Indigofera linifolia*	0.1	0.1

Site: R-145	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat, undulating plain			
Slope, aspect:	10° - Moderate			
Soil:	Clay loam, Red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	D3			
Location (NW):	50 787395 mE, 7414088 mN			

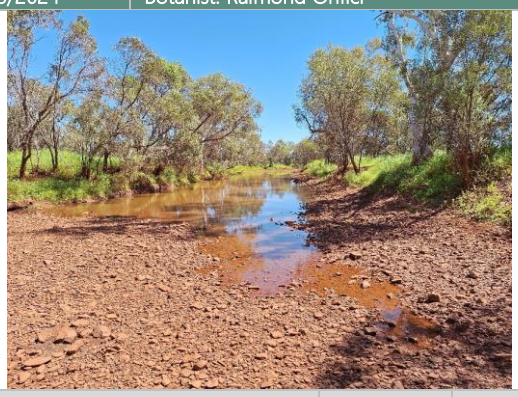
Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia vanleeuwenii	0.4	65	*Acacia tetragonophylla*	1.8	0.6
Eucalyptus gamophylla	4.8	8	*Acacia incurvaneura*	3.2	0.4
Acacia pruinocarpa	4.2	3	*Hakea chordophylla*	3.4	0.4
Triodia pungens	0.4	3	*Eremophila fraseri* subsp. *fraseri*	1.3	0.2
Hakea lorea subsp. *lorea*	3.2	1			

Site: R-146	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	<1° - Level			
Soil:	Clay, Brown red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	H2			
Location (NW):	50 787683 mE, 7414395 mN			



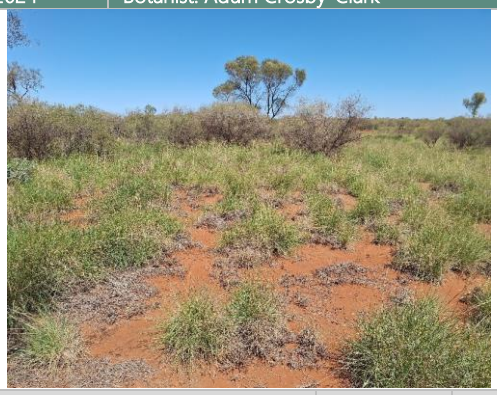
Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	6	50	*Arivela viscosa*	0.3	1
**Cenchrus ciliaris*	0.5	40	*Cheilanthes sieberi*	0.3	0.5
Fimbristylis dichotoma	0.4	5	*Chrysopogon fallax*	0.8	0.5
Senna artemisioides subsp. *oligophylla*	1.5	2	*Solanum lasiophyllum*	0.5	0.5
**Bidens bipinnata*	0.25	2	*Maireana tomentosa* subsp. *tomentosa*	0.5	0.3
Eremophila forrestii subsp. *forrestii*	2.1	1.5	*Rhagodia eremaea*	1.7	0.3
Eremophila latrobei subsp. *latrobei*	2	1.5	*Acrachne racemosa*	0.4	0.1
Dactyloctenium radulans	0.2	1			

Site: R-147	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Creek / River bed			
Slope, aspect:	3° - Gentle East			
Soil:	Sandy loam, Red-orange			
Rocks:	Creek stones			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	None			
Veg Unit:	D2			
Location (NW):	50 785724 mE, 7413154 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Eucalyptus victrix	12	25	*Themeda triandra*	1.5	0.5
Acacia citrinoviridis	7	25	**Bidens bipinnata*	0.3	0.3
**Cenchrus ciliaris*	0.5	15	*Cucumis variabilis*	0.5	0.3
**Malvastrum americanum*	0.5	5	*Cyperus iria*	0.5	0.3
**Echinochloa colona*	0.5	4	*Amaranthus cuspidifolius*	0.3	0.2
Eulalia aurea	0.5	3	*Eragrostis tenellula*	0.3	0.1
Ipomoea racemigera	1	0.6			

Site: R-148	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Sandy calcrete rise breaks away into clayplans			
Slope, aspect:	3° - Gentle			
Soil:	Sand, Light red-orange			
Rocks:	Calcrete			
Abundance:	2-10% Few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium)			
Veg Unit:	FP1			
Location (NW):	50 785878 mE, 7412674 mN			

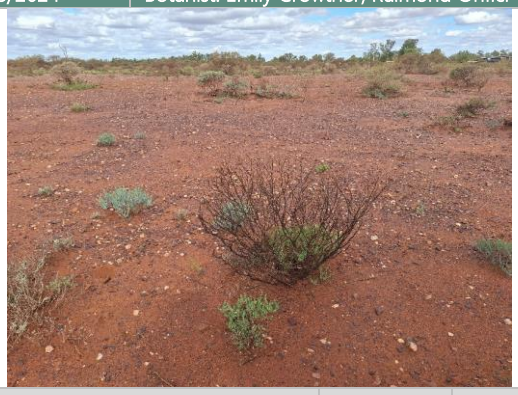


Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	45	*Acacia tetragonophylla*	1.9	0.6
Acacia sclerosperma subsp. *sclerosperma*	3.4	12	*Senna artemisioides* subsp. *oligophylla*	0.5	0.2
**Cenchrus ciliaris*	0.4	5	*Dactyloctenium radulans*	0.2	0.1
Acacia aptaneura	2.6	2	*Ptilotus helipteroides*	0.2	0.1
Grevillea striata	6.3	1			

Site: R-149	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Creek / River bed			
Slope, aspect:	1° - Very Gentle			
Soil:	Loam, Brown red-orange			
Rocks:	Creek stones Ironstone			
Abundance:	<2% Very few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	D2			
Location (NW):	50 784975 mE, 7411084 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Eriachne benthamii	0.3	75	*Cyperus iria*	0.2	0.2
Eucalyptus victrix	11.2	12	-	-	-

Site: R-150	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Emily Crowther, Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle North-west			
Soil:	Clay loam, Red brown			
Rocks:	Quartz Ironstone			
Abundance:	20-50% Many			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Low dust			
Veg Unit:	P1			
Location (NW):	50 785866 mE, 7410540 mN			

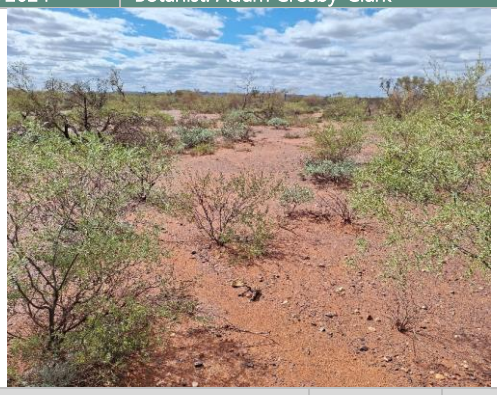


Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Hakea preissii	6	10	*Senna glutinosa* subsp. x *luerssenii*	1.5	2
Eremophila lachnocalyx	1.9	7	*Grevillea striata*	4	1
Acacia synchronicia	2.6	5	*Sclerolaena eriacantha*	0.15	1
Acacia aptaneura	3	4	*Maireana villosa*	0.4	0.5
Acacia tetragonophylla	2.5	3	*Sclerolaena cuneata*	2	0.3
Senna sp. Meekatharra (E. Bailey 1-26)	1.1	3	*Lepidium platypetalum*	0.5	0.2
Enneapogon polyphyllus	0.3	2	*Ptilotus exaltatus*	0.3	0.1
Enteropogon ramosus	0.4	2			

Site: R-151	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark
Landform:	Drainage (floodplain)			
Slope, aspect:	3° - Gentle West			
Soil:	Clay loam, Light red-orange			
Rocks:	Ironstone			
Abundance:	<2% Very few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Low grazing			
Veg Unit:	FP1			
Location (NW):	50 784866 mE, 7409456 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	3.2	18	*Arivela viscosa*	0.4	0.5
**Cenchrus ciliaris*	0.6	12	*Enneapogon polyphyllus*	0.3	0.3
Chrysopogon fallax	1.4	8	*Dactyloctenium radulans*	0.2	0.2
Aristida contorta	0.3	4	*Portulaca oleracea*	0.2	0.2
Acacia synchronicia	3.3	3	*Ptilotus gomphrenoides*	0.3	0.2
Acacia sclerosperma subsp. *sclerosperma*	2.4	2	*Ptilotus helipteroides*	0.3	0.2
Acacia tetragonophylla	2.6	1.5	*Senna artemisioides* subsp. *helmsii*	0.3	0.2
Acacia bivenosa	2.6	1	*Sida fibulifera*	0.3	0.2
Grevillea striata	5.3	1	*Trianthema triquetra*	0.2	0.1

Site: R-152	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	1° - Very Gentle			
Soil:	Sandy loam, Red-orange			
Rocks:	Ironstone Quartz			
Abundance:	50-90% Abundant			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	Weeds (low), tracks			
Veg Unit:	P1			
Location (NW):	50 785086 mE, 7409296 mN			

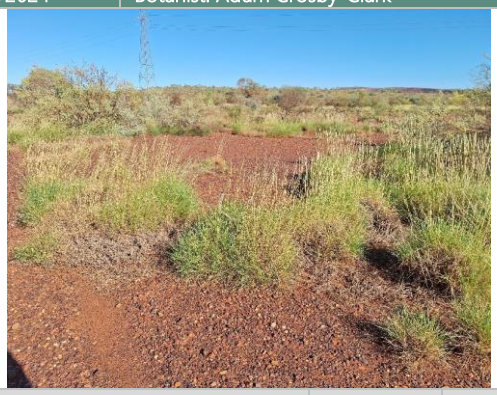


Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia synchronicia	2.6	6	*Grevillea striata*	6.8	0.8
Hakea preissii	2.4	3	*Chrysopogon fallax*	1.3	0.4
Senna glutinosa subsp. x *luerssenii*	1.7	3	*Eremophila cuneifolia*	0.6	0.4
Senna artemisioides subsp. x *sturtii*	0.4	2	*Scaevola spinescens*	4	0.2
**Cenchrus ciliaris*	0.5	2	*Sida fibulifera*	0.3	0.1
Acacia tetragonophylla	2.2	0.8			

Site: R-153	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Raimond Orifici
Landform:	Creek / River bank			
Slope, aspect:	<1° - Level			
Soil:	Sandy clay, Red brown			
Rocks:	Ironstone			
Abundance:	2-10% Few			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	High grazing			
Veg Unit:	D2			
Location (NW):	50 785392 mE, 7409277 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.6	55	*Triodia longiceps*	1	0.3
Acacia citrinoviridis	4.5	15	*Bothriochloa ewartiana*	0.7	0.2
Eucalyptus victrix	10	3	*Portulaca oleracea*	0.1	0.2
Acacia aptaneura	3	2.5	**Bidens bipinnata*	0.3	0.1
Hakea lorea subsp. *lorea*	4	2.5	*Corchorus tridens*	0.4	0.1
Arivela viscosa	0.3	2	*Ipomoea muellerii*	0.1	0.1
Chrysopogon fallax	0.7	1.5	*Ptilotus exaltatus*	0.3	0.1
Triodia pungens	0.6	0.5	*Ptilotus helipteroides*	0.3	0.1
Eragrostis eriopoda	0.5	0.3	**Tribulus terrestris*	0.1	0.1
Trianthema triquetra	0.4	0.3	*Triodia longiceps*	1	0.3

Site: R-154	Type: Releve	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Adam Crosby-Clark
Landform:	Flat plain			
Slope, aspect:	3° - Gentle South-east			
Soil:	Sandy clay loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	20-60 mm - Coarse gravel			
Fire:	2-5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	P1			
Location (NW):	50 789025 mE, 7415141 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	14	*Acacia incurvaneura*	1.4	0.3
Acacia synchronicia	3.2	4	*Arivela viscosa*	0.3	0.2
Acacia bivenosa	2.4	3	*Hakea lorea* subsp. *lorea*	3.1	0.2
Acacia tetragonophylla	2.4	1.1	*Ptilotus obovatus*	0.4	0.2
Acacia pruinocarpa	2.4	0.5	*Senna artemisioides* subsp. *oligophylla*	0.4	0.2
Codonocarpus cotinifolius	3.2	0.5	*Senna notabilis*	0.3	0.1
Acacia inaequilatera	2.6	0.3	*Solanum lasiophyllum*	0.3	0.1

Site: R-155	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	3° - Gentle			
Soil:	Sandy clay loam, Brown red-orange			
Rocks:	Creek stones Ironstone			
Abundance:	20-50% Many			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium)			
Veg Unit:	D2			
Location (NW):	50 789350 mE, 7415366 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	16	*Hakea chordophylla*	2.2	0.4
Acacia synchronicia	2.4	8	*Senna glutinosa* subsp. *pruinosa*	1.4	0.2
**Cenchrus setiger*	0.5	6	*Sporobolus australasicus*	0.2	0.2
Eucalyptus victrix	12.2	4	*Arivela viscosa*	0.3	0.1
Acacia tetragonophylla	1.6	2	*Enneapogon polyphyllus*	0.2	0.1
Senna artemisioides subsp. x *sturtii*	0.7	2	*Euploca cunninghamii*	0.2	0.1
Acacia pruinocarpa	4.4	1	*Acacia aptaneura*	1.4	0
Codonocarpus cotinifolius	4.3	0.4	*Acacia sclerosperma* subsp. *sclerosperma*	2.4	0

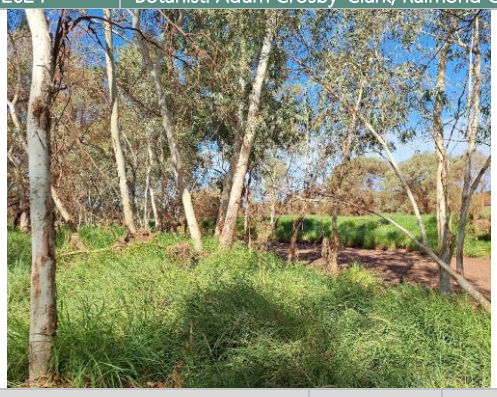
Site: R-156	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	3° - Gentle			
Soil:	Clay loam, Red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (medium)			
Veg Unit:	FP1			
Location (NW):	50 789139 mE, 7415278 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.3	8	*Dactyloctenium radulans*	0.2	0.3
Acacia aptaneura	3.5	7	*Ptilotus obovatus*	0.4	0.3
Acacia synchronicia	3.2	6	*Cymbopogon ambiguus*	1.2	0.2
Acacia tetragonophylla	3.2	1.1	*Perotis rara*	0.1	0.2
Acacia pruinocarpa	3.6	0.5	*Themeda triandra*	0.2	0.2
Enneapogon polyphyllus	0.3	0.4	*Arivela viscosa*	0.3	0.1
Triodia pungens	0.3	0.4	*Ptilotus helipteroides*	0.2	0.1
Aristida contorta	0.2	0.3			

Site: R-157	Type: Releve	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Emily Crowther, Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	1° - Very Gentle North			
Soil:	Clay loam, Red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	2-5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	D2			
Location (NW):	50 790092 mE, 7415656 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.5	50	**Cynodon dactylon*	0.3	0.4
Eucalyptus victrix	10	45	*Eulalia aurea*	0.5	0.4
Eucalyptus camaldulensis	12	25	**Vachellia farnesiana*	1	0.3
Acacia sclerosperma subsp. *sclerosperma*	2	5	*Euphorbia biconvexa*	0.3	0.2
Petalostylis labicheoides	2	5	**Malvastrum americanum*	0.5	0.2
Eucalyptus xerothermica	5	2	*Rhynchosia minima*	1	0.2
Acacia citrinoviridis	2	2	*Sida fibulifera*	0.5	0.2
Glycine canescens	0.2	0.5	*Nellica maderaspatensis*	0.3	0.1

Site: R-158	Type: Releve	Size: Unbounded ~ 50 x 50 m	21/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Creek / River bank			
Slope, aspect:	10° - Moderate South			
Soil:	Clay loam, Dark red-orange			
Rocks:	Creek stones			
Abundance:	2-10% Few			
Size:	6-20 mm - Medium gravel			
Fire:	> 5 yrs			
Condition:	Poor			
Notes:	Low dust, medium grazing activity, Weeds (high), no native understorey, vegetation stucture altered			
Veg Unit:	D2			
Location (NW):	50 775523 mE, 7413233 mN			

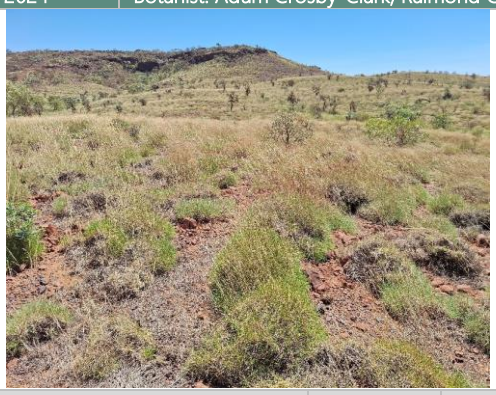


Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	1.3	90	**Cynodon dactylon*	0.3	1
Eucalyptus victrix	14	16	**Malvastrum americanum*	1.2	0.1
Acacia citrinoviridis	11	15	*Sesbania cannabina*	0.4	0.1

Site: R-159	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Drainage line on lower slope			
Slope, aspect:	3° - Gentle South-east			
Soil:	Sandy clay loam, Brown red-orange			
Rocks:	Ironstone			
Abundance:	2-10% Few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	D3			
Location (NW):	50 777405 mE, 7410926 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.4	60	*Acacia synchronicia*	2.1	0.8
Eucalyptus gamophylla	4.8	6	*Cymbopogon ambiguus*	1.1	0.5
Acacia melleodora	2.6	6	*Senna artemisioides* subsp. *helmsii*	0.4	0.4
Acacia inaequilatera	4.8	4	*Senna artemisioides* subsp. *oligophylla*	0.8	0.4
Acacia bivenosa	2.2	3	*Cymbopogon obtectus*	0.6	0.2
Acacia pachyacra	2.4	3	*Indigofera monophylla*	0.3	0.2
Triodia vanleeuwenii	0.3	1.2	*Duperreya commixta*	1.2	0.1

Site: R-160	Type: Releve	Size: Unbounded ~ 50 x 50 m	23/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Simple hill crest			
Slope, aspect:	10° - Moderate South			
Soil:	Loam, Dark red-orange			
Rocks:	Ironstone			
Abundance:	>90% Continuous			
Size:	60-200 mm - Cobbles			
Fire:	> 5 yrs			
Condition:	Excellent			
Notes:	None			
Veg Unit:	H1			
Location (NW):	50 777352 mE, 7410891 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia wiseana	0.4	30	*Ptilotus rotundifolius*	0.5	0.8
Triodia vanleeuwenii	0.4	10	*Acacia synchronicia*	2.3	0.4
Acacia inaequilatera	3.2	1.5	*Senna glutinosa* subsp. x *luerssenii*	0.7	0.3
Acacia bivenosa	2.4	1.1	*Senna glutinosa* subsp. *pruinosa*	0.4	0.2
Acacia tetragonophylla	2.2	1	*Senna artemisioides* subsp. *helmsii*	0.4	0.2
Hakea lorea subsp. *lorea*	3.2	0.8	*Senna artemisioides* subsp. *oligophylla*	0.4	0.2

Site: R-161	Type: Releve	Size: Unbounded ~ 50 x 50 m	21/03/2024	Botanist: Adam Crosby-Clark, Raimond Orifici
Landform:	Creek / River bank			
Slope, aspect:	10° - Moderate North			
Soil:	Clay loam, Dark red-orange			
Rocks:	Creek stones			
Abundance:	2-10% Few			
Size:	6-20 mm – Medium gravel			
Fire:	> 5 yrs			
Condition:	Poor			
Notes:	Low dust, low grazing, Weeds (high), no native understorey, vegetation stucture altered			
Veg Unit:	D2			
Location (NW):	50 774959 mE, 7412806 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	1.1	90	*Cyperus vaginatus*	0.7	1.1
Acacia citrinoviridis	12	50	**Malvastrum americanum*	0.6	0.3
Eucalyptus victrix	11	8	*Amaranthus undulatus*	1.2	0.2

Site: RA-001	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	25/03/2024	Botanist: Emily Crowther, Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle North			
Soil:	Clay, Orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	None			
Veg Unit:	-			
Location (NW):	50 785654 mE, 7410527 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	4	40	*Ptilotus obovatus*	0.4	2
Enneapogon polyphyllus	0.3	15	*Chrysopogon fallax*	1.1	1.3
Hibiscus burtonii	1.3	6	*Fimbristylis dichotoma*	0.2	1
Eremophila forrestii subsp. *forrestii*	1	3	*Tephrosia* sp. Newman (A.A. Mitchell PRP 29)	0.1	0.1

Site: RA-002	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Emily Crowther, Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	3° - Gentle East			
Soil:	Sandy clay loam, Red-orange			
Rocks:	Calcrete			
Abundance:	10 -20% Common			
Size:	60-200 mm - Cobbles			
Fire:	2-5 yrs			
Condition:	Very Good			
Notes:	None			
Veg Unit:	-			
Location (NW):	50 789991 mE, 7415732 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.6	40	*Acacia sclerosperma* subsp. *sclerosperma*	2	8
Petalostylis labicheoides	2	20	*Acacia bivenosa*	1.5	3
Eucalyptus xerothermica	5	15	*Codonocarpus cotinifolius*	2.3	0.6

Site: RA-003	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Emily Crowther, Raimond Orifici
Landform:	Drainage (floodplain)			
Slope, aspect:	1° - Very Gentle North			
Soil:	Clay loam, Red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	None			
Veg Unit:	D1			
Location (NW):	50 789197 mE, 7415592 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.6	15	*Acacia tetragonophylla*	2	2.5
Corymbia candida	8	10	*Acacia citrinoviridis*	3.5	2
Acacia pruinocarpa	4	3	**Cenchrus ciliaris*	5	2

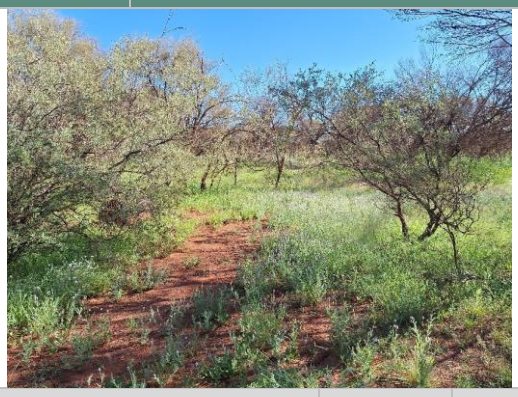
Site: RA-004	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Flat, undulating plain			
Slope, aspect:	1° - Very Gentle North			
Soil:	Sandy loam, Red-orange			
Rocks:	Ironstone			
Abundance:	2-10% Few			
Size:	20-60 mm - Coarse gravel			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	D3			
Location (NW):	50 789340 mE, 7415799 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Triodia pungens	0.5	20	*Acacia synchronicia*	2	4
Acacia pruinocarpa	4	10	*Indigofera monophylla*	0.5	3
Acacia citrinoviridis	4	5	*Triodia vanleeuwenii*	0.4	3
Acacia inaequilatera	4	5	*Acacia tetragonophylla*	1.4	2
Petalostylis labicheoides	1.5	5			

Site: RA-005	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Creek / River bank			
Slope, aspect:	1° - Very Gentle East			
Soil:	Clay, Red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Good			
Notes:	Weeds (high)			
Veg Unit:	D1			
Location (NW):	50 785717 mE, 7413091 mN			

Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
**Cenchrus ciliaris*	0.5	60	*Duperreya commixta*	0.6	0.3
Acacia citrinoviridis	6	35	*Dactyloctenium radulans*	0.1	0.2
Corymbia candida	8	20	*Arivela viscosa*	0.5	0.1
Chrysopogon fallax	1.3	8	*Corchorus tridens*	0.2	0.1
**Bidens bipinnata*	0.2	1	*Glycine canescens*	0.8	0.1

Site: RA-006	Type: Rapid Assessment Site	Size: Unbounded ~ 50 x 50 m	26/03/2024	Botanist: Raimond Orifici
Landform:	Flat plain			
Slope, aspect:	<1° - Level			
Soil:	Clay loam, Red-orange			
Rocks:	None			
Abundance:	No rocks			
Size:	-			
Fire:	> 5 yrs			
Condition:	Very Good			
Notes:	Weeds (low)			
Veg Unit:	-			
Location (NW):	50 785716 mE, 7410890 mN			



Species	Height (m)	Cover (%)	Species	Height (m)	Cover (%)
Acacia aptaneura	5	30	**Cenchrus ciliaris*	0.5	2
Acacia sclerosperma subsp. *sclerosperma*	4	10	**Bidens bipinnata*	0.4	1
Chrysopogon fallax	1	10	*Eremophila forrestii* subsp. *forrestii*	1.4	1
Ptilotus helipteroides	0.3	6	*Hibiscus burtonii*	1	0.3
Grevillea striata	8	4	*Rhagodia eremaea*	1	0.3
Acacia synchronicia	2.5	4	*Digitaria ctenantha*	0.3	0.2
Fimbristylis dichotoma	0.3	4			

Appendix C: Likelihood of Occurrence Assessment

Desktop Likelihood of Occurrence	Post Survey Likelihood of Occurrence	Status	Family	Taxon	Longevity / Lifeform	Flowering	Description	Habitat	Distance to Survey Area (km)
Recorded	Recorded	P2	Convolvulaceae	*Ipomoea racemigera*	Annual Climber	Mar to Aug	Creeping annual, herb or climber. Flowers white.	Fringing vegetation of river.	0.0
Recorded	High	P3	Goodeniaceae	*Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727)	Annual Herb	Feb to May	Open, erect annual or biennial, herb, to 0.2 m high. Flowers yellow.	Red-brown clay soil. Calcrete pebbles. Low undulating plain, swampy plains.	0.0
Recorded	High	P3	Fabaceae	*Swainsona thompsoniana*	Perennial Herb	Apr to Aug	Erect, herb. Stems terete, not spiny, glabrous.	Flat crabhole plain.	0.0
Recorded	High	P3	Poaceae	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	Perennial Grass	August	Tussocky perennial, grass-like or herb, 0.9 - 1.8 m high.	Flat terrain, low in landscape. Red loamy soil with some alluvial sand material and stones.	0.0
High	Recorded	P3	Scrophulariaceae	*Eremophila naaykensii*	Perennial Shrub	Aug to Oct	Shrub to 2 m tall. Rounded crowded canopy. Flowers white-cream-yellow-pink-purple.	Hill crest. Creek embankments. Gullies.	0.1
High	High	P3	Poaceae	*Aristida jerichoensis* var. *subspinulifera*	Perennial Grass	In response to rain	Compactly tufted perennial, grass-like or herb, 0.3 - 0.8 m high, lemma groove muricate.	Flat terrain. Red clay loam, low in landscape. Hardpan plains.	1.7
High	High	P3	Apocynaceae	*Gymnanthera cunninghamii*	Perennial Shrub	Jan to Dec	Erect shrub, 1 - 2 m high. Flowers cream-yellow-green.	Sandy soils. Drainage lines.	1.9
High	High	P3	Fabaceae	*Indigofera gilesii*	Perennial Shrub	May or Aug	Shrub, to 1.5 m high. Flowers purple-pink.	Pebbly loam. Amongst boulders & outcrops, hills.	0.3
High	High	P3	Fabaceae	*Isotropis parviflora*	Perennial Shrub	March	Shrub, 0.1 m high. Flowers white/pink.	Low rocky hill. Red-brown loam soils and ironstone gravel.	0.9
High	High	P3	Chenopodiaceae	*Rhagodia* sp. Hamersley (M. Trudgen 17794)	Perennial Shrub	March	Erect shrub to 1.5m.	Flat plain. Floodplain. Hillslope. Red sandy loam with surface cobbles.	4.1
Medium	Medium	P2	Poaceae	*Aristida lazaridis*	Perennial Grass	April	Tufted perennial, grass-like or herb, 0.4 - 1.5 m high. Flowers green / purple.	Clay plains of an ephemeral lake. Floodplain/drainage zone. Sand or loam.	7.3
Medium	Medium	P2	Euphorbiaceae	*Euphorbia inappendiculata* var. *inappendiculata*	Annual Herb	August	Herb to 2 cm.	Flat, red-brown loam. Cracking clay.	3.6

Desktop Likelihood of Occurrence	Post Survey Likelihood of Occurrence	Status	Family	Taxon	Longevity / Lifeform	Flowering	Description	Habitat	Distance to Survey Area (km)
Medium	Medium	P3	Scrophulariaceae	*Eremophila magnifica* subsp. *velutina*	Perennial Shrub	Aug to Sep	Shrub, 0.5 - 1.5 m high. Flowers blue-purple.	Skeletal soils over ironstone. Summits.	1.8
Medium	Medium	P3	Asteraceae	*Streptoglossa* sp. Cracking clays (S. van Leeuwen *et al.* PBS 7353)	Annual Herb	June	Erect annual herb. Light green stems and mid green leaves with slightly greyish hairs.	Cracking clay.	6.4
Medium	Medium	P4	Scrophulariaceae	*Eremophila magnifica* subsp. *magnifica*	Perennial Shrub	Aug to Nov	Shrub, 0.5 - 1.5 m high. Flowers blue.	Skeletal soils over ironstone. Rocky screes.	1.9
Medium	Medium	P4	Brassicaceae	*Lepidium catapycnon*	Perennial Herb / Shrub	October	Open, woody perennial, herb or shrub, 0.2 - 0.3 m high, stems zigzag. Flowers white.	Skeletal soils. Hillsides.	2.5
Low	Low	P1	Fabaceae	*Acacia corusca*	Perennial Shrub	Apr to Aug	Rounded to broadly rounded, robust, multi-stemmed shrub or small tree 1.5 - 4.0 (-5.0) m high, 1.5 - 5 (-6.0) m wide.	Red-brown sandy loam soils on hill crests, ridges, slopes and minor drainage lines upon low, subdued and undulating stony hills.	25.1
Low	Low	P1	Scrophulariaceae	*Eremophila capricornica*	Perennial Shrub	Jun to Aug	Small shrub 50 - 75 cm high. Branches terete, with woolly dendritic hairs. Leaves alternate and grey. Flowers purple.	Sandy clay loams in open mulga shrubland with an understory of Triodia spp. and other grasses.	25.6
Low	Low	P1	Scrophulariaceae	*Eremophila pilosa*	Perennial Shrub	September	Shrub, 0.8 m high. Flowers purple.	Red-brown clay loam on sandy plains between Jigalong and Roy Hill.	52.1
Low	Low	P1	Scrophulariaceae	*Eremophila rhegos*	Perennial Shrub	September	Erect shrub 1 m high. Flowers blue-purple-white.	Skeletal stony loam over granite.	36.3
Low	Low	P1	Asteraceae	*Helichrysum oligochaetum*	Annual Herb	Aug to Nov	Erect annual, herb, to 0.25 m high. Flowers yellow,	Red clay. Alluvial plains.	55.2
Low	Low	P1	Rubiaceae	*Paranotis* sp. Pilbara (H. Ajduk HAOP04a)	Annual Herb	March	Erect ephemeral herb to 0.25 m tall with white flowers and mature fruit.	Drainage lines.	26.9
Low	Low	P1	Plantaginaceae	*Stemodia* sp. Battle Hill (A.L. Payne 1006)	Perennial Shrub	September	Low shrub.	Cracking clay. Floodplain.	55.2
Low	Low	P1	Poaceae	*Triodia veniciae*	Perennial Hummock Grass	Feb to Mar	Resinous perennial, strongly aromatic. Leaves dark green.	Low hills.	73.1

Desktop Likelihood of Occurrence	Post Survey Likelihood of Occurrence	Status	Family	Taxon	Longevity / Lifeform	Flowering	Description	Habitat	Distance to Survey Area (km)
Low	Low	P2	Poaceae	*Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109)	Perennial Grass	September	Tussock-forming perennial, grass-like or herb, to 0.3 m high.	Red-brown skeletal soils. Ironstone. Steep slopes. Summits.	42.5
Low	Low	P2	Scrophulariaceae	*Eremophila* sp. West Angelas (S. van Leeuwen 4068)	Perennial Shrub	June	Spindly shrub to 3 m high.	Summits of hills. Slopes.	31.8
Low	Low	P2	Goodeniaceae	*Goodenia hartiana*	Perennial Herb / Shrub	Aug and Sep	Erect to spreading, multi-stemmed perennial, herb or shrub (sub-shrub).	Sand. Sand dune swales, sandhills.	20.3
Low	Low	P2	Malvaceae	*Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	Perennial Shrub	Nov, March	Spindly upright shrub to 3 m tall, purple flower.	Rocky (boulder) slope below low cliffs. Gully. Gravelly, pebbly red-brown loam.	41.6
Low	Low	P2	Oxalidaceae	*Oxalis* sp. Pilbara (M.E. Trudgen 12725)	Annual / Perennial Herb	May	Small herb to 10 cm tall. Leaves green above, purple below. Yellow flowers.	Gully. Brown-red loam.	39.2
Low	Low	P3	Fabaceae	*Acacia subtiliformis*	Perennial Shrub	June	Spindly, slender, erect shrub, to 3.5 m high, phyllodes green, new growth slightly viscid, resinous, aromatic. Flowers yellow.	Rocky calcrete plateau.	28.2
Low	Low	P3	Amaranthaceae	*Amaranthus centralis*	Annual Herb	Throughout the year	Erect, to 60 cm high. Stems angular, sometimes reddish, sparsely hairy. Leaves obtuse to emarginate.	Red sand in ephemeral watercourses. Sandy to clayey loam. River banks. Edges of permanent pools in Eucalypt lined channels.	38.7
Low	Low	P3	Fabaceae	*Crotalaria smithiana*	Annual Herb	June	Annual, herb, to 0.4 m high. Flowers yellow.	Regeneration site on floodplain.	20.0
Low	Low	P3	Goodeniaceae	*Dampiera metallorum*	Perennial Herb	Apr or Jun to Oct	Rounded, multi-stemmed perennial, herb, to 0.5 m high. Flowers blue.	Skeletal red-brown gravelly soil over banded ironstone. Steep slopes. Summits of hills.	46.6
Low	Low	P3	Poaceae	*Eragrostis crateriformis*	Annual Herb	Jan to May or Jul	Annual, grass-like or herb, 0.17 - 0.42 m high.	Clayey loam or clay. Creek banks. Depressions.	55.2
Low	Low	P3	Scrophulariaceae	*Eremophila rigida*	Perennial Shrub	September	Bushy shrub, 0.3 - 4 m high. Flowers cream.	Red sand alluvium. Hardpan plains, stony clay depressions.	16.2
Low	Low	P3	Scrophulariaceae	*Eremophila spongiocarpa*	Perennial Shrub	May or Sep	Compact succulent-leaved shrub to 1m.	Alluvial semi-saline clay plain.	55.2

Desktop Likelihood of Occurrence	Post Survey Likelihood of Occurrence	Status	Family	Taxon	Longevity / Lifeform	Flowering	Description	Habitat	Distance to Survey Area (km)
Low	Low	P3	Myrtaceae	*Eucalyptus rowleyi*	Perennial Tree	March, June	Mallee. Smooth slightly powdery white bark. Dull green leaves on crown.	Loam, clay loam, sandy loam.	55.2
Low	Low	P3	Goodeniaceae	*Goodenia purpurascens*	Annual / Perennial Herb	Jan or Apr or Jun or Sep or Dec	Erect perennial or annual, herb, 0.1 - 0.3 m high. Flowers blue-purple/white/yellow.	Clay, mud. Swamps & seasonally wet depressions.	25.5
Low	Low	P3	Proteaceae	*Grevillea saxicola*	Perennial Shrub	March or June	Tall shrub to 2.5 m.	Breakaway. Scree slope.	37.0
Low	Low	P3	Asteraceae	*Iotasperma sessilifolium*	Annual Herb	Aug to Sep	Erect herb. Flowers pink.	Cracking clay, black loam. Edges of waterholes, plains.	55.2
Low	Low	P3	Chenopodiaceae	*Maireana prosthecochaeta*	Perennial Shrub	Aug	Open, densely-leaved shrub, 0.3 - 0.6 m high.	Laterite. Hills, salty places.	36.3
Low	Low	P3	Acanthaceae	*Rostellularia adscendens var. latifolia*	Perennial Herb	Apr to May	Herb or shrub, 0.1 - 0.3 m high. Fl. blue-purple-violet.	Drainage area with red-brown loam soils. Ironstone soils. Creeks. Rocky hills.	59.4
Low	Low	P3	Stylidiaceae	*Stylidium weeliwolli*	Annual Herb	Aug to Sep	Annual, herb, 0.1 - 0.25 m high, throat appendages 4, rod-shaped. Flowers pink & red.	Gritty sand soil, sandy clay. Edge of watercourses.	55.1
Low	Low	P3	Poaceae	*Triodia* sp. Mt Ella (M.E. Trudgen 12739)	Perennial Hummock Grass	Feb and March	Perennial, grass-like or herb, 0.4 m high.	Gullies. Hill slopes. Drainage lines.	12.3
Low	Low	P3	Asteraceae	*Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684)	Annual / Perennial Herb	July	Tall daisy to 1 m, open canopy, in late flower and dehiscing fruit, cream/white flowers.	Flat terrain, low in landscape. Red clay loam with some stone. Gilgai. Drainage lines.	18.8
Low	Low	P4	Fabaceae	*Acacia bromilowiana*	Perennial Shrub / Tree	Jul to Aug	Tree or shrub, to 12 m high, bark dark grey, fibrous; phyllodes more or less glaucous & slightly pruinose; inflorescence in spikes. Flowers yellow/pink.	High in landscape. Edge of cliff. Rocky ironstone scree. Skeletal soil.	31.8
Low	Low	P4	Cyperaceae	*Bulbostylis burbidgeae*	Annual Sedge	Mar or Jun to Aug	Tufted, erect to spreading annual, grass-like or herb (sedge), 0.03 - 0.25 m high, spikelets in a simple umbel or rarely solitary. Flowers Brown.	Rocky outcrops and boulders.	4.6

Desktop Likelihood of Occurrence	Post Survey Likelihood of Occurrence	Status	Family	Taxon	Longevity / Lifeform	Flowering	Description	Habitat	Distance to Survey Area (km)
Low	Low	P4	Scrophulariaceae	*Eremophila youngii* subsp. *lepidota*	Perennial Shrub	Jan to Mar or Jun to Sep	Dense, spreading shrub, 1 - 3 m high. Flowers purple-red-pink.	Stony red sandy loam. Flats plains. Floodplains, sometimes semi-saline. Clay flats.	11.2
Low	Low	P4	Goodeniaceae	*Goodenia berringbinensis*	Annual Herb	October	Ascending annual, herb, 0.1 - 0.3 m high. Flowers yellow.	Red sandy loam. Along watercourses.	16.7
Low	Low	P4	Malvaceae	*Hibiscus* aff. *campanulatus*	Annual / Perennial Shrub	June	Shrub to 3m. Hairy stems. Flowers white to mauve.	Ranging from hillslopes, base of hillslopes, sheltered gullies or rock drainage lines and below associated cliff-lines or rocky ridges.	6.8
Low	Low	P4	Malvaceae	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	Perennial Shrub	Aug	Spreading shrub, to 0.5 m high. Flowers yellow.	Skeletal red soils pockets. Steep slope.	41.6

Appendix D: Flora Species List

Family	Species	Notes
Acanthaceae	*Dipteracanthus australasicus* subsp. *australasicus*	-
Aizoaceae	*Trianthema triquetra*	-
Amaranthaceae	*Alternanthera denticulata* var. *denticulata*	-
	Amaranthus cuspidifolius	-
	Amaranthus undulatus	-
	Ptilotus astrolasius	-
	Ptilotus calostachyus	-
	Ptilotus carinatus	-
	Ptilotus exaltatus	-
	Ptilotus gomphrenoides	-
	Ptilotus helipteroides	-
	Ptilotus obovatus var. *obovatus*	-
	Ptilotus polystachyus	-
	Ptilotus rotundifolius	-
	Ptilotus schwartzii	-
Apocynaceae	*Vincetoxicum lineare*	-
Asteraceae	**Bidens bipinnata*	Weed
Boraginaceae	*Euploca cunninghamii*	-
	Euploca inexplicita	-
	Euploca tanythrix	-
	Trichodesma zeylanicum var. *zeylanicum*	-
Brassicaceae	*Lepidium platypetalum*	-
Chenopodiaceae	*Maireana tomentosa* subsp. *tomentosa*	-
	Maireana villosa	-
	Rhagodia eremaea	-
	Sclerolaena bicornis	-
	Sclerolaena cornishiana	-
	Sclerolaena cuneata	-
	Sclerolaena eriacantha	-
Cleomaceae	*Arivela viscosa*	-
Convolvulaceae	*Bonamia erecta*	-
	Duperreya commixta	-
	Evolvulus alsinoides var. *decumbens*	-
	Evolvulus alsinoides var. *villosicalyx*	-
	Ipomoea lonchophylla	-
	Ipomoea muelleri	-
	Ipomoea racemigera	Priority 2
	Operculina aequisepala	-
Cucurbitaceae	*Cucumis variabilis*	-
Cyperaceae	*Cyperus iria*	-
	Cyperus vaginatus	-
	Fimbristylis dichotoma	-
Euphorbiaceae	*Euphorbia australis* var. *hispidula*	-
	Euphorbia biconvexa	-
Fabaceae	*Acacia ancistrocarpa*	-
	Acacia aneura	-
	Acacia aptaneura	-
	Acacia ayersiana	-
	Acacia bivenosa	-
	Acacia catenulata subsp. *occidentalis*	-
	Acacia citrinoviridis	-
	Acacia elachantha	-
	Acacia hilliana	-

Family	Species	Notes
	Acacia inaequilatera	-
	Acacia incurvaneura	-
	Acacia kempeana	-
	Acacia maitlandii	-
	Acacia melleodora	-
	Acacia pachyacra	-
	Acacia paraneura	-
	Acacia pruinocarpa	-
	Acacia sclerosperma subsp. *sclerosperma*	-
	Acacia sibirica	-
	Acacia spondylophylla	-
	Acacia synchronicia	-
	Acacia tenuissima	-
	Acacia tetragonophylla	-
	Glycine canescens	-
	Gompholobium oreophilum	-
	Indigofera linifolia	-
	Indigofera monophylla	-
	Isotropis iophyta	-
	Neptunia xanthonema	-
	Petalostylis labicheoides	-
	Rhynchosia minima	-
	Senna artemisioides subsp. *helmsii*	-
	Senna artemisioides subsp. *oligophylla*	-
	Senna artemisioides subsp. *x artemisioides*	-
	Senna artemisioides subsp. *x sturtii*	-
	Senna glutinosa subsp. *glutinosa*	-
	Senna glutinosa subsp. *pruinosa*	-
	Senna glutinosa subsp. *x luerssenii*	-
	Senna notabilis	-
	Senna sp. Meekatharra (E. Bailey 1-26)	-
	Sesbania cannabina	-
	Tephrosia sp. Newman (A.A. Mitchell PRP 29)	-
	Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)	-
	Tephrosia sp. *clay soils (S. van Leeuwen et al. PBS 0273)*	-
	**Vachellia farnesiana*	Weed
	Vigna sp. Hamersley Clay (A.A. Mitchell PRP 113)	-
Goodeniaceae	*Goodenia stobbsiana*	-
	Scaevola amblyanthera var. *centralis*	-
	Scaevola spinescens	-
Gyrostemonaceae	*Codonocarpus cotinifolius*	-
Lamiaceae	*Dicrastylis cordifolia*	-
Malvaceae	*Abutilon fraseri* subsp. *fraseri*	-
	Abutilon otocarpum	-
	Corchorus lasiocarpus subsp. *parvus*	-
	Corchorus tridens	-
	Hibiscus burtonii	-
	Hibiscus coatesii	-
	Hibiscus sturtii var. *campylochlamys*	-
	Hibiscus sturtii var. *platychlamys*	-
	**Malvastrum americanum*	Weed
	Sida fibulifera	-
Marsileaceae	*Marsilea exarata*	-

Family	Species	Notes
Myrtaceae	*Calytrix carinata*	-
	Corymbia candida	-
	Corymbia hamersleyana	-
	Eucalyptus camaldulensis	-
	Eucalyptus gamophylla	-
	Eucalyptus leucophloia subsp. *leucophloia*	-
	Eucalyptus socialis subsp. *eucentrica*	-
	Eucalyptus trivalva	-
	Eucalyptus victrix	-
	Eucalyptus xerothermica	-
	Melaleuca eleuterostachya	-
Oleaceae	*Jasminum didymum* subsp. lineare	-
Phrymaceae	*Peplidium aithocheilum*	-
Phyllanthaceae	*Nellica maderaspatensis*	-
Poaceae	*Acrachne racemosa*	-
	Aristida contorta	-
	Aristida latifolia	-
	Astrebla pectinata	-
	Bothriochloa ewartiana	-
	**Cenchrus ciliaris*	Weed
	**Cenchrus setiger*	Weed
	Chrysopogon fallax	-
	Cymbopogon ambiguus	-
	Cymbopogon obtectus	-
	Cynodon convergens	-
	**Cynodon dactylon*	Weed
	Dactyloctenium radulans	-
	Dichanthium sericeum	-
	Dichanthium sericeum subsp. *humilius*	-
	Digitaria brownii	-
	Digitaria ctenantha	-
	**Echinochloa colona*	Weed
	Enneapogon caerulescens	-
	Enneapogon polyphyllus	-
	Enneapogon robustissimus	-
	Enteropogon ramosus	-
	Eragrostis dielsii	-
	Eragrostis eriopoda	-
	Eragrostis tenellula	-
	Eriachne benthamii	-
	Eriachne lanata	-
	Eriachne mucronata	-
	Eriachne pulchella	-
	Eulalia aurea	-
	Iseilema vaginiflorum	-
	Panicum laevinode	-
	Paraneurachne muelleri	-
	Paspalidium clementii	-
	Perotis rara	-
	**Setaria verticillata*	Weed
	Sporobolus australasicus	-
	Themeda triandra	-
	Tragus australianus	-

Family	Species	Notes
	Triodia angusta	-
	Triodia longiceps	-
	Triodia pungens	-
	Triodia vanleeuwenii	-
	Triodia wiseana	-
	Urochloa distachyos	-
	Urochloa occidentalis var. *occidentalis*	-
	Xerochloa barbata	-
Portulacaceae	*Portulaca oleracea*	-
Proteaceae	*Grevillea striata*	-
	Grevillea wickhamii subsp. *hispidula*	-
	Hakea chordophylla	-
	Hakea lorea subsp. *lorea*	-
	Hakea preissii	-
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	-
Rubiaceae	*Dolichocarpa crouchiana*	-
	Psydrax suaveolens	-
Santalaceae	*Anthobolus leptomerioides*	-
	Santalum lanceolatum	-
Scrophulariaceae	*Eremophila cuneifolia*	-
	Eremophila forrestii subsp. *forrestii*	-
	Eremophila fraseri subsp. *fraseri*	-
	Eremophila galeata	-
	Eremophila lachnocalyx	-
	Eremophila latrobei subsp. *filiformis*	-
	Eremophila latrobei subsp. *glabra*	-
	Eremophila latrobei subsp. *latrobei*	-
	Eremophila margarethae	-
	Eremophila naaykensii	Priority 3
	Eremophila platycalyx subsp. *pardalota*	-
Solanaceae	*Solanum cleistogamum*	-
	Solanum lasiophyllum	-
Violaceae	*Afrohybanthus aurantiacus*	-
Zygophyllaceae	*Tribulopis angustifolia*	-
	Tribulus astrocarpus	-
	Tribulus hirsutus	-
	Tribulus suberosus	-
	**Tribulus terrestris*	Weed