Report No. J022486

Detailed flora survey and basic fauna survey of Fielding Gully

Prepared for: Calidus Resources Limited
Date: 21 May 2024

Rapallo Environmental is a Western Australian consultancy with a strong reputation for technical excellence, client-focus and innovation. We build long-term alliances through outstanding delivery on a range of services to the resource sector, government, and associated industries.

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Revision	Date	Prepared	Reviewed	Approved
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Executive Summary

Calidus Resources Limited (Calidus) proposes to develop the Fieldings Gully area into a proposed satellite mining area located to the west of the main Warrawoona project, comprising a proposed mining pit with associated topsoil stockpiles, waste rock dump, haul road, and other infrastructure for the Warrawoona Gold Project.

Calidus commissioned Rapallo Environmental (Rapallo) to conduct a combined flora and fauna assessment for the Fieldings Gully area associated with the Warrawoona Gold Project. The objective of the survey was to identify conservation significant vertebrate fauna species, conservation significant flora species, and vegetation types that may potentially be impacted by development of the Fieldings Gully project area.

The survey area for the project covers approximately 254 hectares, and is located approximately 20 kilometres southwest of Marble Bar in the Pilbara region of Western Australia.

A combined detailed flora and vegetation survey and basic vertebrate fauna survey was completed over nine days, from 14 to 21 July 2023, by a team of two ecologists. A total of 25 flora quadrats and 9 non-permanent relevés were sampled to record the broad vegetation types and their condition, as well as collecting an inventory of flora species present. Fauna habitat data was also recorded at each of the quadrat and relevé locations, as well as at multiple opportunistic locations.

Flora desktop results

A review of all available literature and database relevant to the survey area was conducted to compile a list of conservation significant flora species with the potential to occur with the Fieldings Gully area.

The flora desktop identified 53 conservation significant taxa from 26 families recorded within 50 kilometres of the survey area. Out of these 52 taxa, one (*Ptilotus mollis,* P4) was considered likely to occur in the survey area, and fifteen were considered possible to occur. All of these comprised DBCA listed Priority flora taxa. No Threatened flora were assessed as possible to likely to occur in the survey area.

Flora survey results

The survey recorded 137 flora taxa from 34 families. These included 134 native taxa and three introduced taxa (weeds). The most species-rich families recorded were the Fabaceae (wattles and peas) with 31 taxa, Malvaceae with 19 taxa, and Poaceae (grasses) with 16 taxa.

No conservation significant flora taxa were recorded. However, the survey recorded five taxa which may be indicative of groundwater dependent vegetation, these were *Eucalyptus victrix*, *Melaleuca linophylla*, *Atalaya hemiglauca*, *Acacia coriacea* subsp. *pendens*, and *Cyperus vaginatus*. All of these taxa were recorded in vegetation type D which comprised wide drainage channels flanked by tall, white-barked eucalypts. However, these five taxa are all facultative phreatophytes, which means they also occur in areas without access to permanent groundwater. No obligate phreatophytes were recorded. Groundwater studies indicate that the groundwater table at Fieldings Gully sits between 19.36 to 27.19 metres below ground level. Based on this result, it is very unlikely that the vegetation type D represents groundwater dependent vegetation.

The three weeds recorded were **Aerva javanica*, **Calotropis procera*, and **Cenchrus ciliaris*. Of these, **Calotropis procera* (rubber bush) is a Declared Pest – s22(2), while the other two weed are listed Permitted – s11. **Calotropis procera* was recorded from two locations in the survey area.

Broad vegetation types recorded in the survey area

Five broad vegetation types (labelled types A to E) were identified in the survey area. Parts of the survey area were cleared or heavily disturbed in the past, including for roads. At the time of the survey, many of the previously disturbed or cleared areas had experienced regrowth of native vegetation, and these are mapped as vegetated in this report. Only the roads were mapped as cleared, covering 3.4 hectares (1.4%) of the survey area.

- A – *Ficus brachypoda* or *Atalaya hemiglauca* over *Acacia bivenosa* over *Triodia wiseana* on steep rocky slopes, gullies, and rocky hill crests. Extent: 26.9 hectares (10.6% of the survey area)
- B – *Corymbia hamersleyana* over *Acacia inaequilatera* and *Acacia orthocarpa* over *Triodia wiseana* and *Trioda brizoides* on stony plains and rounded hills with on orange soil. Extent: 176.0 hectares (69.2% of the survey area)
- C – *Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia acradenia* over *Triodia angusta* and *Triodia epactia* on stony plains and lower hill slopes with calcareous soil and surface rocks. Extent: 32.5 hectares (12.8% of the survey area)
- D – *Eucalyptus victrix*, *Acacia trachycarpa*, *Melaleuca linophylla* and *Atalaya hemiglauca* over **Cenchrus ciliaris* in drainage channels with open stony creek bed. Extent: 5.2 hectares (2.0% of the survey area)
- E – *Corymbia hamersleyana* over *Acacia acradenia* tall shrubland over mixed shrubs over *Chrysopogon fallax* and **Cenchrus ciliaris* on diffuse drainage channels. Extent: 10.2 hectares (4.0% of the survey area)

Vegetation condition across the survey area varied from Excellent to Good in the unburnt areas, to Poor to Degraded in the recently burnt areas. The only exception was vegetation type D growing in major drainage lines, which appeared to have been relatively unaffected by the fires.

Fauna desktop results

A review of available literature and database information relevant to the survey area was conducted to compile a list of vertebrate fauna species with the potential to occur within the survey area. A total of four reports were reviewed and four databases searched.

The literature review and database searches identified a total of 292 vertebrate fauna species which have the potential to occur within the survey area. This comprises 35 native and three introduced mammal species, 172 bird species, 73 reptile species, seven amphibian species and two fish species. Not all species are likely to occur in the survey area due to the non-permanent water bodies resulting in seasonal abundances and absences of species, particularly for amphibians and fish. Additionally, many species tend to be patchily distributed even where appropriate habitats are present, and many species of birds can occur as regular migrants, occasional visitors, or vagrants.

A total of 31 fauna species of conservation significance were identified in the literature review and database searches as potentially occurring within the survey area, including 10 mammals, 19 birds and two reptiles. This comprised eight species listed as Threatened (four mammals, three birds and one reptile), one bird species is listed as Other Specially Protected under the *Biodiversity Conservation Act* 2016 (BC Act) and seven species listed as Priority by the DBCA (six mammals and one reptile). Sixteen bird species are listed as Migratory (all birds) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and/or BC Act.

Based on the likelihood assessment, 21 species of conservation significant fauna were assessed as confirmed, highly likely, likely, or possible to occur in the survey area. The remaining species were assessed as unlikely to occur within the survey area due to the absence of suitable habitat, and/or the survey area being well outside its currently known range.

The Pilbara leaf-nosed bat (*Rhinonicteris aurantia* (Pilbara form)) was confirmed to occur in the survey area, with recordings captured during the survey at low numbers originating from roosts close to Warrawoona (i.e. Klondyke Queen and Bow Bells South historical workings).

The grey falcon (*Falco hypoleucos*) was confirmed to occur in the survey area, with one sighting of this species in active foraging flight. The northern quoll (*Dasyurus hallucatus*) and western pebble-mound mouse (*Pseudomys chapmani*), were ranked as highly likely to occur on the survey area.

A further, 19 migratory species are considered "Unlikely" to occur within the survey area due to their rare occurrence in the Pilbara region, the absence of suitable habitat within the survey area and/or the occurrence of the survey area well outside the species' known or expected distribution and absence of recorded occurrences proximal to the survey area. The occurrence of these species is likely to be infrequent and limited only to rare occasions, such rare vagrants and/or migrating individuals blown off course by cyclonic activity.

Habitats

Four broad fauna habitat types were recorded for the survey area. Hillcrest/ hillslope was the dominant broad fauna habitat within the survey area, covering approximately 195.8 hectares (77.0%), followed by stony plain (39.6 hectares, 15.6%), minor drainage (10.2 hectares, 4.0%), and medium drainage (5.2 hectares, 2.0%). As mentioned above, a small section of the survey area (3.4 hectares, 1.4%) was cleared for roads.

1 Introduction

1.1 Project overview

Calidus Resources Limited (Calidus) commissioned Rapallo Environmental (Rapallo) to complete a combined detailed flora and vegetation survey and a basic terrestrial vertebrate fauna survey for the Fieldings Gully project area, which is associated with the Warrawoona Gold Project. Fieldings Gully is located approximately 11 kilometres northwest of the Warrawoona Gold Project camp and 15 kilometres south of Marble Bar in the Pilbara region of Western Australia (Figure 1.1).

The Fieldings Gully project area encompasses mining leases M45/521, M45/672, and the western margin of M45/682, miscellaneous licences L45/564, L45/565, and L45/566, and general purpose licence G45/348. The survey area requested by Calidus was 254.2 hectares in size.

The Fieldings Gully project area is part of a proposed satellite mining area located to the west of the main Warrawoona project area, which would comprise of a mining pit with associated topsoil stockpiles, waste rock dump, haul road, and other infrastructure.

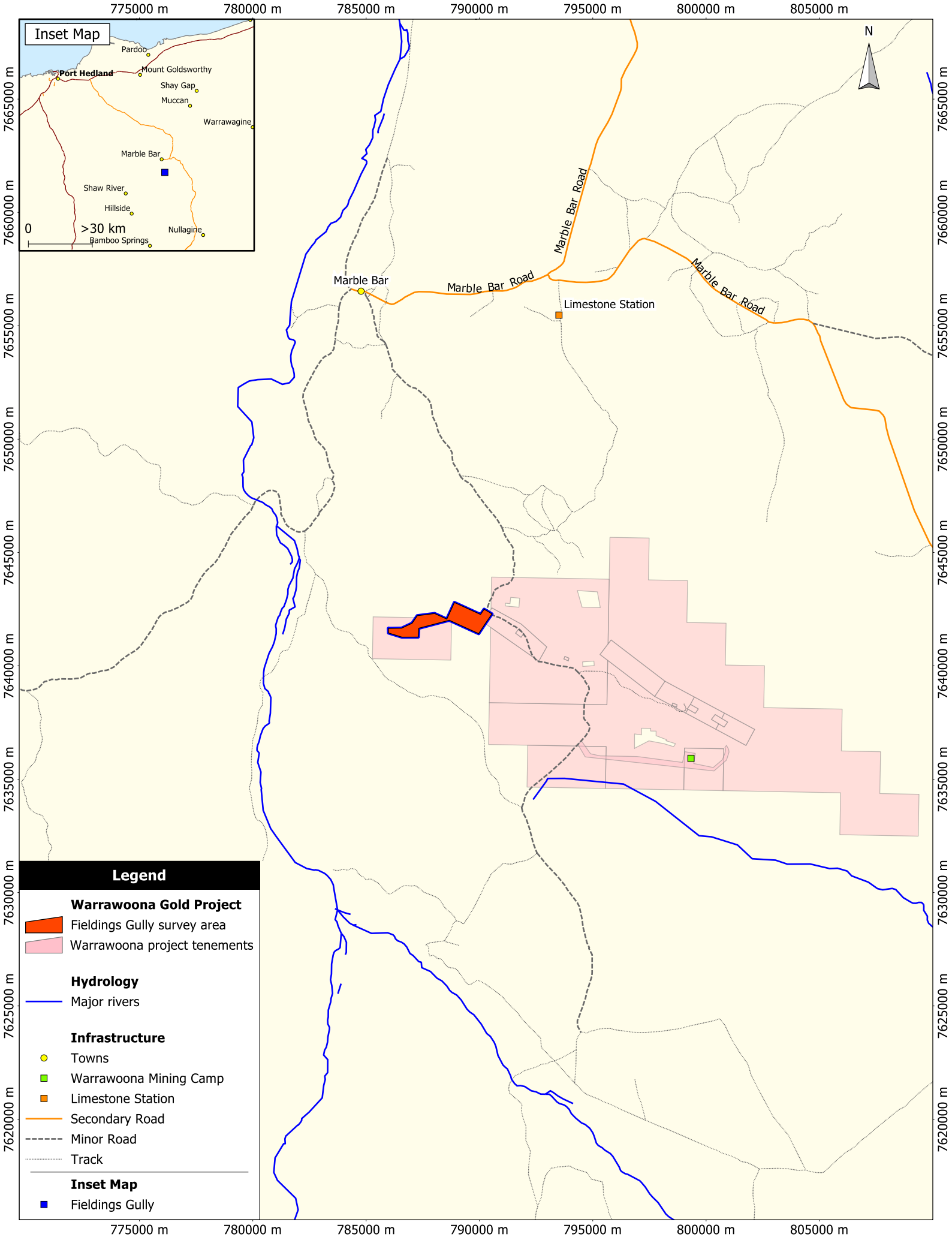
1.2 Scope and objectives

The objectives of the detailed flora and vegetation survey were to:

- Complete a desktop study to document the regional flora and vegetation and to identify conservation significant flora and ecological communities that may occur in the survey area.
- Conduct a detailed field survey of the project area to map vegetation communities and describe the floristic diversity of the survey area, verify desktop information, and determine if the habitats of the survey area contain conservation significant flora and vegetation.

The objectives of the basic vertebrate fauna survey were to:

- Complete a desktop study to understand the regional fauna assemblage and habitats.
- Conduct a basic fauna survey of the proposed survey area to identify and map broad-scale fauna habitats, verify desktop information, and determine if conservation significant vertebrate habitats occur within the survey area.



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Calidus Resources
Fieldings Gully
Flora and Fauna survey

CALIDUS RESOURCES LIMITED

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Figure 1.1

Location and extent of the survey area

2 Regional context

2.1 Climate and weather

The Pilbara bioregion has a semi-desert to tropical climate, with rainfall occurring sporadically throughout the year, mostly during summer (Thackway & Cresswell 1995). Summer rainfall is usually the result of tropical storms and tropical cyclones that impact upon the coast and move inland. Winter rainfall is generally lighter and are the result of cold fronts moving north easterly across the state (Leighton 2004). The average annual rainfall ranges from 200-350 mm, although there are significant fluctuations between years (BoM, 2021), with up to 1,200 mm falling in some locations in some years (McKenzie *et al.* 2009).

Long-term climatic data is available from the closest Bureau of Meteorology (BoM) weather station at Marble Bar (station 004106), proximal to the survey area and the Warrawoona Gold Project (BoM 2023) (Figure 2.1). On average, between 2000 and 2023, the area experiences approximately 387.8 mm of rainfall. During the day, December is the hottest month with an average maximum of 42°C, while June is the coldest month with a maxium mean temperature of 27.1°C. Janurary has the hottest mean minimum temperature at 26.5°C, and July has the coldest mean minimum temperature at 12.2°C (BoM 2023).

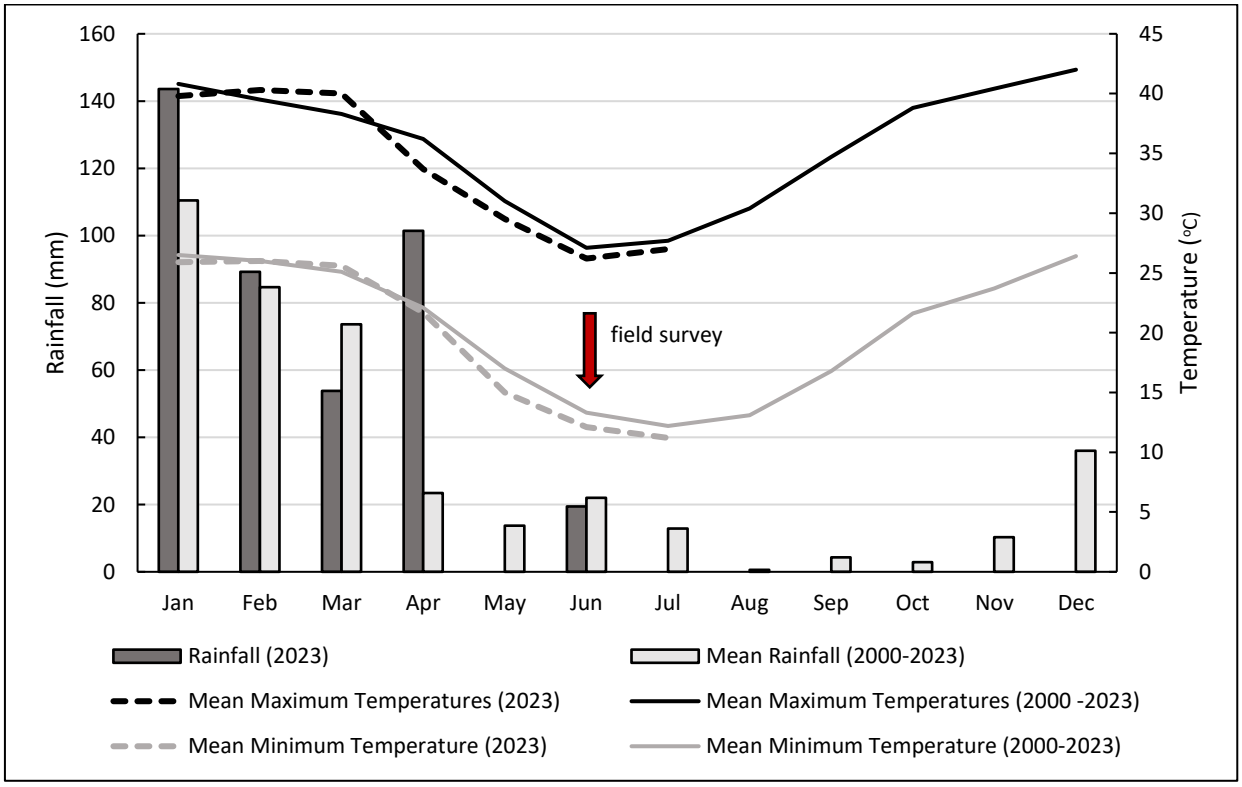


Figure 2.1 Climate data collected at Marble Bar weather station 004106.

Rainfall over the three months preceding the survey was well above average in April, but below average in March and May, with May receiving no rain fall at all. During the survey a total of 19.4mm of rain was recorded at Marble Bar, which was the only rain experienced in the area for that month and just shy of the long-term average. Daily maximum temperatures during the survey ranged from 18.9°C to 29.3°C. Daily minimum temperatures ranged from 9.9°C to 17.0 °C at night.

2.2 Biogeography

2.2.1 IBRA bioregions

The bioregions of Australia are described in the Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway & Cresswell 1995). Bioregions are large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The latest version, IBRA7, classifies Australia's landscapes into 89 large geographically distinct bioregions and 419 subregions (DoE 2012).

The survey area is located within the Pilbara bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). The Pilbara bioregion is characterised by vast coastal plains and inland mountain ranges with cliffs and deep gorges (Thackway & Cresswell 1995). Vegetation is predominantly mulga low woodlands or snappy gum over bunch and hummock grasses (Bastin 2008).

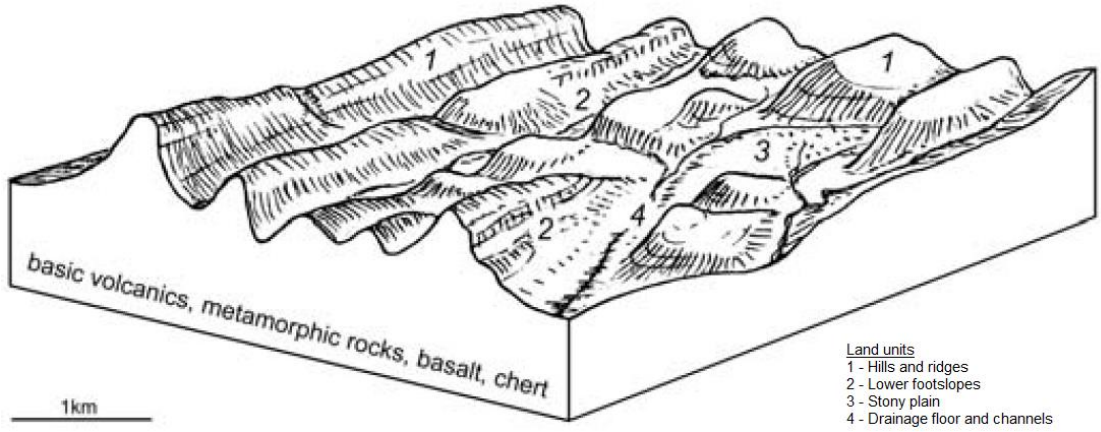
The survey area is located within the Chichester (PIL 1) IBRA subregion, comprised of undulating archaean granite and basalt plains with areas of basaltic ranges (Kendrick & Mckenzie 2001). The plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur through the ranges (Kendrick & Mckenzie 2001).

2.2.2 Land systems

The land systems of the Pilbara region are classified according to similarities in landform, soil, vegetation, geology and geomorphology, following van Vreeswyk *et al.* (2004). The survey area falls within the Talga Land System (Figure 2.2) as summarised in Table 2.1 below. The Talga Land System comprises four land units, which were all represented in the survey area.

Table 2.1 Land systems of the survey area

<table>
<tr><th>Name</th><th>Description based on van Vreeswyk et al. (2004)</th></tr>
<tr><td>Talga Land system</td><td>Extent: 2 124 km^2
Summary: Hills and ridges of greenstone and chert and stony plains supporting hard and soft spinifex grasses.
Geology: Archaean basic volcanics, ultramafic rocks and other metamorphics, basalt, andesite, shale, slate, chert, and Quaternary colluvium.
Geomorphology: Erosional surfaces; hill tracts and ridges on basalt, greenstones, schist, other metamorphics and chert with rocky rounded crests and ridge tops extending for many kilometres; very steep upper slopes, more gently inclined lower footslopes, restricted lower stony plains and interfluves; moderately spaced tributary and strike aligned drainage floors and channels. Relief is up to about 100 m.
Land management: Much of the system is poorly accessible. Hard spinifex vegetation is not preferred by grazing animals, but soft spinifex is moderately preferred for a few years following fire. The system is prospective and localised areas have been disturbed by exploration and mining activity. The system is not susceptible to erosion.
Land units as shown in diagram and described in table below:
<table>
<tr><th>Unit</th><th>Area</th><th>Landform</th><th>Soil</th><th>Vegetation</th></tr>
<tr><td>1</td><td>50%</td><td>Hills and ridges – Hills and strike ridges with rounded rocky crests and ridge tops extending for many kilometres; moderately inclined to very steep, sometimes benched, upper slopes; surface mantles of</td><td>Stony soils and some calcareous shallow loams</td><td>Hummock grasslands of Triodia wiseana, T.
lanigera, T. spp., (hard spinifex) or, less frequently, Triodia pungens (soft spinifex) with isolated to scattered shrubs such as Acacia</td></tr>
</table>
</td></tr>
</table>

		abundant pebbles and cobbles of metamorphic rocks and basalt, outcrops of parent rock. Relief up to 90 m.		inaequilatera, A. orthocarpa and Senna spp.
2	30%	**Lower footslopes** – Very gently inclined to gently inclined footslopes up to 500 m in extent below unit 1, surface mantles of very abundant pebbles and cobbles of metamorphic rocks and basalt.	Calcareous shallow loams and red shallow loams	Hummock grasslands of Triodia wiseana, T. plurinervata, T. spp. or, less frequently, Triodia pungens with isolated to scattered shrubs particularly Acacia inaequilatera and Senna spp.
3	15%	**Stony plains** – Gently undulating plains up to 1 km in extent, surface mantles of abundant pebbles and cobbles of mixed lithology.	Red shallow loams and minor calcareous shallow loams	Hummock grasslands of Triodia wiseana, T. lanigera, T. plurinervata or, less frequently, T. pungens with isolated to scattered shrubs of Acacia and Senna spp.
4	5%	**Drainage floors and channels** – Drainage lines as small channels (2-5 m wide) in narrow valleys in upper parts becoming broader floors to 100 m wide downslope, unchanneled or with central channels to 30 m wide and banks up to 3 m high.	Red deep sandy duplex soils (405). Channels with river bed soils (705).	Hummock grasslands of *Triodia pungens* with isolated to very scattered shrubs. Scattered to moderately close tall shrublands /woodlands of *Acacia* spp., *Eucalyptus victrix* (coolibah), *E. camaldulensis* (river red gum) with understorey of *T. pungens* or tussock grasses including *Chrysopogon fallax* (ribbon grass) and **Cenchrus ciliaris* (buffel grass).
				

2.2.3 Geology

The survey area is situated in the Eastern Pilbara Domain of the Archean Pilbara Craton within the Warrawoona and Kelly groups. The area is dominated by the Salgash subgroup, of the Warrawoona group, containing banded iron formations, shale, volcaniclastic rock, chert and quartzite, while the Kelly group is characterised by felsic tuffaceous sandstone, quartz sandstone, siltstone, shale, chert and volcaniclastic rock (Mine Earth 2019).

The surface geology across the survey area varies, showing the same north-west to south-east alignment as clearly visible in the mountain ranges forming the landscape. Surface geology is mapped in Figure 2.3 and summarised in Table 2.2, source DMIRS (2008).

Table 2.2 Surface geology of the survey area

Code	Description	Area (ha)
A-DA-mats	Serpentinite, schistose	17.0
A-GC-s	Sandstone, siltstone, conglomerate, shale, chert, and banded iron-formation; metamorphosed	12.3
A-KEw-fnt	Felsic volcanic sandstone; tuffaceous; local quartz sandstone; metamorphosed	2.3
A-WAa-bb	Basalt; tholeiitic and massive; commonly pillowed and locally schistose; metamorphosed	59.3
A-WAa-bbo	Pillowed and massive basalt; includes minor dolerite; metamorphosed	25.9
A-WAa-bk	Komatiitic basalt, massive and pillowed lavas and subvolcanic intrusions; local pyroxene spinifex texture; weakly metamorphosed	55.4
A-WAa-cc	Chert; metamorphosed	5.7
A-WAa-mbbq	Silicified metabasalt	8.5
A-WAa-mbbs	Strongly sheared chloritic schist after metabasalt	30.9
A-WAa-mbmq	Silicified komatiitic basalt	1.2
A-WAa-mutk	Talc--carbonate rock derived from metaperidotite; includes volcanic protoliths	26.1
A-WAa-muts	Talc- or serpentine-schist; local tremolite--chlorite--serpentine--carbonate schist; sheared and serpentized ultramafic rocks including peridotite, pyroxenite, and komatiite	1.7
_A1c	Sand, silt, and gravel in active drainage channels; includes clay, silt, and sand in poorly defined drainage courses on floodplains	8.0

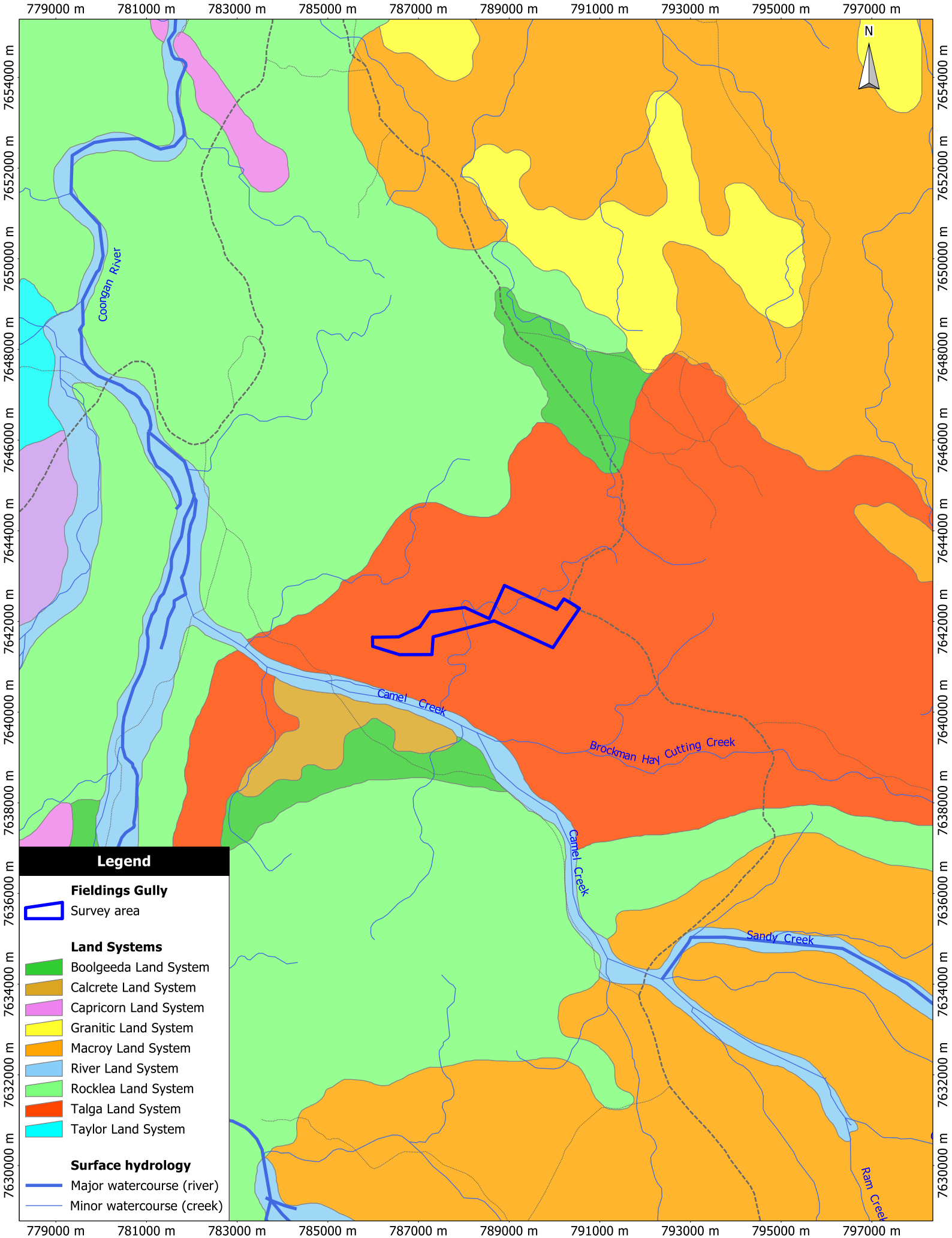
2.2.4 Soils

The survey area is dominantly influenced by the Warrawoona Group as per soil unit Gf1, described as steep ranges on basic lavas along with dolomites, tuff, banded iron formations, and dolerite dykes, with some narrow valley plains and high-level gently undulating areas of limited extent. Soils are generally shallow and stony and there are large areas without soil cover: chief soils are brown loams (Um6.23) along with significant areas of earthy loams (Um5.51). (Dr2.33) soils occur on lower slopes, with (Uf6.71) and (Ug5.37) on valley floors (CSIRO Australia 2018).

2.2.5 Hydrology

The Warrawoona Range, which intersects the survey area is a major feature that impacts hydrology within the local surrounds, forming a local and regional surface water divide (Groundwater Resource Management 2019a).

The Fieldings Gully survey area falls within the De Grey River basin, within the Coongan River catchment. The northwest striking Warrawoona Range forms a local surface water and groundwater divide. Runoff from the range proceeds to the Brockman Creek catchment to the north, which discharges to the Talga River or alternatively to the Coongan River catchment, approximately 4.4 kilometres north-west of the survey area. The Coongan River discharges into the Camel Creek in a southerly direction, with this creek located approximately 1 kilometre south of the western end of survey area, (Groundwater Resource Management 2019b). The flowlines proximal to the survey area are tributaries of the Coongan River. One unnamed tributary of the Camel Creek intersects the survey area twice as it winds its way in and out of its boundaries, as shown in Figure 2.2.



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Fieldings Gully
Flora and Fauna survey

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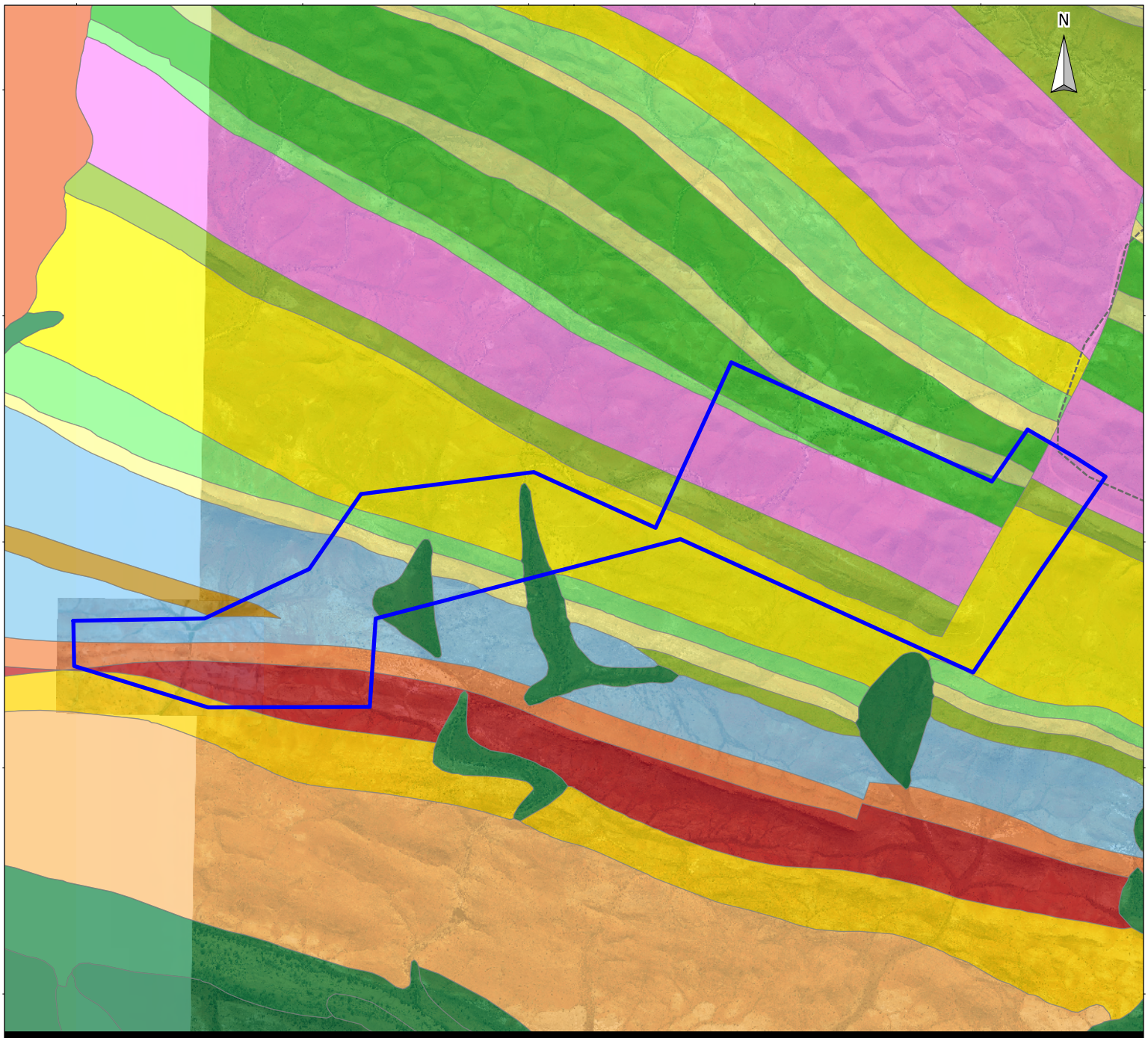
Original Size: A4
Scale: 1:50,000
Datum: MGA94 Zone 50
0 2 km

Figure 2.2

Land systems and surface hydrology



Legend

Fieldings Gully

Survey area

Surface Geology 1:100K

- A-DA-mats: Serpentinite, schistose
- A-GC-s: Sandstone, siltstone, conglomerate, schale, chert, and banded iron formation; metamorphosed
- A-KEw-fnt: Felsic volcanic sandstone; tuffaceous; local quartz sandstone; metamorphosed
- A-WAa-bb: Basalt, tholeiitic and massive; commonly pillowed and locally schistose; metamorphosed
- A-WAa-bbo: Pillowed and massive basalt; includes minor dolerite; metamorphosed
- A-WAa-bk: Komatiitic basalt, massive and pillowed lavas and subvolcanic intrusions; local pyroxene spinifex texture; weakly metamorphosed
- A-WAa-cc: Chert; metamorphosed
- A-WAa-mbbq: Silicified basalt
- A-WAa-mbbs: Strongly sheared chloritic schist after metabasalt
- A-WAa-mbmq: Silicified komatiitic basalt
- A-WAa-mutk: Talc - Carbonate rock derived from metaperidotite; includes volcanic protoliths
- A-WAa-muts: Talc - or serpentine-schist; local tremolite - chlorite - serpentite - carbonate schist; sheared and serpentized ultramafic rocks
- _A1c: Sand, silt, and gravel in active drainage channels; includes clay, silt, and sand in poorly defined drainage courses on floodplains

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Original Size: A4
Scale: 1:25,000
Datum: MGA94 Zone 50

0 800 m

Figure 2.3

Surface geology

2.3 Regional vegetation

The Fieldings Gully survey area is situated in the Pilbara Botanical District in the Eremaean Botanical Province of Western Australia (Beard 1975).

Digital maps (spatial data) of pre-European vegetation communities, based on state-wide mapping by J.S. Beard at 1:250,000 scale, are published by the Department of Primary Industries and Regional Development (DPIRD) (Beard 2018). The survey area is situated within association 82 of the George Ranges vegetation system. However, it is situated immediately adjacent to the border of the Abydos Plain 92 system-association, and elements of this are visible thought the survey area as well.

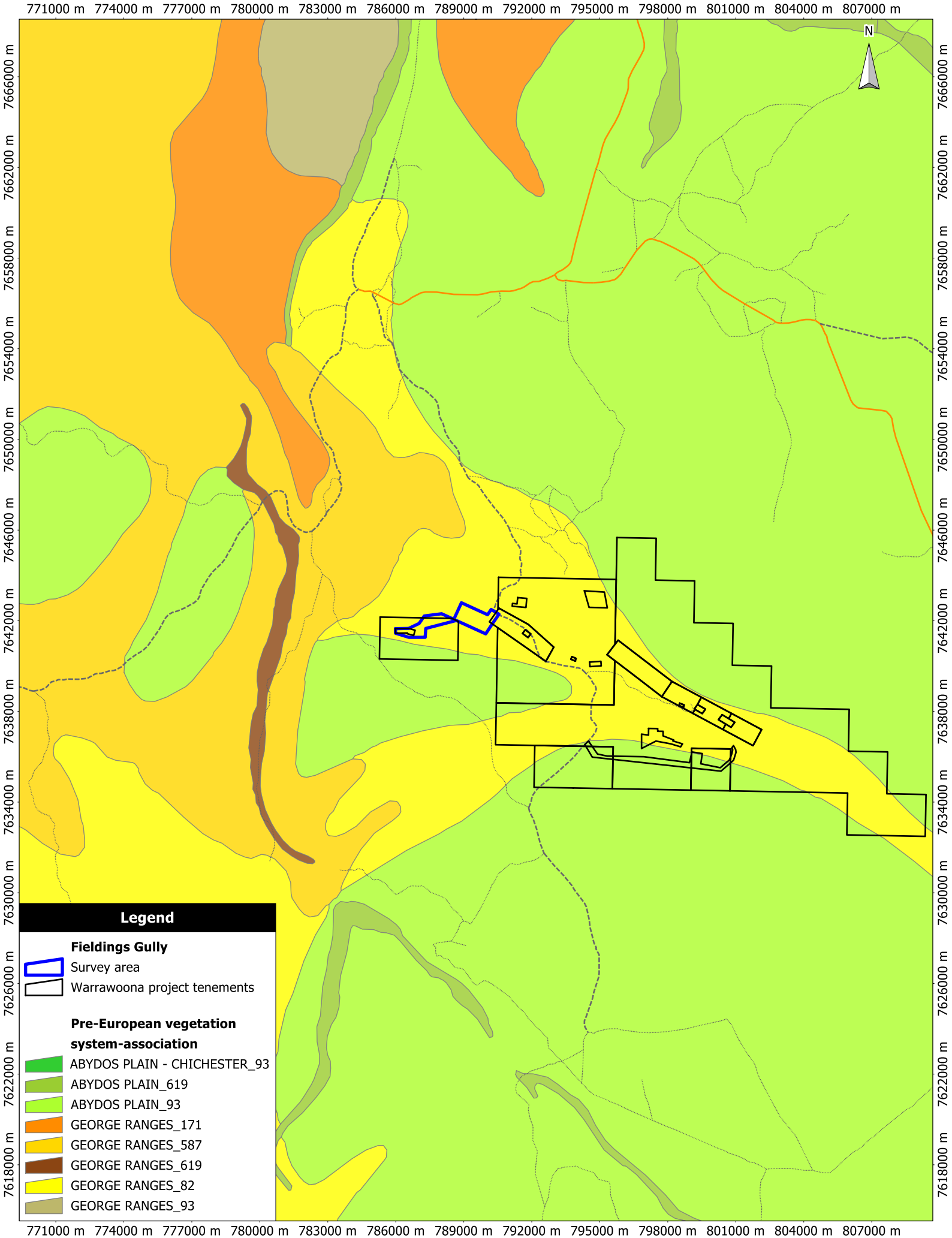
George Ranges 82 is described as a single vegetation type comprising a low tree steppe of snappy gum (*Eucalyptus leucophloia*) over *Triodia wiseana* hummock grassland.

Abydos Plain 93 is described as a mosaic of eleven different vegetation types, as listed below:

- Types 1-6: *Acacia pyrifolia* and *Acacia pachycarpa* shrub steppe over hummock grassland comprising either *Triodia lanigera*, *T. longiceps*, *T. angusta*, *T. secunda*, *T. brizoides*, or *T. schinzii*.
- Type 7: Mixed sparse shrubland over *Acacia pyrifolia*, *Acacia pachycarpa*, *Grevillea pyramidalis*, *Hakea lorea* and *Carissa spinarum*.
- Type 8: Open woodland of *Eucalyptus dichromophloia* and *E. papuana*.
- Type 9: Mixed sparse shrubland of *Acacia bivenosa*, *Senna artemisioides* subsp. x *sturtii*, *Petalostylis labicheoides*, *Senna glutinosa* subsp. *luerssenii*, *Acacia eriopoda*, over *Chrysopogon fallax*, *Eragrostis eriopoda*, *Abutilon muticum*, *Aristida arenaria*, *Boerhavia diffusa* tussock grassland.
- Type 10: *Acacia pyrifolia*, *Acacia pachycarpa* sparse shrubland over *Triodia pungens* hummock grassland.
- Type 11: *Triodia pungens* and *T. wiseana* hummock grassland.

These vegetation associations are common at the subregional and regional level and widespread through both the Chichester IBRA subregion (Shepherd *et al.* 2002).

The George Ranges 82 and Abydos Plain 93 vegetation system-associations extend into the main Warrawoona project area, which is situated entirely within these system-associations (Figure 2.4). The vegetation of the Warrawoona project area, as mapped by Woodman (2020a) is therefore likely to be quite similar to the vegetation found in Fieldings Gully.



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Fieldings Gully
Flora and Fauna survey

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Original Size: A4
Scale: 1:200,000
Datum: MGA94 Zone 50

0 5 km

Figure 2.4

Pre-European vegetation system-associations

3 Methods

3.1 Desktop study

3.1.1 Flora desktop study

The flora desktop study comprised a search of public databases and DBCA records, and a review of available literature relevant to the survey area. The desktop review served to compile a list of conservation significant flora taxa and vegetation communities with the potential to occur within the survey area. Conservation significant taxa identified in the desktop were then reviewed and assessed for likelihood of occurrence within the survey area, based proximity of earlier records, and availability of suitable habitat in the survey area, as outlined in Table 3.1.

Table 3.1 Flora desktop likelihood assessment criteria

Likelihood	Criteria
Highly likely	The taxon has been recorded previously within the survey area, or there are (recent) previous records within 5 km of the survey area, and suitable habitat is present in the survey area.
Likely	Suitable habitat is present in the survey area and there are previous (recent) records within 5-10 km of the survey area.
Possible	The habitat specificity of the taxon is not well defined and/or the survey area contains suitable habitat and nearest records are within 10-50 km of the survey area.
Unlikely	The habitat specificity of the taxon is well defined from previous records and the survey area does not contain suitable habitat for the taxon.

Table 3.2 Flora database search parameters

Source of information	Search area
DBCA (2023a) Threatened and Priority Flora Database	100 km radius surrounding the survey area
DBCA (2023b) Threatened and Priority Ecological Communities (TEC-PEC) database	100 km radius surrounding the survey area
Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023a) Protected Matters search tool	50 km radius surrounding the survey area

Table 3.3 Summary of relevant regional flora surveys

Survey report	Survey type and level
Woodman (2020a) Warrawoona Gold Project Groundwater Dependent Vegetation Assessment	Groundwater Dependent Vegetation Assessment Addresses portions of the survey area: Fieldings Gully
Woodman (2019) Warrawoona Gold Project Flora and Vegetation Survey.	Targeted and Level 2
Woodman (2020b) Warrawoona Gold Project. Detailed Flora and Vegetation Assessment	Targeted and Level 2

Survey report	Survey type and level
Mattiske (2007) Flora and Vegetation and Assessment of Groundwater Dependent Ecosystems in the Panorama Project survey area.	Summary of Trudgen *et al.* (2002), Trudgen (2006, 2007) Level 2 and Targeted
Woodman (2012a) Abydos Direct Shipping Ore Project – Flora and Vegetation Studies	Level 2
Woodman (2012b) Abydos East Project Camp and Haul Road Survey area – Flora and Vegetation Studies	Level 1
Woodman (2013a) Mt Webber DSO Project – Flora and Vegetation Assessment	Level 2
Woodman (2013b) McPhee Creek Project – Flora and Vegetation Assessment	Level 2
Woodman (2013c) McPhee Creek Iron Ore Project – Conservation Significant Flora Assessment.	Targeted
Woodman (2014a) McPhee Creek Iron Ore Project – Riparian Vegetation Mapping (Discharge Options 1, 2 and 3).	Level 2
Woodman (2014b) McPhee Creek Rail Project (Eastern Survey area Yandeyarra to Mt Webber and McPhee Creek) – Flora and Vegetation Assessment	Level 2
Woodman (2014c) McPhee Creek Rail Spur Project – Flora and Vegetation Assessment.	Level 2
Woodman (2016) Corunna Downs Project, Level 2 Flora and Vegetation Assessment	Level 2
GHD (2017) Coongan Gorge Realignment Environmental Impact Assessment and Environmental Management Plan	Level 2

3.1.2 Fauna desktop study

The fauna desktop study comprised a search of public databases and DBCA data and a review of available literature relevant to the survey area. The fauna desktop served to place the fauna assemblage of the survey area in a regional context and to compile a list of vertebrate fauna species with the potential to occur within the survey area. This list was then filtered for conservation significant fauna species and likelihood to occur within the survey area was assessed using the fauna decision matrix located in Appendix II.

Four fauna databases were searched (Table 3.4), two to obtain information on all species previously recorded (Atlas of Living Australia and Birdlife Birdata), one to identify species of conservation significance previously recorded in the region (DBCA threatened and priority fauna database) and one to identify EPBC listed species of conservation significance known or likely to occur within the region (Protected matters database). Fauna Database search parameters are outlined in Table 3.4 and the literature review is summarised in Table 3.5. Other sources of information are referenced in text.

Table 3.4 Fauna Database search parameters

Source of information	Search area
DBCA (2023c) Threatened and Priority Fauna Database (TPFa).	100 km radius surrounding the survey area

ALA (2023) Atlas of living Australia online database	50 km radius surrounding the survey area
DCCEEW (2023a) Protected Matters search tool	50 km radius surrounding the survey area
Birdlife Australia (2023) Birdata database	50 km radius surrounding the survey area

Table 3.5 Summary of relevant regional fauna surveys

Survey report	Survey Type
MWH (2016) Corunna Downs Iron Ore Project Terrestrial Vertebrate Fauna Survey	Level 2
Biologic 2017. Warrawoona Level 1 Fauna Assessment. Calidus Resources Limited. December 2017.	Level 1
Biologic (2019a) Warrawoona Gold Project Level 1 Vertebrate Fauna Survey, and Desktop SRE and Subterranean Assessment	Level 1
Biologic (2019b) Warrawoona Gold Project: Habitat Assessment and Targeted Vertebrate Fauna Survey.	Level 1 and Targeted
Bat Call WA (2022) Warrawoona Vulnerable Bat Colony Monitoring 2019 to 2021	Targeted

3.2 Field Survey

A combined basic vertebrate fauna survey and detailed flora survey was completed by a team of two ecologists. The field survey was completed between 13 and 21 June 2023 with travel on the first and last day. The survey area was accessed by four-wheel drive vehicle using existing tracks and surveyed on foot.

The survey was carried out in a manner consistent with the following documents developed by the Western Australian Environmental Protection Authority (EPA):

- Environmental Protection Authority (EPA) *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020)
- Environmental Protection Authority (EPA) *Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016)

3.2.1 Detailed flora survey

A total of 25 flora quadrats (50 by 50 metres) and 9 relevés were sampled throughout the survey area (Figure 3.1), with approximately 620 flora specimens collected for identification. Relevés and quadrats were located in all preliminary vegetation types identified through a combination of interpretation of aerial, photographs, landform, and on-ground inspection.

The following information was recorded at each relevé and quadrat:

- Site name, date, photographs
- GPS coordinates of quadrats corners and a central GPS coordinate for relevés.
- Landform and topography
- Soil type, colour, rock type and rock cover
- Vegetation condition (as per EPA 2016, Table 2)
- Disturbances if present
- Fire history and intensity (estimate)
- Vascular plant species – including height and percentage cover.

Additional flora taxa were recorded opportunistically while traversing the survey area. Opportunistic collections were made of (a) taxa not (well) represented in quadrats or relevés, (b) potential conservation significant taxa. Preliminary vegetation boundaries were mapped in the field using aerial photographs and GPS waypoints of vegetation transitions.

Following the survey, the broad vegetation types of the survey area were classified through a combination of PATN analysis and manual classification based on landform, floristic composition, and vegetation structure. Vegetation boundaries were mapped using aerial photographs, field maps, classification of quadrats and relevés, mapping points, and notes and photos taken at opportunistic flora collection sites.

PATN analysis procedure

Statistical analysis to support classification of vegetation types was carried out using PATN software V4 (Belbin 2013). PATN analysis was performed on the complete dataset from all quadrats (25 quadrats, 133 taxa). No taxa were removed from the dataset, and the data did not require transformation.

Prior to analysis, percentage cover data for each species at each quadrat was re-coded into cover scores. The analysis was first completed first on flora taxa using the cover score values from the quadrat

occurrence records. A two-step association measure was used to classify flora taxa into five groups The final association of sites used the Agglomerative Hierarchical Fusion classification strategy, the Flexible UPGMA classification technique and the Bray and Curtis association measure, with beta of -0.1, producing 5 groups of sites.

An evaluation was run on the data to identify Kruskal-Wallis (KW) values for each flora taxon. In PATN analysis, KW values are used to estimate the strength of impact a variable has on the discrimination between a set of groups (Belbin 2013), where taxa with high KW values are considered to be strong drivers of groupings, while taxa with the low KW values are likely to have no to negligible impact on groupings. KW values must be considered with care, however, as taxa which only occur once in a dataset will often have low KW values, but their rarity in the dataset could be either because (A) they occurred once in a frequently sampled vegetation type, or (B) because they reflect the presence of a distinct vegetation type which was sampled with only one or two quadrats.

All taxa with KW values below 0.5 were removed from the analysis, and PATN analysis was run on the remaining taxa. However, comparison between the dendrograms between the first and the second runs did not show a difference in groupings, and many of the taxa excluded based on low KW values were found to be defining taxa the less common vegetation types. For this reason, the original analysis including all taxa was selected as the final PATN result, as presented in section 4.2.2.

3.2.2 Basic fauna survey

Fauna habitat assessment

The broad fauna habitats of the survey area were mapped and described with the aim of identifying habitats that may support species of conservation significance. Habitat data was recorded at each flora quadrat and relevé location throughout the survey area.

Additional fauna records and habitat data was recorded opportunistically in the survey area via a search around the general vicinity of habitat sites, and during traverses on foot between sites.

Information recorded at fauna habitat sites included:

- Site name, date, photographs, central GPS coordinate
- Landform, slope, and aspect
- Notes on soil and rock cover
- Leaf litter cover and depth, presence of coarse woody debris and dead trees
- Broad description of habitat

Preliminary habitat boundaries were mapped in the field while traversing the survey area by drawing vegetation boundaries on an aerial photograph of the survey area whilst completing the flora survey.

Following the survey, broad fauna habitats were manually classified using field data aligned with land system mapping, surface geology and topography data, and final boundaries were drawn using GIS.

Opportunistic fauna records

Opportunistic records and mapping points were collected throughout the survey area. Opportunistic records included direct sightings and calls, as well as secondary signs of presence such as tracks, scats, diggings, burrows, mounds, feathers, bones, sloughed reptile skins. All records were accompanied by a GPS waypoint and/or fauna habitat notes, in order to link species records to fauna habitats.

Deployment of SM4 detectors

Bat and night parrot calls were surveyed opportunistically by deploying two SM4 detectors which were regularly moved. The recordings were "continuously" made using ultrasonic SM4BAT-FS (SM4U) and acoustic SongMeter (SM4A) detectors (both by Wildlife Acoustics Inc., USA). The audio settings used followed the manufacturer's recommendations contained in the user manuals.

Microbats were surveyed using one SM4 ultrasonic recorder (SM4U) which was deployed at four different sites across the survey area. The SM4U recorder was moved every two nights for the first three sites, and then left in situ at the fourth site until it was retrieved by Calidus staff on 30/06/2023.

The ultrasonic recorder was deployed at locations that would be likely to contain bat activity such as creeklines and rocky outcrops. The bat survey consisted of completing a total of 11 overnight ultrasonic bat sound recordings, at four locations beginning at twilight.

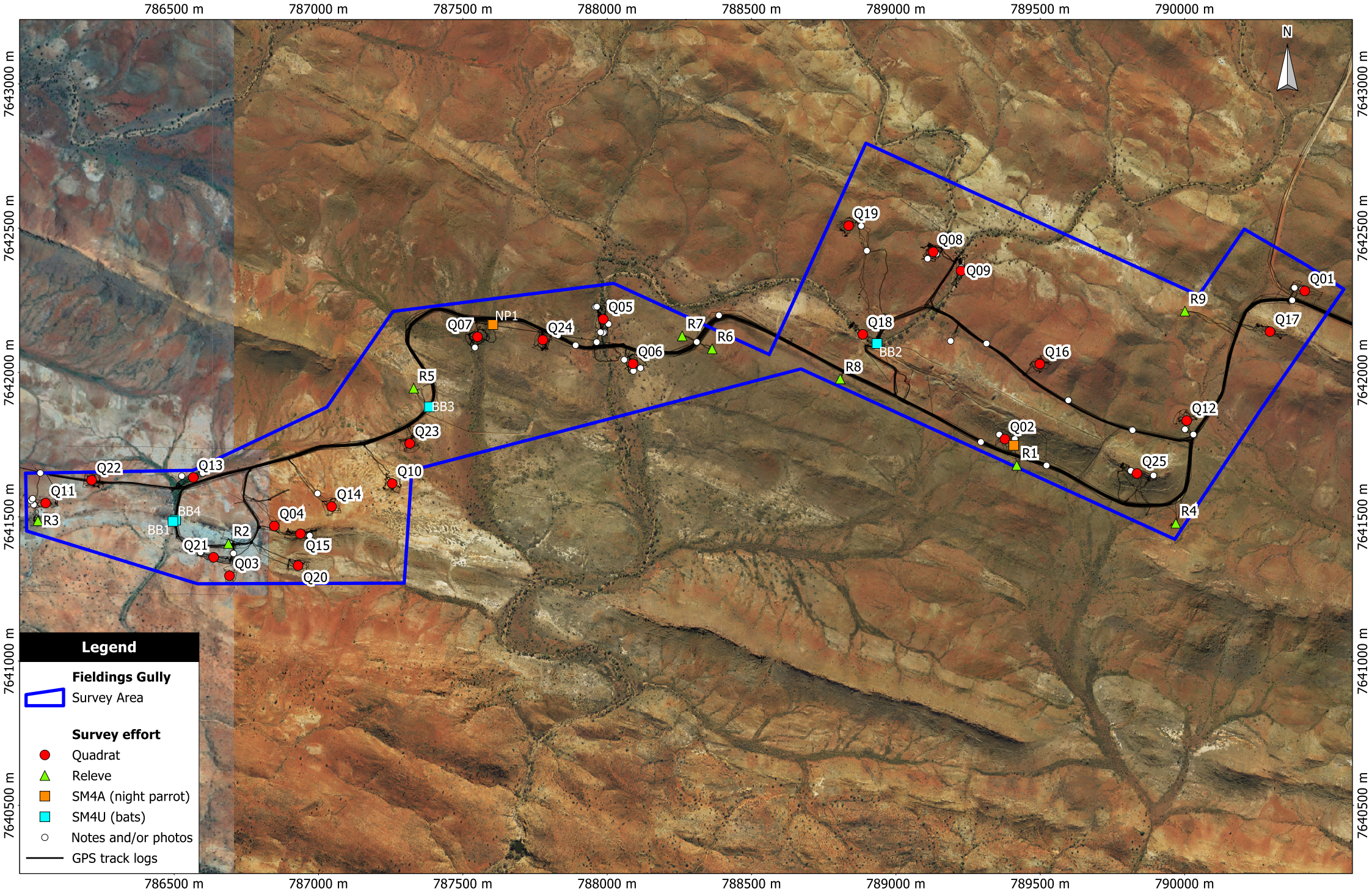
A total of four acoustic survey nights were completed at two sites for night parrot calls, using an acoustic SM4 recorder (SM4A).

The locations of SM4 units deployed during the survey are mapped in Figure 3.1, with deployment details summarised in below Table 3.6.

Table 3.6 Summary of SM4 ultrasonic and acoustic recorders deployed

Site	Device	Deployed	Retrieved	Latitude	Longitude
BB1	Bat recorder (S4U 8168)	15/06/2023	17/06/2023	-21.30590	119.76150
BB2	Bat recorder (S4U 8168)	17/06/2023	19/06/2023	-21.30000	119.78490
BB3	Bat recorder (S4U 8168)	19/06/2023	21/06/2023	-21.30220	119.77000
BB4	Bat recorder (S4U 8168)	21/06/2023	30/06/2023	-21.30590	119.76160
NP1	NP recorder (SM4A 11075)	17/06/2023	20/06/2023	-21.29960	119.77210
NP2	NP recorder (SM4A 11075)	15/06/2023	17/06/2023	-21.30310	119.78950

Recordings were sent to Bat Call for analysis and identification. For the ultrasonic recordings, call analysis details are as recommended by Australasian Bat Society (Australasian Bat Society 2006). Reference data for the species identified are available in (Bullen & McKenzie 2002, McKenzie & Bullen 2003, 2009). For the acoustic recordings, Bat Call reviewed recordings both manually and using an automatic scan technique for Night parrot calls. Candidate calls were compared Bat Call's confirmed reference calls from two Western Australian arid zone locations.



Rapallo environmental

Calidus Resources
Fieldings Gully
Flora and Fauna survey

CALIDUS RESOURCES LIMITED

Original Size: A4 Scale: 1:16,000
Datum: MGA94 Zone 50
0 500 m

Figure 3.1

Survey effort

3.3 Personnel and licensing

The personnel involved in the field survey, data entry and analysis, and the preparation of this report are listed in Table 3.7.

Flora samples were collected under a flora taking (biological assessment) licence, under Regulation 62, Biodiversity Conservation Regulations 2018. This work was completed through licence numbers FB62000547 and FB62000574.

Table 3.7 Personnel

Name	Position	Survey	Analysis	Reporting
Kate George	Principal Environmental Scientist			•
Marieke Weerheim	Senior Environmental Scientist		•	•
Jasmine Kasper	Zoologist	•	•	•
Arnika Thorbjornsen	Ecologist	•		
Molly George	Ecologist		•	•

3.4 Nomenclature and conservation listing

In this report, names for all vertebrate fauna species follows the Western Australian Museum Checklist of Terrestrial Vertebrate Fauna (May 2023). Names for fish species follow the Fishes of Australia website (Bray & Gomon 2021).

Distribution maps and recent records of vertebrate fauna species were verified using the Atlas of Living Australia (ALA 2023) and Birdata online databases, the Species Profile and Threats Database (SPRAT) (AWE 2021), Van Dyck and Strahan (2008), Johnstone and Storr (1998, 2004), Wilson and Swan (2017), Cogger (2018), and other relevant publications as cited within this report.

Flora taxonomy and nomenclature follows FloraBase (Western Australian Herbarium 1998). FloraBase was also accessed to verify conservation codes, distribution records, habitat requirements, and flowering times. Conservation codes cited in this report are as per Appendix I.

4 Results and Discussion

4.1 Flora desktop results

The flora desktop review identified 695 flora taxa from 75 families recorded from within 100 km of the survey area. The list included 53 conservation significant taxa from 26 families, and 29 introduced taxa (weeds) from 16 families.

4.1.1 Conservation significant flora desktop results

The desktop search identified 53 conservation significant taxa. These were assessed for likelihood to occur in the Fielding Gully survey area as per likelihood criteria presented in Table 3.1. Results are summarised in Table 4.1 with full results presented in Appendix III.

Table 4.1 Summary statistics of conservation significant flora desktop results

Likelihood	Conservation status					
	EN	P1	P2	P3	P4	Total
Likely		1			1	**2**
Possible		6		10		**16**
Unlikely	1	13	4	14	3	**35**
Grand Total	**1**	**20**	**4**	**24**	**4**	**53**

Out of the 53 taxa, only one was considered likely to occur, and 15 were considered possible to occur. These are listed in below, showing known flowering times for these taxa.

Table 4.2 Conservation significant flora taxa assessed as likely to possible to occur in the survey area

Family	Scientific Name	Status	Flowering period	Likelihood
Fabaceae	*Acacia aphanoclada*	P1	August to October	Possible
Fabaceae	*Acacia cyperophylla* var. *omearana*	P1	March, April, August, October	Possible
Fabaceae	*Acacia leeuweniana*	P1	No info	Possible
Fabaceae	*Acacia levata*	P3	May and October	Possible
Fabaceae	*Acacia* sp. Marble Bar (J.G. & M.H. Simmons 3499)	P1	September	Possible
Fabaceae	*Acacia* sp. Nullagine (B.R. Maslin 4955)	P1	No info	Possible
Malvaceae	*Corchorus* sp. Yarrie (J. Bull & D. Roberts CAL 01.05)	P1	May, June	Possible
Poaceae	*Eragrostis crateriformis*	P3	May or July	Possible
Euphorbiaceae	*Euphorbia clementii*	P3	April	Possible
Boraginaceae	*Euploca mutica*	P3	April to June, September	Possible
Amaranthaceae	*Gomphrena leptophylla*	P3	March to September	Possible
Apocynaceae	*Gymnanthera cunninghamii*	P3	January to December	Possible
Boraginaceae	*Heliotropium murinum*	P3	May or September	Possible

Family	Scientific Name	Status	Flowering period	Likelihood
Pedaliaceae	*Josephinia* sp. Woodstock (A.A. Mitchell PRP 989)	P1	No info	Possible
Amaranthaceae	*Ptilotus mollis*	P4	May or September	Likely
Acanthaceae	*Rostellularia adscendens* var. *latifolia*	P3	April to May	Possible

Out of the sixteen taxa considered possible to likely to occur in the survey area, six were *Acacia* species, growing as either shrubs or trees, while *Gymnanthera cunninghamii* also grows as a shrub. These seven taxa would be detectable year-round and if present in quadrats they would have been recorded. The other nine taxa comprised low shrubs, herbs, or grasses. The survey was completed in June, when many of these taxa (but not all) would have been in flower, and therefore readily detectable in quadrats. The survey team collected representative specimens of all taxa present in quadrats, with multiple repeat collections for all taxa found in more than one quadrat. However, the survey did not comprise a targeted survey and these taxa may occur in the survey area outside of the quadrats sampled.

The survey occurred outside of the known flowering periods of *Euphorbia clementii*, *Heliotropium murinum*, *Josephinia* sp. Woodstock, *Ptilotus mollis*, and *Rostellularia adscendens* var. *latifolia*. These five taxa comprise dwarf shrubs or herbs. The two taxa recorded in close proximity to the survey area are discussed below.

***Ptilotus mollis* (Priority 4)**

This taxon is a small compact shrub to 0.5 metres high with soft grey foliage. Leaves are ovate, 5-30 millimetres long and covered in soft downy hairs. It grows on stony hills and scree slopes, which occur in several places in the survey area. Flowering has been recorded in May and September (Western Australian Herbarium 1998).

The desktop study returned multiple records of *Ptilotus mollis* within 5 kilometres of the survey area, as well as hundreds of records from the main Warrawoona project (Woodman 2020b), with locations 8-13 kilometres east of the survey area from surface geology that continues on into Fieldings Gully (DMIRS 2008). For this reason, *Ptilotus mollis* is considered likely to occur in the Fieldings Gully survey area.

The Fieldings Gully detailed flora survey collected 24 *Ptilotus* specimens, which were identified as representing seven different species, based on flowers or having very distinct foliage. One specimen collected from quadrat Q23 could not be fully identified, and had small soft grey ovate leaves which resembled those of *Ptilotus mollis*, but also those *Ptilotus astrolasius*. The plant was juvenile, and did not have flowers. The survey occurred outside the known flowering period of *Ptilotus mollis*, hence it is not possible to exclude this species entirely, however Quadrat Q23 was on a plain with loamy soil with a few scattered round pebbles, which does not match this species' habitat, hence it is much more likely that the specimen was *P. astrolasius* which is widespread and occurs across a variety of habitats. Furthermore, mature specimens of *P. astrolasius* were recorded from Q23.

***Acacia* sp. Marble Bar (Priority 1)**

This taxon is a shrub with dull green foliage. It flowers in September with inflorescences in golden spikes to 30 mm long (WA Herbarium 1998-). It is currently only known from only one 1997 record, from one location 2 kilometres north of the survey area, along seasonal watercourse among low rocky hills. The occurrence and even the status of this taxon is a mystery. The original population has seemingly been killed by fire and no other records of this taxon have been detected since (Maslin 2018). The fact sheet

on the Wattle database states that the taxonomic status of *Acacia* sp. Marble Bar is uncertain, and it is possible that the record comprised a hybrid between *Acacia trachycarpa* and another unidentified *Acacia* (Maslin 2018). *A. trachycarpa* however has distinct minni ritchi[1] bark, which is not mentioned in the description of *A*. sp. Marble Bar (Maslin 2018).

The Fieldings Gully survey recorded 115 specimens of *Acacia*, but none were identified as potentially representing *Acacia* sp. Marble Bar. Noting the close proximity of the only known location of this taxon to the survey area and the presence of suitable habitat throughout the survey area (especially vegetation type E), the assessment matrix presented in Table 3.1 indicates that *Acacia* sp. Marble Bar should be ranked as likely to occur in the survey area, which is how it is presented in this report.

However, it must be noted that the taxon was only recorded once in 1997 and never recorded again, and it is unknown if the species remains extant, or whether it was an actual species at all and not a hybrid. Since the Fieldings Gully survey occurred outside of the known flowering period, and did not comprise a targeted survey, *Acacia* sp. Marble Bar may occur in the survey area, however for reasons stated above it is considered possible to occur in the survey area.

4.1.2 Introduced flora (weeds)

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) categorises the weeds of Western Australia into four main classifications:

- Declared Pests (under Section 22 of the Act);
- Permitted (under Section 11 of the Act);
- Prohibited (under Section 12 of the Act); and
- Permitted requiring a permit (Section 73, BAM Regulations 2013).

Under the BAM Act all declared plant pests are placed in one of three categories:

- C1 (Exclusion) — Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State;
- C2 (Eradication) — Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still feasible; and
- C3 (Management) — Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size.

Fifteen introduced taxa have been identified by DBCA as 'Priority Alerts' for the Pilbara region, including **Azadirachta indica, *Calotropis procera, *Chloris gayana, *Clitoria ternatea, *Cryptostegia grandiflora, *Cylindropuntia spp., *Euphorbia tirucalli, *Jatropha gossypifolia, *Lantana camara, *Moringa oleifera, *Ricinus communis, *Schinus molle var. areira, *Vachellia nilotica, *Washingtonia robusta and *Xanthium strumarium* (DPaW 2014).

The desktop returned 29 introduced flora taxa from 16 families recorded previously within 100 kilometres of the survey area. The status of each of these weeds was assessed against the Western Australian Organism List (WAOL) as available from the Department of Agriculture and Food (DAFWA) website

[1] Minni ritchi bark: Reddish bark exfoliating in narrow, curled strips. Usually only applied to certain species of *Acacia* or *Eucalyptus* (Western Australian Herbarium 1998)

(DAFWA 2021). Most weeds recorded were listed as Permitted – s11, and two were listed as Declared Pest – s22(2). Three weeds (**Aerva javanica*, **Calotropis procera*, and **Cenchrus ciliaris*) were recorded during the survey. These are highlighted in Table 4.5.

Table 4.3 Weeds recorded in the desktop study

Family	Taxon	WAOL status	Records
Aizoaceae	**Trianthema portulacastrum*	Permitted - s11	2
Amaranthaceae	**Aerva javanica*	Permitted - s11	18
Amaranthaceae	**Amaranthus viridis*	Permitted - s11	1
Apocynaceae	**Calotropis procera*	Declared Pest - s22(2)	16
Asphodelaceae	**Aloe vera* var. *officinalis*	Permitted - s11	3
Asteraceae	**Bidens bipinnata*	Permitted - s11	2
Asteraceae	**Flaveria trinervia*	Permitted - s11	11
Asteraceae	**Sonchus oleraceus*	Permitted - s11	3
Cucurbitaceae	**Citrullus colocynthis*	Permitted - s11	2
Cucurbitaceae	**Citrullus lanatus*	Permitted - s11	3
Euphorbiaceae	**Ricinus communis*	Permitted - s11	2
Fabaceae	**Parkinsonia aculeata*	Declared Pest - s22(2)	1
Fabaceae	**Vachellia farnesiana*	Permitted - s11	14
Malvaceae	**Malvastrum americanum*	Permitted - s11	10
Papaveraceae	**Argemone mexicana*	Declared Pest, Prohibited - s12	1
Papaveraceae	**Argemone ochroleuca*	Permitted - s11	10
Passifloraceae	**Passiflora foetida* var. *hispida*	Permitted - s11	1
Poaceae	**Cenchrus ciliaris*	Permitted - s11	52
Poaceae	**Cenchrus setiger*	Permitted - s11	6
Poaceae	**Chloris barbata*	Permitted - s11	5
Poaceae	**Chloris virgata*	Permitted - s11	2
Poaceae	**Cynodon dactylon*	Permitted - s11	12
Poaceae	**Digitaria ciliaris*	Permitted - s11	1
Poaceae	**Echinochloa colona*	Permitted - s11	4
Poaceae	**Eragrostis minor*	Permitted - s11	1
Poaceae	**Setaria verticillata*	Permitted - s11	7
Portulacaceae	**Portulaca pilosa*	Permitted - s11	1
Solanaceae	**Solanum nigrum*	Permitted - s11	3

4.1.3 Threatened Ecological Communities and Environmentally Sensitive Areas

The search of the Commonwealth Protected Matters database with regard to MNES listed under the EPBC Act did not return any TECs as likely or known to occur within the search area (AWE 2020).

Search results of the DBCA Threatened and Priority Ecological Communities (TEC-PEC) database did not yield any known TEC or PEC within the survey area boundaries, nor within 50 kilometres of the survey area. Three PECs were identified within 50-100 kilometres of the survey area, as listed below and described in Table 4.4 based on

- Four plant assemblages of the Wona Land System (Priority 1)
- Gregory Land System (Priority 3)
- Stony saline clay plains of the Mosquito Land System (Priority 3)

Table 4.4 Priority Ecological Communities within 100 kilometres of the survey area

Name	Status	Description [1)]	Comments
Four plant assemblages of the Wona Land System (Previously 'Cracking clays of the Chichester and Mungaroona Range')	Priority 1	Four plant assemblages: ▪ Cracking clays of the Chichester and Mungaroona Range. This shrubless plain of stony gibber community occurs on the tablelands with very little vegetative cover during the dry season, however during the wet a suite of ephemerals/annuals and short-lived perennials emerge, many of which are poorly known and range-end taxa (Priority 1) ▪ Annual Sorghum grasslands on self-mulching clays with a moderate-dense overlay of rocks. This community appears very rare and restricted to the Pannawonica-Robe valley end of Chichester Range. Naturally species poor when dry. Threat: weed invasion (Priority 1) ▪ Mitchell grass plains (*Astrebla* spp.) on gilgai (Priority 3(iii)) ▪ Mitchell grass and Roebourne Plain grass (*Eragrostis xerophila*) plain on gilgai. *Astrebla pectinata*, *A. elymoides*, *E. xerophila*, *Aristida latifolia*, Eriachne and *Sida fibulifera*. Typical type, heavily grazed (Priority 3 (iii)) Threats: grazing, clearing for mining related activities and solar farms, altered fire regimes	There are 33 occurrences of this PEC between 70 and 100 kilometres south of the survey area. The survey area does not contain gibber, clays, or gilgai. The only flora species named in the description that occurs in the survey area is *Sida fibulifera*, which is very common across the northern two-thirds of western australia. The survey area is highly unlikely to support this PEC
Gregory Land System	Priority 3	Linear dunes and restricted sandplains supporting shrubby hard spinifex (and occasionally soft spinifex) grasslands Threats: over grazing	One location, approximately 95 kilometres north of the survey area. The survey area does not contain linear dunes and sandplains. The survey area is highly unlikely to support this PEC.
Stony saline clay plains of the Mosquito Land System	Priority 3	Triodia longiceps grassland with scattered *Maireana melanocoma* and Sclerolaena spp. and includes Priority flora taxa *Atriplex spinulosa* (P1) and *Ptilotus wilsonii* (P1). Dissected by drainage lines. Dominated by (but not limited to) *Melaleuca eleuterostachya* and *Acacia bivenosa* occurring on saline red brown non-cracking clays with a mantle of quartz gravel and	This PEC occurs over a large area 56 kilometres south-east of the survey area. The survey area does not contain saline red-brown non-cracking clays, and this PEC is highly restricted. Of the named flora taxa, only

Name	Status	Description [1)]	Comments
		neutral subsurface soil material on level to undulating plains. Largely restricted to an area east of Nullagine. Threats: preferential grazing (livestock and feral herbivores), clearing for mining and associated activity.	*A. bivenosa* was recorded in the survey area, which is a very common species across the Pilbara. The survey area is highly unlikely to support this PEC.

Footnotes: 1) Source: Priority Ecological Communities List (DBCA 2023d)

4.2 Flora and vegetation survey results

4.2.1 Flora taxa recorded during the survey

The survey recorded 137 flora taxa from 34 families. These included 134 native taxa and three introduced taxa (weeds). The most species-rich families recorded were the Fabaceae (wattles and peas) with 31 taxa, Malvaceae with 19 taxa, and Poaceae (grasses) with 16 taxa.

No conservation significant flora taxa were recorded.

The survey recorded five taxa which can be associated with groundwater dependent vegetation: *Eucalyptus camaldulensis/victrix*, *Melaleuca linophylla*, *Atalaya hemiglauca*, *Acacia coriacea* subsp. *pendens*, and *Cyperus vaginatus*. All taxa were recorded in vegetation type D, which comprised wide drainage channels flanked by tall river gums. Note, these five taxa are all considered to be facultative phreatophytes, which means they are also able to occur in areas without access to permanent groundwater. No obligate phreatophytes were recorded during the survey.

The three weeds recorded were **Aerva javanica*, **Calotropis procera*, and **Cenchrus ciliaris*. Of these, **Calotropis procera* (rubber bush) is a Declared Pest – s22(2), while the other two weed are listed Permitted – s11. **Calotropis procera* was recorded from two locations in the survey area, as summarised in Table 4.5.

Table 4.5 Weeds recorded during the survey per vegetation type

Family	Taxon	Status	Type A	Type B	Type D	Type E
Amaranthaceae	**Aerva javanica*	Permitted – s11	Q02, Q15, Q17, Q25, R03	Q06, R02		
Apocynaceae	**Calotropis procera*	Declared Pest – s22(2)		R02		Q13
Poaceae	**Cenchrus ciliaris*	Permitted – s11	Q01, Q02, Q17, Q25, R03	Q06, Q23, Q24	Q05, Q09, Q18	Q07, Q13, R08

4.2.2 Vegetation of the survey area

Five broad vegetation types were identified in the survey area, based on PATN analysis of vegetation data, supported by landform and soil. In addition, parts of the survey area had been cleared or heavily disturbed in the past, but had started to regrow native vegetation. These areas are mapped as per the original native vegetation which had started to come back. Approximately 3.4 hectares of the survey area comprised unsealed roads, and these are mapped as cleared.

PATN classification of quadrats

PATN analysis was completed on the 25 quadrats and 133 taxa recorded during the survey. The analysis produced five groups which were checked and supported by manual classification. The vegetation types were coded A to E, and codes for each quadrat have been added to the PATN dendrogram presented below (Figure 4.1).

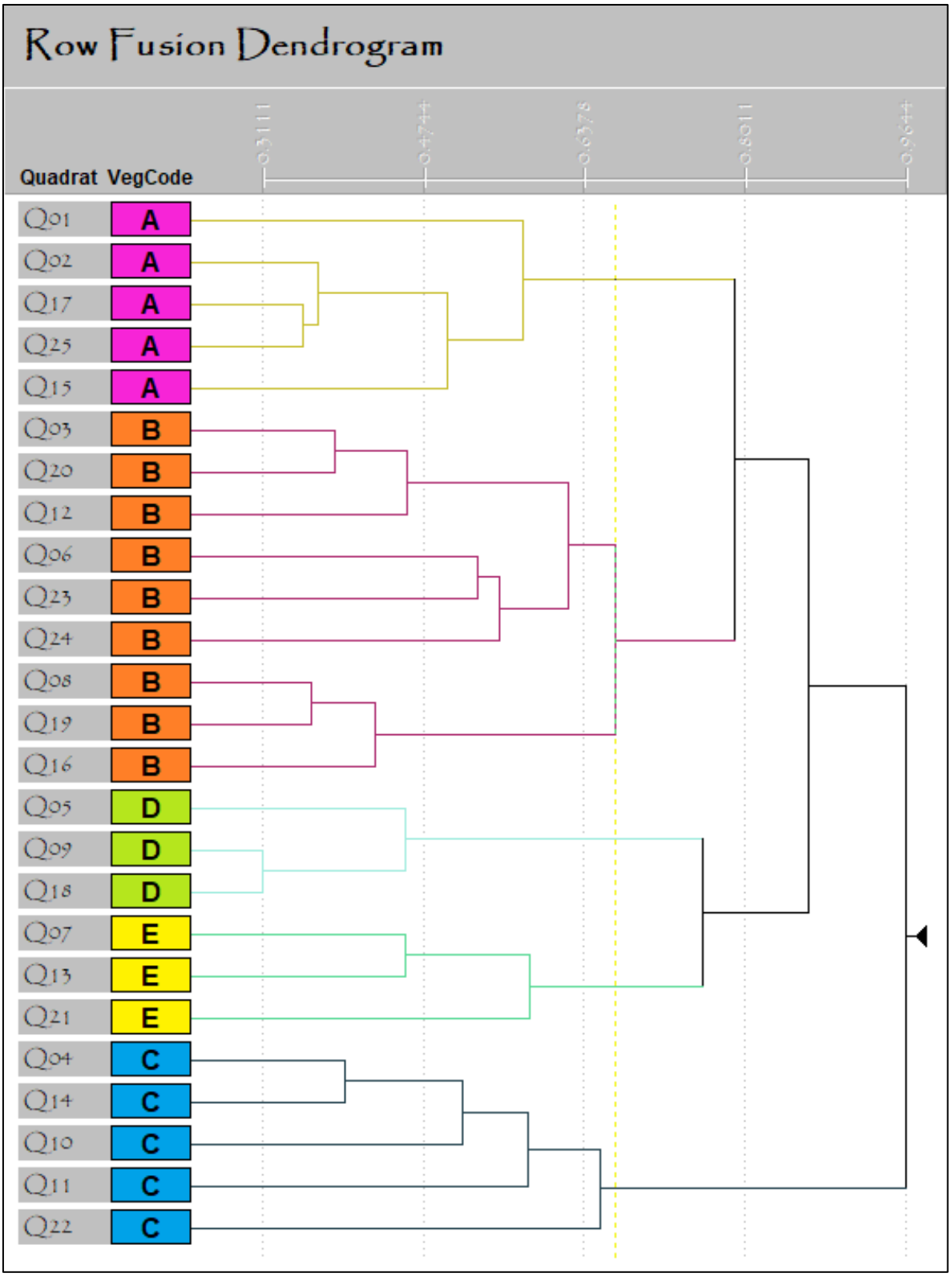


Figure 4.1 PATN dendrogram

Vegetation types

Five broad vegetation types were identified in the survey area, as summarised in Table 4.6, detailed in Table 4.7, and mapped in Figure 4.2.

Table 4.6 Summary of vegetation types recorded in the survey area

Code	Brief description	Area (ha)	Area (%)
A	*Ficus brachypoda* or *Atalaya hemiglauca* over *Acacia bivenosa* over *Triodia wiseana* on steep rocky slopes, gullies, and rocky hill crests	26.9	10.6%
B	*Corymbia hamersleyana* over *Acacia inaequilatera* and *Acacia orthocarpa* over Triodia wiseana and Trioda brizoides on stony plains and rounded hills with on orange soil	176.0	69.2%
C	*Eucalyptus leucophloia* subsp. leucophloia over *Acacia acradenia over Triodia angusta* and *Triodia epactia* on stony plains and lower hill slopes with calcareous soil and surface rocks	32.5	12.8%
D	*Eucalyptus victrix*, *Acacia trachycarpa*, *Melaleuca linophylla* and *Atalaya hemiglauca* over **Cenchrus ciliaris* in drainage channels with open stony creek bed	5.2	2.0%
E	*Corymbia hamersleyana* over *Acacia acradenia* tall shrubland over mixed shrubs over *Chrysopogon fallax* and **Cenchrus ciliaris* on diffuse drainage channels	10.2	4.0%
X	Roads (not a vegetation type)	3.4	1.4%
Total		**254.2**	**100%**

Fire history

The vegetation of the survey area has been affected by a mosaic of fires, with estimated fire history across the area ranging from long unburnt, to within five years, ten years, or within the past 12 months. Fire intensity overall was estimated to have been low, with only the lower strata (especially spinifex) visibly impacted. This led to a mosaic of different spinifex ages, with the more recently burnt areas having a much lower percentage spinifex cover than that of the long unburnt areas. However, fire history did not impact vegetation classification, with a variety of fire ages recorded across all vegetation types. Vegetation type B, which was the dominant vegetation across the survey area, supported all fire history categories recorded.

Conservation significant vegetation

None of the vegetation types of the survey area matched any known TEC or PEC. The vegetation types of the survey area were considered typical for the region, and extended outside the boundaries of the survey area based on both aerial photography and existing biogeology mapping, and on earlier flora surveys completed for the nearby Warrawoona project.

Groundwater Dependent Vegetation

The survey recorded five taxa of facultative phreatophytes, all within vegetation type D which comprised the wider drainage channels of the survey area. Since these taxa are all facultative phreatophytes, vegetation type D does not appear to be (strongly) groundwater dependent.

The main phreatophytic taxa in the Pilbara are *Melaleuca argentea* (silver teatree) and *Sesbania formosa* (white dragon tree) (Woodman 2020b). Neither taxon was recorded from Fieldings Gully, during the

current survey, nor during a reconnaissance visit by Rapallo in 2020 (unpublished data), nor by Woodman (2020b) as part of the Warrawoona flora survey.

Rapallo completed reconnaissance flora surveys along two pipeline routes for the Warrawoona project, referred to as the Moolyella and Big Schist routes. *Melaleuca argentea* was recorded from six relevés in the Moolyella pipeline corridor, which were between 12 and 22 kilometres east to northeast of the Fieldings Gully survey area. *Melaleuca argentea* was also recorded from two relevés along the Big Schist pipeline route, located approximately 7 kilometres north of Fieldings Gully (Rapallo 2021a).

The Atlas of Living Australia (ALA) was searched for all occurrences of *Melaleuca argentea*, and results showed no previous records of this taxon within 10 kilometres of the survey area. The nearest ALA record was from near Marble Bar, 15 kilometres north of the survey area.

The river gums lining the drainage channels of vegetation type D did not have fruits or flowers at the time of the survey to enable conclusive identification. The taxonomist noted that the river gum specimens may comprise either *Eucalyptus victrix* (a facultative phreatophyte) or *Eucalyptus camaldulensis*, which can be an obligate phreatophyte depending on location and depth to groundwater. For the purpose of this report, the river gums recorded in the current survey were identified as most likely *E. victrix*, based on foliage and height, as all white trees along the drainage channels appeared to be mature but did not grow taller than approximately 10 metres, while *E. camaldulensis* can (but not always will) grow to 30 metres. However, in the absence of fruits and flowers, *E. camaldulensis* cannot be excluded.

A subsection of the current Fieldings Gully survey area was surveyed by Woodman in 2019 (Woodman 2020b), but this survey did not put any quadrats in drainage. Rapallo completed a brief reconnaissance visit to Fieldings Gully and recorded possible *E. camaldulensis* (Rapallo 2020, unpublished data). The Moolyella pipeline survey (Rapallo 2021b) recorded *Eucalyptus camaldulensis* from a site 18 kilometres north-east of Fieldings Gully.

Although it was not possible to conclusively identify all the river gums in the survey area, the presence of *E. camaldulensis* would not necessarily suggest that vegetation type D is groundwater dependent. Woodman (2020b) describes *E. camaldulensis* as either an obligate or facultative phreatophyte depending on the groundwater regime at the particular location; if groundwater is present within 10 metres of the surface, the vegetation is likely groundwater dependent, but if the groundwater is deeper than 10 metres, then the vegetation will not be groundwater dependent.

The Bureau of Meteorology (2024) Groundwater Dependent Ecosystems Atlas mapped the Fieldings Gully survey area as Low potential GDE. A recent groundwater study was completed at for the Warrawoona project by Groundwater Resource Management (GRM 2023), including five resource holes at Fieldings Gully. Measurements of water level showed that the groundwater at Fieldings Gully sits between 19.36 to 27.19 metres below ground level. Based on this result, it is very unlikely that the vegetation type D represents groundwater dependent vegetation.

Table 4.7 Broad vegetation types of the survey area

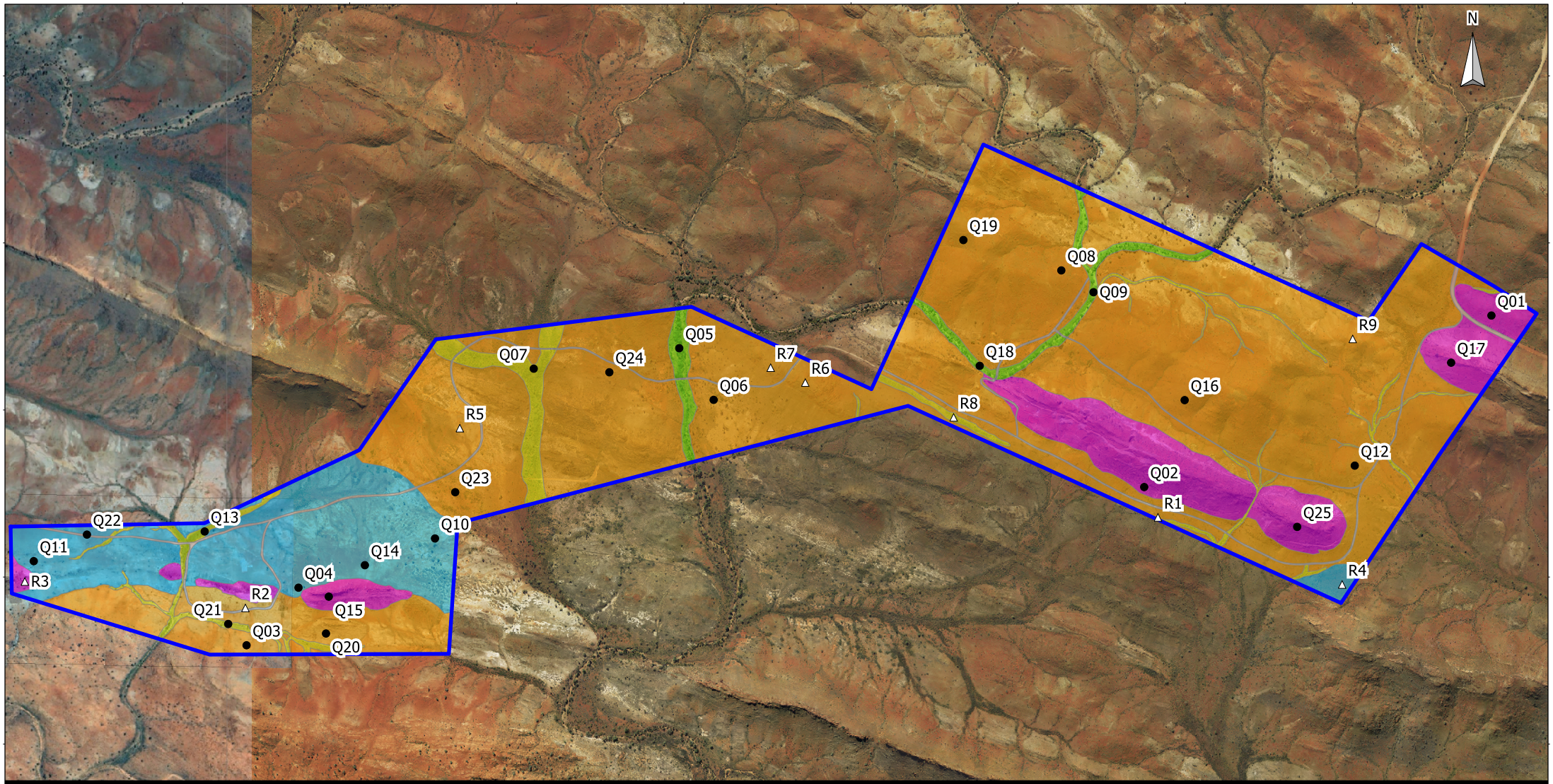
Type	Vegetation description	Photo
A	***Ficus brachypoda* or *Atalaya hemiglauca* over *Acacia bivenosa* over *Triodia wiseana* on steep rocky slopes, gullies, and rocky hill crests** Description: *Ficus brachypoda* or *Atalaya hemiglauca* isolated low trees; over *Acacia bivenosa*, *Grevillea wickhamii*, and *Acacia inaequilatera* tall to low shrubs; over diverse low sparse shrubland including *Tribulus ?platypterus*, **Aerva javanica*, *Gossypium australe*, *Corchorus parviflorus*, and *Indigofera monophylla*; over isolated forbs including *Boerhavia coccinea*, *Gomphrena cunninghamii*, *Polycarpaea longiflora*, and *Nicotiana* sp.; over *Triodia wiseana* hummock grassland; with *Eriachne mucronata*, *Cyperus cunninghamii*, and **Cenchrus ciliaris* isolated grasses/sedges; with *Cucumis variabilis* and *Rhynchosia australis* isolated climbers/creepers. Quadrats: Q01, Q02, Q15, Q17, Q25 Relevés: R03 Extent and landform: Occurs on steep rocky slopes, gullies and rocky hill crests. Covers 26.9 hectares (10.6%) of the survey area. Soil is brown to red-brown with high rock cover of mostly quartz and ironstone. Vegetation condition: Very good Fire history: Low intensity fires within the past 5 years (one quadrat estimated recently burnt) Disturbances: Roads nearby, weeds, low intensity fire Conservation significant flora: None recorded GDV indicator species: *Atalaya hemiglauca* (facultative phreatophyte) however vegetation type A is highly unlikely to be groundwater dependent due to its landform. Weeds: **Aerva javanica* (permitted – s11), **Cenchrus ciliaris* (permitted – s11)	 

Type	Vegetation description	Photo
B	***Corymbia hamersleyana* over *Acacia inaequilatera* and *Acacia orthocarpa* over *Triodia wiseana* and *Trioda brizoides* on stony plains and rounded hills with on orange soil** Description: *Corymbia hamersleyana* isolated low trees; over *Acacia inaequilatera*, *Acacia orthocarpa*, *Grevillea pyramidalis* and *Grevillea wickhamii* tall shrubland; over *Acacia bivenosa*, *Acacia acradenia*, *Senna symonii*, *Senna artemisioides* subsp. *oligophylla* , *Senna glutinosa* subsp. *pruinosa* and *Gossypium australe* low sparse shrubland; over *Corchorus parviflorus*, *Pentalepis trichodesmoides* subsp. *trichodesmoides*, **Aerva javanica*, *Acacia stellaticeps*, and *Indigofera monophylla* dwarf shrubs; over isolated forbs including *Boerhavia coccinea*, and *Ptilotus species*; over *Triodia wiseana* and *Triodia brizoides* hummock grassland with isolated **Cenchrus ciliaris* and other tussock grasses, with *Cucumis variabilis*, *Rhynchosia australis*, and *Cassytha capillaris* isolated climbers/creepers. In this vegetation type, the spinifex on the lower elevations is dominated by *Triodia wiseana*, however on the higher elevations *Triodia brizoides* becomes co-dominant with *T. wiseana*. Quadrats: Q03, Q06, Q09, Q12, Q16, Q19, Q20, Q23, Q24 Relevés: R01, R02, R05, R06, R07, R09 Extent and landform: The dominant vegetation type in the Fieldings Gully survey area, covering 176.0 hectares (69.2%) of the survey area. Occurs on flat and undulating stony plains and rounded hills gradual slopes. Soil is orange with quartz and iron stone surface rocks. Vegetation condition: Good to Excellent Fire history: Ranging from recently burnt (within 12 months) to long unburnt Disturbances: Roads nearby, weeds, low intensity fire Conservation significant flora: None recorded GDV indicator species: None recorded Weeds: **Aerva javanica* (permitted – s11), **Calotropis procera* (Declared pest – s22(2)), **Cenchrus ciliaris* (permitted – s11)	 

Type	Vegetation description	Photo
C	***Eucalyptus leucophloia* subsp. *leucophloia* over *Acacia acradenia* over *Triodia angusta* and *Triodia epactia* on stony plains and lower hill slopes with calcareous soil and surface rocks** Description: *Eucalyptus leucophloia* subsp. leucophloia and *Acacia inaequilatera* low open woodland to isolated trees; over *Acacia acradenia* tall shrubland with *Hakea lorea* subsp. *lorea*; over *Senna symonii*, *Corchorus parviflorus*, and *Acacia stellaticeps* isolated low to dwarf shrubs; over *Ptilotus calostachyus*, *Ptilotus exaltatus*, *Trigastrotheca molluginea* and *Sclerolaena densiflora* isolated fobs; over *Triodia angusta* and *Triodia epactia* hummock grassland; with *Cassytha capillaris* isolated climbers/creepers. Quadrats: Q04, Q10, Q11, Q14, Q22 Relevés: R04 Extent and landform: Covering 32.5 ha (12.8%) of the survey area. Occurs on stony plains and lower hill slopes with calcareous soil and surface rocks, which stand out clearly on aerial photographs. Vegetation condition: Good to Excellent Fire history: Most sites ranked as recently burnt (within 12 months), one site burnt within 10 years. Disturbances: Roads nearby, signs of recent extensive low to medium intensity fire. Conservation significant flora: None GDV indicator species: None Weeds: None	 

Type	Vegetation description	Photo
D	***Eucalyptus victrix*, *Acacia trachycarpa*, *Melaleuca linophylla* and *Atalaya hemiglauca* over **Cenchrus ciliaris* in drainage channels with open stony creek** Description: *Eucalyptus victrix*, *Acacia trachycarpa*, *Melaleuca linophylla*, and *Atalaya hemiglauca* open low woodland with occasional *Corymbia hamersleyana*; over *Acacia acradenia*, *Acacia inaequilatera*, and *Acacia bivenosa* tall to medium shrubland; over *Corchorus parviflorus*, *Acacia pyrifolia*, and *Petalostylis labicheoides* low shrubs; over isolated forbs including *Tephrosia rosea*, *Cajanus pubescens*, and *Afrohybanthus aurantiacus*; over **Cenchrus ciliaris*, *Themeda triandra* and *Chrysopogon fallax* tussock grassland, with *Cyperus vaginatus* sedges and *Triodia wiseana* isolated hummocks; with *Cucumis variabilis* climbers/creepers. Quadrats: Q05, Q09, Q18 Relevés: n/a Extent and landform: Covering 5.2 hectares (2.0%) of the survey area. Soil is sandy clay with a stony creek bed with rocks Vegetation condition: Vert good Fire history: Burnt within 10 years Disturbances: Roads nearby, weeds Conservation significant flora: None GDV indicator species: *Eucalyptus victrix*, *Melaleuca linophylla*, *Atalaya hemiglauca, Acacia coriacea* subsp. *pendens*, *Cyperus vaginatus*: All these are facultative phreatophytes. Weeds: **Cenchrus ciliaris* (permitted – s11)	 

Type	Vegetation description	Photo
E	***Corymbia hamersleyana* over *Acacia acradenia* tall shrubland over mixed shrubs and *Chrysopogon fallax* and **Cenchrus ciliaris* on diffuse drainage channels** Description: *Corymbia hamersleyana* low open woodland, over *Acacia acradenia* and *Grevillea wickhamii* tall shrubland; over *Acacia inaequilatera*, *Petalostylis labicheoides*, and *Senna glutinosa* subsp. *glutinosa* and *Acacia maitlandii* medium shrubs; over *Corchorus parviflorus*, *Acacia stellaticeps*, *Senna artemisioides* subsp. oligophylla, *Indigofera monophylla*, *Scaevola amblyanthera* var. *centralis*, and *Senna notabilis* isolated low shrubs; over *Corchorus parviflorus*, *Isotropis atropurpurea*, *Hibiscus sturtii* var. *campylochlamys*, *Triumfetta clementii*, and *Afrohybanthus aurantiacus* isolated forbs; over *Chrysopogon fallax* and **Cenchrus ciliaris* tussock grassland with *Triodia wiseana* and *Triodia angusta* hummock grassland. The vegetation is a combination of taxa also found in types B and C but occurring in higher densities (for example *Acacia acradenia*, *Grevillea wickhamii*) as well as various taxa commonly associated with drainage lines and flood plains in the Pilbara such as *Petalostylis labicheoides*, *Chrysopogon fallax*, *Afrohybanthus aurantiacus*, and the introduced grass **Cenchrus ciliaris* Quadrats: Q07, Q13, Q21 Relevés: R08 Extent and landform: Covering 10.2 hectares (4.0%) of the survey area. Follows the many diffuse drainage channels traversing types B and C. Soil is clay or sandy clay loam with occasional rocks. Vegetation condition: Very good Fire history: Two sites burnt within 10 years, one site recently burnt (within 12 months) Disturbances: Multiple weeds present, road nearby, signs of low intensity fire Conservation significant flora: None GDV indicator species: None Weeds: **Calotropis procera* (Declared pest – s22(2)), **Cenchrus ciliaris* (permitted – s11)	 



Legend

Fieldings Gully

Survey Area

Survey effort

- Quadrat
- Releve

Vegetation types

- A - Ficus brachypoda or Atalaya hemiglauca over Acacia bivenosa over Triodia wiseana on steep rocky slopes, gullies, and rocky hill crests
- B - Corymbia hamersleyana over Acacia inaequilatera and Acacia orthocarpa over Triodia wiseana and Trioda brizoides on stony plains and rounded hills with on orange soil
- C - Eucalyptus leucophloia subsp. leucophloia over Acacia acradenia over Triodia angusta and Triodia epactia on stony plains and lower hill slopes with calcareous soil and surface rocks
- D - Eucalyptus victrix, Acacia trachycarpa, Melaleuca linophylla and Atalaya hemiglauca over *Cenchrus ciliaris in drainage channels with open stony creek bed
- E - Corymbia hamersleyana over Acacia acradenia tall shrubland over mixed shrubs over Chrysopogon fallax and *Cenchrus ciliaris on diffuse drainage channels
- X - Roads (cleared: not a vegetation type)

Rapallo environmental

Calidus Resources
Fieldings Gully
Flora and Fauna survey

CALIDUS RESOURCES LIMITED

Original Size: A4 Scale: 1:16,000
Datum: MGA94 Zone 50
0 500 m

Figure 4.2

Vegetation types of the
Fielding Gully survey area

4.3 Fauna survey results

4.3.1 Broad fauna habitats

Four broad fauna habitat types were recorded for the survey area (Figure 4.3). These habitats were classified and identified based on topography, landforms, broad vegetation, soil type and surface substrate. Based on topographical mapping and aerial photography, the habitats appeared to extend outside of the survey area. Table 4.6 summarises the broad fauna habitats of the survey area, with habitat assessment data presented in Appendix X.

Table 4.8 Summary of broad fauna habitats recorded in the survey area

Broad fauna habitat	Area (ha)	Area (%)
Hillcrest/hillslope	195.8	77.0%
Stony plain	39.6	15.6%
Medium drainage	5.2	2.0%
Minor drainage	10.2	4.0%
Roads (not a habitat)	3.4	1.4%
	254.2	**100%**

4.3.2 Fauna assemblage

A total of 294 vertebrate fauna species were identified as having the potential to occur within the survey area in the desktop assessment (Appendix IV). These comprised 34 native and 4 introduced mammal species, 172 bird species, 75 reptile species, 7 amphibian species and 2 fish. Not all species will occur in the survey area due to a lack of permanent water bodies. Additionally, many species tend to be patchily distributed even where appropriate habitats are present, and many species of birds can occur as regular migrants, occasional visitors or vagrants.

42 species of vertebrate fauna were recorded during the basic fauna survey. This included 26 species of birds, 13 mammal taxa (two of which are introduced species) and 3 reptile taxa. The majority of these were recorded as opportunistic sightings, while eight species of bat were recorded on SM4-U ultrasonic recorders, including the listed Pilbara Leaf-nosed bat (*Rhinonicteris aurantia* (Pilbara form). The list of fauna opportunistically recorded in the survey area is presented in Appendix V.

4.3.3 Introduced (feral) vertebrate fauna

The desktop study identified four species of introduced (feral) fauna which have been recorded previously within 100 km of the survey area all of which are mammals. Based on distribution, database records and habitat preferences, all species were likely to occur in the survey area. These were dromedary camel (*Camelus dromedarius*), cat (*Felix catus*), house mouse (*Mus musculus*) and cow (*Bos taurus*).

Evidence of two species of introduced fauna, cow (*Bos taurus*) and fox (*Vulpes vulpes*), was recorded during the basic fauna survey.

4.3.4 Conservation significant vertebrate fauna

Based on the likelihood assessment, 21 species of conservation significant fauna were assessed as confirmed, highly likely, likely, or possible to occur in the survey area. The remaining species were assessed as unlikely to occur in the survey area due to the absence of suitable habitat, and/or the survey area being well outside its currently known range. These species are discussed further, with likelihood based on the habitats of the survey area, (Table 4.9).

The Pilbara leaf-nosed bat (*Rhinonicteris aurantia* (Pilbara form)) was confirmed to occur in the survey area, with recordings captured during the survey at low numbers. This species occurs in roosts close to Warrawoona (Klondyke Queen and Bow Bells South historical workings).

The grey falcon (*Falco hypoleucos*) was confirmed to occur in the survey area, with one sighting of this species in active foraging flight.

The northern quoll (*Dasyurus hallucatus*) and western pebble-mound mouse (*Pseudomys chapmani*), were ranked as highly likely to occur on the survey area.

Ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*), peregrine falcon (*Falco peregrinus*), long-tailed dunnart (*Antechinomys longicaudata*) and spectacled hare-wallaby (*Lagorchestes conspicillatus leichhardti*), were ranked as likely to occur on the survey area.

Night parrot (*Pezoporus occidentalis*), greater bilby (*Macrotis lagotis*), Short-tailed mouse (*Leggadina lakedownensis*), Northern brushtail possum (*Trichosurus vulpecula arnhemensis*)*, *Ctenotus nigrilineatus*, Gane's blind snake, (*Anilios ganei*), *Ctenotus uber johnstonei*, Brush-tailed mulgara (*Dasycercus blythi*), Oriental plover (*Charadrius veredus*), Common greenshank (*Tringa nebularia*) were ranked as possibly occurring on the survey area, the latter two species as infrequent visitors.

A further, 19 migratory species are considered "Unlikely" to occur within the survey area due to their rare occurrence in the Pilbara region, the absence of suitable habitat within the survey area, the survey area being well outside the species' known or expected distribution and/or the absence of recorded occurrences proximal to the survey area. The occurrence of these species is likely to be infrequent and limited only to rare occasions, such rare vagrants and/or migrating individuals blown off course by cyclonic activity.

Table 4.9 Desktop results: Conservation significant fauna recorded within 100 km of the survey area

Species	Likelihood	Recorded on survey area	Details
Northern quoll *Dasyurus hallucatus* BCA: EN EPBC: EN	Likely	No	Drainage habitats are known foraging and dispersal pathways for Northern quoll. Hillcrest/hillslope habitat can be utilised by foraging or dispersing quolls, however, these habitats are unlikely to support the species if they are not adjacent to or in close proximity to denning habitat. The closest DBCA (2023a) records are 9 km (2016) to the south west of the Fieldings Gully survey area from the Coongan River with confirmed denning habitat located 10 km to the east within the Warrawoona Range (Biologic 2019c). Habitat suitable for the species within the survey area (potential foraging/dispersal): Hillcrest/hillslope and the drainage habitats.
Night parrot *Pezoporus occidentalis* BCA: CR EPBC: EN	Possible	No	Based on accepted records, night parrot habitat comprises long-unburnt mature Triodia grasslands forming mosaics with samphire and chenopod shrublands (Jackett *et al.* 2017, McDougall *et al*. 2009, Murphy, Silcock, *et al.* 2017) including genera such as Atriplex, Bassia and Maireana, on floodplains and claypans, and on the margins of salt lakes, creeks or other sources of water (McGilp 1931, Wilson 1937). Contemporary Western Australian Pilbara/Murchison records include north east of Wiluna (Hamilton *et al.* 2017, Jackett *et al*. 2017), Lake Disappointment (Great Sandy Desert) (Harewood 2018), Great Sandy Desert (Caccetta 2018), salt lake systems on Martu County (Michelmore & Birch 2020) and near the Fortescue Marsh (Davis & Metcalf 2008; (Young 2021). Murphy *et al.* (2017) found that GPS tracked individuals travelled from Triodia roosts relatively large distances into non-Triodia habitats, making use of fertile, diverse but ephemeral parts of the landscape: floodplains, run-on areas and gilgais. The current interim guidelines for preliminary surveys of night parrot in Western Australia suggest the species requires large, dense Triodia hummocks, primarily old-growth (often more than 50 years unburnt) for roosting and nesting (DPaW 2017). The nearest contemporary records are from greater than 150 kilometres to the east of the survey area. In 2005 three night parrots were observed at Minga Well, a station bore and livestock watering point with large pools of water near Fortescue Marsh (Davis & Metcalf 2008). FMG have confirmed recent records from cloud break (Young 2021). Night parrot is ranked as possible. The survey area does contain some maturing Triodia habitat (>40cm high), corresponding to the less frequently burnt localities, but does not include mosaics with samphire and chenopod shrublands or salt-lake margin, or areas that would not burn during a large fire resulting in patches of big, old Triodia, that are protected via bare soil, the edge of a salt lake and/ or nearby rocky country.
Ghost bat *Macroderma gigas*	Likely	No	The survey area is located 12 and 8 km to the northwest of to two significant roosts, the Klondyke Queen (Category 1 maternity/diurnal roost sites with permanent ghost bat occupancy) and Bow

Species	Likelihood	Recorded on survey area	Details
BCA: VU EPBC: VU			Bells South. Additionally, the Comet mine (Category 1 roost) is located 7 kilometres south of Marble Bar (Bullen 2021)). The Ghost bat will often forage more broadly across habitats, often utilising drainage lines and other habitats where prey species are likely to be most abundant (Richards *et al.* 2008, Tidemann *et al.* 1985). In the Pilbara, ghost bats have been found to prefer to forage on productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (Triodia spp.) on sand or stony ground. Isolated trees and trees on the edge of thin thickets on the plains, or trees along the edges of watercourse woodlands, appear to be preferred vantage points. The bats forage at these sites for between 30 and 300 minutes, before moving to a nearby area (Bullen unpublished data – in Bullen (2021)). No caves or old workings were recorded on the survey area. Habitat suitable for the species within the survey area (potential foraging): drainage, stony plain, hillcrest/hillslope.
Pilbara leaf-nosed bat *Rhinonicteris aurantia (Pilbara)* BCA: VU EPBC: VU	Confirmed	Yes but no known roosts in the survey area. Known roosts located on and proximal to Warrawoona Gold Project (6-10 km to the southeast, Bow Bells-Sth – Category 1, Klondyke Queen - Category 3).	The Pilbara leaf-nosed bat requires deep caves with high levels of humidity and stable temperatures (Churchill 2008). The species has a very limited ability to conserve heat and water and requires very hot (28-32°C) and humid (96-100%) roost sites in caves and/or abandoned mines (Armstrong 2001). These types of caves/mines are relatively uncommon in the Pilbara, with only ca. 26 known of the Pilbara as of 2014 (Biota 2014). The species forages in caves and along waterbodies with fringing vegetation (DoEE 2016). The greatest distance of echolocation records from known roosts is 45 kilometres, with the greater majority of echolocation calls recorded within 20 kilometres of known roosts (Bullen 2021b). The survey area does not contain habitat that could provide caves for roosting but contains foraging habitat. Bat Call WA confirmed that the timing of the recorded calls is consistent with individuals originating from the known roosts located proximal to the Warrawoona Gold Project (6-10 km to the southeast), rather than originating from a roost cave on the survey area.
Greater bilby *Macrotis lagotis* BCA: VU EPBC: VU	Possible	No	Within the Pilbara region the species is often sparsely distributed and occurs in relatively low abundance, making detection difficult (Southgate et al. 2018). The nearest DBCA records to the survey area are 8 km to the north, and 7 km to the south (2014). These records do not indicate the type of presence (sighting, diggings etc) DBCA (2023a). No evidence of Greater bilby was recorded during the current survey; nor was the species detected via targeted searches for the Warrawoona Gold Project (Biologic 2019c). Habitat within the survey area is largely unsuitable for the species to burrow so, given the large home range of the species any use of survey area habitats would be temporary.

Species	Likelihood	Recorded on survey area	Details
Grey falcon *Falco hypoleucos* BCA: VU EPBC: VU	Confirmed	Confirmed	One grey falcon was observed within the survey area hunting in drainage lines. Grey falcon commonly nests in timbered areas, particularly tall trees along watercourses, and forages in open or more sparsely vegetated habitats (Garnett *et al.* 2011). Medium drainage habitats are likely to provide suitable nesting habitat for the species. Grey falcon is likely to forage more broadly across all habitats within the survey area particularly stony plain and minor drainage habitats. In 2018, iNaturalist records (accessed via ALA 2023) were recorded from within a kilometres of the eastern edge of the survey area.
Pilbara olive python *Liasis olivaceus barroni* BCA: VU EPBC: VU	Likely	No but one individual recorded from the Warrawoona Gold Project	Within inland Pilbara the species is most often encountered near permanent waterholes in rocky ranges or among riverine vegetation (Pearson 1993). The nearest record of Pilbara olive python is located within the Klondyke Queen historic underground proximal to the Warrawoona Gold Project (Biologic 2019c). Additional records are approximately 20 km north-west of the Warrawoona Gold Project (DBCA 2023a).) and the species was recorded from within the Corunna Downs project area (MWH, Australia 2016). Habitat suitable for the species within the survey area includes the hillcrest/hillslope and habitat drainage habitats used for foraging and dispersal.
Northern brushtail possum *Trichosurus vulpecula arnhemensis* BCA: VU (recent molecular analysis indicates that the population of the Pilbara region represents a different species to *Trichosurus vulpecula arnhemensis* (Biologic 2021)	Possible	No	Little ecological information is known about the Pilbara population of the species, it has a patchy distribution and is infrequently recorded. The species is omnivorous but often feeds on flowers and insects (Cruz *et al.* 2012). Northern brushtail possum has been recorded approximately 45 km southwest of the Warrawoona Gold Project (Biologic 2020). The species is most often recorded from major drainage lines that contain large hollow-bearing eucalypts and rocky habitats (i.e. gorge/ gully habitat) where suitable shelter sites are present throughout its arid distribution (Kerle *et al.* 1992; Van Dyck & Strahan 2008).
Peregrine falcon *Falco peregrinus* BCA: OS	Likely	No	In arid areas, the Peregrine falcon is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr 1998). It typically nests on rocky ledges occurring on tall, vertical cliff faces between 25 m and 50 m high (Olsen & Olsen 1989). Water ecotones and tree covered areas provide productive habitat for prey species. species. However, peregrine falcon are an open country hunter (Ratcliffe 1993, Jenkins 2000) and some

Species	Likelihood	Recorded on survey area	Details
			level of open country is essential for them to access prey (Jenkins & Hockey 2001). The Peregrine falcon is considered rare over much of its range (Johnstone & Storr 1998). The Peregrine falcon was recorded in 2001, ca. 1.5 kilometres to the southwest of the survey area on Camel Creek (DBCA 2023a). The drainage habitats and open hillcrest/hillslope and stony plain are likely to provide suitable foraging habitat for the species that may nest on vertical cliff faces of the Warrawoona Range.
Ctenotus nigrilineatus DBCA: P1	Possible	No	Records have been collected from spinifex plains at the base of granite outcrops (How *et al.* 1991, How & Dell 2004) and sand and stony soils often associated with *Acacia trachycarpa* over *Triodia pungens* near drainage (Rapallo 2006). Potential habitats within the survey area may include the Stony Plain. The closest record of *Ctenotus nigrilineatus* was from 2001, ~70km east of the survey area from Meentheena (DBCA 2023a).
Gane's blind snake (*Anilios ganei*) DBCA: P1	Possible	No	Little is known of the species' ecology, but this species is often associated with moist soils and leaf litter within gorges and gullies (Wilson & Swan 2017) and potentially within a wide range of other stony habitats. The species has been recorded from numerous habitats but is most likely to be present in rocky terrain and along drainage lines (Biologic 2020). The closest record is a 2018 record from Glacier valley, 80 km to the west of the survey area (DBCA 2023a). Habitat suitable for the species within the survey area includes medium and minor drainage.
Ctenotus uber johnstonei DBCA: P2	Possible	No	Little is known about the habitat preferences of this species, but within the Pilbara the taxon is known from stony hillslopes and plains habitats with variable vegetation cover, often dominated by open Acacia shrubland (*Acacia xiphophylla*) and *Triodia* hummock grassland (Cogger 2014). Records for this species are few, *Ctenotus uber johnstonei* has been previously recorded approximately 68 km south of the Warrawoona Gold Project (Biologic 2020). Habitat suitable for the species within the survey area includes hillcrest/ hillslope and stony plain
Brush-tailed mulgara *Dasycercus blythi* DBCA: P4	Possible	No but recorded from the Warrawoona Gold Project	The Brush-tailed mulgara occurs in *Triodia* sand plain and gibber plain habitats (Pavey *et al.* 2012). Mulgara are renowned for using multiple burrow systems within a home-range and changing these frequently. Brush-tailed mulgara has been recorded from the Sandy Plain habitat of the Warrawoona Gold Project that is absent from Fielding's Gully (Biologic 2019c) and the nearest DBCA record is 20 km south south east of the survey area (DBCA 2023a).
Short-tailed mouse, Lakeland Downs mouse	Possible	No	The short-tailed mouse, also sometimes referred to as the Lakeland Downs mouse, has a broad distribution across much of northern Australia, but is irregularly distributed with scattered

Species	Likelihood	Recorded on survey area	Details
Leggadina lakedownensis DBCA: P4			populations (Van Dyck & Strahan 2008). The species inhabits areas of open tussock and hummock grassland, *Acacia* scrubland, and savanna woodland, on alluvial clay or sandy soils (Lee 1995) and also cracking clay in the Pilbara (Gibson & McKenzie 2009). The closest DBCA (2023a) records were 43km to the west of the survey area from 2005. As the species is irruptive the survey area may contain habitat for the short-tailed mouse but does not appear to contain prime habitat. Based on this, the short-tailed mouse is considered possible to occur in the survey area.
Long-tailed dunnart *Antechinomys longicaudata* DBCA: P4	Likely	No	The long-tailed dunnart has a relatively widespread distribution but is sparsely distributed and can be locally uncommon within the Pilbara region. The species typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes (Gibson & McKenzie 2012). Its core habitat includes rocky scree slopes with hummock grass and shrubs, and tall open *Acacia* shrubland and woodlands (Burbidge *et al.* 2008). The nearest DBCA (2023a) records of this species are located approximately 30k m south-east of the survey area from 2003. Habitat within the survey area considered most suitable to support the species is the hillcrest/hillslope habitat.
Spectacled hare-wallaby *Lagorchestes* conspicillatus *leichhardti* DBCA: P4	Likely	No	The Spectacled Hare-wallaby is patchily distributed throughout the Pilbara region with few records of the species. The nearest record of this species is 10 km east of the survey area from an unknown date DBCA (2023a). The stony plain habitat which comprises patches of Triodia hummock grasslands provides suitable habitat for the species.
Western pebble-mound mouse *Pseudomys chapmani* DBCA: P4	Highly Likely	No but mounds recorded from the Warrawoona Gold Project	The Western pebble-mound mouse occurs on the gentler slopes of rocky ranges where the ground is covered with a stony mantle and vegetated by hard spinifex, often with a sparse overstorey of eucalypts and scattered shrubs (Anstee & Armstrong 2001). Mounds (active and inactive) have been recorded within the Warrawoona Gold Project in (Biologic 2019b). The closest DBCA (2023a) records are 10km to the south west of the project area. The hillcrest/hillslope and stony plain habitat provides suitable habitat for the species.
Fork-tailed swift Apus pacificus BCA: MI EPBC:MI	Unlikely - Aerial Species	No	This species is migratory, and would forage above the survey area during summer (Johnstone & Storr 1998). The species is predominantly aerial so may be observed, but would not typically utilise the habitats of the survey area (Higgins 1999).

Species	Likelihood	Recorded on survey area	Details
Oriental plover *Charadrius veredus* BCA: MI EPBC:MI	Possible - infrequent visitor	No	This migratory species utilises a variety of habitats, including coastal habitats, such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches as well as open inland environments such as, semi-arid or arid grasslands, where the grass is short and sparse (Johnstone & Storr 2004). There is a DBCA (2023a) Bird Atlas 2 record, from 20 km north-east of the survey area (2005) and suitable habitat may occur within the stony plain habitat. Despite the 2005 record, the likelihood of occurrence is ranked as possible because the oriental plover are regarded as casual in the Pilbara interior, occurring mainly on coastal plains south to Cardabia but also Barrow Island on southward passage (Johnstone *et al.* 2013).
Common sandpiper *Actitis hypoleucos* BCA: MI EPBC:MI	Unlikely	No	Common sandpiper favours tidal and reef flats, beaches, saltwork ponds, river pools, flooded claypans, freshwater soaks and ephemeral waters. Usually in ones or twos, occasionally in small parties (Johnstone *et al.* 2013). There are Bird Atlas records from the early 2000s (DBCA 2023a) from Marble Bar: Chinaman Pool and Dooleana Gorge and the species was recently recorded on the large dam at the Moolyella tin mine, 20 km to the north east (Rapallo 2021). Given the lack of large permanent pools within the survey area the common sandpiper is regarded as "Unlikely" to occur.
Sharp-tailed sandpiper *Calidris acuminata* BCA: MI EPBC:MI	Unlikely	No	Sharp-tailed sandpiper favours flooded samphire flats and grasslands, mangrove creeks mudflats, beaches, river pools, saltwork ponds, sewage ponds and freshwater soaks (Johnstone *et al.* 2013). There are Bird Atlas records from 2005 within 20 km of the survey area (DBCA 2023a). Given the lack of large permanent pools within the survey area the Sharp-tailed sandpiper is regarded as "Unlikely" to occur.
Common greenshank *Tringa nebularia* BCA: MI EPBC:MI	Possible - infrequent visitor	No	Inhabits tidal mudflats, mangrove creeks, flooded samphire flats, beaches, river pools, and saltwork and sewage ponds (Johnstone *et al.* 2013). There is a Bird Atlas record from 2005 within 20 km of the survey area (DBCA 2023a). Suitable habitat may occur within the drainage habitats. The species is ranked as 'possible' as it is uncommon south of Dampier and interior, occurring generally in ones, twos or small parties, compared to Eighty Mile Beach and Roebuck Bay where at arrival have recorded a population in excess of 3,000 birds (Johnstone *et al.* 2013). This species may appear anywhere where there is a small amount of water even for a short while.
Wood sandpiper *Tringa glareola*	Unlikely	No	Mainly river pools, sewage ponds, flooded claypans, freshwater lagoons and bore overflows (Johnstone *et al.* 2013). There are Bird Atlas records from early within 20 km of the survey area (DBCA 2023a). The species is ranked as "Unlikely" due to absence of habitat.

Species	Likelihood	Recorded on survey area	Details
BCA: MI EPBC:MI			
Osprey *Pandion haliaetus* BCA: MI EPBC:MI	Unlikely	No	Occurs mainly in sheltered seas around islands, tidal creeks, estuaries and saltwork ponds, also large river pools (Johnstone *et al.* 2013). There are Bird Atlas records from the early 2000s within 50 km of the survey area from the Coongan River and Doolena Gorge (DBCA 2023a). Given the lack of large permanent pools within the survey area the osprey is regarded as "Unlikely" to occur.
Glossy ibis *Plegadis falcinellus* EPBC:MI	Unlikely	No	Occurs in freshwater wetlands, irrigated areas, margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone *et al.* 2013). There is a 2018 Birdata record for Marble Bar (Birdlife Australia 2020b). The species is ranked as 'Unlikely' as the species is nomadic. Rare to very common visitor or drought refugee (Johnstone *et al.* 2013).
Yellow wagtail *Motacilla flava* BCA: MI EPBC:MI	Unlikely	No	An uncommon but regular visitor to the Pilbara region (Johnstone *et al.* 2013). Occupies a range of damp or wet habitats with low vegetation, although favours edges of fresh water, especially sewage ponds. There is a 2010 Birdata record for Marble Bar (Birdlife Australia 2020b). Given the lack of large permanent pools within the survey area and few records for the Pilbara, the Yellow wagtail is regarded as "Unlikely" to occur.
Australian painted-snipe *Rostratula australis* BCA: EN EPBC:EN	Unlikely	No	Generally, occupies shallow terrestrial freshwater wetlands (i.e. temporary and permanent lakes, swamps and claypans) with emergent tussocks of grass, sedges, rushes or reeds, or samphire (Johnstone & Storr 1998). The closest published record is from at Coondiner Pool, located on Roy Hill Pastoral station ~160 km south (Knuckey *et al.* 2013). Given the lack of large permanent pools within the survey area and few records for the Pilbara, the Australian painted-snipe is regarded as "Unlikely" to occur.
Eastern curlew *Numenius madagascariensis* BCA: MI/CR	Unlikely	No	Mainly tidal mudflats, also reef flats, sandy beaches and rarely near-coastal lakes including saltwork ponds (Johnstone & Storr 1998). The closest records are from Port Hedland ~158 km north west (Birdlife Australia 2020b).

Species	Likelihood	Recorded on survey area	Details
EPBC:MI/CR			Given the lack of large permanent pools within the survey area, the eastern curlew is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100km of the survey area.
Pectoral sandpiper *Calidris melanotos* BCA: MI EPBC:MI	Unlikely	No	Coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (Johnstone & Storr 2004, Johnstone *et al.* 2013). It prefers wetlands with open fringing mudflats and low, emergent or fringing vegetation (Geering *et al.* 2007). Given the lack of large permanent pools within the survey area, the Pectoral sandpiper is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100 km of the survey area.
Oriental pratincole *Glareola maldivarum* BCA: MI EPBC:MI	Unlikely	No	Prefers open plains, floodplains or short grasslands, often with extensive bare areas. They often occur near terrestrial wetlands (such as billabongs, lakes or creeks), and artificial wetlands (such as reservoirs, saltworks and sewage farms) (Johnstone & Storr 1998). Closest record is an old record (1980) ~90 km to the north, north west of the survey area (DBCA 2023a). Given the lack of large permanent pools within the survey area, the Oriental pratincole is regarded as "Unlikely" to occur. The species is rarely recorded.
Grey wagtail *Motacilla cinerea* BCA: MI EPBC:MI	Unlikely	No	A rare vagrant to Western Australia where it has been recorded within various habitats with open waterbodies (Johnstone & Storr 2004). This species is considered due to the protected matters search and is not record based. Given the lack of large permanent pools within the survey area, the Grey wagtail is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100 km of the survey area.
Barn swallow *Hirundo rustica* BCA: MI EPBC:MI	Unlikely	No	The barn swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Found near freshwater wetlands, paperbark *Melaleuca* woodland, mesophyll shrub thickets and tussock grassland (Schodde & Mason 1999). The barn swallow is a non-breeding summer visitor to the Pilbara. The barn swallow favours areas near water (Johnstone *et al.* 2013). This species is considered due to the protected matters search and is not record based. The barn swallow is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100km of the survey area.
Curlew sandpiper *Calidris ferruginea* BCA: CR EPBC:CR/MIG	Unlikely	No	Inhabits intertidal mudflats in sheltered coastal areas (i.e. estuaries, bays, inlets and lagoons) (Geering *et al.* 2007). This rare species generally roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (Geering *et al.* 2007).

Species	Likelihood	Recorded on survey area	Details
			Given the lack of large permanent pools within the survey area, the curlew sandpiper is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100km of the survey area.
Red-necked stint *Calidris ruficollis* BCA: MI EPBC:MI	Unlikely	No	Given the lack of large permanent pools within the survey area, the curlew sandpiper is regarded as "Unlikely" to occur. The species is rarely recorded and has not been recorded within 100km of the survey area.
Swinhoe's snipe *Gallinago megala* BCA: MI EPBC:MI	Unlikely	No	Swinhoe's snipe is a migratory species of wader that has few confirmed records in Australia, most of which on Birdata are in coastal locations or large bodies of water, such as the Gibb River (Birdlife Australia 2024). They do not breed whilst in Australia. In WA this species has been recorded in the Pilbara, Kimberely, Mount Goldsworthy, Mount Blaize and the north-west regions of the Mitchell Plateau, and are more common along the coast of the Northern Territory and Top End DCCEEW 2024). Whilst in Australia, Swinhoe's snipe can be found in habitats containing dense clumps of grass and rushes round the edges of fresh and brackish wetlands such as swamps, billabongs, river pools, small streams and sewage ponds. They can also be found in drying claypans and inundated plains pitted with crab holes (Higgins & Davies 1996). There is a 1985 (DBCA 2023a) record of this species from the Shay Gap sewage pond, approximately 100 km north of the survey area. Given that this is a primarily coastal species, and there is a lack of permanent surface water on the survey area it is unlikely that Swinhoe's snipe would be a frequent visitor in the survey area.
Pin-tailed snipe *Gallinago stenura* BCA: MI EPBC:MI	Unlikely	No	There is a 1979 record of this species from the Shay Gap sewage pond, approximately 100 km north of the survey area. Given the Pin-tailed snipe is an uncommon visitor to freshwater habitats, mainly in northeast Pilbara (late Sep-Apr) (Johnstone *et al.* 2013), it is unlikely to occur on the survey area.
Gull-billed tern *Gelochelidon nilotica* BCA: MI EPBC:MI	Unlikely	No	Australian (Gull-billed) Terns are nomadic and occur widely across Australia, including both coastal and inland areas, but generally remain within Australia. They breed colonially on inland wetlands, and forage over sheltered coastal and inland wetlands, and over open grassland and bare ground (Johnstone & Storr 1998). There is a 2007 (DBCA 2023a) record of this species from approximately 100 km north of the survey area.

Species	Likelihood	Recorded on survey area	Details
			The migratory subspecies is a nonbreeding migrant to Australia and is more coastal in its habit (Menkhorst et al. 2017), therefore it would be less likely to occur within the survey area (and would not breed there as it is a non-breeding visitor to Australia).
Caspian Tern *Hydroprogne caspia* BCA: MI EPBC:MI	Unlikely	No	Caspian terns inhabit mainly sheltered seas, estuaries and tidal creeks; occasionally near-coastal salt lakes (including saltwork ponds) and brackish pools in lower courses of rivers; and rarely fresh water (Johnstone & Storr 1998). There is a 2007 (DBCA 2023a) record of this species from approximately 80 km northeast of the survey area from the DeGrey River. It is unlikely that a Caspian tern would frequent the survey area due to unsuitable habitat.
Little curlew *Numenius minutus* BCA: MI EPBC:MI	Unlikely	No	Breeding in central and north-east Russia, little curlews generally spend the non-breeding season in northern Australia between Port Hedland in Western Australia to the Queensland coast (Minton 2002 pers. comm in (DCCEEW 2023)). There are records of the species from inland Australia (Higgins & Davies 1996). The species is recorded in Australia between September and April, with a few winter records (Blakers et al. 1984). The little curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and black soil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used (Higgins & Davies 1996). Generally, foraging is in relatively short grass (around 20 cm tall) as the birds avoid dense tall grasses (Higgins & Davies 1996). Foraging sites are usually within 5 km of daytime roosting sites, as birds move between grassland and wetland, most feeding in drier grassland occurring during the first few hours after dawn and the late afternoon. The little curlew is known to fly up to 10 km for available water then return to feeding grounds; therefore the availability of drinking water is an important habitat requirement (Barter et al. 1999, Bamford et al. 2008;Higgins & Davies 1996; DCCEEW 2023b). When resting during the heat of day, the Little Curlew congregates around pools, riverbeds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated (Higgins & Davies 1996). Birds may also rest in grassy, open

Species	Likelihood	Recorded on survey area	Details
			woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, which may be without vegetation for hundreds of metres (Higgins & Davies 1996). There is a 2007 (DBCA 2023a) record of this species from approximately 80 km northeast of the survey area from the DeGrey River. It is unlikely that a Caspian tern would frequent the survey area due to unsuitable habitat and lack of permanent water for roosting.
Status: BCA = Western Australian Biodiversity Conversation Act 2016. DBCA refers to the priority list maintained by the Department of Biodiversity, Conservation and Attractions. EPBC = Commonwealth Environment Protection and Biodiversity Conservation Act 1999. See Appendix 1 for conservation codes.			

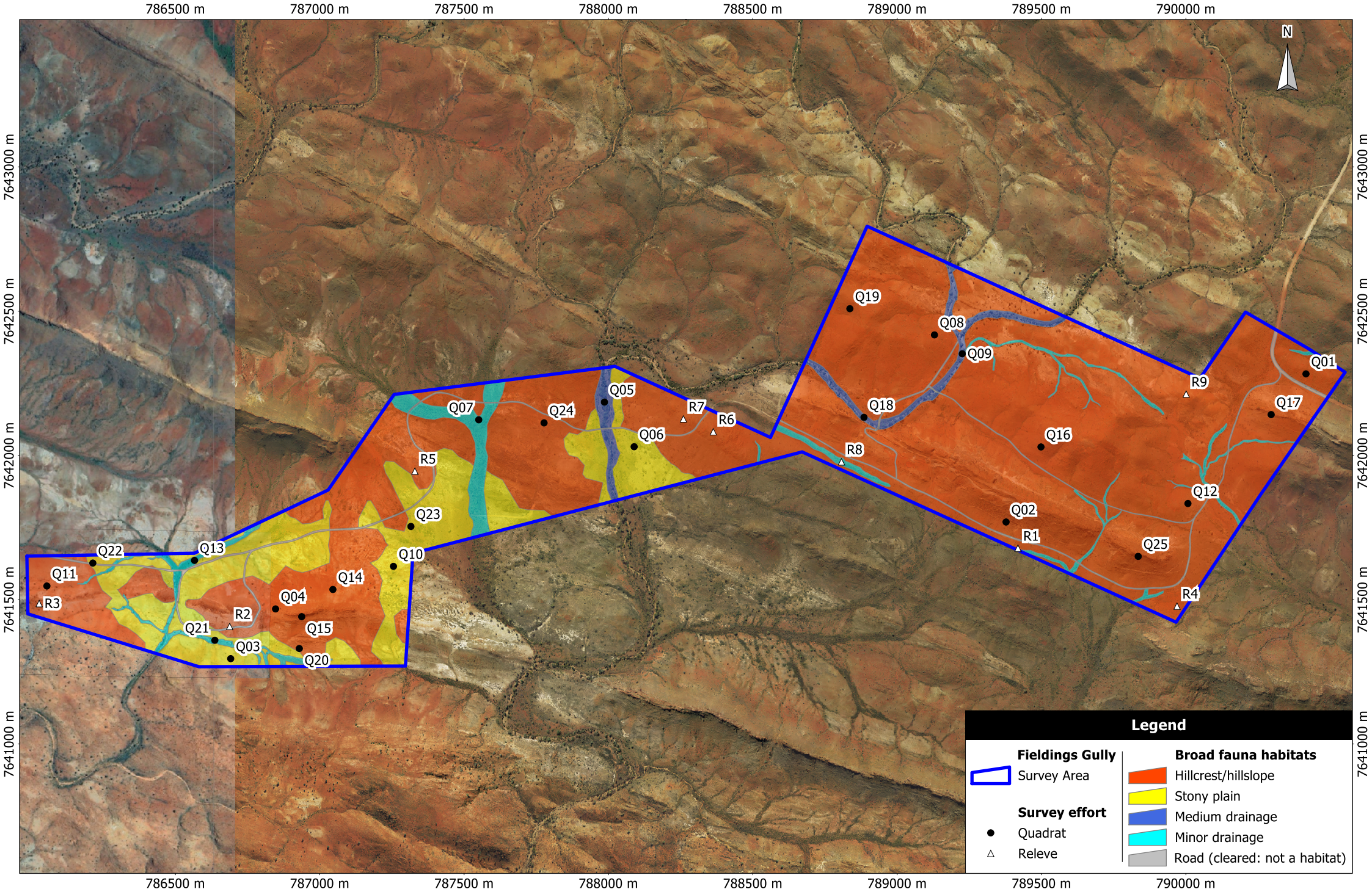
Table 4.10 Broad fauna habitats identified in the survey area

Broad fauna habitat and site examples	Description	Suitability of habitat for conservation significant species	Representative Photograph
Hillcrest/Hillslope Extent in survey area: 295.8 hectares (77.0%) Habitat Assessment Sites: Quadrats Q01, Q02, Q04, Q08, Q11, Q12, Q14, Q15, Q16, Q17, Q19, Q20, Q24, Q25 Relevés R01, R02, R03, R04, R05, R06, R07, R09	Hillcrest/hillslope habitat is dominated by varying species of Triodia with scattered Eucalypts. Typically, rocky substrate, often with exposed bedrock, and skeletal red soils. This habitat encompasses the entirety of vegetation type A and large portions of types B and C. Vegetation dominated by *Triodia* hummock grasses of various life stages, with emergent *Eucalyptus* and *Corymbia* trees, and tall to medium shrubs dominated by *Acacia* species. **Habitat complexity:** Several sub-habitats occur within this broad habitat, such as residual rocky outcrops and gullies, however this habitat does not contain the extensive cracks and crevices of the rocky breakaway habitat that occurs in the higher elevations of the Warrawoona Range to the east. **Extent:** This habitat extends outside of the survey area and is broadly represented across the Pilbara region in areas of topography typically the slopes and crests of hills/ridges that contain gorges and major gullies. This habitat type is represented in conservation estate	Potential Conservation Significant Species ▪ Ghost bat (foraging habitat): foraging habitat within 12 km of Category 1 and 2 Roosts - hill crests, hillslope areas, thinly wooded areas of mulga, acacia, and/or eucalypt spp. with 30-70% open ground cover (Bullen 2021). ▪ Northern quoll (small areas of potential foraging and dispersal habitat– within the small residual rocky outcrop sub habitats) ▪ Pilbara leaf-nosed bat (foraging habitat within the nightly flying range of 20 km of known Category 1, 2 and 3 roosts. (long ridge lines with simple geology and minimal caves and overhangs present, shrubs and spinifex on gully floor, gullies containing minor upland ephemeral watercourses, shallow non-incised gullies). ▪ Pilbara olive python (foraging habitat) ▪ Grey falcon (foraging habitat) ▪ Peregrine falcon (foraging habitat) ▪ Western pebble-mound mouse (breeding/ shelter, foraging/ dispersal) ▪ Long-tailed dunnart (breeding, foraging/ dispersal) Potential *Ctenotus uber johnstonei* habitat	 Quadrat 20

Broad fauna habitat and site examples	Description	Suitability of habitat for conservation significant species	Representative Photograph
Stony Plain Extent in survey area: 39.6 hectares (15.6%) Habitat Assessment Sites: Quadrats Q03, Q06, Q10, Q22, Q23	Gently undulating stony plain with Triodia hummock grasses and scattered shrubland patches on gritty/gravelly loam substrates. This habitat contains small rocky outcrops. Contains areas of vegetation types B and C, comprising *Triodia* hummock grasses of various life stages, with emergent *Eucalyptus* and *Corymbia* trees, and tall to medium shrubs dominated by *Acacia* species. **Habitat complexity:** Contains some residual rocky outcrops, and small areas of maturing spinifex. (>40cm). Can range from very stony on edges of slopes and outcrops to loamy plain with a sprinkling of surface stones on the valley floor. **Extent:** This habitat extends outside of the survey area and is common and widespread within the survey area and more broadly across the Pilbara region. The stony plain habitat is well represented in conservation estate.	Potential Conservation Significant Species ▪ Ghost bat (foraging habitat): foraging habitat within 12 km of Category 1 and 2 roosts; productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (Triodia species) on sand or stony ground, thinly wooded areas of mulga, acacia, and/or Eucalypt spp. with 30-70% open ground cover) (Bullen 2021). ▪ Pilbara leaf-nosed bat (foraging within the nightly flying range of known Category 1, 2 and 3 roosts; lain and low hill habitat (priority 4-5/ moderate foraging rating). This includes: Low rounded hills adjacent to Triodia hummock and tussock grassland plains, three layers of complex vegetation structure containing (<10% overall cover) sparse emergent shrubs and trees. ▪ Grey falcon (foraging) ▪ Peregrine falcon (foraging habitat) ▪ Spectacled hare-wallaby (breeding/ shelter, foraging) ▪ *Ctenotus nigrilineatus* (possible habitat) ▪ Western pebble-mound mouse (breeding/ shelter, foraging) ▪ Short-tailed mouse (breeding/ shelter, foraging) ▪ Oriental plover	 Quadrat 10

Broad fauna habitat and site examples	Description	Suitability of habitat for conservation significant species	Representative Photograph
Medium Drainage Extent in survey area: 5.2 hectares (2.0%) Habitat Assessment Sites: Quadrats Q05, Q09, Q18	Gravelly incised drainage channels lined with large eucalyptus trees typically dissecting hillcrest/hillslope and stony plain habitats. Extent synonymous with vegetation type D, comprising *Eucalyptus victrix*, *Acacia trachycarpa*, *Melaleuca linophylla* and *Atalaya hemiglauca* over **Cenchrus ciliaris* tussock grasses. **Habitat complexity:** No permanent or temporary water bodies were observed within the survey area. All creek lines were dry at the time of the survey, despite the rain during the 19th and 20th of June 2023. Contains microhabitat such as leaf litter accumulations, large trees, hollows. **Extent:** Drainage habitats throughout the Pilbara region are common due to the topography of the region. The habitat is not restricted to the survey area and is represented in conservation estate.	Potential Conservation Significant Species ▪ Ghost bat (foraging habitat): foraging habitat within 12 km of Category 1 and 2 roosts; woodlands with suitable trees (vantage points) along the edge of watercourses (Bullen 2021). ▪ Pilbara leaf-nosed bat (foraging habitat within the nightly flying range of 20 km of known Category 1, 2 and 3 roosts; riparian vegetation of tall eucalypts, melaleuca and acacias. ▪ Grey falcon (breeding/ nesting, foraging) ▪ Pilbara olive python (foraging/dispersal) ▪ Northern quoll (dispersal) ▪ Peregrine falcon (foraging) ▪ Oriental plover (occasional visitor) ▪ Gane's blind snake (possible habitat) ▪ Common greenshank	 Quadrat 5

Broad fauna habitat and site examples	Description	Suitability of habitat for conservation significant species	Representative Photograph
Minor Drainage Extent in survey area: 10.2 hectares (4.0%). Habitat Assessment Sites: Quadrats Q07, Q13, Q21 Relevés R08	The minor drainage habitat represents the diffuse drainage channels within the stony plain and hillslope/hillcrest habitats. Vegetation typically represents that of the surrounding habitat, often as denser patches of mixed shrubs. Tall fringing river gums are typically absent from this habitat type. Extent of this habitat is synonymous with vegetation type E: *Corymbia hamersleyana* trees over *Acacia acradenia* tall shrubland over mixed shrubs and *Chrysopogon fallax* and **Cenchrus ciliaris* tussock grasses. Substrate is generally gravel. **Habitat complexity:** Low **Extent:** the minor drainage habitat is common throughout the Pilbara bioregion particularly within the Chichester and Hamersley subregions where it is associated with the stony plain and hillcrest /hillslope habitats. The minor drainage habitat is not restricted to the survey area and is represented in conservation estate.	Potential Conservation Significant Species ▪ Ghost bat (foraging habitat): foraging habitat within 12 km of Category 1 and 2 roosts; Thinly wooded areas of mulga, acacia, and/or eucalypt spp. with 30-70% open ground cover. Isolated trees on the edge of thin thickets on plains (Bullen 2021). ▪ Pilbara leaf-nosed bat (foraging habitat within the nightly flying range of 20 km of known Category 1, 2 and 3 roosts minor watercourses with fringing tall shrubs and trees). ▪ *Ctenotus nigrilineatus* (possible habitat) ▪ Gane's blind snake (possible habitat) ▪ Grey falcon (forage)	 Quadrat 21



Rapallo environmental

Calidus Resources
Fieldings Gully
Flora and Fauna survey

CALIDUS RESOURCES LIMITED

Original Size: A4 Scale: 1:16,000
Datum: MGA94 Zone 50
0 500 m

Figure 4.3

Broad fauna habitats of the Fieldings Gully survey area

4.4 Survey adequacy and limitations

4.4.1 Survey completeness

To provide an indication of survey completeness of the detailed flora survey, the software program EstimateS (Version 9.1.0) (Colwell 2013) was used to generate species accumulation curves and to calculate predicted species richness. Species accumulation curves represent a theoretical model of the relationship between survey effort and species accumulation: as the number of quadrats increases, the accumulation of flora taxa decreases until the curve reaches an asymptote (Gotelli & Colwell 2011).

Since models can only be generated from data collected through systematic methods, the species accumulation curve and predicted species richness could only be calculated from quadrat data. Analyses were conducted on presence-absence data (133 taxa from 25 quadrats), using the default settings, with the following exceptions:

- Accumulations (runs) were randomised 10,000 times without replacement.
- Upper abundance limit for rare or infrequent species was set to 5.

The species accumulation curve is presented in Figure 4.4, plotting number of flora taxa (y-axis) against the number of quadrats surveyed (x-axis). Observed species richness is presented as a sample-based rarefaction curve, computing the mean expected number of flora taxa (S(est)) over all possible combinations of 1, 2, and up to 25 quadrats (Colwell *et al.* 2012). Predicted species richness was calculated by taking the average of the estimators ICE, Chao 2, Jackknife 1, and Jackknife 2.

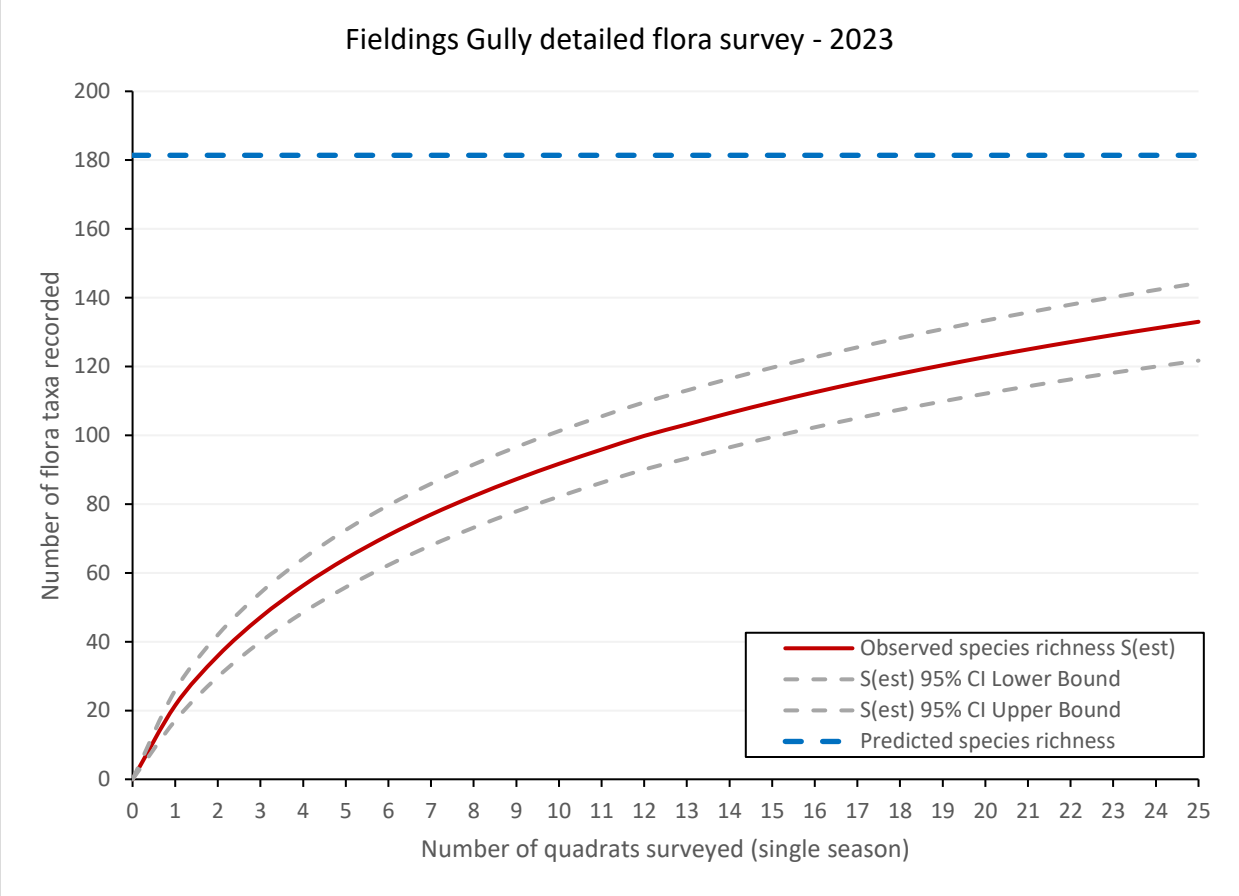


Figure 4.4 Species accumulation curve based on presence-absence quadrat data

Predicted species richness (average of the four predictors) was 181 taxa, which indicates that 73% of the (estimated) total flora taxa present in the survey area were recorded in the quadrats. This is reflected in the species accumulation curve, which after 25 quadrats is approaching an asymptote (Figure 4.4).

Relevés and opportunistic collections yielded another four taxa, hence the total number of taxa recorded during the survey (137 taxa) was 76% of the predicted total.

4.4.2 Assessment against EPA guidance

The EPA Technical guidance for detailed flora surveys recommends a minimum of three quadrats in each vegetation unit, with additional quadrats required in widespread vegetation units (EPA 2016a).

The flora survey was considered adequate to meet the survey objectives outlined in section 1.2. The assessment is a detailed level survey, designed to verify desktop information and enable broad-scale vegetation mapping. The survey was conducted during optimal conditions as there was considerable rainfall prior to the survey. As such, the survey met (EPA 2016a) guidance for a reconnaissance detailed flora and vegetation survey.

The terrestrial vertebrate fauna survey was conducted in accordance with EPA (2020) *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for environmental impact assessment*. The requirements for a basic fauna survey are habitat assessment, photographs, and mapping, to gather broad fauna and habitat information to verify desktop results. As such, the survey met EPA (2020) guidance for a basic fauna survey.

An assessment of the potential survey limitations is presented in Table 4.11.

Table 4.11 Limitations of the flora and fauna survey

Aspect	Limitation	Discussion
Scope and intensity	No	Scope and intensity of survey were suitable to achieve the aims of a reconnaissance flora and vegetation survey, as per EPA (2016). All vegetation types were sampled with at least three quadrats, as well as relevés and vegetation notes and photos. Vegetation types could be classified, described, and mapped at a broad scale across the survey area to meet survey objectives outlined in section 1.2. Scope and intensity of survey were suitable to achieve the aims of a basic fauna survey as outlined in EPA (2020).
Availability of contextual information at a regional and local scale	No	Sufficient desktop flora and vegetation information and vertebrate fauna information was available for the region to place the survey area in a regional context.
Competency/experience of the team carrying out the survey, including experience in bioregion surveyed	No	The ecologists involved in the field survey each had several years' experience conducting ecological surveys in Western Australia, including the Pilbara.
Proportion of flora and fauna recorded and/or collected, any identification issues	No	The flora survey component was adequate to achieve the aims of a detailed flora survey as per meet EPA (2016), although it must be noted that the survey was a single season only. The flora species accumulation curve indicated that the survey recorded 73% of the predicted flora species richness of the area. Representative specimens of all flora taxa encountered in the survey area were collected, either at quadrats and relevés, or opportunistically. The

Aspect	Limitation	Discussion
		taxonomist Sharnya Yates is highly experienced with flora of the Pilbara region. There were no identification issues. The fauna survey component was adequate to achieve the aims of a basic fauna survey as per EPA (2020). Habitats of the survey area were described and mapped with a focus on potential conservation significant fauna habitat. The majority of fauna species were identified on sight in the field, while other species were identified to at least genus level from acoustic recorders and camera traps. This level of identification is adequate for a basic fauna survey.
Was the appropriate area fully surveyed (effort and extent)	No	The survey area was adequately assessed at the intensity appropriate for a detailed flora and vegetation survey, and a basic fauna survey.
Access restrictions within the survey area	No	The survey area was intersected by unsealed tracks, enabling access by 4WD vehicle to all part of the survey area, while sites could easily be sampled on foot. There were no areas in the survey area further than 500 metres away from driveable tracks, and the survey effort maps presented in this report demonstrate adequate coverage of the entire survey area.
Survey timing, rainfall, season of survey	No	The flora survey was completed in June 2023, which falls within the EPA (2016) recommended primary survey period for vegetation surveys in the Eremaean Botanical Province. Rainfall in the month preceding the survey was also slightly above average. A basic fauna survey serves to map habitats and verify desktop information, and there is no specific timing survey timing recommended by EPA (2020) for basic surveys. The survey timing was sufficient to meet EPA (2020) requirements for a basic fauna survey, and to meet survey objectives outlined in section 1.2.
Disturbances that may have affected the results of the survey (e.g. fire, flooding, clearing)	No	Although the survey area was impacted by several fires over the past decades, these fires never burnt the entire survey area, and fire intensity appeared to have been low. Some clearing also impacted small sections of the survey area. Despite these two disturbances, there were sufficient areas of good quality vegetation available to sample the various vegetation types, and regeneration in the areas burnt recently or within the past 5-10 years was good.

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6 Appendices

No	Title
Appendix I	Conservation codes for Australian flora and fauna
Appendix II	Likelihood of occurrence matrix: Vertebrate fauna
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Appendix I Conservation codes for Australian flora and fauna

Conservation codes for Australian flora and fauna under the federal *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act)

Threatened fauna and flora may be listed under Section 178 of the EPBC Act in any one of the following categories:

EX Extinct
EW Extinct in the wild
CR Critically endangered
EN Endangered
VU Vulnerable
CD Conservation dependent

Migratory and Marine species may be listed under respectively Section 209 and Section 248 of the EPBC Act.

MI Migratory
MA Marine

Conservation codes for Western Australian flora and fauna under the Western Australian *Biodiversity Conservation Act 2016*

Threatened, Extinct and Specially Protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.

Published under **schedule 1** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 201*8 for critically endangered flora.

EN Endangered species

Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under **schedule 2** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora*.

VU Vulnerable species

Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.

Published under **schedule 3** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under **schedule 4** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora*.

EW Extinct in the wild species

Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program.

Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under **schedule 5** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under **schedule 6** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018.*

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under **schedule 7** of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

Priority species

Priority species are 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. In this report, priority species are given the codes P1, P2, P3 and P4.

P1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) **Rare**. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) **Near Threatened**. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix II Likelihood of occurrence matrix: Vertebrate fauna

Species records relative to survey area	Habitat suitability			
	High (breeding and foraging)	**Medium (foraging habitat)**	**Low (dispersal habitat)**	**Unsuitable** [6)]
Records within 10 km [1)]	Highly Likely	Likely	Likely	Possible
Records within 50 km [2)]	Likely	Possible	Possible	Unlikely
Records within 100 km [3)]	Possible	Possible	Possible	Unlikely
Records within 200 km [4)]	Possible	Unlikely	Unlikely	Unlikely
No records within 200 km [5)]	Unlikely	Unlikely	Unlikely	Highly unlikely

Footnotes for highly cryptic or poorly known species for which there are few records, and for under-surveyed areas:
1 – survey area occurs within currently known range and species has high dispersal capability.
2 – survey area occurs within currently known range and species has low dispersal capability.
3 – survey area occurs on margin of currently known range and species has high dispersal capability.
4 – survey area occurs outside of currently known range and species has high dispersal capability.
5 – survey area occurs outside of currently known range and species has low dispersal capability.
Footnotes with habitat suitability:
6 – Depending on a species' ecology, 'unsuitable' can either mean 'not preferred' or 'not containing resources', or it can be 'prohibitive' (i.e. absence of water for aquatic species). This distinction affects the final likelihood score in this column.

Appendix III Flora desktop results: Conservation significant flora and likelihood assessment

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Fabaceae	*Acacia aphanoclada*	P1	Slender, wispy shrub, 1.7-5 m high.	Skeletal stony soils. Rocky hills, ridges & rises.	August to October	Yes	10-50 km	Possible
Fabaceae	*Acacia cyperophylla var. omearana*	P1	Tree, 4-10m high, minni-ritchi bark	Stony and gritty alluvium. Associated with creek and drainage lines on sandy and rocky soils	March, April, August, October	Yes	10-50 km	Possible
Fabaceae	*Acacia fecunda*	P1	Erect, obconic tree to 3m, grey bark, phyllodes are sub-glaucous, spikes	Quartzite gibbers, grey-red skeletal soil, creeklines, road verges. Base of hills, scree slopes.	April, May, August, October	Yes	50-100 km	Unlikely
Fabaceae	*Acacia leeuweniana*	P1	Narrow obconic tree to 14 m. Bark minni ritchi, inflorescence in spikes	Gritty, skeletal red-grey sandy loam, light orange-btrown gravelly sand, granite. In rock fissures in outcrops, among boulders	No info	Yes	10-50 km	Possible
Fabaceae	*Acacia levata*	P3	Spreading, multi-stemmed shrub, 1-3 m high, to 5 m wide.	Sand or sandy loam over granite. Hillslopes. Rocky hillslopes, stony clay loams, associated with spinifex	May and October	Yes	10-50 km	Possible
Fabaceae	*Acacia* sp. Marble Bar (J.G. & M.H. Simmons 3499)	P1	Shrub with dull green foliage. Inflorescence in golden spikes, 30 mm long.	Dry watercourse among low rocky hills.	September	Unknown - No habitat info	within 5 km	Possible
Fabaceae	*Acacia* sp. Nullagine (B.R. Maslin 4955)	P1	no info on FloraBase	Rocky clay, low lying area between rocky hills.	No info	Yes	10-50 km	Possible
Chenopodiaceae	*Atriplex spinulosa*	P1	Monoecious, erect annual herb to 0.2	Quartz drainage lines and brown silty clay loams	No info	Possible	50-100 km	Unlikely
Cyperaceae	*Bulbostylis burbidgeae*	P4	Tufted, erect to spreading annual, grass-like or herb (sedge), 0.3-0.25 m high, spikelets in a simple umbel or rarely solitary; stamens 3; involucral bracts long, hairy. Granitic soils.	Granite outcrops, cliff bases.	March, June to August	No	10-50 km	Unlikely

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Bixaceae	*Cochlospermum macnamarae*	P1	no info	Granite boulders, skeletal brown sand	No info	No	10-50 km	Unlikely
Malvaceae	*Corchorus* sp. Yarrie (J. Bull & D. Roberts CAL 01.05)	P1	no info	Mesas (stony hills), an drainage lines associated with mesas	May, June	Yes	10-50 km	Possible
Euphorbiaceae	*Croton aridus*	P3	Monoecious, multi-stemmed evergreen shrub to 1.5m high	Deep red sand, pindan soil. Sandplains or ridges, spinifex sandplains	August	No	50-100 km	Unlikely
Cucurbitaceae	*Cucumis* sp. Barrow Island (D.W. Goodall 1264)	P2	no info	Lower footslope of a basalt hill	May	No	50-100 km	Unlikely
Rubiaceae	*Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479)	P3	no info	Claypan, red-brown sandy clay.	No info	No	50-100 km	Unlikely
Poaceae	*Eragrostis crateriformis*	P3	Annual, grass-like or herb, 0.17-0.42 m high. Clayey loam or clay.	Creek banks, depressions, Claypans, red-brown clay loams	May or July	Yes	10-50 km	Possible
Scrophulariaceae	*Eremophila maculata subsp. filifolia*	P1	no info	Plain. Red sand. Collection site: rangeland.	July	Maybe	50-100 km	Unlikely
Myrtaceae	*Eucalyptus rowleyi*	P3	no info	Creeklines, grey sandy loams	June to July	Yes	50-100 km	Unlikely
Euphorbiaceae	*Euphorbia clementii*	P3	Erect herb, to 0.6 m high.	Gravelly hillsides, stony grounds. Drainage lines, red-orange sandy loams, some stony areas	April	Yes	10-50 km	Possible
Euphorbiaceae	*Euphorbia inappendiculata* var. *inappendiculata*	P2	no info on FloraBase	Claypan, red-brown sandy clay.	May	No	50-100 km	Unlikely
Boraginaceae	*Euploca argyrea*	P1	No info	Loose rubble on limestone ridge.	No info	No	50-100 km	Unlikely

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Boraginaceae	*Euploca mutica*	P3	Ascending to spreading perennial, herb, to 0.3 m high.	Flat terrain, low in landscape, skeletal red brown granite soil, very gritty. Clay loams, floodplains, sandplains	April to June, September	Maybe	10-50 km	Possible
Boraginaceae	*Euploca parviantrum*	P1	Erect annual, herb, to 0.15 m high	Sandy soils. Flats, plains, rocky slopes.	February to June	Yes	50-100 km	Unlikely
Cyperaceae	*Fimbristylis sieberiana*	P3	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), 0.25-0.6 m high	Drainage line with black clay loam soil. Mud, skeletal soil pockets. Pool edges, sandstone cliff	May to June	No	50-100 km	Unlikely
Cyperaceae	*Fimbristylis* sp. Shay Gap (K.R. Newbey 10293)	P1	Tufted annual, grass-like or herb (sedge), 0.12-0.15 m high, inflorescence of 3-many spikelets	Sandy soil, basalt, Drainage line	June to July	Maybe	50-100 km	Unlikely
Amaranthaceae	*Gomphrena leptophylla*	P3	Prostrate or erect to spreading annual, herb, to 0.15 m high. Sand, sandy to clayey loam, granite, quartzite.	Open flats, sandy creek beds, edges salt pans & marshes, stony hillsides.	March to September	Yes	10-50 km	Possible
Goodeniaceae	*Goodenia pedicellata*	P1	Single-stemmed perennial, herb (with dense, cottony and strigose hairs), to 0.25 m high	Stony flat-topped hill with some calcrete exposed by track grading.	0	No	50-100 km	Unlikely
Apocynaceae	*Gymnanthera cunninghamii*	P3	Erect shrub, 1-2 m high	Sandy soils and drainage lines	January to December	Yes	10-50 km	Possible
Boraginaceae	*Heliotropium murinum*	P3	Short-lived perennial, herb, up to 0.4 m high. Fl. May or Sep. Red sand. Plains.	Flat. Brown light clay/sand over ironstone. 0-10% loose rock. Collection site: private property.	May or September	Yes	10-50 km	Possible
Fabaceae	*Indigofera ammobia*	P3	no info	Hummock sandplains	No info	Yes	50-100 km	Unlikely
Fabaceae	*Indigofera ixocarpa*	P2	Shrub, to 1 m high	Stony alluvial soils Skeletal red soils over massive ironstone.	March, May	No	50-100 km	Unlikely

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Asteraceae	*Iotasperma sessilifolium*	P3	Erect herb, flowers pink	Erect herb. Fl. pink. Cracking clay, black loam. Edges of waterholes, plains.	No info	No	50-100 km	Unlikely
Convolvulaceae	*Ipomoea racemigera*	P2	Creeping annual, herb or climber. Fl. white.	Drainage. Gravel loam, sand over river stone.	0	Yes	50-100 km	Unlikely
Pedaliaceae	*Josephinia* sp. Woodstock (A.A. Mitchell PRP 989)	P1	Small herbaceous shrub to approximately 0.4 m with pale pink to mauve foxglove-like flowers, serrated leaves, and woolly stems and abaxial surface of foliage.	Sheet flow or drainage lines, on red sandy (granitic) plains. Recorded at Warrawoona from a loamy minor drainage line, within VT4 (Woodman 2020).	No info	Yes	10-50 km	Possible
Brassicaceae	*Lepidium catapycnon*	P4	Erect annual, herb, to 0.15 m high	Sandy soils. Flats, plains, rocky slopes.	February to June	Yes	50-100 km	Unlikely
Solanaceae	*Nicotiana umbratica*	P3	Erect, short-lived annual or perennial, herb, 3-7 m high. Shallow soils.	Rocky granite outcrops	April to June	No	10-50 km	Unlikely
Phyllanthaceae	*Phyllanthus hebecarpus*	P3	no info	Granite outcrop and red sandy plain	No info	No	10-50 km	Unlikely
Amaranthaceae	*Ptilotus mollis*	P4	Compact, perennial shrub to 5 m high, soft grey foliage.	Stony hills and screes.	May or September	Yes	5-10 km	Likely
Amaranthaceae	*Ptilotus wilsonii*	P1	Shrub, ca 0.5 m high. Fl. green-white	Stony gravelly soils, rocky hills. Lower hill slope. Gravelly, calcrete / limestone - like rocky surface.	October	Yes	50-100 km	Unlikely
Lamiaceae	*Quoya zonalis*	EN	no info	Granite and rocky outcrops	June-September	No	50-100 km	Unlikely
Fabaceae	*Rhynchosia bungarensis*	P4	Compact, prostrate shrub, to 0.5 m high	Granite outcrop, with boulders. Skeletal brown sandy loam. Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	May, July, November	Maybe	50-100 km	Unlikely

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Acanthaceae	*Rostellularia adscendens* var. *latifolia*	P3	Herb or shrub, 0.1-0.3 m high. Ironstone soils.	Near creeks, rocky hills.	April to May	Yes	10-50 km	Possible
Fabaceae	*Rothia indica* subsp. *australis*	P3	Prostrate annual, herb, to 0.3 m high, densely covered in spreading hairs.	Sandy soils. Sandhills and sandy flats. Sandy drainage flat. Red/brown sandy loam. Some rocks	April to August	Yes	10-50 km	Possible
Cyperaceae	*Schoenus coultasii*	P1	no info	Granite seepage area. Brown sandy loam.	No info	No	10-50 km	Unlikely
Solanaceae	*Solanum* sp. Mosquito Creek (A.A. Mitchell et al. AAM 10795)	P1	no info	Drainage lines, semi-saline clay pans, stony undulating plains	March, June, October	Yes	50-100 km	Unlikely
Plantaginaceae	*Stemodia* sp. Battle Hill (A.L. Payne 1006*)*	P1	Low shrub	Flat on valley floor. Pebbly, cobbly, reddish - brown clay (cracking clay patch). Underlying geology: basalt.	No info	No	50-100 km	Unlikely
Stylidiaceae	*Stylidium weeliwolli*	P3	Annual, herb, 0.1-0.25 m high, throat appendages 4, rod-shaped. Gritty sand soil, sandy clay.	Edge of watercourses. Granite seepage area. Brown sandy loam.	August to September	No	10-50 km	Unlikely
Fabaceae	*Swainsona thompsoniana*	P3	Erect, herb	Gentle, north facing flat on valley floor. Pebbly, cobbly, red - brown clay over basalt and some ironstone pebbles.	April, June, August	No	50-100 km	Unlikely
Combretaceae	*Terminalia supranitifolia*	P3	Spreading, tangled shrub or tree, 1.5-3 m high. Fl. green-yellow	Sand. Among basalt rocks.	May, July, December	No	50-100 km	Unlikely
Poaceae	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	P3	Tussocky perennial, grass-like or herb, 0.9-1.8 m high	Red clay. Clay pan, grass plain. Moist, red sand-loam along minor creek. Over dolerite (bright red rocks). Burnt in 2003.	August	No	50-100 km	Unlikely

Family	Scientific Name	Status	Taxon description	Habitat information	Flowering period	Habitat present	Nearest records	Likelihood
Poaceae	*Themeda* sp. Panorama (J. Nelson et al. NS 102)	P1	Grass. No further information available.	Steep rocky slopes, shaded rocky gullies, basalt hillslopes.	No info	No	10-50 km	Unlikely
Poaceae	*Triodia basitricha*	P3	no info	Ironstone hills	May	Yes	10-50 km	Possible
Poaceae	*Triodia chichesterensis*	P3	no info	Quartz gullies, rocky hill slopes, on calcrete mesa, steep rocky slopes, undulating stony plain on brown clay loam with calcrete, low rise with quartzite and ironstone pebbles, red-brown clay laom, rocky basalt slope red-brown clay loam.	May	No	50-100 km	Unlikely
Fabaceae	*Vigna triodiophila*	P3	Twining or climbing herb	Bedrock and proximal colluvial footslopes. Moderately inclined slope, aspect 330 degrees. Many coarse fragments to maximum size of 200 mm. Slight bedrock outcrop. Red brown loam.	No info	Yes	50-100 km	Unlikely

Appendix IV Fauna desktop results: All fauna

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Actinopterygii (fish)											
Leiopotherapon unicolor	Spangled Perch			1							
Neosilurus hyrtlii	Hyrtl's Catfish			2							
Amphibia											
Cyclorana australis	Giant Frog			1							
Cyclorana maini	Main's Frog			11					1		
Litoria caerulea	Green Tree Frog			1							
Litoria rubella	Desert Tree Frog			11					1		
Notaden nichollsi	Desert Spadefoot			10							
Platyplectrum spenceri	Spencer's Frog			1					1		
Uperoleia saxatilis	Pilbara Toadlet			1					1		
Ave											
Acanthagenys rufogularis	Spiny-cheeked Honeyeater			2		2					
Acanthiza robustirostris	Slaty-backed Thornbill			1		1					
Accipiter cirrocephalus	Collared Sparrowhawk			2		3			1		
Accipiter fasciatus	Brown Goshawk			7		7			1		
Acrocephalus australis	Australian Reed-Warbler			13		16					
Actitis hypoleucos	Common Sandpiper	MI	MI	9		11				1	1447
Aegotheles cristatus	Australian Owlet-nightjar			5		5			1		
Amytornis striatus	Striated Grasswren			9		6	1				
Amytornis whitei whitei	Pilbara Grasswren							1	1		
Anas castanea	Chestnut Teal			1							
Anas gracilis	Grey Teal			59		57					
Anas superciliosa	Pacific Black Duck			61		56					
Anhinga novaehollandiae	Australasian Darter			74		77					

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Anthus novaeseelandiae	Australasian Pipit			27		19			1		
Apus pacificus	Fork-tailed Swift	MI	MI							1	442
Aquila audax	Wedge-tailed Eagle			13		13	1	1	1		
Ardea alba	Great Egret			32		57					
Ardea alba modesta	Eastern Great Egret			32							
Ardea intermedia	Intermediate Egret			9		11					
Ardea pacifica	White-necked Heron			81		71					
Ardeotis australis	Australian Bustard			6		3			1		
Artamus cinereus	Black-faced Woodswallow			41		39		1	1		
Artamus leucorynchus	White-breasted Woodswallow					1					
Artamus minor	Little Woodswallow			36		33			1		
Artamus personatus	Masked Woodswallow			6		2					
Aythya australis	Hardhead			14		13					
Barnardius zonarius	Australian Ringneck			30		24			1		
Bubulcus ibis	Cattle Egret			4							
Burhinus grallarius	Bush Stone-curlew			18		15			1		
Cacatua sanguinea	Little Corella			118		111			1		
Calidris acuminata	Sharp-tailed Sandpiper	MI	MI	7		4				1	123
Calidris ferruginea	Curlew Sandpiper	CR	CR & MI							2	
Calidris melanotos	Pectoral Sandpiper	MI	MI							1	
Calidris minuta	Little Stint			2							
Calidris ruficollis	Red-necked stint	MI	MI								20
Calidris subminuta	Long-toed Stint			3							
Centropus phasianinus	Pheasant Coucal			5		4					
Certhionyx variegatus	Pied Honeyeater			1							
Chalcites basalis	Horsfield's Bronze-cuckoo			24		27			1		
Charadrius ruficapillus	Red-capped Plover			9		12					

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Charadrius veredus	Oriental Plover	MI	MI	2		2				1	174
Chenonetta jubata	Australian Wood Duck			5		2					
Cheramoeca leucosterna	White-backed Swallow			3							
Chlamydera guttata	Western Bowerbird			14		12			1		
Chlidonias hybrida	Whiskered Tern			2		1					
Cincloramphus cruralis	Brown Songlark			3		2					
Cincloramphus mathewsi	Rufous Songlark			21		19			1		
Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush			1							
Circus approximans	Swamp Harrier			2		3					
Circus assimilis	Spotted Harrier			11		8			1		
Climacteris melanurus	Black-tailed Treecreeper			4		2			1		
Colluricincla harmonica	Grey Shrike-thrush			46		38			1		
Conopophila rufogularis	Rufous-throated Honeyeater			1							
Coracina novaehollandiae	Black-faced Cuckoo-shrike			109		104			1		
Corvus bennetti	Little Crow			15		12			1		
Corvus orru	Torresian Crow			80		73	1	1	1		
Cracticus nigrogularis	Pied Butcherbird			101		88			1		
Cracticus torquatus	Grey Butcherbird			1		1					
Cygnus atratus	Black Swan			8		5					
Dacelo leachii	Blue-winged Kookaburra			71		69			1		
Dendrocygna eytoni	Plumed Whistling Duck					2					
Dicaeum hirundinaceum	Mistletoebird			7		5			1		
Dromaius novaehollandiae	Emu			1							
Egretta garzetta	Little Egret			23		23					
Egretta novaehollandiae	White-faced Heron			88		84					
Elanus axillaris	Black-shouldered Kite								1		
Elseyornis melanops	Black-fronted Dotterel			124		105			1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Emblema pictum	Painted Finch			107		81		1	1		
Eolophus roseicapilla	Galah			118		103	1	1	1		
Ephippiorhynchus asiaticus	Black-necked Stork			20		22					
Epthianura aurifrons	Orange Chat			1							
Epthianura tricolor	Crimson Chat			9		6			1		
Erythrogonys cinctus	Red-kneed Dotterel			12		14					
Eurostopodus argus	Spotted Nightjar			5		11			1		
Falco berigora	Brown Falcon			25		24			1		
Falco cenchroides	Nankeen Kestrel			46		37	1	1	1		
Falco hypoleucos	Grey Falcon	VU		2							767
Falco peregrinus	Peregrine Falcon	OS		3		5			1		88
Falco subniger	Black Falcon			2		2					
Fulica atra	Eurasian Coot			21		22					
Gallinago megala	Swinhoe's snipe	MI	MI								17
Gallinago stenura	Pin-tailed snipe	MI	MI								21
Gavicalis virescens	Singing Honeyeater			44		29	1	1	1		
Gelochelidon nilotica	Gull-billed tern	MI	MI								68
Geopelia cuneata	Diamond Dove			78		63	1	1	1		
Geopelia striata placida	Peaceful dove			29		56		1	1		
Geophaps plumifera	Spinifex Pigeon			101		82	1	1	1		
Glareola maldivarum	Oriental Pratincole	MI	MI								27
Grallina cyanoleuca	Magpie-lark			180		176			1		
Gymnorhina tibicen	Australian Magpie			51		41			1		
Haliaeetus leucogaster	White-bellied Sea-eagle			2		3					
Haliastur sphenurus	Whistling Kite			85		78			1		
Hamirostra melanosternon	Black-breasted Buzzard			1		1					
Heteroscenes pallidus	Pallid Cuckoo			40		35			1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Hieraaetus morphnoides	Little Eagle			14		15					
Himantopus himantopus	Pied Stilt			23							
Himantopus leucocephalus	Pied Stilt					26					
Hirundo neoxena	Welcome Swallow			3		4					
Hydroprogne caspia	Caspian Tern	MI	MI	1							180
Hypotaenidia philippensis	Buff-banded Rail			1		1					
Lalage tricolor	White-winged Triller			9		21			1		
Lichmera indistincta	Brown Honeyeater			92		79			1		
Lophoictinia isura	Square-tailed Kite			1		1					
Malacorhynchus membranaceus	Pink-eared Duck			15		16					
Malurus assimilis	Purple-backed Fairy-Wren			14		10			1		
Malurus leucopterus	White-winged Fairy-wren			15		10					
Manorina flavigula	Yellow-throated Miner			157		129	1	1	1		
Melanodryas cucullata	Hooded Robin			1		1			1		
Melithreptus gularis	Black-chinned Honeyeater			14		7			1		
Melopsittacus undulatus	Budgerigar			41		35		1	1		
Merops ornatus	Rainbow Bee-eater	MI	MI	122		109			1		
Microcarbo melanoleucos	Little Pied Cormorant			66		64					
Milvus migrans	Black Kite			17		11			1		
Mirafra javanica	Horsfield's Bushlark			7		2		1			
Motacilla tschutschensis	Eastern Yellow Wagtail	MI	MI			1					
Myiagra nana	Paperbark Flycatcher			1							
Neochmia ruficauda	Star Finch			6		4					
Neopsephotus bourkii	Bourke's Parrot			1		1					
Ninox boobook	Boobook Owl			30		27			1		
Ninox connivens	Barking Owl			3							768

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Numenius minutus	Little curlew	MI	MI								32
Nycticorax caledonicus	Nankeen Night Heron (Rufous Night Heron)			18		15					
Nymphicus hollandicus	Cockatiel			51		49			1		
Ocyphaps lophotes	Crested Pigeon			51		42			1		
Oreoica gutturalis	Crested Bellbird			10		7			1		
Pachycephala rufiventris	Rufous Whistler			17		20			1		
Pandion haliaetus	Osprey	MI	MI	2		2					73
Pardalotus rubricatus	Red-browed Pardalote			77		67			1		
Pardalotus striatus	Striated Pardalote			6		6					
Pelecanus conspicillatus	Australian Pelican			69		64					
Petrochelidon ariel	Fairy Martin			64		60			1		
Petrochelidon nigricans	Tree Martin			39		40			1		
Petroica goodenovii	Red-capped Robin			1		1					
Pezoporus occidentalis	Night Parrot	CR	EN								31
Phalacrocorax sulcirostris	Little Black Cormorant			71		68					
Phalacrocorax varius	Pied Cormorant (Australian Pied Cormorant)			6							
Phaps chalcoptera	Common Bronzewing			10		10			1		
Platalea flavipes	Yellow-billed Spoonbill			1							
Platalea regia	Royal Spoonbill			3		1					
Plegadis falcinellus	Glossy Ibis	MI	MI	3		2					199
Podargus strigoides	Tawny Frogmouth			1		2					
Poephila cincta	Black-throated Finch			1							
Poliocephalus poliocephalus	Hoary-headed Grebe			7		9					
Pomatostomus superciliosus	White-browed Babbler			1							
Pomatostomus temporalis	Grey-crowned Babbler			55		57			1		
Poodytes carteri	Spinifexbird			28		20			1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Poodytes gramineus	Little Grassbird			2		2	1	1			
Porphyrio porphyrio	Purple Swamphen			1		1					
Ptilotula keartlandi	Grey-headed Honeyeater			71		46			1		
Ptilotula penicillata	White-plumed Honeyeater			170		155			1		
Ptilotula plumula	Grey-fronted Honeyeater			1		1			1		
Recurvirostra novaehollandiae	Red-necked Avocet			3							
Rhipidura albiscapa	Grey Fantail								1		
Rhipidura leucophrys	Willie Wagtail			130		115	1	1	1		
Smicrornis brevirostris	Weebill			17		15	1	1	1		
Stiltia isabella	Australian Pratincole			1		1					
Stipiturus ruficeps	Rufous-crowned Emu-wren			1		1					
Sugomel nigrum	Black Honeyeater			4		1					
Synoicus ypsilophorus	Brown Quail			7		7					
Tachybaptus novaehollandiae	Australasian Grebe (Black-throated Grebe)			28		27					
Taeniopygia castanotis	Zebra Finch			121		97		1	1		
Threskiornis moluccus	Australian White Ibis			4		4					
Threskiornis spinicollis	Straw-necked Ibis			49		46					
Todiramphus pyrrhopygius	Red-backed Kingfisher			31		28			1		
Todiramphus sanctus	Sacred Kingfisher			46		40					
Tribonyx ventralis	Black-tailed Native hen			2		2					
Tringa glareola	Wood Sandpiper			11		14					208
Tringa nebularia	Common Greenshank			1		2					456
Turnix velox	Little Button-quail			13		3		1	1		
Tyto alba	Barn Owl								1		
Vanellus miles	Masked Lapwing			21		10					
Zapornia tabuensis	Spotless Crake			3		3					

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Mammals											
Antechinomys longicaudatus	Long-tailed Dunnart	P4		4							8
Bos taurus	European Cattle	Introduced							1		
Camelus dromedarius	Dromedary, Camel	Introduced							1		
Canis familiaris sp.	Dingo, Dog			2			1	1	1		
Chaerephon jobensis	Greater Northern Free-tailed Bat			7					1		
Chalinolobus gouldii	Gould's Wattled Bat			1					1		
Dasycercus blythi	Brush-tailed mulgara	P4									64
Dasykaluta rosamondae	Kaluta			12					1		
Dasyurus hallucatus	Northern Quoll	EN	EN	3			5	2	1	1	13
Felis catus	Cat	Introduced		2					1		
Lagorchestes conspicillatus leichardti	Spectacled hare-wallaby (mainland)	P4		1					1		
Leggadina lakedownensis	Short-tailed mouse, Lakeland Downs mouse	P4		1							18
Macroderma gigas	Ghost Bat	VU	VU	31	31		1	2	1		
Macrotis lagotis	Greater Bilby	VU	VU	1							781
Mus musculus	House Mouse	Introduced		3					1		
Ningaui timealeyi	Pilbara Ningaui			47					1		
Notomys alexis	Spinifex Hopping-mouse			2							
Nyctophilus geoffroyi geoffroyi	Lesser Long-eared Bat								1		
Osphranter robustus	Euro, Biggada			768			1	1	1		
Osphranter rufus	Red Kangaroo			2					1		
Ozimops lumsdenae	Northern Free-tailed Bat								1		
Petrogale rothschildi	Rothschild's Rock-wallaby			3					1		
Planigale ingrami	Long-tailed Planigale								1		
Pseudantechinus woolleyae	Woolley's Pseudantechinus			5			1	1	1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Pseudomys chapmani	Western Pebble-mound Mouse	P4		8				1	1		
Pseudomys delicatulus	Delicate Mouse			17					1		
Pseudomys desertor	Desert Mouse			17					1		
Pseudomys hermannsburgensis	Sandy Inland Mouse			12					1		
Rhinonicteris aurantia (Pilbara form)	Pilbara Leaf-nosed Bat	P4		4	4500		1	2	1		
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat			2					1		
Scotorepens greyii	Little Broad-nosed Bat			1					1		
Sminthopsis macroura	Stripe-faced Dunnart			3							
Sminthopsis youngsoni	Lesser Hairy-footed Dunnart			2							
Tachyglossus aculeatus acanthion	Short-beaked Echidna			1			1	1	1		
Taphozous georgianus	Common Sheath-tailed Bat			7			1	1	1		
Trichosurus vulpecula arnhemensis	Northern Brushtail Possum	VU	VU						1		
Vespadelus finlaysoni	Finlayson's Cave Bat			24			1	1	1		
Zyzomys argurus	Common Rock-rat						1	1	1		
Reptiles											
Acanthophis pyrrhus	Desert Death Adder								1		
Acanthophis wellsi	Pilbara Death Adder			2					1		
Anilios ammodytes	Sand-diving Blind Snake			2					1		
Anilios grypus	Long-beaked Blind Snake			5					1		
Anilios hamatus	Northern Hook-snouted Blind Snake								1		
Anilios pilbarensis	Pilbara Blind Snake			1							
Antaresia childreni	Children's Python			1							
Antaresia perthensis	Pygmy Python			3					1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Brachyurophis approximans	North-western Shovel-nosed Snake								1		
Carlia munda	Striped Rainbow Skink								1		
Carlia triacantha	Desert Rainbow Skink								1		
Chelodina steindachneri	Flat-shelled Turtle			1					1		
Cryptoblepharus ustulatus	Russet Snake-eyed Skink								1		
Ctenophorus caudicinctus	Ring-tailed Dragon			12			1	1	1		
Ctenophorus isolepis	Central Military Dragon								1		
Ctenophorus nuchalis	Central Netted Dragon			5					1		
Ctenotus duricola	Eastern Pilbara Lined Ctenotus								1		
Ctenotus grandis grandis	Grand ctenotus								1		
Ctenotus inornatus	Bar-shouldered Ctenotus			6					1		
Ctenotus leonhardii	Common Desert Ctenotus								1		
Ctenotus nigrilineatus	Pin-striped finesnout Ctenotus	P1									49
Ctenotus pantherinus	Leopard Ctenotus			2					1		
Ctenotus rubicundus	Ruddy Ctenotus								1		
Ctenotus rutilans	Rusty-shouldered Ctenotus								1		
Cyclodomorphus melanops	Spinifex Slender Blue-tongue			5					1		
Delma butleri	Spinifex Delma								1		
Delma elegans	Pilbara Delma			3					1		
Delma nasuta	Sharp-snouted Delma			2					1		
Delma pax	Peace Delma			1					1		
Delma tincta	Excitable Delma			4					1		
Demansia reticulata	Reticulated Whipsnake			2					1		
Demansia rufescens	Rufous Whipsnake			1					1		
Diplodactylus conspicillatus	Variable Fat-tailed Gecko								1		
Diplodactylus savagei	Southern Pilbara Beak-faced Gecko								1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Egernia depressa	Southern Pygmy Spiny-tailed Skink			2							
Egernia epsisolus	Eastern Pilbara Spiny-tailed Skink			1					1		
Egernia formosa	Goldfields Crevice-skink			1					1		
Furina ornata	Orange-naped Snake, Moon Snake			1					1		
Gehyra montium	Centralian Dtella			13							
Gehyra pilbara	Pilbara Dtella			1							
Gehyra punctata	Spotted Dtella			1					1		
Gehyra variegata	Variegated gehyra								1		
Gowidon longirostris	Long-nosed Dragon			1					1		
Heteronotia binoei	Bynoe's Gecko			8					1		
Heteronotia spelea	Pilbara Cave Gecko			1					1		
Lerista bipes	Western Two-toed Slider			6					1		
Lerista jacksoni	Jackson's three-toed slider			1					1		
Lerista muelleri	Mueller's Three-toed Slider			1					1		
Lialis burtonis	Burton's Snake-lizard			4					1		
Liasis olivaceus barroni	Pilbara olive python	VU	VU	1					1		
Lucasium stenodactylus	Western Sandplain Gecko								1		
Lucasium wombeyi	Wombey's gecko								1		
Menetia greyii	Common Dwarf Skink			1					1		
Morethia ruficauda	Fire-tailed Skink			1					1		
Notoscincus ornatus	Ornate Soil-crevice Skink								1		
Oedura fimbria	Western Marbled Velvet Gecko								1		
Pseudechis australis	Mulga Snake			1			1	1	1		
Pseudonaja mengdeni	Western Brown Snake			1							
Pseudonaja modesta	Ringed Brown Snake			1					1		
Pygopus nigriceps	Western Hooded Scaly-foot								1		

Species Name	Common Name	Species Status		Data source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Rhynchoedura ornata	Western Beaked Gecko								1		
Strophurus elderi	Jewelled Gecko								1		
Suta fasciata	Rosen's Snake								1		
Suta monachus	Inland Hooded Snake						1	1	1		
Tiliqua multifasciata	Central Blue-tongue			1					1		
Varanus acanthurus	Spiny-tailed Goanna			1					1		
Varanus brevicauda	Short-tailed Pygmy Goanna								1		
Varanus eremius	Pygmy Desert Goanna								1		
Varanus giganteus	Perentie			2					1		
Varanus panoptes	Yellow-spotted Monitor								1		
Varanus pilbarensis	Northern Pilbara Rock Goanna								1		
Varanus tristis	Racehorse Goanna								1		
Vermicella snelli	Pilbara Bandy Bandy								1		

Taxonomy of some species may reflect previous revisions reflecting the date of the data source.

Appendix V Fauna desktop results: Conservation significant vertebrate fauna

Species Name	Common Name	Species Status		Data Source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Ave											
Actitis hypoleucos	Common Sandpiper	MI	MI	9		11				1	1447
Apus pacificus	Fork-tailed Swift	MI	MI							1	442
Calidris acuminata	Sharp-tailed Sandpiper	MI	MI	7		4				1	123
Calidris ferruginea	Curlew Sandpiper	CR	CR & MI							2	
Calidris melanotos	Pectoral Sandpiper	MI	MI							1	
Calidris ruficollis	Red-necked stint	MI	MI								20
Charadrius veredus	Oriental Plover	MI	MI	2		2				1	174
Falco hypoleucos	Grey Falcon	VU		2							767
Falco peregrinus	Peregrine Falcon	OS		3		5			1		88
Gallinago megala	Swinhoe's snipe	MI	MI								17
Gallinago stenura	Pin-tailed snipe	MI	MI								21
Gelochelidon nilotica	Gull-billed tern	MI	MI								68
Glareola maldivarum	Oriental Pratincole	MI	MI								27
Hydroprogne caspia	Caspian Tern	MI	MI	1							180
Motacilla tschutschensis	Eastern Yellow Wagtail	MI	MI			1					
Numenius minutus	Little curlew	MI	MI								32
Pandion haliaetus	Osprey	MI	MI	2		2					73
Pezoporus occidentalis	Night Parrot	CR	EN								31
Plegadis falcinellus	Glossy Ibis	MI	MI	3		2					199
Mammal											
Antechinomys longicaudatus	Long-tailed Dunnart	P4		4							8
Dasycercus blythi	Brush-tailed mulgara	P4									64
Dasyurus hallucatus	Northern Quoll	EN	EN	3			5	2	1	1	13

Species Name	Common Name	Species Status		Data Source							
		BC Act (WA)	EPBC Status (Federal)	ALA	BC22	BD	BL17	BL19	MWH16	PM	TFA
Lagorchestes conspicillatus leichardti	Spectacled hare-wallaby (mainland)	P4		1					1		
Leggadina lakedownensis	Short-tailed mouse, Lakeland Downs mouse	P4		1							18
Macroderma gigas	Ghost Bat	VU	VU	31	31		1	2	1		
Macrotis lagotis	Greater Bilby	VU	VU	1							781
Pseudomys chapmani	Western Pebble-mound Mouse	P4		8				1	1		
Rhinonicteris aurantia (Pilbara form)	Pilbara Leaf-nosed Bat	P4		4	4500		1	2	1		
Trichosurus vulpecula arnhemensis	Northern Brushtail Possum	VU	VU						1		
Reptilia											
Ctenotus nigrilineatus	Pin-striped fine snout ctenotus	P1									49
Liasis olivaceus barroni	Pilbara olive python	0	VU	1					1		

Taxonomy of some species may reflect previous revisions reflecting the date of the data source.

Recent molecular analysis indicates that the population of the Pilbara region represents a different species to *Trichosurus vulpecula arnhemensis* (Biologic 2021)

Appendix VI Central coordinates of quadrats, relevés, and SM4 locations

Type	Site name	Start date	End date	Latitude	Longitude
Quadrat	Q01	15/06/2023	15/06/2023	-21.29810	119.79910
Quadrat	Q02	15/06/2023	15/06/2023	-21.30290	119.78920
Quadrat	Q03	15/06/2023	15/06/2023	-21.30760	119.76340
Quadrat	Q04	15/06/2023	15/06/2023	-21.30600	119.76490
Quadrat	Q05	16/06/2023	16/06/2023	-21.29940	119.77580
Quadrat	Q06	16/06/2023	16/06/2023	-21.30070	119.77680
Quadrat	Q07	16/06/2023	16/06/2023	-21.30000	119.77160
Quadrat	Q08	16/06/2023	16/06/2023	-21.29710	119.78670
Quadrat	Q09	17/06/2023	17/06/2023	-21.29770	119.78770
Quadrat	Q10	17/06/2023	17/06/2023	-21.30460	119.76880
Quadrat	Q11	17/06/2023	17/06/2023	-21.30540	119.75730
Quadrat	Q12	17/06/2023	17/06/2023	-21.30220	119.79530
Quadrat	Q13	18/06/2023	18/06/2023	-21.30450	119.76220
Quadrat	Q14	18/06/2023	18/06/2023	-21.30540	119.76680
Quadrat	Q15	18/06/2023	18/06/2023	-21.30620	119.76580
Quadrat	Q16	18/06/2023	18/06/2023	-21.30050	119.79040
Quadrat	Q17	19/06/2023	19/06/2023	-21.29940	119.79800
Quadrat	Q18	19/06/2023	19/06/2023	-21.29970	119.78440
Quadrat	Q19	19/06/2023	19/06/2023	-21.29630	119.78390
Quadrat	Q20	19/06/2023	19/06/2023	-21.30720	119.76570
Quadrat	Q21	20/06/2023	20/06/2023	-21.30700	119.76290
Quadrat	Q22	20/06/2023	20/06/2023	-21.30470	119.75880
Quadrat	Q23	20/06/2023	20/06/2023	-21.30340	119.76940
Quadrat	Q24	20/06/2023	20/06/2023	-21.30000	119.77380
Quadrat	Q25	20/06/2023	20/06/2023	-21.30390	119.79370
Relevé	R01	15/06/2023	15/06/2023	-21.30370	119.78960
Relevé	R02	15/06/2023	15/06/2023	-21.30660	119.76340
Relevé	R03	17/06/2023	17/06/2023	-21.30600	119.75700
Relevé	R04	21/06/2023	17/06/2023	-21.30540	119.79500
Relevé	R05	21/06/2023	17/06/2023	-21.30160	119.76950
Relevé	R06	21/06/2023	17/06/2023	-21.30020	119.77940
Relevé	R07	21/06/2023	17/06/2023	-21.29980	119.77840
Relevé	R08	21/06/2023	17/06/2023	-21.30110	119.78370
Relevé	R09	21/06/2023	17/06/2023	-21.29880	119.79520
SM4U (bats)	BB4	21/06/2023	30/06/2023	-21.30590	119.76160
SM4U (bats)	BB2	17/06/2023	19/06/2023	-21.30000	119.78490
SM4A (birds)	NP1	17/06/2023	19/06/2023	-21.29960	119.77210
SM4U (bats)	BB3	19/06/2023	21/06/2023	-21.30220	119.77000
SM4A (birds)	NP2	15/06/2023	17/06/2023	-21.30310	119.78950
SM4U (bats)	BB1	15/06/2023	17/06/2023	-21.30590	119.76150

Appendix VII Flora taxa per vegetation type

Family	Taxon	A	B	C	D	E
Aizoaceae	*Trianthema triquetrum*			1		
Amaranthaceae	**Aerva javanica*	5	2			
Amaranthaceae	*Amaranthus undulatus*	1				
Amaranthaceae	*Gomphrena cunninghamii*	6		2		
Amaranthaceae	*Ptilotus astrolasius*	1	2	3		2
Amaranthaceae	*Ptilotus auriculifolius*		1			
Amaranthaceae	*Ptilotus calostachyus*		2	4		1
Amaranthaceae	*Ptilotus clementii*	1	1			
Amaranthaceae	*Ptilotus exaltatus*		3	4		1
Amaranthaceae	*Ptilotus incanus*	1		1		
Amaranthaceae	*Ptilotus obovatus*		1			1
Apocynaceae	**Calotropis procera*		1			1
Asteraceae	*Pentalepis trichodesmoides* subsp. *trichodesmoides*	1	3			
Asteraceae	*Pluchea tetranthera*		1			
Asteraceae	*Pterocaulon serrulatum* var. *velutinum*			1		1
Bignoniaceae	*Dolichandrone occidentalis*					1
Boraginaceae	*Euploca cunninghamii*		2			
Boraginaceae	*Euploca pachyphylla*			1		
Boraginaceae	*Euploca tenuifolia*		1			2
Boraginaceae	*Heliotropium crispatum*	1				
Caryophyllaceae	*Polycarpaea holtzei*	1	2			
Caryophyllaceae	*Polycarpaea longiflora*	4			1	
Chenopodiaceae	*Salsola australis*	1	2	1		
Chenopodiaceae	*Sclerolaena densiflora*			3		
Cleomaceae	*Arivela viscosa*	2			1	
Convolvulaceae	*Bonamia pilbarensis*		6	4		
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*					1
Convolvulaceae	*Polymeria ambigua*		1		2	1
Convolvulaceae	*Operculina sp.*				1	
Cucurbitaceae	*Cucumis melo*	1				
Cucurbitaceae	*Cucumis variabilis*	5	2		2	
Cyperaceae	*Bulbostylis barbata*	1				
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*	3		1		
Cyperaceae	*Cyperus vaginatus*				4	
Cyperaceae	*Fimbristylis ? dichotoma*	1		1		

Family	Taxon	A	B	C	D	E
Cyperaceae	*Fimbristylis simulans*		1	1		
Euphorbiaceae	*Euphorbia biconvexa*				1	
Euphorbiaceae	*Euphorbia careyi*	6	2		1	1
Fabaceae	*Acacia acradenia*	1	9	5	3	4
Fabaceae	*Acacia arida*		1			
Fabaceae	*Acacia bivenosa*	3	5	1	2	
Fabaceae	*Acacia coriacea* subsp. *pendens*				1	
Fabaceae	*Acacia inaequilatera*	5	15	5	3	3
Fabaceae	*Acacia maitlandii*		1	1		2
Fabaceae	*Acacia orthocarpa*	1	7		1	
Fabaceae	*Acacia pyrifolia* var. *pyrifolia*				1	
Fabaceae	*Acacia stellaticeps*		2	1		1
Fabaceae	*Acacia trachycarpa*	1			3	
Fabaceae	*Cajanus pubescens*				3	
Fabaceae	*Crotalaria medicaginea* var. *neglecta*		1		2	2
Fabaceae	*Dichrostachys spicata*				2	
Fabaceae	*Indigofera monophylla*	4	6	3	1	2
Fabaceae	*Indigofera trita* subsp. *trita*	1			1	
Fabaceae	*Isotropis atropurpurea*					1
Fabaceae	*Petalostylis labicheoides*				1	1
Fabaceae	*Rhynchosia australis*	3	2		2	2
Fabaceae	*Senna artemisioides* subsp. *oligophylla*	1	2			1
Fabaceae	*Senna glutinosa*	3	3	3	2	1
Fabaceae	*Senna glutinosa* subsp. *glutinosa*	1				1
Fabaceae	*Senna glutinosa* subsp. *pruinosa*	1	3			
Fabaceae	*Senna notabilis*					1
Fabaceae	*Senna symonii*		5	4		1
Fabaceae	*Swainsona formosa*				1	
Fabaceae	*Swainsona stenodonta*		1			
Fabaceae	*Tephrosia ?clementii*		2	2		1
Fabaceae	*Tephrosia rosea*				3	
Fabaceae	*Tephrosia* sp. Bungaroo Creek (M.E Trudgen 11601*)*					1
Fabaceae	*Tephrosia supina*		1			
Fabaceae	*Tephrosia densa*	1	1			
Goodeniaceae	*Dampiera candicans*	1				1
Goodeniaceae	*Goodenia stobbsiana*		3	2		1
Goodeniaceae	*Scaevola amblyanthera var. centralis*					2

Family	Taxon	A	B	C	D	E
Lamiaceae	*Clerodendrum floribundum* var. *?ovatum*		1			
Lamiaceae	*Clerodendrum floribundum* var. *angustifolium*		1			
Lauraceae	*Cassytha capillaris*		1	1		
Malvaceae	*Abutilon lepidum*		1			
Malvaceae	*Abutilon* sp.	1				
Malvaceae	*Abutilon* sp. Pilbara (W.R. Barker 2025)			1		
Malvaceae	*Corchorus laniflorus*		1			
Malvaceae	*Corchorus parviflorus*	3	9	5	3	4
Malvaceae	*Gossypium australe*	2	3			4
Malvaceae	*Hibiscus ?leptocladus*			1		
Malvaceae	*Hibiscus* sp.	1	1			
Malvaceae	*Hibiscus sturtii* var. *campylochlamys*					1
Malvaceae	*Melhania oblongifolia*	1				
Malvaceae	*Sida echinocarpa*	2		1		
Malvaceae	*Sida fibulifera*		2			
Malvaceae	*Sida rohlenae* subsp. *rohlenae*					1
Malvaceae	*Sida* sp.		1			
Malvaceae	*Sida* sp. Pilbara (A.A. Mitchell PRP 1543)		1	2		1
Malvaceae	*Triumfetta clementii*		1			2
Malvaceae	*Triumfetta propinqua*	3				
Malvaceae	*Triumfetta* sp			1		
Malvaceae	*Waltheria indica*				1	
Menispermaceae	*Tinospora smilacina*				1	
Molluginaceae	*Trigastrotheca molluginea*	2		4		1
Moraceae	*Ficus brachypoda*	2				
Myrtaceae	*Corymbia hamersleyana*	1	5		2	2
Myrtaceae	*Eucalyptus leucophloia* subsp. *leucophloia*			4		
Myrtaceae	*Eucalyptus victrix*				3	
Myrtaceae	*Melaleuca linophylla*				1	
Nyctaginaceae	*Boerhavia burbidgeana*				1	
Nyctaginaceae	*Boerhavia coccinea*	5	8		2	2
Nyctaginaceae	*Boerhavia gardneri*					1
Phyllanthaceae	*Flueggea virosa* subsp. *melanthesoides*				1	
Phyllanthaceae	*Nellica maderaspatensis*				2	
Phyllanthaceae	*Notoleptopus decaisnei*	1			1	
Plantaginaceae	*Stemodia grossa*		1			
Poaceae	**Cenchrus ciliaris*	5	3		3	3

Family	Taxon	A	B	C	D	E
Poaceae	*Aristida holathera* var. *holathera*			1		
Poaceae	*Chrysopogon fallax*				3	3
Poaceae	*Cymbopogon ambiguus*	8	2		3	1
Poaceae	*Enneapogon caerulescens*		1			
Poaceae	*Enneapogon lindleyanus*	5	1	1		
Poaceae	*Eriachne ? benthamii*				1	
Poaceae	*Eriachne mucronata*	6	1	1	1	1
Poaceae	*Eriachne pulchella* subsp. *dominii*	1		1		
Poaceae	*Eriachne sp.*				2	1
Poaceae	*Paraneurachne muelleri*		1			2
Poaceae	*Themeda triandra*				3	
Poaceae	*Triodia angusta*	1	3	4	1	2
Poaceae	*Triodia brizoides*	1	3	1		
Poaceae	*Triodia epactia*			4		
Poaceae	*Triodia wiseana*	6	15	1	3	3
Polygalaceae	*Polygala glaucifolia*		1			
Proteaceae	*Grevillea pyramidalis*		2		2	1
Proteaceae	*Grevillea wickhamii*	3	4	1	2	4
Proteaceae	*Hakea lorea* subsp. *lorea*	1	1	2		
Sapindaceae	*Atalaya hemiglauca*	2			3	
Sapindaceae	*Dodonaea coriacea*			1		1
Scrophulariaceae	*Eremophila ? latrobei*	1				
Solanaceae	*Nicotiana* sp.	1				
Solanaceae	*Solanum diversiflorum*	1	1			
Solanaceae	*Solanum horridum*	1		1		
Violaceae	*Afrohybanthus aurantiacus*	1	3		1	2
Zygophyllaceae	*Tribulus ?platypterus*	1	1			
Zygophyllaceae	*Tribulus suberosus*	4	3	2	1	1

Appendix VIII Vertebrate fauna recorded during the survey

Species Name	Common Name	Species Status		Method		
		BC Act (WA)	EPBC Status (Federal)	Observed	Signs	SM4-U
Ave						
Artamus cinereus	Black-faced Woodswallow			11		
Barnardius zonarius	Australian Ringneck			2		
Chlamydera guttata	Western Bowerbird			1		
Coracina novaehollandiae	Black-faced Cuckooshrike			6		
Corvus orru	Torresian Crow			7		
Cracticus torquatus	Grey Butcherbird			1		
Eolophus roseicapilla	Pink and Grey Galah			27		
Falco cenchroides	Australian Kestrel (Nankeen Kestrel)			1		
Falco hypoleucos	Grey falcon	VU		1		
Gavicalis virescens	Singing Honeyeater			11		
Geophaps plumifera	Spinifex Pigeon			18		
Grallina cyanoleuca	Magpie-lark			2		
Gymnorhina tibicen	Australian Magpie			5		
Haliastur sphenurus	Whistling Kite			4		
Lichmera indistincta	Brown Honeyeater			2		
Manorina flavigula	Yellow-throated Miner			22		
Melopsittacus undulatus	Budgerigar			30	1	
Merops ornatus	Rainbow Bee-eater	MI	MI	17		
Nymphicus hollandicus	Cockatiel			10		
Oreoica gutturalis	Crested Bellbird			7		
Pomatostomus superciliosus	White-browed Babbler			3		
Ptilotula keartlandi	Grey-headed Honeyeater			9		
Ptilotula penicillata	White-plumed Honeyeater			3		
Rhipidura leucophrys	Willie Wagtail			10		

Species Name	Common Name	Species Status		Method		
		BC Act (WA)	EPBC Status (Federal)	Observed	Signs	SM4-U
Synoicus ypsilophorus	Brown quail			3		
Taeniopygia castanotis	Australian Zebra Finch			38		
Mammal						
Austronomus australis	White-striped Free-tailed Bat					1
Bos taurus	European Cattle	Introduced			7	
Canis familiaris	Dingo, dog				1	
Chaerephon jobensis	Greater Northern Free-tailed Bat					1
Chalinolobus gouldii	Gould's Wattled Bat					1
Macropod sp.	Macropod sp.			1	4	
Osphranter rufus	Red Kangaroo, Marlu			8	4	
Rhinonicteris aurantia (Pilbara form)	Pilbara leaf-nosed bat	VU	VU			9
Scotorepens greyii	Little Broad-nosed Bat					1
Taphozous georgianus	Common Sheath-tailed Bat					1
Taphozous hilli	Hill's Sheath-tailed Bat					1
Vespadelus finlaysoni	Finlayson's Cave Bat					1
Vulpes vulpes	Fox	Introduced			1	
Reptile						
Ctenophorus caudicinctus	Ring tailed dragon			2		
Scincidae sp.	Skink sp.			2		
Varanus sp.	Varanus Sp.				2	

Appendix IX Flora quadrat data

Site name	FG Q01	**Date surveyed**	15/06/2023
Latitude	-21.29807	**Longitude**	119.79878
Landform	Small Hill	**Topography**	Gradual Slope
Soil type	Rocky surface with red loamy soil below (also containing more rocks)	**Soil colour**	Red/brown
Fire history	Within 5 years	**Disturbances**	Low intensity fire. Road nearby otherwise undisturbed
Vegetation code	Vegetation type A	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Grevillea wickhamii and Acacia inaequilatera tall sparse shrubland; over Acacia orthocarpa and Acacia acradenia sparse shrubland; over Corchorus parviflorus, Indigofera monophylla, and Senna glutinosa subsp. Pruinosa isolated low shrubs; over Euphorbia coccinea, Boerhavia coccinea, and Gomphrena cunninghamii isolated dwarf shrubs; over Triumfetta propinqua, Polycarpaea longiflora and Trigastrotheca molluginea isolated forbs; over Cymbopogon ambiguus isolated tall grasses; over Triodia wiseana closed hummock grassland; with *Cenchrus ciliaris and other isolated tussock grasses.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Gomphrena cunninghamii*		0.1	0.001
Caryophyllaceae	*Polycarpaea holtzei*		0.02	0.001
Caryophyllaceae	*Polycarpaea longiflora*		0.25	0.01
Cyperaceae	*Bulbostylis barbata*		0.15	0.001
Cyperaceae	*Fimbristylis ? dichotoma*		0.1	0.02
Euphorbiaceae	*Euphorbia careyi*		0.2	0.21
Fabaceae	*Acacia acradenia*		1.7	0.05
Fabaceae	*Acacia inaequilatera*		4.5	0.5
Fabaceae	*Acacia orthocarpa*		2	1

Appendix IX Flora quadrat data

Fabaceae	*Indigofera monophylla*		0.5	0.05
Fabaceae	*Senna glutinosa* subsp. *pruinosa*		0.5	0.02
Fabaceae	*Tephrosia densa*		0.7	0.01
Malvaceae	*Corchorus parviflorus*		0.6	0.05
Malvaceae	*Hibiscus* sp.		0.05	0.001
Malvaceae	*Triumfetta propinqua*		0.15	0.015
Molluginaceae	*Trigastrotheca molluginea*		0.1	0.001
Nyctaginaceae	*Boerhavia coccinea*		0.3	0.03
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.3	0.02
Poaceae	*Cymbopogon ambiguus*		0.5	0.2
Poaceae	*Eriachne pulchella* subsp. *dominii*		0.15	0.001
Poaceae	*Triodia wiseana*		0.4	75
Proteaceae	*Grevillea wickhamii*		3.5	2
Zygophyllaceae	*Tribulus suberosus*		0.5	0.001

Appendix IX Flora quadrat data

Site name	FG Q02	**Date surveyed**	15/06/2023
Latitude	-21.30278	**Longitude**	119.7891
Landform	Big Hill	**Topography**	Steep Slope
Soil type	quartz and iron stone surface with red/brown soil below	**Soil colour**	Brown,Red/brown
Fire history	Within 5 years	**Disturbances**	Road nearby, weeds recorded, no other signs of disturbance.
Vegetation code	Vegetation type A	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Hakea lorea subsp. lorea and Corymbia hamersleyana isolated low trees; over Acacia bivenosa, Acacia inaequilatera and Senna glutinosa subsp. glutinosa sparse shrubland; over Sida echinocarpa and *Aerva javanica isolated low shrubs; over Euphorbia careyi, Indigofera monophylla and Rhynchosia australis isolated dwarf shrubs; over Polycarpaea longiflora, Boerhavia coccinea, Gomphrena cunninghamii, Salsola australis and Abutilon sp isolated forbs; with Cymbopogon ambiguus isolated tall grasses; over Triodia wiseana hummock grassland with *Cenchrus ciliaris, Eriachne mucronata, and Enneapogon lindleyanus isolated grasses; with Cucumis variabilis isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	**Aerva javanica*	s11 - Permitted	0.5	0.001
Amaranthaceae	*Gomphrena cunninghamii*		0.15	0.002
Caryophyllaceae	*Polycarpaea longiflora*		0.2	0.002
Chenopodiaceae	*Salsola australis*		0.3	0.001
Cucurbitaceae	*Cucumis variabilis*		0	0.001
Euphorbiaceae	*Euphorbia careyi*		0.3	0.02
Fabaceae	*Acacia bivenosa*		1.5	8

Appendix IX Flora quadrat data

Fabaceae	*Acacia inaequilatera*		1.5	0.5
Fabaceae	*Indigofera monophylla*		0.3	0.002
Fabaceae	*Rhynchosia australis*		0.3	0.002
Fabaceae	*Senna glutinosa* subsp. *glutinosa*		1.8	0.02
Malvaceae	*Abutilon* sp.		0.1	0.001
Malvaceae	*Sida echinocarpa*		0.6	0.003
Myrtaceae	*Corymbia hamersleyana*		3.5	0.001
Nyctaginaceae	*Boerhavia coccinea*		0.15	0.002
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.35	0.02
Poaceae	*Cymbopogon ambiguus*		1.5	0.003
Poaceae	*Enneapogon lindleyanus*		0.1	0.002
Poaceae	*Eriachne mucronata*		0.3	0.02
Poaceae	*Triodia wiseana*		0.3	45
Proteaceae	*Hakea lorea* subsp. *lorea*		2	0.5

Appendix IX Flora quadrat data

Site name	FG Q03	**Date surveyed**	15/06/2023
Latitude	-21.30729	**Longitude**	119.76351
Landform	Plain	**Topography**	Undulating
Soil type	quartz and iron stone surface with red/brown soil below	**Soil colour**	Red/brown
Fire history	Recent (within 12 months)	**Disturbances**	Road nearby, signs of low intensity fire with in 12 months, otherwise undisturbed.
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Acacia inaequilatera tall sparse shrubland; over Grevillea wickhamii and Corymbia hamersleyana (regenerating) isolated medium shrubs; over Acacia acradenia, Senna symonii, Boerhavia coccinea, Ptilotus calostachyus and Acacia maitlandii low sparse shrubland; over Corchorus parviflorus, Acacia stellaticeps, Indigofera monophylla, Goodenia stobbsiana, Euploca tenuifolia Isolated dwarf shrubs; over Sida sp. Pilbara (A.A. Mitchell PRP 1543), Ptilotus exaltatus and Tephrosia ?clementii Isolated forbs; with Triodia wiseana hummock grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus calostachyus*		0.6	0.002
Amaranthaceae	*Ptilotus exaltatus*		0.3	0.002
Boraginaceae	*Euploca tenuifolia*		0.18	0.002
Fabaceae	*Acacia acradenia*		0.7	0.75
Fabaceae	*Acacia inaequilatera*		3	5
Fabaceae	*Acacia maitlandii*		0.5	0.002
Fabaceae	*Acacia stellaticeps*		0.4	0.2
Fabaceae	*Indigofera monophylla*		0.2	0.02

Appendix IX Flora quadrat data

Fabaceae	*Senna symonii*		0.7	0.25
Fabaceae	*Tephrosia* ? *clementii*		0.03	0.002
Goodeniaceae	*Goodenia stobbsiana*		0.2	0.002
Malvaceae	*Corchorus parviflorus*		0.15	0.25
Malvaceae	*Sida* sp. *Pilbara* (A.A. Mitchell PRP 1543)		0.3	0.02
Myrtaceae	*Corymbia hamersleyana*		1	0.7
Nyctaginaceae	*Boerhavia coccinea*		0.5	0.25
Poaceae	*Triodia wiseana*		0.2	65
Proteaceae	*Grevillea wickhamii*		1.7	0.25

Appendix IX Flora quadrat data

Site name	FG Q04	**Date surveyed**	15/06/2023
Latitude	-21.30581	**Longitude**	119.7647
Landform	Small Hill	**Topography**	Gradual Slope
Soil type	"99% red Rock and quartz, 1% sand"	**Soil colour**	Red/orange
Fire history	Recent (within 12 months)	**Disturbances**	Road nearby, signs of medium intensity fire with in 12 months, otherwise undisturbed.
Vegetation code	Vegetation type C	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Eucalyptus leucophloia subsp. leucophloia and Acacia inaequilatera low open woodland; over Ptilotus astrolasius, Corchorus parviflorus, Acacia stellaticeps, Ptilotus exaltatus, Acacia acradenia, and Tribulus suberosus isolated dwarf shrubs; over Ptilotus calostachyus, Goodenia stobbsiana, Sida sp. Pilbara (A.A. Mitchell PRP 1543), Trigastrotheca molluginea, and Tephrosia ?clementii isolated forbs; over Triodia angusta closed hummock grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.2	0.25
Amaranthaceae	*Ptilotus calostachyus*		0.5	0.03
Amaranthaceae	*Ptilotus exaltatus*		0.4	0.003
Fabaceae	*Acacia acradenia*		0.4	0.002
Fabaceae	*Acacia inaequilatera*		3	0.2
Fabaceae	*Acacia stellaticeps*		0.3	0.02
Fabaceae	*Tephrosia ? clementii*		0.08	0.001
Goodeniaceae	*Goodenia stobbsiana*		0.25	0.002
Malvaceae	*Corchorus parviflorus*		0.4	0.05
Malvaceae	*Sida* sp. *Pilbara* (A.A. Mitchell PRP 1543)		0.2	0.001

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Molluginaceae	*Trigastrotheca molluginea*		0.1	0.002
Myrtaceae	*Eucalyptus leucophloia* subsp. *leucophloia*		5	2
Poaceae	*Triodia angusta*		0.2	80
Zygophyllaceae	*Tribulus suberosus*		0.3	0.002

Appendix IX Flora quadrat data

Site name	FG Q05	**Date surveyed**	16/06/2023
Latitude	-21.29907	**Longitude**	119.77564
Landform	Major Drainage	**Topography**	Flat
Soil type	red gravel with some iron stone and red sand in the creek bed and darker red clay on edges	**Soil colour**	Red/brown
Fire history	Within 10 years	**Disturbances**	Road nearby, weeds present on site, otherwise undisturbed.
Vegetation code	Vegetation type D	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Potential - Contains *Eucalyptus victrix*, Melaleuca linophylla, *Atalaya hemiglauca* and Acacia coriacea subps. pendens		
Vegetation description	Eucalyptus victrix, Melaleuca linophylla, Acacia trachycarpa, Atalaya hemiglauca and Acacia coriacea subsp. pendens low closed-forest; over Acacia acradenia and Acacia inaequilatera tall sparse shrubland; over Grevillea wickhamii isolated medium shrubs; over Cajanus pubescens isolated low shrubs; over Corchorus parviflorus, Acacia pyrifolia var. pyrifolia and Tephrosia rosea isolated dwarf shrubs; over *Cenchrus ciliaris and Cyperus vaginatus closed tall tussock grassland; over Triodia wiseana, Themeda triandra, Cymbopogon ambiguus and Chrysopogon fallax isolated grasses; with Tinospora smilacina isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Cyperaceae	*Cyperus vaginatus*	Facultative phreatophyte	0.6	2
Fabaceae	*Acacia acradenia*		2.5	2.25
Fabaceae	*Acacia coriacea* subsp. *pendens*	Facultative phreatophyte	6.5	0.25
Fabaceae	*Acacia inaequilatera*		2.5	2.25

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Fabaceae	*Acacia pyrifolia* var. *pyrifolia*		0.15	0.002
Fabaceae	*Acacia trachycarpa*		5	2
Fabaceae	*Cajanus pubescens*		0.6	0.002
Fabaceae	*Tephrosia rosea*		0.4	0.001
Malvaceae	*Corchorus parviflorus*		0.35	0.002
Menispermaceae	*Tinospora smilacina*		0	0.001
Myrtaceae	*Eucalyptus victrix*	Facultative phreatophyte	9	50
Myrtaceae	*Melaleuca linophylla*	Facultative phreatophyte	3	18
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.5	90
Poaceae	*Chrysopogon fallax*		0.2	0.02
Poaceae	*Cymbopogon ambiguus*		0.4	0.002
Poaceae	*Eriachne* sp.		0.3	0.75
Poaceae	*Themeda triandra*		0.4	1
Poaceae	*Triodia wiseana*		0.4	0.04
Proteaceae	*Grevillea wickhamii*		2	0.02
Sapindaceae	*Atalaya hemiglauca*	Facultative phreatophyte	3	2

Appendix IX Flora quadrat data

Site name	FG Q06	**Date surveyed**	16/06/2023
Latitude	-21.30047	**Longitude**	119.77643
Landform	Plain	**Topography**	Flat
Soil type	Quarts over red/brown soil	**Soil colour**	Red/brown
Fire history	Within 10 years	**Disturbances**	Road nearby, weeds present on site, otherwise undisturbed.
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Site appears to be on floodplain draining towards minor drainage channel but no indicator species present		
Vegetation description	Acacia inaequilatera and Corymbia hamersleyana low open woodland; over Acacia acradenia tall open shrubland; over Acacia bivenosa shrubland; over Senna artemisioides subsp. oligophylla, *Aerva javanica, Corchorus parviflorus, Gossypium australe and Senna symonii low sparse shrubland; over Pluchea tetranthera isolated dwarf shrubs; over Boerhavia coccinea, Corchorus laniflorus, Polymeria ambigua, Sida ?fibulifera, Bonamia pilbarensis and Ptilotus exaltatus isolated forbs; over Triodia wiseana closed hummock grassland with isolated *Cenchrus ciliaris grasses; over Enneapogon lindleyanus isolated grasses.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	**Aerva javanica*	s11 - Permitted	0.7	0.25
Amaranthaceae	*Ptilotus exaltatus*		0.3	0.001
Asteraceae	*Pluchea tetranthera*		0.4	0.002
Convolvulaceae	*Bonamia pilbarensis*		0.1	0.002
Convolvulaceae	*Polymeria ambigua*		0.2	0.002
Fabaceae	*Acacia acradenia*		3	10
Fabaceae	*Acacia bivenosa*		2	40
Fabaceae	*Acacia inaequilatera*		3	10

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Fabaceae	*Senna artemisioides* subsp. *oligophylla*		0.5	0.75
Fabaceae	*Senna symonii*		0.6	0.025
Malvaceae	*Corchorus laniflorus*		0.2	0.002
Malvaceae	*Corchorus parviflorus*		0.5	0.25
Malvaceae	*Gossypium australe*		0.5	0.03
Malvaceae	*Sida fibulifera*		0.15	0.002
Myrtaceae	*Corymbia hamersleyana*		4	5
Nyctaginaceae	*Boerhavia coccinea*		0.15	0.02
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.5	0.25
Poaceae	*Enneapogon lindleyanus*		0.15	0.025
Poaceae	*Triodia wiseana*		0.6	70

Appendix IX Flora quadrat data

Site name	FG Q07	**Date surveyed**	16/06/2023
Latitude	-21.30015	**Longitude**	119.77645
Landform	Medium Drainage	**Topography**	Flat
Soil type	Sandy Clay Loam	**Soil colour**	Red/brown
Fire history	Within 10 years	**Disturbances**	No obvious signs of disturbance, forb and grass layer appears to be struggling.
Vegetation code	Vegetation type E	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Vegetation follows surface drainage but no indicator species present.		
Vegetation description	Acacia acradenia, Acacia inaequilatera, Grevillea wickhamii and Grevillea pyramidalis tall shrubland; over Gossypium australe, Afrohybanthus aurantiacus and Ptilotus obovatus isolated dwarf shrubs; over Corchorus parviflorus, Rhynchosia australis, Euploca tenuifolia and Ptilotus astrolasius isolated forbs; with Triodia wiseana hummock grassland; over Chrysopogon fallax, *Cenchrus ciliaris and Paraneurachne muelleri closed tussock grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.15	0.001
Amaranthaceae	*Ptilotus obovatus*		0.15	0.001
Boraginaceae	*Euploca tenuifolia*		0.25	0.001
Fabaceae	*Acacia acradenia*		2.5	50
Fabaceae	*Acacia inaequilatera*		3	1
Fabaceae	*Rhynchosia australis*		0.4	0.003
Malvaceae	*Corchorus parviflorus*		0.4	0.25
Malvaceae	*Gossypium australe*		0.4	0.001

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Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.3	22
Poaceae	*Chrysopogon fallax*		0.4	65
Poaceae	*Paraneurachne muelleri*		0.3	0.5
Poaceae	*Triodia wiseana*		0.5	30
Proteaceae	*Grevillea pyramidalis*		2.3	0.001
Proteaceae	*Grevillea wickhamii*		2.5	0.3
Violaceae	*Afrohybanthus aurantiacus*		0.3	0.001

Appendix IX Flora quadrat data

Site name	FG Q08	**Date surveyed**	16/06/2023
Latitude	-21.29681	**Longitude**	119.78659
Landform	Big Hill	**Topography**	Gradual Slope
Soil type	"99% red Rock with small patches of quartz, 1% red sand"	**Soil colour**	Red/orange
Fire history	Long Unburnt	**Disturbances**	No obvious signs of disturbance
Vegetation code	Vegetation type B	**Vegetation condition**	Excellent
Groundwater dependent vegetation	No		
Vegetation description	Acacia orthocarpa isolated trees; over Acacia inaequilatera, Acacia acradenia, Acacia orthocarpa, and Grevillea wickhamii tall sparse shrubland; over Senna symonii, Hakea lorea subsp. lorea and Senna glutinosa isolated medium shrubs; over Indigofera monophylla, Corchorus parviflorus, Pentalepis trichodesmoides subsp. trichodesmoides and Tribulus suberosus isolated low shrubs; over Gossypium australe and Euphorbia careyi isolated dwarf shrubs; over Bonamia pilbarensis, Polycarpaea holtzei, and Tephrosia supina isolated forbs; over Triodia wiseana and Triodia brizoides closed hummock grassland with isolated Fimbristylis simulans grasses; with Cassytha capillaris isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Asteraceae	*Pentalepis trichodesmoides* subsp. *trichodesmoides*		0.5	0.008
Caryophyllaceae	*Polycarpaea holtzei*		0.05	0.001
Convolvulaceae	*Bonamia pilbarensis*		0.1	0.002
Cyperaceae	*Fimbristylis simulans*		0.05	0.001
Euphorbiaceae	*Euphorbia careyi*		0.3	0.01
Fabaceae	*Acacia acradenia*		3.5	1
Fabaceae	*Acacia inaequilatera*		4.5	5
Fabaceae	*Acacia orthocarpa*		2.5	0.01

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Fabaceae	*Indigofera monophylla*		0.5	0.1
Fabaceae	*Senna glutinosa*		1.6	0.01
Fabaceae	*Senna symonii*		1.1	0.4
Fabaceae	*Tephrosia supina*		0.05	0.001
Lauraceae	*Cassytha capillaris*		0	0.001
Malvaceae	*Corchorus parviflorus*		1	0.02
Malvaceae	*Gossypium australe*		0.2	0.001
Poaceae	*Triodia brizoides*		0.3	35
Poaceae	*Triodia wiseana*		0.4	35
Proteaceae	*Grevillea wickhamii*		3	0.08
Proteaceae	*Hakea lorea* subsp. *lorea*		2	0.02
Zygophyllaceae	*Tribulus suberosus*		0.5	0.001

Appendix IX Flora quadrat data

Site name	FG Q09	**Date surveyed**	17/06/2023
Latitude	-21.29731	**Longitude**	119.78757
Landform	Medium Drainage	**Topography**	Undulating
Soil type	Sandy Clay Loam,lots of stone (ranging from reds to greys and white) with brown/red sand	**Soil colour**	Red/brown
Fire history	Within 10 years	**Disturbances**	Road nearby, no other signs of disturbance
Vegetation code	Vegetation type D	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Potential - Contains *Eucalyptus victrix*, *Atalaya hemiglauca* and *Cyperus vaginatus*		
Vegetation description	Eucalyptus victrix, Atalaya hemiglauca and Corymbia hamersleyana low woodland; over Acacia trachycarpa, Flueggea virosa subsp. melanthesoides, Grevillea pyramidalis, and Acacia orthocarpa tall sparse shrubland; over Acacia acradenia, Senna glutinosa and Acacia bivenosa isolated medium shrubs; over Cajanus pubescens, Acacia inaequilatera, Corchorus parviflorus, Dichrostachys spicata, Indigofera monophylla and Petalostylis labicheoides isolated low shrubs; over Tribulus suberosus isolated dwarf shrubs; over Boerhavia coccinea, Crotalaria medicaginea var. neglecta, Polycarpaea longiflora, Polymeria ambigua, Tephrosia rosea, Nellica maderaspatensis, and Afrohybanthus aurantiacus isolated forbs; over Cyperus vaginatus sparse sedges; with Cymbopogon ambiguus isolated tall grasses; over *Cenchrus ciliaris, Themeda triandra, Chrysopogon fallax, Triodia wiseana, Eriachne sp and Eriachne mucronata open tussock grassland; over Cucumis variabilis and Rhynchosia australis isolated Climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Caryophyllaceae	*Polycarpaea longiflora*		0.2	0.002
Convolvulaceae	*Polymeria ambigua*		0.15	0.002

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Convolvulaceae	*Operculina* sp.		0.1	0.001
Cucurbitaceae	*Cucumis variabilis*		0	0.25
Cyperaceae	*Cyperus vaginatus*	Facultative phreatophyte	0.5	3
Fabaceae	*Acacia acradenia*		1.5	0.02
Fabaceae	*Acacia bivenosa*		1.2	0.001
Fabaceae	*Acacia inaequilatera*		1	0.01
Fabaceae	*Acacia orthocarpa*		2.7	0.001
Fabaceae	*Acacia trachycarpa*		4	6
Fabaceae	*Cajanus pubescens*		1	0.02
Fabaceae	*Crotalaria medicaginea* var. *neglecta*		0.35	0.002
Fabaceae	*Dichrostachys spicata*		1	0.001
Fabaceae	*Indigofera monophylla*		0.6	0.001
Fabaceae	*Petalostylis labicheoides*		0.6	0.001
Fabaceae	*Rhynchosia australis*		0	0.001
Fabaceae	*Senna glutinosa*		1.6	0.001
Fabaceae	*Swainsona formosa*		0.2	0.001
Fabaceae	*Tephrosia rosea*		0.1	0.002
Malvaceae	*Corchorus parviflorus*		0.5	0.01
Myrtaceae	*Corymbia hamersleyana*		6	0.5
Myrtaceae	*Eucalyptus victrix*	Facultative phreatophyte	10	15
Nyctaginaceae	*Boerhavia coccinea*		0.05	0.004
Phyllanthaceae	*Flueggea virosa* subsp. *melanthesoides*		2.5	0.02
Phyllanthaceae	*Nellica maderaspatensis*		0.3	0.001
Phyllanthaceae	*Notoleptopus decaisnei*		0.05	0.001
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.4	20
Poaceae	*Chrysopogon fallax*		0.3	1
Poaceae	*Cymbopogon ambiguus*		0.5	0.01
Poaceae	*Eriachne mucronata*		0.2	0.002
Poaceae	*Eriachne* sp.		0.4	0.01
Poaceae	*Themeda triandra*		0.4	5
Poaceae	*Triodia wiseana*		0.3	0.3
Proteaceae	*Grevillea pyramidalis*		3.5	0.002

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Sapindaceae	*Atalaya hemiglauca*	Facultative phreatophyte	6	5
Violaceae	*Afrohybanthus aurantiacus*		0.25	0.001
Zygophyllaceae	*Tribulus suberosus*		0.4	0.002

Appendix IX Flora quadrat data

Site name	FG Q10	**Date surveyed**	17/06/2023
Latitude	-21.30457	**Longitude**	119.76891
Landform	Plain,maybe some minor drainage here? there's cracking clays near by	**Topography**	Flat
Soil type	white quartz over red brown sand	**Soil colour**	Red/brown
Fire history	Within 10 years	**Disturbances**	No obvious signs of disturbance
Vegetation code	Vegetation type C	**Vegetation condition**	Excellent
Groundwater dependent vegetation	No		
Vegetation description	Eucalyptus leucophloia subsp. leucophloia and Acacia inaequilatera low open woodland; over Acacia acradenia tall open shrubland; over Senna glutinosa and Acacia stellaticeps isolated medium shrubs; over Senna symonii and Acacia maitlandii isolated low shrubs; over Corchorus parviflorus, Goodenia stobbsiana and Indigofera monophylla isolated dwarf shrubs; over Pterocaulon serrulatum var. velutinum, Sclerolaena densiflora, Ptilotus astrolasius, Ptilotus calostachyus, Abutilon sp. Pilbara (W.R. Barker 2025) and Sclerolaena sp isolated forbs; with Triodia angusta and Triodia wiseana closed hummock grasslands; over Fimbristylis ?dichotoma isolated grasses; with Cassytha capillaris isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.35	0.002
Amaranthaceae	*Ptilotus calostachyus*		0.4	0.001
Asteraceae	*Pterocaulon serrulatum* var. *velutinum*		0.3	0.003
Chenopodiaceae	*Sclerolaena densiflora*		0.1	0.004
Cyperaceae	*Fimbristylis ? dichotoma*		0.1	0.001
Fabaceae	*Acacia acradenia*		2.5	16

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Fabaceae	*Acacia inaequilatera*		2	0.06
Fabaceae	*Acacia maitlandii*		0.5	0.001
Fabaceae	*Acacia stellaticeps*		1.5	0
Fabaceae	*Indigofera monophylla*		0.3	0.001
Fabaceae	*Senna glutinosa*		1.5	0.001
Fabaceae	*Senna symonii*		1	0.02
Goodeniaceae	*Goodenia stobbsiana*		0.25	0.002
Lauraceae	*Cassytha capillaris*		0	0.001
Malvaceae	*Abutilon* sp. *Pilbara* (W.R. Barker 2025)		0.2	0.001
Malvaceae	*Corchorus parviflorus*		0.3	0.004
Myrtaceae	*Eucalyptus leucophloia* subsp. *leucophloia*		5.5	4
Poaceae	*Triodia angusta*		0.5	65
Poaceae	*Triodia wiseana*		0.6	15

Appendix IX Flora quadrat data

Site name	FG Q11	**Date surveyed**	17/06/2023
Latitude	-21.30529	**Longitude**	119.75765
Landform	Major Gully,Ridge	**Topography**	Steep Slope
Soil type	"95%rock and quartz, 5% light brown soil"	**Soil colour**	Brown
Fire history	Recent (within 12 months)	**Disturbances**	Regrowth from fire, weeds present
Vegetation code	Vegetation type C	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Eucalyptus leucophloia subsp. leucophloia low woodland; over Hakea lorea subsp. lorea isolated medium shrubs; over Corchorus parviflorus, Acacia acradenia, Senna glutinosa and Senna symonii isolated low shrubs; over Tribulus suberosus, Triumfetta sp and Grevillea wickhamii isolated dwarf shrubs; over Ptilotus incanus, Trigastrotheca molluginea, Solanum horridum, Bonamia pilbarensis and Dodonaea coriacea isolated forbs; with Triodia angusta, Triodia brizoides, Triodia epactia, Eriachne mucronata, Cyperus cunninghamii subsp. Cunninghamii, Enneapogon lindleyanus and Gomphrena cunninghamii hummock grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Gomphrena cunninghamii*		*0.1*	*0.001*
Amaranthaceae	*Ptilotus incanus*		*0.15*	*0.001*
Convolvulaceae	*Bonamia pilbarensis*		*0.02*	*0.001*
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*		*0.3*	*0.001*
Fabaceae	*Acacia acradenia*		*0.5*	*0.006*
Fabaceae	*Senna glutinosa*		*1*	*0.003*
Fabaceae	*Senna symonii*		*0.5*	*0.002*
Malvaceae	*Corchorus parviflorus*		*0.5*	*0.25*
Malvaceae	*Triumfetta* sp.		*0.2*	*0.001*

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Molluginaceae	*Trigastrotheca molluginea*		*0.15*	*0.001*
Myrtaceae	*Eucalyptus leucophloia* subsp. *leucophloia*		*10*	*15*
Poaceae	*Enneapogon lindleyanus*		*0.3*	*0.001*
Poaceae	*Eriachne mucronata*		*0.2*	*0.002*
Poaceae	*Triodia angusta*		*0.2*	*50*
Poaceae	*Triodia brizoides*		*0.2*	*1*
Poaceae	*Triodia epactia*		*0.1*	*1*
Proteaceae	*Grevillea wickhamii*		*0.15*	*0.001*
Proteaceae	*Hakea lorea* subsp. *lorea*		*1.5*	*0.001*
Sapindaceae	*Dodonaea coriacea*		*0.02*	*0.001*
Solanaceae	*Solanum horridum*		*0.1*	*0.001*
Zygophyllaceae	*Tribulus suberosus*		*0.45*	*0.002*

Appendix IX Flora quadrat data

Site name	FG Q12	**Date surveyed**	17/06/2023
Latitude	-21.30257	**Longitude**	119.79557
Landform	Small Hill	**Topography**	Gradual Slope
Soil type	iron Stone with minimal quartz on brown soil	**Soil colour**	Brown
Fire history	Long Unburnt	**Disturbances**	Road nearby, no other signs of disturbance
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Acacia orthocarpa isolated tall shrubs; over Acacia inaequilatera and Acacia bivenosa sparse medium shrubland; over Corymbia hamersleyana isolated (regenerating) trees; over Acacia acradenia low sparse shrubland; over Tribulus suberosus and Indigofera monophylla isolated dwarf shrubs; over Boerhavia coccinea and Euploca cunninghamii isolated forbs; with Triodia wiseana and Triodia angusta hummock grassland.		

Family	Taxon	Status	Height	Cover %
Boraginaceae	*Euploca cunninghamii*		*0.15*	*0.001*
Fabaceae	*Acacia acradenia*		*1*	*1.25*
Fabaceae	*Acacia bivenosa*		*1.1*	*0.25*
Fabaceae	*Acacia inaequilatera*		*1.9*	*2*
Fabaceae	*Acacia orthocarpa*		*2.5*	*1*
Fabaceae	*Indigofera monophylla*		*0.5*	*0.002*
Myrtaceae	*Corymbia hamersleyana*		*0.6*	*0.002*
Nyctaginaceae	*Boerhavia coccinea*		*0.1*	*0.004*
Poaceae	*Triodia angusta*		*0.35*	*25*

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Poaceae	*Triodia wiseana*		*0.4*	*30*
Zygophyllaceae	*Tribulus suberosus*		*0.4*	*0.25*

Appendix IX Flora quadrat data

Site name	FG Q13	**Date surveyed**	18/06/2023
Latitude	-21.30467	**Longitude**	119.76195
Landform	Medium Drainage	**Topography**	Flat
Soil type	Clay	**Soil colour**	Red/brown,Red/orange
Fire history	Within 10 years	**Disturbances**	Road nearby, weeds present on site, otherwise undisturbed.
Vegetation code	Vegetation type E	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Vegetation follows surface drainage but no indicator species present.		
Vegetation description	Corymbia hamersleyana low open woodland; over Acacia acradenia and Grevillea wickhamii closed tall shrubland; over Acacia inaequilatera and *Calotropis procera isolated medium shrubs; over Corchorus parviflorus, Acacia stellaticeps, Goodenia stobbsiana, Senna glutinosa, Senna notabilis and Acacia maitlandii low sparse shrubland; over Senna artemisioides subsp. oligophylla, Indigofera monophylla, Afrohybanthus aurantiacus, Dolichandrone occidentalis, Gossypium australe and Scaevola amblyanthera var. centralis isolated dwarf shrubs; over Polymeria ambigua, Sida rohlenae subsp. Rohlenae, Pterocaulon serrulatum var. velutinum, Boerhavia coccinea, Triumfetta clementii, Crotalaria medicaginea var. neglecta, Ptilotus exaltatus, Boerhavia gardneri and Evolvulus alsinoides var. villosicalyx isolated forbs; with *Cenchrus ciliaris tall tussock grassland; over Chrysopogon fallax, Triodia angusta, Triodia wiseana and Paraneurachne muelleri short tussock grassland; with Rhynchosia australis isolated climbers/creepers.		
			

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus exaltatus*		0.3	0.001
Apocynaceae	**Calotropis procera*	s22(2) - Declared Pest	1.5	0.01
Asteraceae	*Pterocaulon serrulatum* var. *velutinum*		0.6	0.02

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Bignoniaceae	*Dolichandrone occidentalis*		0.3	0.001
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*		0.3	0.001
Convolvulaceae	*Polymeria ambigua*		0.15	0.05
Fabaceae	*Acacia acradenia*		3	70
Fabaceae	*Acacia inaequilatera*		2	0.3
Fabaceae	*Acacia maitlandii*		0.5	0.001
Fabaceae	*Acacia stellaticeps*		0.6	0.25
Fabaceae	*Crotalaria medicaginea* var. *neglecta*		0.5	0.001
Fabaceae	*Indigofera monophylla*		0.4	0.04
Fabaceae	*Rhynchosia australis*		0	0.002
Fabaceae	*Senna artemisioides* subsp. *oligophylla*		0.4	0.25
Fabaceae	*Senna glutinosa*		0.5	0.02
Fabaceae	*Senna notabilis*		1	0.001
Goodeniaceae	*Goodenia stobbsiana*		0.5	0.02
Goodeniaceae	*Scaevola amblyanthera* var. *centralis*		0.25	0.001
Malvaceae	*Corchorus parviflorus*		1	1
Malvaceae	*Gossypium australe*		0.3	0.001
Malvaceae	*Sida rohlenae* subsp. *rohlenae*		0.5	0.04
Malvaceae	*Triumfetta clementii*		0.2	0.002
Myrtaceae	*Corymbia hamersleyana*		8	1.5
Nyctaginaceae	*Boerhavia coccinea*		0.2	0.002
Nyctaginaceae	*Boerhavia gardneri*		0.3	0.001
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.6	60
Poaceae	*Chrysopogon fallax*		0.35	30
Poaceae	*Paraneurachne muelleri*		0.3	0.02
Poaceae	*Triodia angusta*		0.4	0.25
Poaceae	*Triodia wiseana*		0.3	0.25
Proteaceae	*Grevillea wickhamii*		4	10
Violaceae	*Afrohybanthus aurantiacus*		0.3	0.002

Appendix IX Flora quadrat data

Site name	FG Q14	**Date surveyed**	18/06/2023
Latitude	-21.30418	**Longitude**	119.76558
Landform	Small Hill	**Topography**	Gradual Slope
Soil type	Loam,Sand,lots of rock and quartz	**Soil colour**	Red/brown
Fire history	Recent (within 12 months)	**Disturbances**	Road nearby, signs of extensive low intensity fire with in 12 months, entire grass/forb layer is regrowing, otherwise undisturbed.
Vegetation code	Vegetation type C	**Vegetation condition**	Good
Groundwater dependent vegetation	No		
Vegetation description	Eucalyptus leucophloia subsp. leucophloia isolated regen trees; over Acacia inaequilatera and Hakea lorea subsp. lorea tall sparse shrubland; over Senna symonii isolated low shrubs; over Indigofera monophylla, Corchorus parviflorus, Ptilotus astrolasius and Acacia acradenia isolated dwarf shrubs; over Ptilotus exaltatus, Ptilotus calostachyus, Ptilotus calostachyus, Sclerolaena densiflora, Trianthema triquetrum, Salsola australis, Sida sp. Pilbara (A.A. Mitchell PRP 1543), Bonamia pilbarensis and Trigastrotheca molluginea isolated forbs; with Triodia angusta, Triodia epactia and Aristida holathera var. holathera hummock grassland.		

Family	Taxon	Status	Height	Cover %
Aizoaceae	*Trianthema triquetrum*		0.15	0.002
Amaranthaceae	*Ptilotus astrolasius*		0.3	0.002
Amaranthaceae	*Ptilotus calostachyus*		0.45	0.004
Amaranthaceae	*Ptilotus exaltatus*		0.3	0.01
Chenopodiaceae	*Salsola australis*		0.1	0.002
Chenopodiaceae	*Sclerolaena densiflora*		0.05	0.003
Convolvulaceae	*Bonamia pilbarensis*		0.05	0.001

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Fabaceae	*Acacia acradenia*		0.3	0.001
Fabaceae	*Acacia inaequilatera*		2.1	2
Fabaceae	*Indigofera monophylla*		0.15	n/a
Fabaceae	*Senna symonii*		0.5	1
Malvaceae	*Corchorus parviflorus*		0.4	0.005
Malvaceae	*Sida* sp. *Pilbara* (A.A. Mitchell PRP 1543)		0.3	0.001
Molluginaceae	*Trigastrotheca molluginea*		0.05	0.001
Myrtaceae	*Eucalyptus leucophloia* subsp. *leucophloia*		2.5	0.25
Poaceae	*Aristida holathera* var. *holathera*		0.15	0.004
Poaceae	*Triodia angusta*		0.2	30
Poaceae	*Triodia epactia*		0.2	15
Proteaceae	*Hakea lorea* subsp. *lorea*		2.5	0.001

Appendix IX Flora quadrat data

Site name	FG Q15	**Date surveyed**	18/06/2023
Latitude	-21.30615	**Longitude**	119.76535
Landform	Ridge	**Topography**	Steep Slope
Soil type	rock with little red brown soil	**Soil colour**	Brown,Red/brown
Fire history	Recent (within 12 months)	**Disturbances**	Low intensity fire. Weeds.
Vegetation code	Vegetation type A	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Contains *Atalaya hemiglauca* but site on hill crest / hill slope		
Vegetation description	Ficus brachypoda isolated low trees; over Acacia inaequilatera isolated tall shrubs; over Grevillea wickhamii isolated medium shrubs; over Atalaya hemiglauca isolated (regenerating) trees; over Tribulus ?platypterus and Senna glutinosa low sparse shrubland; over Euphorbia careyi, Gossypium australe, Dampiera candicans and Corchorus parviflorus isolated dwarf shrubs; over Boerhavia coccinea, Solanum horridum, Gomphrena cunninghamii and Trigastrotheca molluginea isolated forbs; with Cymbopogon ambiguus and *Aerva javanica tall Sparse open tussock grassland; over Triodia wiseana, Triodia angusta, Eriachne mucronata, Enneapogon lindleyanus and Cyperus cunninghamii subsp. cunninghamii hummock grassland; with Cucumis variabilis isolated Climbers/Creepers.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	**Aerva javanica*	s11 - Permitted	0.6	0.002
Amaranthaceae	*Gomphrena cunninghamii*		0.05	0.002
Cucurbitaceae	*Cucumis variabilis*		0	0.001
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*		0.3	0.001
Euphorbiaceae	*Euphorbia careyi*		0.3	0.3
Fabaceae	*Acacia inaequilatera*		2.5	0.05

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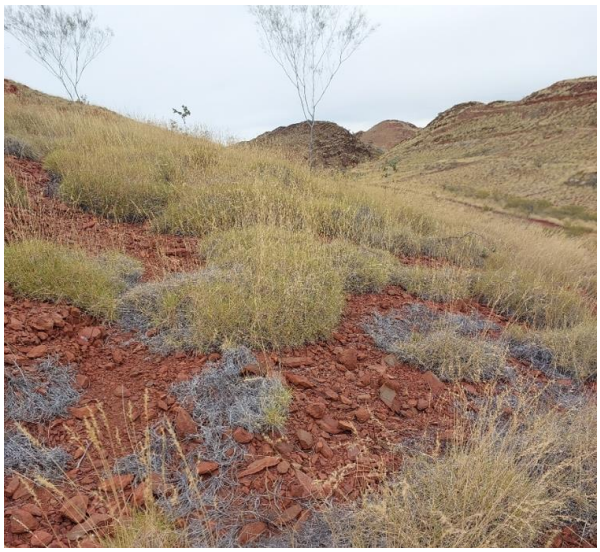
Fabaceae	*Senna glutinosa*		1	0.25
Goodeniaceae	*Dampiera candicans*		0.4	0.001
Malvaceae	*Corchorus parviflorus*		0.2	0.001
Malvaceae	*Gossypium australe*		0.4	0.003
Molluginaceae	*Trigastrotheca molluginea*		0.2	0.001
Moraceae	*Ficus brachypoda*		2	0.75
Nyctaginaceae	*Boerhavia coccinea*		0.2	0.01
Poaceae	*Cymbopogon ambiguus*		1	1.5
Poaceae	*Enneapogon lindleyanus*		0.3	0.75
Poaceae	*Eriachne mucronata*		0.3	10
Poaceae	*Triodia angusta*		0.3	2
Poaceae	*Triodia wiseana*		0.3	50
Proteaceae	*Grevillea wickhamii*		1.5	0.001
Sapindaceae	*Atalaya hemiglauca*	Facultative phreatophyte	0.7	1
Solanaceae	*Solanum horridum*		0.2	0.002
Zygophyllaceae	*Tribulus ? platypterus*		1	2

Appendix IX Flora quadrat data

Site name	FG Q16	**Date surveyed**	19/06/2023
Latitude	-21.30045	**Longitude**	119.79009
Landform	Big Hill	**Topography**	Gradual Slope
Soil type	iron Stone with minimal quartz on red/brown soil	**Soil colour**	Brown,Red/brown
Fire history	Within 5 years	**Disturbances**	Road nearby, very good regrowth from fire approximately 5 years ago.
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Acacia acradenia, Acacia orthocarpa and Acacia inaequilatera tall open shrubland; over Acacia arida and Acacia bivenosa isolated medium shrubs; over Pentalepis trichodesmoides subsp. trichodesmoides and Senna glutinosa isolated low shrubs; over Goodenia stobbsiana, Boerhavia coccinea, Afrohybanthus aurantiacus, Bonamia pilbarensis, Polycarpaea holtzei and Sida sp. Isolated forbs; with Triodia wiseana and Triodia brizoides hummock grassland; with Cucumis variabilis isolated Climbers/Creepers.		



Family	Taxon	Status	Height	Cover %
Asteraceae	*Pentalepis trichodesmoides* subsp. *trichodesmoides*		0.5	0.5
Caryophyllaceae	*Polycarpaea holtzei*		0.02	0.001
Convolvulaceae	*Bonamia pilbarensis*		0.05	0.001
Cucurbitaceae	*Cucumis variabilis*		0	0.04
Fabaceae	*Acacia acradenia*		3.5	8
Fabaceae	*Acacia arida*		2	0.25
Fabaceae	*Acacia bivenosa*		1.6	0.25
Fabaceae	*Acacia inaequilatera*		4	4

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Fabaceae	*Acacia orthocarpa*		4	6
Fabaceae	*Senna glutinosa*		0.6	0.002
Goodeniaceae	*Goodenia stobbsiana*		0.3	0.002
Malvaceae	*Sida* sp.		0.02	0.001
Nyctaginaceae	*Boerhavia coccinea*		0.15	0.001
Poaceae	*Cymbopogon ambiguus*		0.5	0.001
Poaceae	*Triodia brizoides*		0.3	15
Poaceae	*Triodia wiseana*		0.4	36
Violaceae	*Afrohybanthus aurantiacus*		0.1	0.001

Appendix IX Flora quadrat data

Site name	FG Q17	**Date surveyed**	19/06/2023
Latitude	-21.29915	**Longitude**	119.79748
Landform	Big Hill,Ridge	**Topography**	Steep Slope
Soil type	rock with little red brown soil	**Soil colour**	Brown,Red/brown
Fire history	Within 10 years	**Disturbances**	Road nearby, no other signs of disturbance
Vegetation code	Vegetation type A	**Vegetation condition**	Very Good
Groundwater dependent vegetation	No		
Vegetation description	Ficus brachypoda low open woodland; over Acacia bivenosa and Acacia inaequilatera tall open shrubland; over Grevillea wickhamii and Senna glutinosa isolated medium shrubs; over Gossypium australe, *Aerva javanica, Tribulus suberosus and Indigofera monophylla low sparse shrubland; over Triumfetta propinqua and Afrohybanthus aurantiacus isolated dwarf shrubs; over Boerhavia coccinea, Gomphrena cunninghamii, Polycarpaea longiflora, Euphorbia careyi, Notoleptopus decaisnei, Amaranthus undulatus, Nicotiana sp and Arivela viscosa isolated forbs; over Cymbopogon ambiguus isolated tall grasses; over Triodia wiseana hummock grassland; with Eriachne mucronata, Enneapogon lindleyanus, *Cenchrus ciliaris and Cyperus cunninghamii subsp. cunninghamii hummock isolated tussock grasses; with Cucumis variabilis and Rhynchosia australis isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	**Aerva javanica*	s11 - Permitted	0.5	0.25
Amaranthaceae	*Amaranthus undulatus*		0.2	0.001
Amaranthaceae	*Gomphrena cunninghamii*		0.2	0.006
Caryophyllaceae	*Polycarpaea longiflora*		0.3	0.003
Cleomaceae	*Arivela viscosa*		0.1	0.001

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Cucurbitaceae	*Cucumis variabilis*		0	0.004
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*		0.3	0.003
Euphorbiaceae	*Euphorbia careyi*		0.3	0.001
Fabaceae	*Acacia bivenosa*		3	18
Fabaceae	*Acacia inaequilatera*		2.5	0.1
Fabaceae	*Acacia trachycarpa*		1	1
Fabaceae	*Indigofera monophylla*		0.6	0.003
Fabaceae	*Rhynchosia australis*		0	0.004
Fabaceae	*Senna glutinosa*		1.7	0.003
Malvaceae	*Triumfetta propinqua*		0.4	0.25
Moraceae	*Ficus brachypoda*		3	4
Nyctaginaceae	*Boerhavia coccinea*		0.15	0.008
Phyllanthaceae	*Notoleptopus decaisnei*		0.3	0.001
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.45	0.008
Poaceae	*Cymbopogon ambiguus*		0.5	0.1
Poaceae	*Enneapogon lindleyanus*		0.25	0.01
Poaceae	*Eriachne mucronata*		0.3	0.25
Poaceae	*Triodia wiseana*		0.4	65
Proteaceae	*Grevillea wickhamii*		2	0.04
Solanaceae	*Nicotiana* sp.		0.15	0.001
Violaceae	*Afrohybanthus aurantiacus*		0.4	0.001
Zygophyllaceae	*Tribulus suberosus*		0.5	0.05

Appendix IX Flora quadrat data

Site name	FG Q18	**Date surveyed**	19/06/2023
Latitude	-21.29937	**Longitude**	119.78425
Landform	Major Drainage	**Topography**	one side is relatively flat, then dips down to the actualy River bed, then there's a steep slope on the southern side
Soil type	rock with little red brown soil	**Soil colour**	Brown,Red/brown
Fire history	Within 10 years	**Disturbances**	Road nearby, weeds present on site, otherwise undisturbed.
Vegetation code	Vegetation type D	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Potential - Contains *Atalaya hemiglauca* and Cyperus vaginatus		
Vegetation description	Eucalyptus victrix, Corymbia hamersleyana and Atalaya hemiglauca low woodland; over Acacia trachycarpa and Acacia acradenia tall open shrubland; over Acacia inaequilatera, Acacia bivenosa, Grevillea pyramidalis and Grevillea wickhamii isolated medium shrubs; over Corchorus parviflorus, Tephrosia rosea, Cajanus pubescens, Senna glutinosa and Waltheria indica isolated low shrubs; over Indigofera trita subsp. Trita, Nellica maderaspatensis and Dichrostachys spicata isolated dwarf shrubs; over Crotalaria medicaginea var. neglecta, Euphorbia careyi, Arivela viscosa, Euphorbia biconvexa, Boerhavia burbidgeana, Boerhavia coccinea and Polymeria ambigua isolated forbs; with *Cenchrus ciliaris, Triodia wiseana, Triodia angusta, Themeda triandra, Chrysopogon fallax, Eriachne ? Benthamii and Cymbopogon sp. Mixed Hummock/Tussock grassland; over Cucumis variabilis and Rhynchosia australis isolated climbers/creepers; with Cyperus vaginatus isolated sedges.		

Family	Taxon	Status	Height	Cover %
Cleomaceae	*Arivela viscosa*		0.15	0.001
Convolvulaceae	*Polymeria ambigua*		0.02	0.001
Cucurbitaceae	*Cucumis variabilis*		0	0.05

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Cyperaceae	*Cyperus vaginatus*	Facultative phreatophyte	0.7	0.3
Euphorbiaceae	*Euphorbia biconvexa*		0.15	0.001
Euphorbiaceae	*Euphorbia careyi*		0.2	0.001
Fabaceae	*Acacia acradenia*		2.5	0.25
Fabaceae	*Acacia bivenosa*		2	0.05
Fabaceae	*Acacia inaequilatera*		2	0.5
Fabaceae	*Acacia trachycarpa*		4	25
Fabaceae	*Cajanus pubescens*		0.7	0.004
Fabaceae	*Crotalaria medicaginea* var. *neglecta*		0.45	0.001
Fabaceae	*Dichrostachys spicata*		0.4	0.002
Fabaceae	*Indigofera trita* subsp. *trita*		0.4	0.04
Fabaceae	*Rhynchosia australis*		0	0.04
Fabaceae	*Senna glutinosa*		0.7	0.003
Fabaceae	*Tephrosia rosea*		0.5	0.05
Malvaceae	*Corchorus parviflorus*		0.6	0.25
Malvaceae	*Waltheria indica*		0.6	0.001
Myrtaceae	*Corymbia hamersleyana*		9	5
Myrtaceae	*Eucalyptus victrix*	Facultative phreatophyte	10	20
Nyctaginaceae	*Boerhavia burbidgeana*		0.05	0.001
Nyctaginaceae	*Boerhavia coccinea*		0.05	0.001
Phyllanthaceae	*Nellica maderaspatensis*		0.4	0.003
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.35	35
Poaceae	*Chrysopogon fallax*		0.3	0.5
Poaceae	*Cymbopogon ambiguus*		0.3	0.04
Poaceae	*Eriachne* ? *benthamii*		0.3	0.25
Poaceae	*Themeda triandra*		0.35	1
Poaceae	*Triodia angusta*		0.2	5
Poaceae	*Triodia wiseana*		0.35	7
Proteaceae	*Grevillea pyramidalis*		1.1	0.01
Proteaceae	*Grevillea wickhamii*		1.2	0.005
Sapindaceae	*Atalaya hemiglauca*	Facultative phreatophyte	2	0.25

Appendix IX Flora quadrat data

Site name	FG Q19	**Date surveyed**	19/06/2023
Latitude	-21.29608	**Longitude**	119.78396
Landform	Big Hill	**Topography**	Steep Slope
Soil type	rock with little red brown soil	**Soil colour**	Red/orange
Fire history	Within 10 years	**Disturbances**	No obvious signs of disturbance
Vegetation code	Vegetation type B	**Vegetation condition**	Excellent
Groundwater dependent vegetation	Unlikely - Site near drainage channel but no indicator species present		
Vegetation description	Acacia inaequilatera, Acacia orthocarpa, and Clerodendrum floribundum tall open shrubland; over Senna glutinosa subsp. pruinosa and Clerodendrum floribundum var. angustifolium isolated medium shrubs; over Tribulus suberosus, Pentalepis trichodesmoides subsp. trichodesmoides and Corchorus parviflorus isolated low shrubs; over Indigofera monophylla and Goodenia stobbsiana isolated dwarf shrubs; over Bonamia pilbarensis isolated forbs; with Triodia brizoides hummock grassland; over Triodia wiseana, Cymbopogon ambiguus and Eriachne mucronata hummock grassland.		

Family	Taxon	Status	Height	Cover %
Asteraceae	*Pentalepis trichodesmoides* subsp. *trichodesmoides*		0.5	0.008
Convolvulaceae	*Bonamia pilbarensis*		0.05	0.001
Fabaceae	*Acacia inaequilatera*		4	10
Fabaceae	*Acacia orthocarpa*		3	1.5
Fabaceae	*Indigofera monophylla*		0.4	0.004
Fabaceae	*Senna glutinosa* subsp. *pruinosa*		1.5	0.006
Goodeniaceae	*Goodenia stobbsiana*		0.3	0.002
Lamiaceae	*Clerodendrum floribundum* var. ? *ovatum*		1	0.002
Lamiaceae	*Clerodendrum floribundum* var. *angustifolium*		2	0.001

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Malvaceae	*Corchorus parviflorus*		0.7	0.004
Poaceae	*Cymbopogon ambiguus*		0.4	0.01
Poaceae	*Eriachne mucronata*		0.35	0.01
Poaceae	*Triodia brizoides*		0.5	30
Poaceae	*Triodia wiseana*		0.4	41
Zygophyllaceae	*Tribulus suberosus*		0.7	0.01

Appendix IX Flora quadrat data

Site name	FG Q20	**Date surveyed**	19/06/2023
Latitude	-21.30725	**Longitude**	119.76563
Landform	Small Hill	**Topography**	Gradual Slope
Soil type	rock with little red brown soil	**Soil colour**	Brown
Fire history	Recent (within 12 months)	**Disturbances**	Low intensity recent fire, patchy regrowth, otherwise undisturbed
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Possible - see comments		
Vegetation description	Acacia inaequilatera tall open shrubland; over Grevillea wickhamii, Corchorus parviflorus, Indigofera monophylla and Senna symonii isolated low shrubs; over Acacia acradenia and Grevillea pyramidalis isolated dwarf shrubs; over Bonamia pilbarensis, Ptilotus calostachyus, Boerhavia coccinea and Tephrosia ?clementii isolated forbs; with Triodia angusta and Triodia wiseana open hummock grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus calostachyus*		0.6	0.001
Convolvulaceae	*Bonamia pilbarensis*		0.2	0.003
Fabaceae	*Acacia acradenia*		0.35	0.02
Fabaceae	*Acacia inaequilatera*		3.5	15
Fabaceae	*Indigofera monophylla*		0.5	0.01
Fabaceae	*Senna symonii*		0.6	0.005
Fabaceae	*Tephrosia ? clementii*		0.1	0.001
Malvaceae	*Corchorus parviflorus*		0.5	0.01
Nyctaginaceae	*Boerhavia coccinea*		0.1	0.001

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Poaceae	*Triodia angusta*		0.15	15
Poaceae	*Triodia wiseana*		0.3	5
Proteaceae	*Grevillea pyramidalis*		0.4	0.002
Proteaceae	*Grevillea wickhamii*		0.6	0.01

Appendix IX Flora quadrat data

Site name	FG Q21	**Date surveyed**	20/06/2023
Latitude	-21.30698	**Longitude**	119.76297
Landform	Medium Drainage	**Topography**	Flat
Soil type	rock with little red brown soil	**Soil colour**	Red/orange
Fire history	Recent (within 12 months)	**Disturbances**	Low intensity recent fire, but barely any damage to vegetation, otherwise undisturbed
Vegetation code	Vegetation type E	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Vegetation follows surface drainage but no indicator species present.		
Vegetation description	Corymbia hamersleyana low open woodland; over Acacia acradenia tall open shrubland; over Petalostylis labicheoides, Acacia inaequilatera and Senna glutinosa subsp. glutinosa sparse shrubland; over Grevillea wickhamii, Corchorus parviflorus, Acacia maitlandii, Senna symonii and Indigofera monophylla low open shrubland; over Ptilotus astrolasius, Gossypium australe, Tephrosia sp. Bungaroo Creek (M.E Trudgen 11601), Euphorbia careyi, Euploca tenuifolia, Scaevola amblyanthera var. centralis, Tribulus suberosus and Dodonaea coriacea isolated dwarf shrubs; over Isotropis atropurpurea, Hibiscus sturtii var. campylochlamys, Boerhavia coccinea, Dampiera candicans, Sida sp. Pilbara (A.A. Mitchell PRP 1543), Ptilotus calostachyus, Tephrosia ?clementii, Trigastrotheca molluginea, Crotalaria medicaginea var. neglecta and Triumfetta clementii isolated forbs; with Chrysopogon fallax, Cymbopogon ambiguus and Eriachne mucronata sparse tussock grassland; over Triodia wiseana, Triodia angusta, and Eriachne sp. sparse grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.3	0.1
Amaranthaceae	*Ptilotus calostachyus*		0.5	0.004
Boraginaceae	*Euploca tenuifolia*		0.15	0.006

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Euphorbiaceae	*Euphorbia careyi*		0.3	0.008
Fabaceae	*Acacia acradenia*		2.2	25
Fabaceae	*Acacia inaequilatera*		2	0.05
Fabaceae	*Acacia maitlandii*		0.55	0.025
Fabaceae	*Crotalaria medicaginea* var. *neglecta*		0.35	0.001
Fabaceae	*Indigofera monophylla*		0.5	0.01
Fabaceae	*Isotropis atropurpurea*		0.4	0.1
Fabaceae	*Petalostylis labicheoides*		1.9	1
Fabaceae	*Senna glutinosa* subsp. *glutinosa*		1.6	0.02
Fabaceae	*Senna symonii*		0.65	0.01
Fabaceae	*Tephrosia* ? *clementii*		0.3	0.003
Fabaceae	*Tephrosia* sp. *Bungaroo Creek* (M.E Trudgen 11601)		0.2	0.01
Goodeniaceae	*Dampiera candicans*		0.4	0.03
Goodeniaceae	*Scaevola amblyanthera* var. *centralis*		0.2	0.005
Malvaceae	*Corchorus parviflorus*		0.5	0.75
Malvaceae	*Gossypium australe*		0.4	0.01
Malvaceae	*Hibiscus sturtii* var. *campylochlamys*		0.3	0.05
Malvaceae	*Sida* sp. *Pilbara* (A.A. Mitchell PRP 1543)		0.6	0.01
Malvaceae	*Triumfetta clementii*		0.2	0.001
Molluginaceae	*Trigastrotheca molluginea*		0.2	0.003
Myrtaceae	*Corymbia hamersleyana*		5	5
Nyctaginaceae	*Boerhavia coccinea*		0.1	0.05
Poaceae	*Chrysopogon fallax*		0.5	2
Poaceae	*Cymbopogon ambiguus*		0.7	0.01
Poaceae	*Eriachne mucronata*		0.5	0.01
Poaceae	*Eriachne* sp.		0.4	1.5
Poaceae	*Triodia angusta*		0.2	0.1
Poaceae	*Triodia wiseana*		0.3	2
Proteaceae	*Grevillea wickhamii*		1	15
Sapindaceae	*Dodonaea coriacea*		0.3	0.004
Zygophyllaceae	*Tribulus suberosus*		0.15	0.005

Appendix IX Flora quadrat data

Site name	FG Q22	**Date surveyed**	20/06/2023
Latitude	-21.30472	**Longitude**	119.75916
Landform	Plain	**Topography**	Flat
Soil type	Red loamy soil with red Rock ans some quartz	**Soil colour**	Red/orange
Fire history	Recent (within 12 months)	**Disturbances**	Road nearby, signs of low intensity fire with in 12 months, otherwise undisturbed.
Vegetation code	Vegetation type C	**Vegetation condition**	Good
Groundwater dependent vegetation	No		
Vegetation description	Acacia inaequilatera tall sparse shrubland; over Senna symonii, Acacia acradenia and Acacia bivenosa isolated low shrubs; over Indigofera monophylla, Corchorus parviflorus, Senna glutinosa, Hibiscus ?leptocladus and Euploca pachyphylla isolated dwarf shrubs; over Ptilotus exaltatus, Tephrosia ?clementii, Bonamia pilbarensis, Ptilotus calostachyus and Trigastrotheca molluginea isolated forbs; with Triodia epactia hummock grassland; with Fimbristylis ?simulans and Eriachne pulchella subsp. dominii isolated tussock grasses.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus calostachyus*		0.4	0.001
Amaranthaceae	*Ptilotus exaltatus*		0.7	0.025
Boraginaceae	*Euploca pachyphylla*		0.2	0.001
Convolvulaceae	*Bonamia pilbarensis*		0.05	0.002
Cyperaceae	*Fimbristylis simulans*		0.1	0.004
Fabaceae	*Acacia acradenia*		0.5	0.25
Fabaceae	*Acacia bivenosa*		1	0.002
Fabaceae	*Acacia inaequilatera*		3.5	2
Fabaceae	*Indigofera monophylla*		0.4	0.01

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Fabaceae	*Senna glutinosa*		0.4	0.002
Fabaceae	*Senna symonii*		1	0.5
Fabaceae	*Tephrosia* ? *clementii*		0.1	0.002
Malvaceae	*Corchorus parviflorus*		0.4	0.008
Malvaceae	*Hibiscus* ? *leptocladus*		0.15	0.002
Molluginaceae	*Trigastrotheca molluginea*		0.1	0.001
Poaceae	*Eriachne pulchella* subsp. *dominii*		0.1	0.002
Poaceae	*Triodia epactia*		0.2	40

Appendix IX Flora quadrat data

Site name	FG Q23	**Date surveyed**	20/06/2023
Latitude	-21.30309	**Longitude**	119.76947
Landform	Plain	**Topography**	Flat
Soil type	Red loamy (or clay hard to tell when wet)soil with red Rock ans some quartz	**Soil colour**	Red/orange
Fire history	Recent (within 12 months)	**Disturbances**	Road nearby, signs of medium intensity fire with in 12 months, multiple burnt plants, varying regrowth of triodia, weeds present
Vegetation code	Vegetation type B	**Vegetation condition**	Good
Groundwater dependent vegetation	Unlikely - Site locatect between minor drainage channels but no indicator species present		
Vegetation description	Acacia inaequilatera tall open shrubland; over Acacia acradenia isolated medium shrubs; over Senna glutinosa subsp. Pruinosa and Abutilon lepidum isolated low shrubs; over Corchorus parviflorus, Sida? fibulifera, Ptilotus sp and Senna artemisioides subsp. oligophylla isolated dwarf shrubs; over Boerhavia coccinea, Rhynchosia australis, Ptilotus astrolasius, Triumfetta clementii, Afrohybanthus aurantiacus and Bonamia pilbarensis isolated forbs; with Triodia wiseana, *Cenchrus ciliaris and Paraneurachne muelleri sparse grassland.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.3	0.002
Amaranthaceae	*Ptilotus obovatus*		0.15	0.002
Convolvulaceae	*Bonamia pilbarensis*		0.1	0.001
Fabaceae	*Acacia acradenia*		2	0.75
Fabaceae	*Acacia inaequilatera*		4	25
Fabaceae	*Rhynchosia australis*		0.2	0.003
Fabaceae	*Senna artemisioides* subsp. *oligophylla*		0.15	0.001

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Fabaceae	*Senna glutinosa* subsp. *pruinosa*		1	0.01
Malvaceae	*Abutilon lepidium*		0.7	0.001
Malvaceae	*Corchorus parviflorus*		0.3	0.005
Malvaceae	*Sida fibulifera*		0.2	0.002
Malvaceae	*Triumfetta clementii*		0.25	0.001
Nyctaginaceae	*Boerhavia coccinea*		0.2	0.006
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.3	0.5
Poaceae	*Paraneurachne muelleri*		0.3	0.002
Poaceae	*Triodia wiseana*		0.5	7.25
Violaceae	*Afrohybanthus aurantiacus*		0.2	0.001

Appendix IX Flora quadrat data

Site name	FG Q24	**Date surveyed**	20/06/2023
Latitude	-21.29972	**Longitude**	119.7737
Landform	Plain	**Topography**	Flat
Soil type	Red loamy (or clay hard to tell when wet)soil with red Rock ans some quartz	**Soil colour**	Red/brown
Fire history	Within 5 years	**Disturbances**	Road nearby, weeds recorded, no other signs of disturbance.
Vegetation code	Vegetation type B	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Site near drainage channel but no indicator species present		
Vegetation description	Corymbia hamersleyana isolated low trees; over Acacia orthocarpa, Acacia inaequilatera, Grevillea pyramidalis and Acacia acradenia tall shrubland; over Senna symonii, Acacia bivenosa and Senna glutinosa sparse medium shrubland; over Tephrosia densa and Corchorus parviflorus isolated low shrubs; over Afrohybanthus aurantiacus isolated dwarf shrubs; over Ptilotus astrolasius, Boerhavia coccinea, Crotalaria medicaginea var. neglecta, Polygala glaucifolia and Hibiscus sp. Isolated forbs; with Triodia wiseana hummock grassland; with Enneapogon caerulescens isolated tussock grasses; over *Cenchrus ciliaris isolated tussock grasses; with Cucumis variabilis and Rhynchosia australis isolated climbers/creepers.		

Family	Taxon	Status	Height	Cover %
Amaranthaceae	*Ptilotus astrolasius*		0.4	0.006
Cucurbitaceae	*Cucumis variabilis*		0	0.02
Fabaceae	*Acacia acradenia*		2.5	0.5
Fabaceae	*Acacia bivenosa*		1.6	0.05
Fabaceae	*Acacia inaequilatera*		2.2	2
Fabaceae	*Acacia orthocarpa*		3	40

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Fabaceae	*Crotalaria medicaginea* var. *neglecta*		0.2	0.001
Fabaceae	*Rhynchosia australis*		0	0.02
Fabaceae	*Senna glutinosa*		1.5	0.003
Fabaceae	*Senna symonii*		1.7	1
Fabaceae	*Tephrosia densa*		0.5	0.02
Malvaceae	*Corchorus parviflorus*		0.8	0.004
Malvaceae	*Hibiscus* sp.		0.05	0.001
Myrtaceae	*Corymbia hamersleyana*		6	0.25
Nyctaginaceae	*Boerhavia coccinea*		0.15	0.003
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.4	0.75
Poaceae	*Enneapogon caerulescens*		0.5	0.001
Poaceae	*Triodia wiseana*		0.5	50
Polygalaceae	*Polygala glaucifolia*		0.1	0.001
Proteaceae	*Grevillea pyramidalis*		3	1
Violaceae	*Afrohybanthus aurantiacus*		0.1	0.003

Appendix IX Flora quadrat data

Site name	FG Q25	**Date surveyed**	20/06/2023
Latitude	-21.3048	**Longitude**	119.79317
Landform	Big Hill,Ridge	**Topography**	Steep Slope
Soil type	"mostly rock(jas says maybe granite?), about 5% soil"	**Soil colour**	Brown
Fire history	Within 5 years	**Disturbances**	Road nearby, signs of old clearing nearby, weeds recorded, no other signs of disturbance.
Vegetation code	Vegetation type A	**Vegetation condition**	Very Good
Groundwater dependent vegetation	Unlikely - Contains *Atalaya hemiglauca* but site on hill crest / hill slope		
Vegetation description	Atalaya hemiglauca isolated low trees; over Senna glutinosa isolated tall shrubs; over Acacia bivenosa, Acacia inaequilatera and Eremophila ? latrobei isolated medium shrubs; over *Aerva javanica, Pentalepis trichodesmoides subsp. trichodesmoides and Triumfetta propinqua isolated low shrubs; over Gossypium australe, Indigofera monophylla, Corchorus parviflorus, Euphorbia careyi, Melhania oblongifolia, Boerhavia coccinea, Sida echinocarpa, Tribulus suberosus, Indigofera trita subsp. trita and Senna artemisioides subsp. oligophylla isolated dwarf shrubs; over Ptilotus incanus, Heliotropium crispatum, Arivela viscosa, Rhynchosia australis, Gomphrena cunninghamii, Ptilotus astrolasius, Cucumis melo, Ptilotus clementii and Polycarpaea longiflora isolated forbs; with *Cenchrus ciliaris isolated tussock grassed; over Triodia wiseana hummock grassland; with Cymbopogon ambiguus, Eriachne mucronata, and Enneapogon lindleyanus isolated tussock grasses; with Cucumis variabilis isolated climbers/creepers.		
			

Family	Taxon	Status	Height	Cover %
Amaranthaceae	**Aerva javanica*	s11 - Permitted	0.5	0.06
Amaranthaceae	*Gomphrena cunninghamii*		0.05	0.01

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Amaranthaceae	*Ptilotus astrolasius*		0.05	0.01
Amaranthaceae	*Ptilotus clementii*		0.5	0.006
Amaranthaceae	*Ptilotus incanus*		0.2	0.05
Asteraceae	*Pentalepis trichodesmoides* subsp. *trichodesmoides*		0.5	0.025
Boraginaceae	*Heliotropium crispatum*		0.2	0.025
Caryophyllaceae	*Polycarpaea longiflora*		0.15	0.001
Cleomaceae	*Arivela viscosa*		0.2	0.02
Cucurbitaceae	*Cucumis melo*		0	0.01
Cucurbitaceae	*Cucumis variabilis*		0	0.0025
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*		0.2	0.001
Euphorbiaceae	*Euphorbia careyi*		0.3	0.02
Fabaceae	*Acacia bivenosa*		2	0.5
Fabaceae	*Acacia inaequilatera*		2	0.05
Fabaceae	*Indigofera monophylla*		0.4	0.02
Fabaceae	*Indigofera trita* subsp. *trita*		0.2	0.01
Fabaceae	*Rhynchosia australis*		0.15	0.02
Fabaceae	*Senna artemisioides* subsp. *oligophylla*		0.4	0.008
Fabaceae	*Senna glutinosa*		4	0.03
Malvaceae	*Corchorus parviflorus*		0.3	0.02
Malvaceae	*Gossypium australe*		0.4	0.03
Malvaceae	*Melhania oblongifolia*		0.3	0.02
Malvaceae	*Sida echinocarpa*		0.3	0.01
Malvaceae	*Triumfetta propinqua*		0.5	0.01
Nyctaginaceae	*Boerhavia coccinea*		0.1	0.02
Poaceae	**Cenchrus ciliaris*	s11 - Permitted	0.5	1
Poaceae	*Cymbopogon ambiguus*		0.3	0.04
Poaceae	*Enneapogon lindleyanus*		0.25	0.02
Poaceae	*Eriachne mucronata*		0.3	0.02
Poaceae	*Eriachne mucronata*		0.3	0.02
Poaceae	*Triodia wiseana*		0.4	50
Sapindaceae	*Atalaya hemiglauca*	Facultative phreatophyte	4	1
Scrophulariaceae	*Eremophila ? latrobei*		1.6	0.03
Solanaceae	*Solanum diversiflorum*		0.35	0.008
Zygophyllaceae	*Tribulus suberosus*		0.3	0.01

Appendix X Fauna Habitat Data

Site information				Geology				Fauna habitat data				Fire		Night Parrot Habitat Screen		
Site name	**Latitude**	**Longitude**	**Date**	**Landform**	**Topography**	**Soil colour**	**Soil type**	**Fauna habitat type**	**Burrowing suitability**	**Fallen timber for refugia**	**Tree hollows for fauna**	**Fire history**	**Fire intensity**	**Triodia dominant?**	**Triodia description**	**Chenopod present?**
Q01	-21.2981	119.7991	15/06/2023	Small Hill	Gradual Slope	Red/brown	Rocky surface with red loamy soil below (also containing more rocks)	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q02	-21.3029	119.7892	15/06/2023	Big Hill	Steep Slope	Brown, Red/brown	Quartz and iron stone surface with red/brown soil below	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q03	-21.3076	119.7634	15/06/2023	Plain	Undulating	Red/brown	Quartz and iron stone surface with red/brown soil below	Stony plain	Difficult	Negligible	No Hollows	Recent (within 12 months)	Medium Intensity (all ground and shrubs burnt) trees blackened but alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn)	No
Q04	-21.306	119.7649	15/06/2023	Small Hill	Gradual Slope	Red/orange	99% red Rock and quartz, 1% sand	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn)	No
Q05	-21.2994	119.7758	16/06/2023	Major Drainage	Flat	Red/brown	Gravel with some iron stone and red sand in the creek bed and darker red clay on edges	Medium drainage	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	No	Not dominant ground layer	No
Q06	-21.3007	119.7768	16/06/2023	Plain	Flat	Red/brown	Quarts over red/brown soil	Stony plain	Moderate	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q07	-21.3	119.7716	16/06/2023	Medium Drainage	Flat	Red/brown	Sandy Clay Loam	Minor drainage	Easy	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat (on edges of drainage)	No
Q08	-21.2971	119.7867	16/06/2023	Big Hill	Gradual Slope	Red/orange	99% red Rock with small patches of quartz, 1% red sand	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Long Unburnt	Unable to tell	Yes	Long runs of connected clumps, Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q09	-21.2977	119.7877	17/06/2023	Medium Drainage	Undulating	Red/brown	Sandy Clay Loam with lots of stone	Medium drainage	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	No	Not dominant ground layer	No
Q10	-21.3046	119.7688	17/06/2023	Plain,maybe some minor drainage here? there's cracking clays near by	Flat	Red/brown	White quartz over red brown sand	Stony plain	Moderate	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No

Appendix X Fauna Habitat Data

Site information				Geology				Fauna habitat data				Fire		Night Parrot Habitat Screen		
Site name	**Latitude**	**Longitude**	**Date**	**Landform**	**Topography**	**Soil colour**	**Soil type**	**Fauna habitat type**	**Burrowing suitability**	**Fallen timber for refugia**	**Tree hollows for fauna**	**Fire history**	**Fire intensity**	**Triodia dominant?**	**Triodia description**	**Chenopod present?**
Q11	-21.3054	119.7573	17/06/2023	Gully,Ridge	Steep Slope	Brown	95% rock and quartz, 5% light brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Young clumps (post burn)	No
Q12	-21.3022	119.7953	17/06/2023	Small Hill	Gradual Slope	Brown	Iron stone with minimal quartz on brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Long Unburnt	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming <40cm - not dense	No
Q13	-21.3045	119.7622	18/06/2023	Medium Drainage	Flat	Red/brown, Red/orange	Clay	Minor drainage	Moderate	Negligible	No Hollows	Within 10 years	Unable to tell	No	Not dominant ground layer	No
Q14	-21.3054	119.7668	18/06/2023	Small Hill	Gradual Slope	Red/brown	Loam, Sand, lots of rock and quartz	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, Young clumps (post burn)	No
Q15	-21.3062	119.7658	18/06/2023	Ridge	Steep Slope	Brown, Red/brown	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, Young clumps (post burn)	No
Q16	-21.3005	119.7904	19/06/2023	Big Hill	Gradual Slope	Brown, Red/brown	Iron stone with minimal quartz on red/brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Unable to tell	Yes	Long runs beginning to form, mix of young and larger Triodia (mid-dense total)	No
Q17	-21.2994	119.798	19/06/2023	Big Hill,Ridge	Steep Slope	Brown, Red/brown	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q18	-21.2997	119.7844	19/06/2023	Major Drainage	one side is relatively flat, then dips down to the River bed, then there's a steep slope on the southern side	Brown, Red/brown	Mainly rock with little red brown soil	Medium drainage	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	No	Not dominant ground layer	No
Q19	-21.2963	119.7839	19/06/2023	Big Hill	Steep Slope	Red/orange	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
Q20	-21.3072	119.7657	19/06/2023	Small Hill	Gradual Slope	Brown	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn)	No
Q21	-21.307	119.7629	20/06/2023	Medium Drainage	Flat	Red/orange	Mainly rock with little red brown soil	Minor drainage	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	No	Not dominant ground layer	No

Appendix X Fauna Habitat Data

Site information				Geology				Fauna habitat data				Fire		Night Parrot Habitat Screen		
Site name	**Latitude**	**Longitude**	**Date**	**Landform**	**Topography**	**Soil colour**	**Soil type**	**Fauna habitat type**	**Burrowing suitability**	**Fallen timber for refugia**	**Tree hollows for fauna**	**Fire history**	**Fire intensity**	**Triodia dominant?**	**Triodia description**	**Chenopod present?**
Q22	-21.3047	119.7588	20/06/2023	Plain	Flat	Red/orange	Red loamy soil with rock and some quartz	Stony plain	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn)	No
Q23	-21.3034	119.7694	20/06/2023	Plain	Flat	Red/orange	Red loamy/clay soil with rock and some quartz	Stony plain	Difficult	Negligible	No Hollows	Recent (within 12 months)	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn)	No
Q24	-21.3	119.7738	20/06/2023	Plain	Flat	Red/brown	Red loamy/clay soil with rock and some quartz	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Mature (long unburnt) and clumped or ring forming <40cm - not dense	No
Q25	-21.3039	119.7937	20/06/2023	Big Hill,Ridge	Steep Slope	Brown	95% rock, about 5% soil"	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Medium Intensity (all ground and shrubs burnt) trees blackened but alive	Yes	Young clumps (post burn)	No
R1	-21.3037	119.7896	15/06/2023	Small Hill	Gradual Slope	Brown	Quartz and iron stone surface with brown soil below	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Medium Intensity (all ground and shrubs burnt) trees blackened but alive	Yes	Young clumps (post burn)	No
R2	-21.3066	119.7634	15/06/2023	Small Hill	Gradual Slope	Grey	Iron stone and grey sand	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	No	Mature (long unburnt) and clumped or ring forming <40cm - not dense, Clumps discrete with larges spaces in between	No
R3	-21.306	119.757	17/06/2023	Ridge	top of ridge	Brown	95% rock, 5% light brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	No	Mature (long unburnt) and clumped or ring forming <40cm - not dense	No
R4	-21.3054	119.795	21/06/2023	Plain	Undulating	Red/orange	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)	Medium Intensity (all ground and shrubs burnt) trees blackened but alive	Yes	Clumps discrete with larges spaces in between, young clumps (post burn),	No
R5	-21.3016	119.7695	21/06/2023	Plain	Undulating	Red/orange	Mainly rock with little red brown soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Recent (within 12 months)		Yes	Clumps discrete with larges spaces in between, Young clumps (post burn)	No
R6	-21.3002	119.7794	21/06/2023	Small Hill	on top of hill is relatively flat - some undulating	Red/brown	Rock and quartz layer over brown/red soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No

Appendix X Fauna Habitat Data

Site information				Geology				Fauna habitat data				Fire		Night Parrot Habitat Screen		
Site name	**Latitude**	**Longitude**	**Date**	**Landform**	**Topography**	**Soil colour**	**Soil type**	**Fauna habitat type**	**Burrowing suitability**	**Fallen timber for refugia**	**Tree hollows for fauna**	**Fire history**	**Fire intensity**	**Triodia dominant?**	**Triodia description**	**Chenopod present?**
R7	-21.2998	119.7784	21/06/2023	Small Hill	Undulating	Red/brown	Rock and quartz layer over brown/red soil	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 10 years	Unable to tell	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No
R8	-21.3011	119.7837	21/06/2023	Minor Drainage	Area is a low point between hills	Red/brown	Sandy Clay Loam, with small rocks	Minor drainage	Moderate	Negligible	No Hollows	Within 10 years	Unable to tell	No	Not dominant ground cover	No
R9	-21.2988	119.7952	21/06/2023	Big Hill	Gradual Slope	Red/brown	Mainly of light orange-grey rocks with red brown soil below	Hillcrest/ hillslope	Difficult	Negligible	No Hollows	Within 5 years	Low Intensity (only low shrubs and herbs burnt), trees and shrubs alive	Yes	Mature (long unburnt) and clumped or ring forming >40cm - dense habitat	No