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ENVIRONMENTAL SCIENCES

Detailed flora and vegetation survey for the Port Hedland Green Steel Project

Prepared for Port Hedland Green Steel Pty Ltd

December 2024

Final Report

Detailed flora and vegetation for the Port Hedland Green Steel Project

Prepared for Port Hedland Green Steel Pty Ltd

Version history

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EXECUTIVE SUMMARY

Port Hedland Green Steel Pty Ltd (PHGS) is progressing the development of large-scale downstream iron ore processing capability known as the Port Hedland Green Steel Project (the Project). The Project is located approximately 15 km southwest of Port Hedland, Western Australia (WA) in the Boodarie Strategic Industrial Area. PHGS intend to seek approval under Part IV of the *Environmental Protection Act 1986* (EP Act) to enable development of the Project which will consist of a pellet plant and a hot briquette iron (HBI) plant, consuming approximately 3-3.5 million tonnes per annum (Mtpa) of iron ore. Phoenix Environmental Sciences Pty Ltd (Phoenix) were engaged in February 2023 to conduct a detailed flora vegetation survey for areas that overlap sections of the Project. The survey covered an area of 1,476.3 ha.

A desktop assessment was prepared prior to the field work. The results of the desktop assessment identified the potential for 12 significant flora, and 60 introduced species, of which 6 are a Declared Pest species with 3 of those declared pests also listed as a Weed of National Significance (WoNs). No Threatened or Priority Ecological communities were recorded for the study area.

Survey design, methodology and report writing adhere to relevant principles and guidelines. The first phase of the field work was conducted from 15 to 19 April 2023. A total of 41 quadrats (50 m x 50 m) were conducted in the study area. This was then followed by the second season field work from 13 to 15 September 2023 which revisited the 41 quadrats. Targeted searches were conducted during both seasons to maximise the likelihood of finding significant flora.

Four significant flora were identified in the study area. The Priority 1 *Tephrosia rosea* var. Port Hedland and three species considered significant due to habitat range extensions. The species listed as range extensions are *Eragrostis setifolia*, *Maireana georgei*, and *Santalum spicatum*.

Two vegetation types were considered locally significant. EvGlEa, was considered locally significant with one quadrat placed in the area where this unique vegetation type is occurring. Additionally, a small patch to the west of the study area, has a strong resemblance to the locally significant area and is thus also considered locally significant. The vegetation type AsTsch, was considered significant as one population of the Priority 1 flora *Tephrosia rosea* var. Port Hedland occurred within that vegetation type.

The results of the desktop and field surveys by Phoenix provides adequate baseline data to minimise environmental impacts when developing the study area; specifically identifying relatively discrete areas that support the conservation of significant species.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

BoM	Bureau of Meteorology
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPIRD	Department of Primary Industries and Regional Development
IBRA	Interim Biogeographic Regionalisation of Australia
NES	National Environmental Significance
NVIS	National Vegetation Information System
PEC	Priority Ecological Communities
WA	Western Australia
WoNS	Weed of National Significance
EPBC	Environmental Protection and Biodiversity Conservation
UPGMA	Unweighted pair group method with arithmetic mean

1 INTRODUCTION

Port Hedland Green Steel Pty Ltd (PHGS) is progressing the development of large-scale downstream iron ore processing capability known as the Port Hedland Green Steel Project (the Project). The Project is located approximately 15 km southwest of Port Hedland, Western Australia (WA) in the Boodarie Strategic Industrial Area (Figure 1-1). PHGS intend to seek approval under Part IV of the *Environmental Protection Act 1986* (EP Act) to enable development of the Project which will consist of a pellet plant and a hot briquette iron (HBI) Plant, consuming approximately 3-3.5 million tonnes per annum (Mtpa) of iron ore.

In February 2023, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by PHGS to undertake a Detailed flora and vegetation survey for the Project.

The purpose of the survey was to delineate key flora values for the proposal to inform the environmental assessment and approvals process, as well as provide context for the preparation of Environmental Impact Assessment documentation.

1.1 SCOPE OF WORK

The scope of work for the Detailed flora and vegetation survey. was as follows:

- Desktop study:
    - identify any conservation significant species or ecological communities located either in the study area or near the study area.
- Field survey:
    - collect comprehensive site and species data within quadrats.
    - targeted searches for Threatened and Priority flora identified in the desktop assessment.
    - vegetation type and condition mapping
- Reporting:
    - provide the survey outcomes in a detailed report suitable for use in regard to the environmental approvals and assessment process

1.2 STUDY AREA

The study area is located in the Town of Port Hedland and the Eremaean Climatic Province as defined by EPA (2016b). It is approximately 1,476.3 ha and includes 4 corridors with the western-most corridor located adjacent to the Port Hedland power station (Figure 1-1).

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
Date	7/03/2024
Drawn by	JL
Map author	LB

0 25 50
Kilometers

1:1,220,800 (at A4) GDA 1994 MGA Zone 50

- Study area
- Boodarie Strategic Industrial Area
- Indicative disturbance footprint
- Environmentally sensitive areas
- Lakes
- DBCA managed land
- Road

Figure 1-1
Project location and study area

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2 LEGISLATIVE CONTEXT

The protection of flora in WA is principally governed by three acts:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- State *Biodiversity Conservation Act 2016* (BC Act)
- State EP Act.

The BC Act came into full effect on 1 January 2019 and replaced the functions of the *Wildlife Conservation Act 1950* (WC Act).

2.1 COMMONWEALTH

The EPBC Act is administered by the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW). The EPBC Act provides for the listing of Threatened flora (and fauna) and Threatened Ecological Communities (TECs) as matters of National Environmental Significance (NES). Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of NES, require approval from the Australian Government Minister for the Environment through a formal referral process. Key threats and habitat critical to the survival of EPBC Act Threatened species are usually defined in the conservation advice and/or recovery plan for the species.

Conservation categories applicable to Threatened flora species under the EPBC Act are as follows:

- Extinct (EX)[1] – there is no reasonable doubt that the last individual has died
- Extinct in the Wild (EW) – taxa known to survive only in captivity
- Critically Endangered (CR) – taxa facing an extremely high risk of extinction in the wild in the immediate future
- Endangered (EN) – taxa facing a very high risk of extinction in the wild in the near future
- Vulnerable (VU) – taxa facing a high risk of extinction in the wild in the medium-term
- Conservation Dependent (CD)[1] – taxa whose survival depends upon ongoing conservation measures; without these measures, a conservation dependent taxon would be classified as Vulnerable, Endangered or Critically Endangered.

Ecological communities are defined as 'naturally occurring biological assemblages that occur in a particular type of habitat' (English & Blyth 1997). There are three categories under which ecological communities can be listed as TECs under the EPBC Act: Critically Endangered, Endangered and Vulnerable.

2.2 STATE

2.2.1 Threatened and Priority species

In WA, the State BC Act provides for the listing of Threatened flora species (Government of Western Australia 2018) in the following categories:

- Critically Endangered (CR) – species facing an extremely high risk of extinction in the wild in the immediate future[2]
- Endangered (EN) – species facing a very high risk of extinction in the wild in the near future[2]

[1] Species listed as Extinct and Conservation Dependent are not matters of NES and therefore do not trigger the EPBC Act.

[2] As determined in accordance with criteria set out in the ministerial guidelines.

- Vulnerable (VU) – species facing a high risk of extinction in the wild in the medium term future[2].

The Department of Biodiversity, Conservation and Attractions (DBCA) administers the BC Act and also maintains a non-statutory list of Priority flora. Priority species are still considered to be of conservation significance – that is they may be Threatened – but cannot be considered for listing under the BC Act until there is adequate understanding of threat levels imposed on them. Species on the Priority flora list are assigned to one of four Priority (P) categories, P1 (highest) – P4 (lowest), based on level of knowledge/concern.

2.2.2 Critical habitat

Under the State BC Act, habitat is eligible for listing as critical habitat if it is critical to the survival of a Threatened species or a TEC and its listing is otherwise in accordance with the ministerial guidelines.

2.2.3 Threatened and Priority Ecological Communities

The BC Act provides for the listing of TECs in the following categories:

- Critically Endangered – facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future[2]
- Endangered – facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future[2]
- Vulnerable – facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium term future[2].

An ecological community may be listed as a collapsed ecological community under the BC Act if there is no reasonable doubt that the last occurrence of the ecological community has collapsed or the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure.

The DBCA also maintains a non-statutory list of Priority Ecological Communities (PECs), which may become TECs in the future; however, do not currently meet survey criteria or that are not adequately defined. PECs are assigned to one of five categories depending on their priority for survey or definition, with Priority 1 of highest concern and Priority 5 of lowest concern.

2.2.4 Other significant flora and vegetation

Under the EPA's environmental factor guidelines, flora and vegetation may be considered significant for a range of reasons other than listing as a Threatened or Priority species or ecological community.

In addition to listing as Threatened or Priority, EPA (2016a) identifies the following:

- flora may be significant for
    - local endemism or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
    - new species or anomalous features that indicate a potential new species
    - representing the range of a species (particularly at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
    - being unusual species, including restricted subspecies, varieties or naturally occurring hybrids
    - having relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape
- vegetation may be significant for:

- having restricted distribution
- subject to a degree of historical impact from threatening processes
- having a role as a refuge
- providing an important function required to maintain ecological integrity of a significant ecosystem.

Provided in the guide for assessment of applications to clear native vegetation DER (2014) is a scale for assessing the bioregional conservation status of ecological vegetation classes (Table 2-1).

Table 2-1 Bioregional conservation status of ecological vegetation classes

Conservation status	Description
Presumed extinct	Probably no longer present in the bioregion
Endangered*	Less than 10% of pre-European extent remains
Vulnerable*	10-30% of pre-European extent exists
Depleted*	More than 30% and up to 50% pre-European extent exists
Least concern	More than 50% of pre-European extent exists and subject to little or no degradation over a majority of this area

*or a combination of depletion, loss of quality, current threats and rarity gives a comparable status.

2.2.5 Environmentally Sensitive Areas

Under section 51B of the EP Act the Minister for Environment may declare by notice either a specified area of the State or a class of areas of the State to be Environmentally Sensitive Areas (ESAs). ESAs are declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, which was gazetted on 8th April 2005 (Government of Western Australia 2005).

ESAs are areas where the vegetation has high conservation value. Several types of areas are declared ESAs including:

- the area covered by vegetation within 50 metres (m) of Threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the Threatened flora is located
- the area covered by a TEC
- a defined wetland (Ramsar wetlands, conservation category wetlands and nationally important wetlands) and the area within 50 m of the wetland
- Bush Forever sites.

2.2.6 Introduced flora

Introduced flora (weeds) pose threats to biodiversity and natural values by successfully out-competing native species for available nutrients, water, space and sunlight; reducing the natural structural and biological diversity by smothering native plants or preventing them from growing back after clearing, fire or other disturbance; replacing the native plants that animals use for shelter, food and nesting; and altering fire regimes, often making fires hotter and more destructive (Australian Weeds Committee 2007).

Management of some weed species is required under Commonwealth or State frameworks. Key classifications for significant introduced flora that are relevant to this report are:

- Declared Pest – the *Biosecurity and Agriculture Management Act 2007*, Section 22 makes provision for a plant taxon to be listed as a Declared Pest organism in parts of, or the entire State. Under the Biosecurity and Agriculture Management Regulations 2013 Declared Pests

are assigned to one of three control categories that dictate the level of management required (DPIRD 2019).

- Weed of National Significance (WoNS) – high impact, established introduced flora causing major economic, environmental, social and/or cultural impacts in a number of states/territories, and which have strong potential for further spread (Australian Weeds Committee 2012). Management is required in accordance with Department of Primary Industries and Regional Development (DPIRD) guidelines for particular WoNS.

Throughout this report, introduced flora species are indicated with an asterisk (*).

3 EXISTING ENVIRONMENT

3.1 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia's landscapes into large 'bioregions' and 'subregions' based on climate, geology, landform, native vegetation and species information (DoEE 2016). The study area is located in the Roebourne subregion (PIL4) of the Pilbara bioregion (Figure 3-1) which is characterised as (Kendrick & Stanley 2001)

"Quaternary alluvial and older colluvial coastal and subcoastal plains with a grass savannah of mixed bunch and hummock grasses and dwarf shrubsteppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, Sporobolus and mangal occur in the marine alluvial flats and river deltas."

3.2 LAND SYSTEMS AND SURFACE GEOLOGY

DPIRD undertakes land system mapping for WA using a nesting soil-landscape mapping hierarchy (Schoknecht & Payne 2011). While the primary purpose of the mapping is to inform pastoral and agricultural land capability, it is also useful for informing biological assessments. Under this hierarchy, land systems are defined as areas with recurring patterns of landforms, soils, vegetation and drainage (Payne & Leighton 2004).

The study area intersects two land systems and is almost entirely dominated by the Uaroo System (Payne & Leighton 2004) (Table 3-1; Figure 3-2).

Table 3-1 Land systems and extent in study area

Land system	Description	Area (ha)	% of study area
Uaroo System	Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered *Acacia* shrubs.	1,474.0	99.8
Littoral System	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.	2.3	0.2
	Total	**1,476.3**	**100.0**

According to the Surface Geology of Australia 1:1,000,000 scale, WA database Stewart *et al.* (2008) the study area intersects one geological formation (Table 3-2; Figure 3-3).

Table 3-2 Surface geology of the study area, extent by deposit type

Surface geology	Abbreviation	Description	Area (ha)	% of study area
Alluvium 38485	Qa	Channel and flood plain alluvium; gravel, sand silt, clay, locally calcreted.	1476.3	100.0
		Total	**1476.3**	**100.0**

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
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Map author	LB

0 20 40
Kilometers

1:1,155,400(at A4) GDA 1994 MGA Zone 50

Study area

Region, subregion

- Dampierland, Pindanland
- Great Sandy Desert, McLarty
- Pilbara, Chichester
- Pilbara, Fortescue
- Pilbara, Roebourne

Figure 3-1

Study area in relation to IBRA bioregions and subregions

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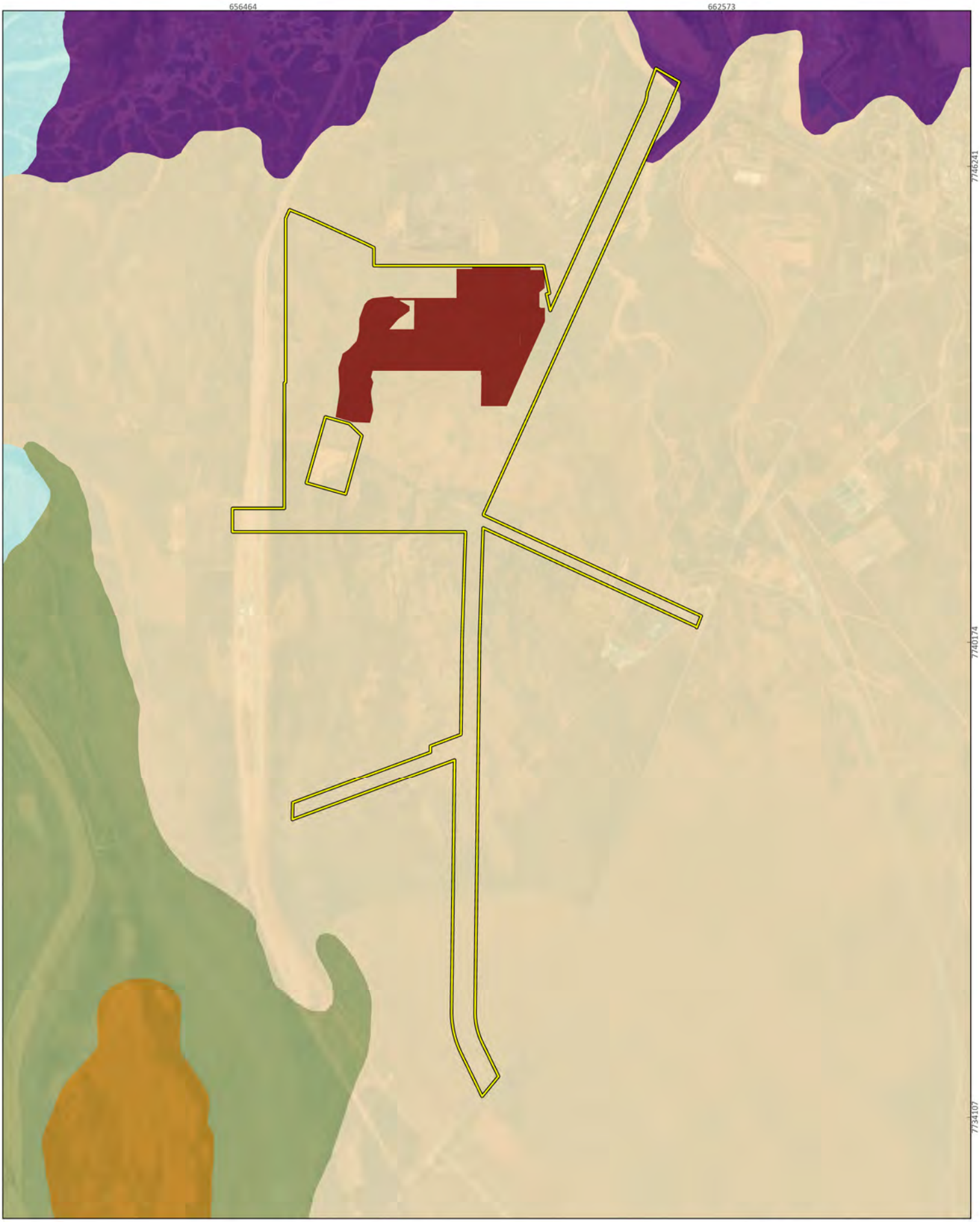

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
Date	7/03/2024
Drawn by	FK
Map author	LB

0 1 2
Kilometers

1:62,400(at A4) GDA 1994 MGA Zone 50

- Study area
- Indicative disturbance footprint

Land systems

- Littoral System
- Mallina System
- River System
- Uaroo System
- Yamerina System

Figure 3-2

Land systems in the study area

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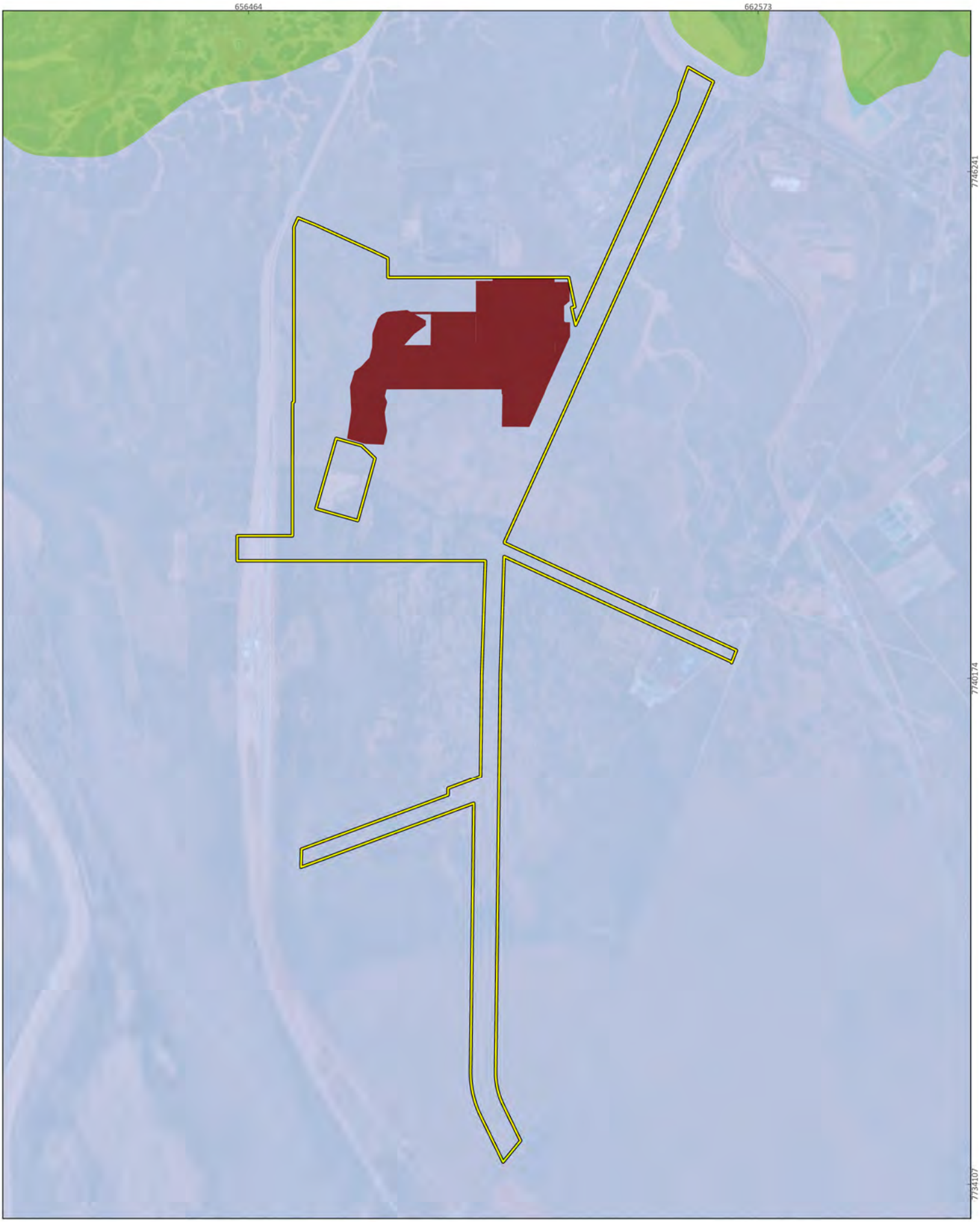

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
Date	7/03/2024
Drawn by	FK
Map author	LB

0 1 2
Kilometers

1:58,600(at A4) GDA 1994 MGA Zone 50

Study area

Indicative disturbance footprint

Surface geology

Qa

Qe

Figure 3-3

Surface geology in the study area

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3.3 CLIMATE AND WEATHER

The climate of the Roebourne subregion is described as arid (semi-desert) tropical with highly variable rainfall, falling mainly in summer (Kendrick & Stanley 2001). The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection and recent historic climate data is Port Hedland Airport (no. 004032), Latitude: 20.37°S Longitude 118.63°E), located 12km north-east of the study area.

Port Hedland Airport records the highest mean maximum monthly temperature (37.7°C) in December 2022 (lowest in July 2022, 27.8°C) and the lowest minimum mean monthly temperature (11.6°C) in July 2022 (highest in February 2023, 27.2°C) (BoM 2024)(Figure 3-4). The total rainfall the year preceding the survey was 306 mm compared to the historical annual mean of 318.5 mm, which is marginally lower than the mean. May 2022 recorded the highest total rainfall with 123.8 mm (Figure 3-4).

Daily mean temperatures at Port Hedland Airport in the 3 months preceding the surveys were on average consistent with the long-term averages for the region (Figure 3-4). The average mean maximum and minimum temperatures were between 0.3°C and 1.3°C warmer than the long-term averages, respectively. Daily maximum temperatures during the survey ranged from 31.7°C to 34.9°C, and daily minimum temperatures from 15.6°C to 25.4°C. However, notably in the final 7 months preceding the survey, the mean maximum temperature was inconsistent with the historical data trendline.

Records from Port Hedland Airport show that total rainfall between February-April 2023 (74.4 mm) was less than half of the historical data during the same months (165.4 mm) (Figure 3-4).

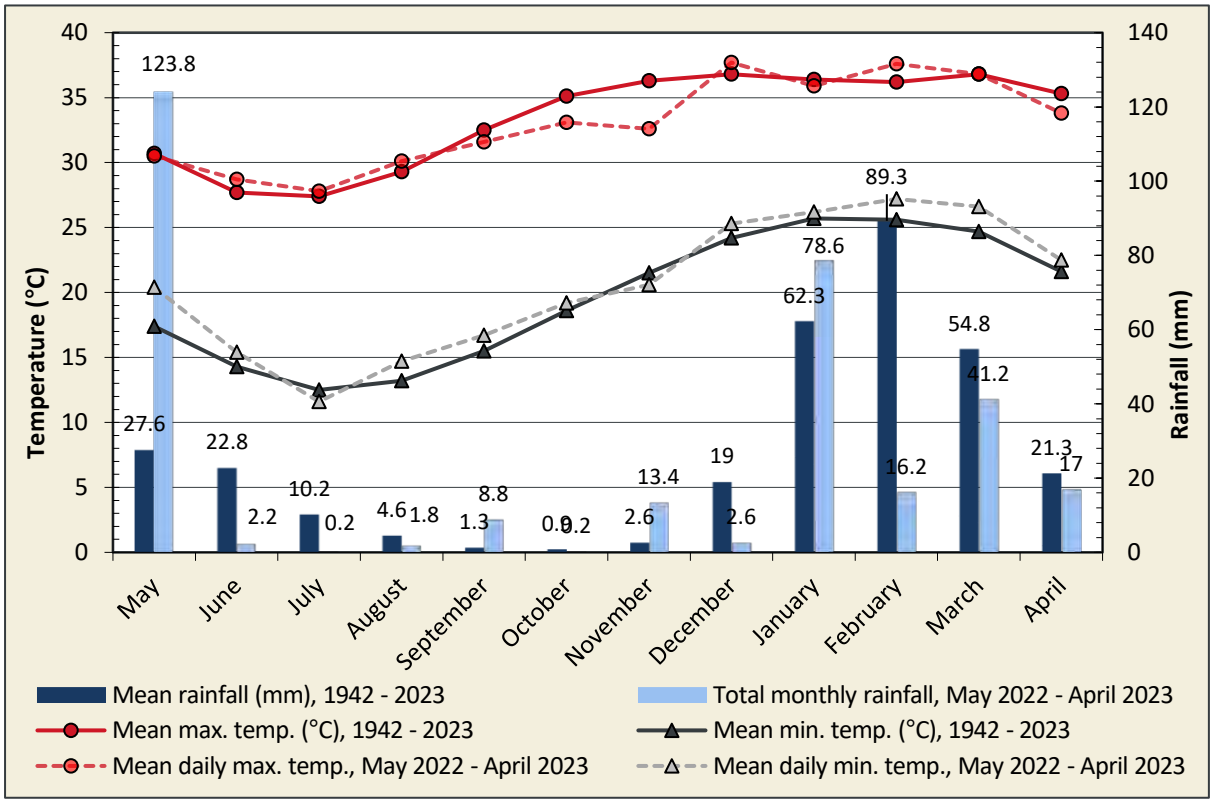


Figure 3-4 **Annual climate and weather data for Port Hedland Airport (no. 004032) and mean monthly data for the 12 months preceding the Autumn survey (BoM 2024)**

Port Hedland Airport recorded the highest mean maximum monthly temperature (37.7°C) in December 2022 (lowest in June 2023, 27.4°C) and the lowest minimum mean monthly temperature (12.8°C) in July 2023 (highest in February 2023, 27.2°C) (BoM 2024)(Figure 3-5) The total rainfall the year preceding the survey was 186.4 mm compared to the historical annual mean of 318.5 mm, which is substantially lower than the mean. January 2023 recorded the highest total rainfall with 78.6 mm (Figure 3-5).

Daily mean temperatures at Port Hedland Airport in the 3 months preceding the surveys were on average hotter than the long-term averages for the region (Figure 3-5). Both minimum and maximum temperatures in July were consistent with the historical data. September and August temperatures rose, mean maximum temperatures in the final two months were higher by 3°C when compared to historical data, the mean minimum temperatures in the final two months were approximately 2.5°C higher than the historical data.

Records from Port Hedland Airport show total rainfall between July-September 2023 (0.2 mm) was less than historical data during the same months (16.1 mm). Total annual rainfall for 2022-2023 (186.4 mm) averaged just over half of the historical mean (318.5) (Figure 3-5). Rainfall in the Pilbara is variable (Sudmeyer 2016). In the Port Hedland Airport Station, the highest and lowest mean rainfall records from 1942 -2023 are 713.2 mm and 44.5 mm respectively. Thus, the low annual rainfall registered in the period from 2022 – 2023 is not considered unusual.

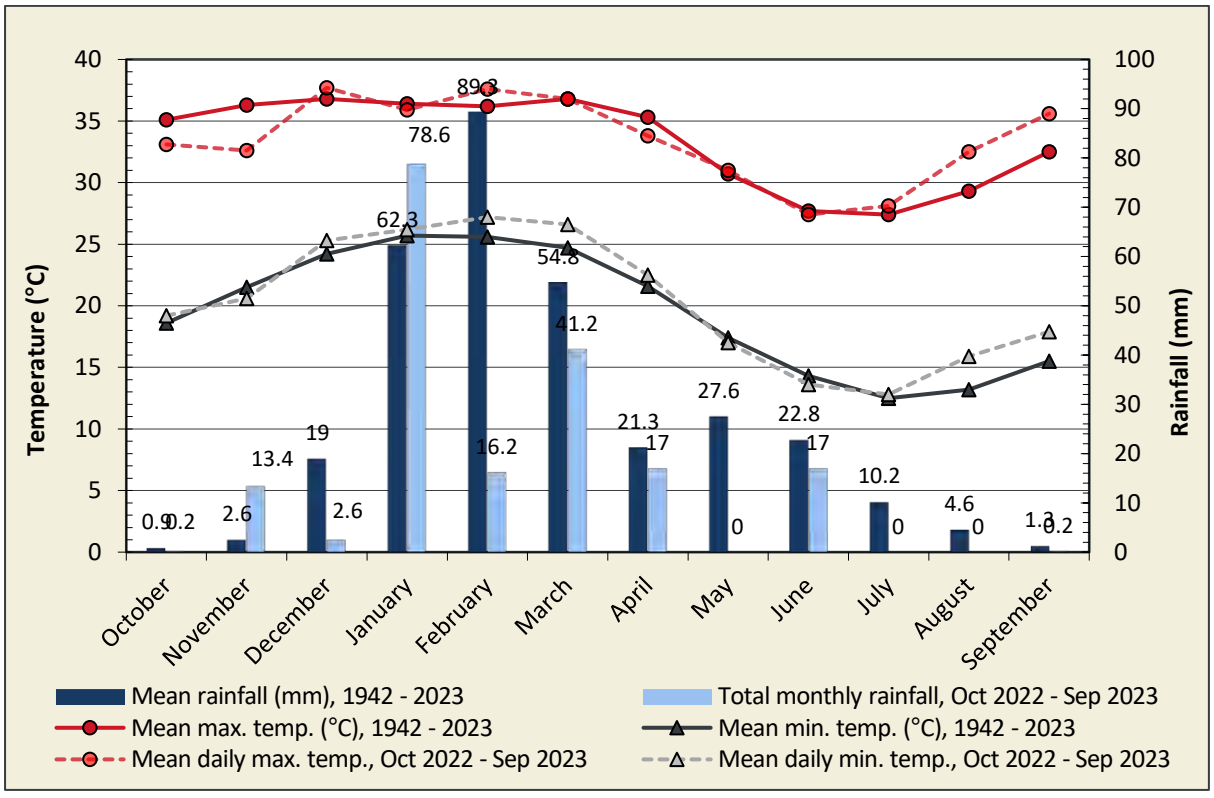


Figure 3-5 **Annual climate and weather data for Port Hedland Airport (no. 004032) and mean monthly data for the 12 months preceding the Spring survey (BoM 2024)**

3.4 LAND USE

The dominant land use of the PIL4 subregion comprises grazing (native pastures), Aboriginal lands and reserves, conservation, mining leases and urban development (Kendrick & Stanley 2001). As per land use summaries extracted from the Australian Bureau of Agricultural and Resource Economics and Sciences ABARES (2018) and summarised in Table 3-3, 'production from relatively natural environments' and 'conservation and natural environments' are the dominant land use components

comprising the PIL4 subregion. The majority of the study area is covered by the area allocated as the 'Boodarie Strategic Industrial Area. Land use across the study area is subject to similar usages (and proportional area) to the PIL4 subregion; the dominant secondary components represent 'grazing native vegetation' (1,008.5 ha, 68.3%) and 'other minimal uses' (461.1 ha, 31.2%), which does not have any formal environmental protection. The Port Hedland and South Hedland power stations and a pipe stockyard are situated adjacent to the study area to the east.

Table 3-3 Land use of the study area, according to ABARES (2018)

Land use	PIL4 subregion		Study area	
	Area (ha)	% of PIL4	Area (ha)	% of study area
Conservation and natural environments	492,279.8	26.5	461.1	31.2
Intensive uses	8,481.1	0.5	4.2	0.3
Production from dryland agriculture and plantations	367.7	<0.01	-	-
Production from irrigated agriculture and plantations	0.4	<0.01	-	-
Production from relatively natural environments	1,302,639.7	70.1	1,008.7	68.3
Water	54,528.3	2.9	2.3	0.2
Total	**1,858,297.0**	**100.0**	**1,476.3**	**100.0**

3.5 CONSERVATION RESERVES AND ESAS

No conservation reserves intersect the study area or occur within the 40 km desktop search extent. The nearest conservation reserves are Mungaroona Range Nature Reserve and Eighty Mile Beach Marine Park, located approximately 101 km south-southwest and 110 km north-west from the study area boundary, respectively (Figure 1-1). No DBCA lands of interest proposed for conservation occur near the study area.

A total of 8 ESAs occur within the 40 km desktop search extent (Figure 1-1). All of the 8 ESA's can be characterised as coastal. This indicates that these ESAs are not relevant to the study area, as it is not considered to be coastal (Figure 1-1).

4 METHODS

The detailed flora survey was conducted in accordance with relevant survey guidelines and guidance, including:

- *EPA Environmental Factor Guideline: Flora and vegetation* (EPA 2016a)
- *EPA Technical Guidance: Flora and vegetation surveys for Environmental Impact Assessment* (EPA 2016b)

4.1 DESKTOP REVIEW

Searches of several biological databases were undertaken to identify and prepare lists of significant flora and vegetation that may occur within the study area (Table 4-1). A literature search was conducted for accessible reports for biological surveys conducted within 40 km of the study area to build on the lists developed from the database searches (Table 4-2).

Table 4-1 Database searches conducted for the desktop review

Database	Target group/s	Search coordinates and extent
Protected Matters Search Tool (DCCEEW 2023)	EPBC Act Threatened flora and ecological communities	Study area plus 40 km buffer
DBCA Threatened and Priority Flora Database (DBCA 2023c)	Threatened and Priority flora	Study area plus a 40 km buffer
DBCA Threatened and Priority Ecological Communities Database (DBCA 2023b)	TECs and PECs	Study area plus a 40 km buffer
DBCA NatureMap Database (DBCA 2023a)	Flora records	Study area plus a 40 km buffer

Table 4-2 Survey reports included in the desktop review

Report author	Survey description	Project
Phoenix Environmental Sciences (2022)	Baseline flora and vegetation survey	Port Hedland Solar Farm Project
ENV (2011)	Detailed flora and vegetation assessment	Port Hedland region
Emerge Associates (2019)	Reconnaissance Flora and vegetation assessment	Port Hedland International Airport
GHD (2016)	Reconnaissance Flora and vegetation assessment	Roy Hill Port Facility
GHD (2020)	Level 1 fauna and reconnaissance flora survey	Windfence
Biota (2008)	Targeted survey and vegetation mapping	Utah Point Berth Development
Biota (2004)	Detailed flora and vegetation assessment	FMG Stage A Rail Corridor

4.2 FIELD SURVEY

4.2.1 Survey timing

Field survey dates are provided in Table 4-3.

Table 4-3 Survey dates

Survey type	Season	Dates
Flora and vegetation detailed survey, phase 1	Autumn	15 – 19 April 2023
Targeted searches for significant flora	Autumn	19 April 2023
Flora and vegetation detailed survey, phase 2	Spring	13 – 15 September 2023
Targeted searches for significant flora	Spring	15 September 2023

4.2.2 Flora and vegetation

Field methods for the flora and vegetation survey of the survey area included:

- surveying of quadrats (see 4.2.2.1)
- targeted searches for significant flora (4.2.2.2)
- vegetation type and condition mapping (4.2.2.3, 4.2.2.4)
- TEC/PEC assessment (4.2.2.5).

Prior to the commencement of the field survey, data including satellite imagery, survey boundary, and pre-selected vegetation quadrats were loaded onto electronic field devices. The field survey involved assessing and mapping vegetation boundaries, conducting quadrat sampling and collecting opportunistic flora specimens. GPS locations of vegetation and condition boundaries, survey sites and flora specimen data were recorded digitally.

4.2.2.1 Quadrats

Quadrat locations were selected to ensure that an accurate representation of the major vegetation types within the study area were sampled adequately, with a minimum of at least three quadrats per vegetation type. Two methods were used for the selection of quadrat placement within the study area. Preliminary quadrat locations were pre-selected using aerial photography, with selection based on apparent changes in the vegetation visible in the aerial imagery. Final quadrat placement was determined in the field while ground-truthing the study area on foot.

In total, 41 quadrats were surveyed across the study area (Figure 4-1; Appendix 1).

Quadrat sampling dimensions were 50 m x 50 m in accordance with EPA guidance for the Eremaean Botanical Province. The following information was recorded for each quadrat (Appendix 2)

- location – the geographic coordinates of all four corners of the quadrat in WGS84 projection
- description of vegetation – a broad description utilising the structural formation and height classes based on National Vegetation Information System ESCAVI (2003) and in accordance with EPA (2016b) (Appendix 3)
- habitat – a brief description of landform and habitat

- geology – a broad description of surface soil type and rock type
- disturbance history – a description of any observed disturbance including an estimate of time since last fire, weed invasions, soil disturbance, human activity and fauna activity
- vegetation condition – using the condition scale in EPA (2016b) for the Eremaean Botanical Province
- height and percentage foliage cover (PFC) – a visual estimate of cover of total vegetation cover, cover of shrubs and trees >2 m tall, cover of shrubs <2 m, total grass cover and total herb cover
- photograph – a colour photograph of the vegetation within each quadrat in a south-easterly direction from the north-west corner of the quadrat
- flora species list – comprehensive list of all flora species recorded within the quadrat.

To ensure accurate taxonomic identification of flora species present within the study area, collections were made of each specimen at least once and each collection was pressed and documented for identification using the WA Herbarium resources.

For each species identified, records on FloraBase and the Australasian Virtual Herbarium were consulted to provide information on known ranges to determine whether the survey area represented a range extension for the species.

4.2.2.2 Targeted flora searches

Targeted searches were undertaken for significant flora (Threatened and Priority), Declared Pests and WoNS. Remnant vegetation was traversed by foot in meandering transects with the searches focused on habitats considered likely to support significant flora.

If a flora species was considered to potentially be a significant species (i.e. similar floristic characteristics and occurring within suitable habitat) the following information was collected:

- GPS coordinates, including population boundary where applicable
- description of the habitat and floristic community in which the potential significant species was located
- population size estimate (i.e. estimated number of individual plants) where applicable
- specimen collection for taxonomic identification and lodgement to the WA Herbarium
- photograph of live plant in situ and description of important details, such as flower colour, height of individual or average height of population.

Following the field survey, the likelihood of occurrence for each significant flora species identified in the desktop review was assessed and assigned to one of three ratings:

- recorded – species recorded within the study area by previous or current survey
- possible – study area within known range of species; potential habitat within the study area, records within 5 km of study area and may not have been detectible during survey (e.g. survey conducted outside flowering period, annual plant survey conducted outside likely period of occurrence, small herbaceous plant in dense vegetation), or entire area of habitat not thoroughly searched
- unlikely – study area outside known range of species and/or no suitable habitat present in study area and/or suitable/potential habitat present but study area considered adequately searched for the species.

4.2.2.3 Vegetation type mapping

Vegetation mapping was undertaken at a scale of 1:10,000 using the National Vegetation Information System (NVIS) sub-association level (L5) for structural descriptions (ESCAVI 2003). The vegetation descriptions from quadrats from the survey were grouped according to similarity of community structure (i.e. canopy levels), species composition and combination of species and the prevalent community structure (i.e. woodland, shrubland, etc.). The vegetation boundaries were mapped utilising QGIS ESRI imagery and from vegetation boundaries recorded on GPS during the field survey.

To support delineation of vegetation types, a cluster analysis was conducted based on species presence in each quadrat. The fusion strategy for the site classification was flexible UPGMA with a beta value of -0.1 and Bray Curtis association measure in the software package PATN (Belbin 2003). A dendrogram was produced to illustrate the similarities between the vegetation units identified. Statistically distinct vegetation units (the floristic group) classified the vegetation at a local scale. Local scale vegetation units were described at NVIS Level V – Association (ESCAVI 2003). The term 'vegetation type' was used for local scale vegetation units in accordance with EPA technical guidance (EPA 2016b).

Quadrat BI020 was excluded from the vegetation analysis. The target vegetation to sample was too small and mixed with the adjacent vegetation types for PATN to include coherently the site into a branch.

4.2.2.4 Vegetation condition mapping

The condition of vegetation was mapped across the study area based on the appropriate condition scale for the Eremaean Botanical Province (EPA 2016b; Trudgen 1988) (Table 4-4). The vegetation condition ratings relate to vegetation structure, the level of disturbance and weed cover at each structural layer and the ability of the vegetation unit to regenerate. Vegetation condition ranges from Excellent being the highest rating to Completely Degraded as the lowest.

Completely cleared areas (e.g. roads, tracks, paddocks) were excluded from condition ratings and mapped as 'not assessed'.

Table 4-4 Vegetation condition rating scale (EPA 2016b)

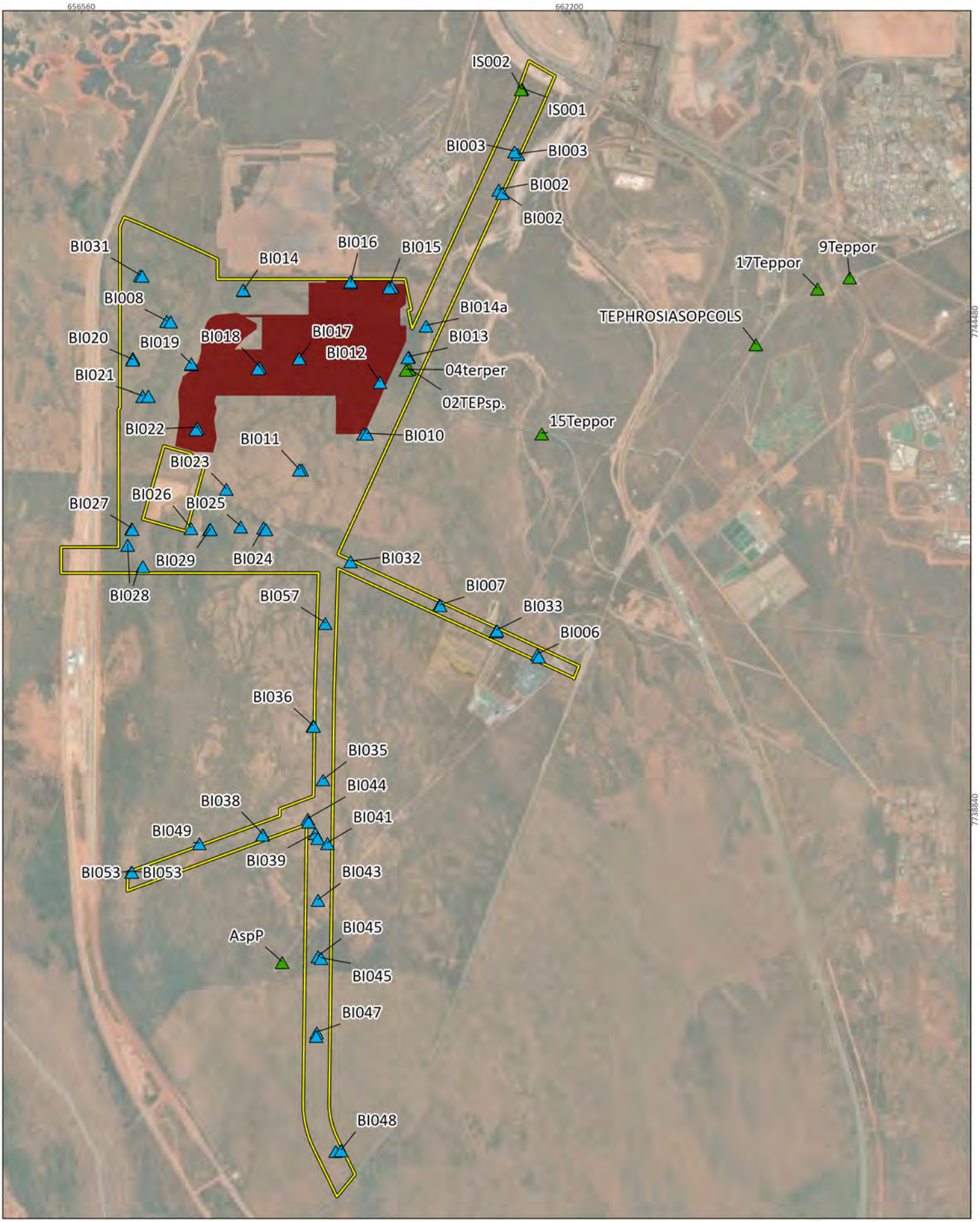
Condition rating	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

4.2.2.5 TEC/PEC assessment

The presence/absence of TECs and PECs was assessed by comparing the DBCA database with the observations made in the field, as well as with statistical analysis interpretation of significant vegetation types.

4.2.2.6 Analysis of survey completeness

A species accumulation curve based on accumulated species versus number of sites surveyed was used to evaluate the level of adequacy of the survey effort. The species accumulation curve was generated by inputting the site-species matrix into Phoenix's proprietary spreadsheet.



Western Australia

PERTH

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
Date	11/12/2024
Drawn by	JL
Map author	LB

0 1 2
Kilometers

1:56,500(at A4) GDA 1994 MGA Zone 50

Study area

Indicative disturbance footprint

Site type

Individual specimen

Quadrat

Figure 4-1

Flora and vegetation survey sites

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4.2.3 Assessment personnel

The personnel involved in the assessment and field surveys are listed in Table 4-5. All survey work was carried out under relevant licences issued by DBCA under the BC Act.

Table 4-5 Survey personnel

Name	Permit	Qualifications	Role/s
Dr Grant Wells	FB62000538; TFL2324-0016	PhD (Botany)	Quality assurance, reporting, and field survey
Natasha Rogers	FB62000518; TFL 2223-0135	Bachelor of Science	Field survey, reporting, and logistics
Luis Buchan Rivas	FB62000514; TFL 2324-0018	Grad Dip in Science (Biodiversity Science)	Field survey, reporting, data analysis, and mapping
Calvin Williams	FB62000525; TFL 2324-0015	Bachelor of Environmental Science	Field survey
Sarah Woodiss-Field	FB62000479	BSc (Zool. And Cons. Biol)	Field survey
Gemma Maling	FB62000528	BSc Environmental Restoration	Field survey
Dr Andrew Perkins	N/A	PhD (Botany)	Taxonomy
Frank Obbens	N/A	BSc. Hons (Biology)	Taxonomy
Brigitte Kovar	N/A	Msc (Geo. Int.)	Map production
Jade Larkman	N/A	Bachelor of Science (Environmental Science)	Map production

5 RESULTS

5.1 DESKTOP REVIEW

5.1.1 Flora and vegetation

5.1.1.1 Flora assemblage

The desktop review identified records of 544 flora taxa within the 40 km desktop search extent, comprising of 485 native species and 60 introduced species. The taxa representing 228 genera and 72 families. The most prominent families were the Fabaceae (103 spp.; 18.9%), Poaceae (94 spp.; 17.3%), Malvaceae (41 spp.; 7.5%), and Amaranthaceae (32 spp.; 5.9%).

A detailed survey of the proposed Port Hedland Solar Farm by Phoenix Environmental Sciences (2022) conducted 19 quadrats and 11 relevé surveys within an area of 670.37 ha. A total of 146 taxa were recorded representing 38 families and 88 genera with 140 native species and 6 introduced flora. The most prominent families were Poaceae, Fabaceae, Malvaceae and Convolvulaceae. No Declared Pests or WoNS were recorded during the survey but three declared pests, **Calotropis procera, *Opuntia stricta* (WoNs) and **Tamarix aphylla* (WoNs) were identified in the desktop assessment.

A regional survey of the Port Hedland area ENV (2011) conducted 158 quadrats and 3 relevé surveys within an area of 80,874 ha. A total of 388 taxa were recorded from 55 families and 152 genera with 326 native species and 12 introduced flora. The most prominent families were Fabaceae (71), Poaceae (51), Malvaceae (29), Amaranthaceae (18) and Cyperaceae (15). No Declared Pests or WoNS were recorded during the survey.

A reconnaissance survey of an area of the Port Hedland airport Emerge Associates (2019) conducted 5 10 x 10 m^2 quadrats for detailed vegetation sampling and opportunistic collections within an area of 37.99 ha. A total of 43 species were recorded representing 16 Families and 31 genera with 38 native species and 5 introduced flora. The most prominent families were Poaceae (9), Fabaceae (6) Amaranthaceae (5) and Asteraceae (4). One Declared Pest **Calotropis procera* was recorded.

A reconnaissance survey of a port facility GHD (2016) conducted transects and opportunistic collecting sampling within an area of 27.13 ha. A total of 28 species were recorded from 15 families and 23 genera with 25 native species and 3 introduced flora. The most prominent families were Poaceae (6), Fabaceae (5) and Chenopodiaceae (4). No Declared Pests or WoNS were recorded.

A reconnaissance survey of Port Wind Fence Survey Area on Finucane Island GHD (2020) conducted 5 relevés and transect sampling within an area of 3.77 ha. A total of 47 taxa were recorded representing 30 families and 39 genera with 42 native species and 5 introduced flora. The most prominent families were Fabaceae, Poaceae and Chenopodiaceae. One declared pest **Coccinia grandis* was recorded.

A targeted survey at Port Hedland port at Utah Point on Finucane Island Biota (2008) conducted systematic searches for rare flora within an area of 349.7 ha. A total of 115 taxa were recorded representing 35 families and 77 genera with 110 native species and 5 introduced flora. The most prominent families were Fabaceae (21), Poaceae (16), Convolvulaceae (7) and Malvaceae (7). No Declared Pests or WoNS were recorded.

A detailed survey of a proposed new port in Port Hedland and railway leading to Weeli Wolli Creek Biota (2004) conducted 97 quadrats and over 30 relevés. A total of 762 taxa were recorded representing 69 families and 233 genera with 751 native species and 11 introduced flora. The most prominent families were Fabaceae (140), Poaceae (125), Malvaceae (66) and Chenopodiaceae (37). No Declared Pests or WoNS were recorded. Due to the nature of this survey because it's a long corridor that extended for approximately 345 km SE, much of the results from this survey are not applicable to this desktop review.

5.1.1.2 Significant flora

Records of 13 significant flora species were identified within the desktop search extent (Table 5-1; Figure 5-1). No Threatened flora listed under the EPBC Act and/or BC Act were identified, 12 Priority flora listed by the DBCA were identified. The remaining significant species recorded was a locally significant species *Phyllanthus* sp. B Kimberley Flora.

There were no records of significant flora within the study area, however 7 records were within 5 km of the study area (Figure 5-1). Taking into consideration the proximity of known records and preferred habitat of each significant species it was considered that 8 species may occur in the project.

Emerge Associates (2019); (GHD 2016, 2020) didn't record any conservation significant species.

Phoenix Environmental Sciences (2022) recorded no Threatened or Priority species but did collect one locally significant species *Phyllanthus* sp. B Kimberley Flora. In the Phoenix Environmental Sciences (2022) report, it is referred as *Phyllanthus* sp. 'Port Hedland Solar Farm'. This species is deemed locally significant in this desktop review as there are only 6 records of this species on Florabase and the Port Hedland specimen is a significant range extension and the southernmost record.

ENV (2011) recorded 4 Priority flora species, *Tephrosia* rosea var. Port Hedland (P1), *Gomphrena pusilla* (P2), *Abutilon* sp. Pritzelianum (P3) and *Euploca mutica* (P3).

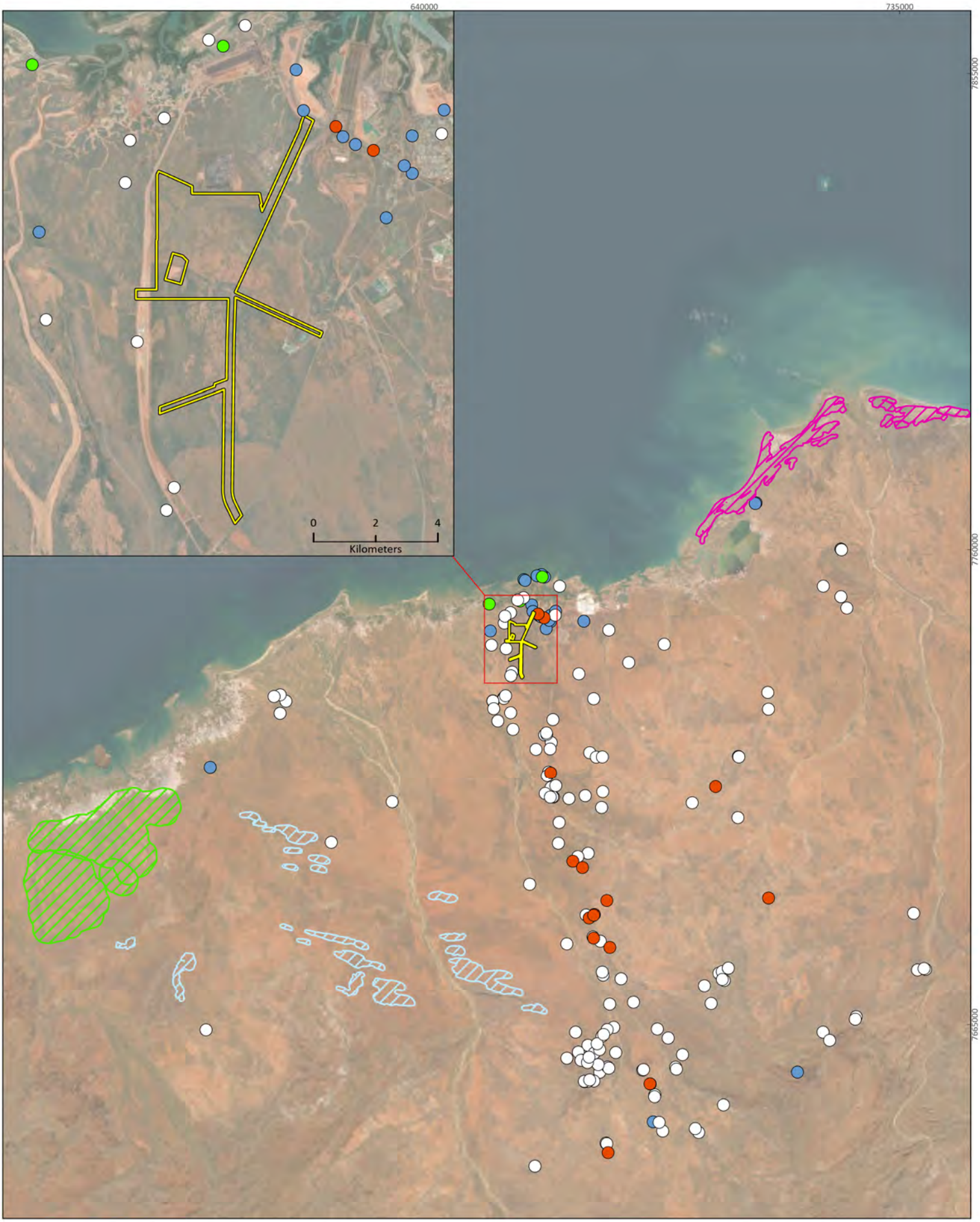
Biota (2008) recorded one priority species, *Bulbostylis burbidgeae* (P4) which they collected twice in a new habitat type that previously it wasn't known to occur in.

Biota (2004) recorded 7 species that maintain a priority listing, *Paspalidium retiglume* (P2), *Eremophila spongiocarpa* (P3), *Goodenia* sp. East Pilbara (P3), *Stylidium weeliwolli* (P3), *Gymnanthera cunninghamii* (P3), *Themeda* sp. Hamersley Station (P3) and *Bulbostylis burbidgeae* (P4). However, due to the nature of the study area, many of these species aren't applicable to the current survey and therefore 6 of the 7 species listed were not included in the desktop review.

Table 5-1 Significant flora identified in the desktop review

Species	Status	Proximity to study area (number of records within 40 km)	Habitat	Flowering times	Likelihood of occurrence in study area
Tephrosia rosea var. Port Hedland (A.S. George 1114)	P1 (DBCA)	2.4 km NE (24 records)	Predominantly recorded on coastal dunes but also in red sand plain in *Acacia* shrublands over *Triodia* hummock grasslands.	March, July, August, September, October	Possible, especially in northwest.
Gomphrena pusilla	P2 (DBCA)	5.8 km NW (5 records)	Grows in open Shrubland of *Acacia bivenosa* over open *Triodia epactia* hummock grassland of over an open tussock of *Cenchrus ciliaris* along limestone ridge tops on brown loam, exposed calcrete rock and calcareous coastal dunes.	March – April, June	Unlikely, as generally closer to the coast.
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	P3 (DBCA)	0.7 km S (33 records)	Grows in shrublands of *Acacia* sp. over *Triodia* hummock grasslands on sandy plains and floodplains in red-brown sandy clay loam soil.	April, July	Possible, suitable habitat is present.
Eragrostis crateriformis	P3 (DBCA)	0.42 km W (10 records)	Grows in low open woodlands over sparse *Acacia* shrublands over *Triodia* grasslands on red sandy clay loam soil associated with drainage lines, floodplains and clay pans.	January – May or July	Possible, suitable habitat is present.
Euphorbia clementii	P3 (DBCA)	37.5 km SSE of study area (27 records)	Grows in *Corymbia hamersleyana* woodland over *Acacia* spp. shrubland on undulating rocky plains, edges of minor drainage lines and in red-brown clay-loam with ironstone.	May - July	Unlikely, habitat may not be present.
Euploca mutica	P3 (DBCA)	8.7 km E (34 records)	Grows in *Acacia* shrubland over hummock grassland in sandy loam plains and floodplains.	May - November	Possible, suitable habitat is present.
Gomphrena leptophylla	P3 (DBCA)	1.8 km NW (1 record)	Grows in hummock grassland, *with Triodia epactia* and *T. secunda* along drainage lines and floodplains in red sandy loam soils.	March - September	Possible, suitable habitat may be present.

Species	Status	Proximity to study area (number of records within 40 km)	Habitat	Flowering times	Likelihood of occurrence in study area
Gymnanthera cunninghamii	P3 (DBCA)	4.8 km N (6 records)	Grows in *Eucalyptus*, *Melaleuca* and *Acacia* woodlands over mixed grasslands associated with riverbanks, creeks, drainage lines and floodplains.	January - December	Possible, suitable habitat may be present.
Rothia indica subsp. *australis*	P3 (DBCA)	15 km SE and E (5 records)	Grows in shrublands over *Triodia* hummock grasslands in red sandy to loamy soils.	April - August	Possible, suitable habitat is present.
Triodia chichesterensis	P3 (DBCA)	28 km SSE (3 records)	Grows in clay-loam soils frequently associated with quartzite on undulating plains and low rises in woodlands and shrublands over *Triodia* hummock grasslands.	April - June	Unlikely, habitat may not be present.
Bulbostylis burbidgeae	P4 (DBCA)	2.5 km NE (2 records)	Grows in *Triodia* hummock grasslands typically associated with granite boulders, hill tops and outcrops.	March or June - August	Unlikely, habitat may not be present.
Ptilotus mollis	P4 (DBCA)	22 km SSE (1 record)	Grows on iron outcropping, hill slopes in skeletal red/brown clay loam soils.	May or September	Unlikely, habitat may not be present.
Phyllanthus sp. B Kimberley Flora (T.E.H. Aplin et al. 809)	sp. nov.	1.5 km E (1 record)	Riparian vegetation with *Eucalyptus victrix*.	March	Possible, suitable habitat is present.



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Drawn by	JL
Map author	LB

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Kilometers

1:976,900(at A4) GDA 1994 MGA Zone 50

Study area

Status

- P1 (DBCA list)
- P2 (DBCA list)
- P3 (DBCA list)
- P4 (DBCA list)

TEC/PEC name, category

- Eighty Mile Land System, Priority 3
- Gregory Land System, Priority 3
- Horseflat Land System of the Roebourne Plains, Priority 3

Figure 5-1

Desktop records of significant flora and vegetation

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5.1.1.3 Introduced flora

The desktop review identified records of 60 introduced species within the desktop search extent (Appendix 4). Of those 60 introduced species, 6 are Declared Pests, and 3 are WoNs (Table 5-2; Appendix 4).

Table 5-2 Desktop records of significant weeds

Species	Declared Pest	WoNS
**Calotropis procera*	X	
**Coccinia grandis*	X	
**Indigofera hochstetteri*	X	
**Opuntia stricta*	X	X
**Parkinsonia aculeata*	X	X
**Tamarix aphylla*	X	X

5.1.1.4 Vegetation associations

Regional scale pre-European vegetation mapping for Western Australia (Beard *et al.* 2013; DPIRD 2018) identifies two vegetation associations mapped in the study area (Table 5-3, Figure 5-2). The remaining extent of both vegetation associations at the Statewide scale exceeds 99.5% and they are therefore considered of Least Concern (Table 5-3). None of vegetation association 647 is currently represented in DBCA lands (Government of Western Australia 2019).

Table 5-3 Statewide extent of Pre-European vegetation associations present in the study area (Government of Western Australia 2019)

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in DBCA lands (%)	% of study area
589, Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex	807,698.6	802,713.4	99.4	1.9	82.9
647, Hummock grasslands, dwarf-shrub steppe; *Acacia translucens* over soft spinifex	195,860.9	191,711.4	97.9	N/A	17

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Study area

Vegetation association

- Short bunch-grass savanna / Grass-steppe
- Shrub-steppe
- Tidal mud flat
- Woodland other

Figure 5-2
Vegetation associations of the study area

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5.1.1.5 Significant vegetation

The DBCA Threatened and Priority Ecological Communities database search identified the presence of one PEC within the desktop search extent (Figure 5-1; Table 5-4). This community does not intersect with the study area.

Table 5-4 TECs and PECs identified in the desktop review

Community name	Status	Proximity to study area	Description
Eighty Mile Land System	P3 (DBCA)	~36 km NE of study area	Beach foredunes, longitudinal coastal dunes and sandy plains with tussock grasslands and spinifex grasslands. Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, erosion, and weed invasion (buffel grass).

5.2 FIELD SURVEY

5.2.1 Flora and vegetation

5.2.1.1 Flora assemblage

A total of 140 flora taxa representing 36 families and 84 genera identified to species level were recorded in the study area during the field surveys (Appendix 5). Species richness ranged from 0 - 28 species between quadrats (Appendix 2, Appendix 5). The assemblage included 136 native species and 4 introduced species, including 118 perennial species, and 22 annual or short-lived species. The most prominent families recorded were Poaceae (28 spp.), Fabaceae (24 spp.), Convolvulaceae (11 spp.), and Malvaceae (11 spp.).

The species accumulation curve constructed to demonstrate survey completeness indicates that sufficient sites were surveyed to capture the flora present during the time of surveying the study area. The curve begins at 14, accounting for the 14 taxa recorded outside the quadrats, i.e. targeted searches, and opportunistic collections (Figure 5-3).

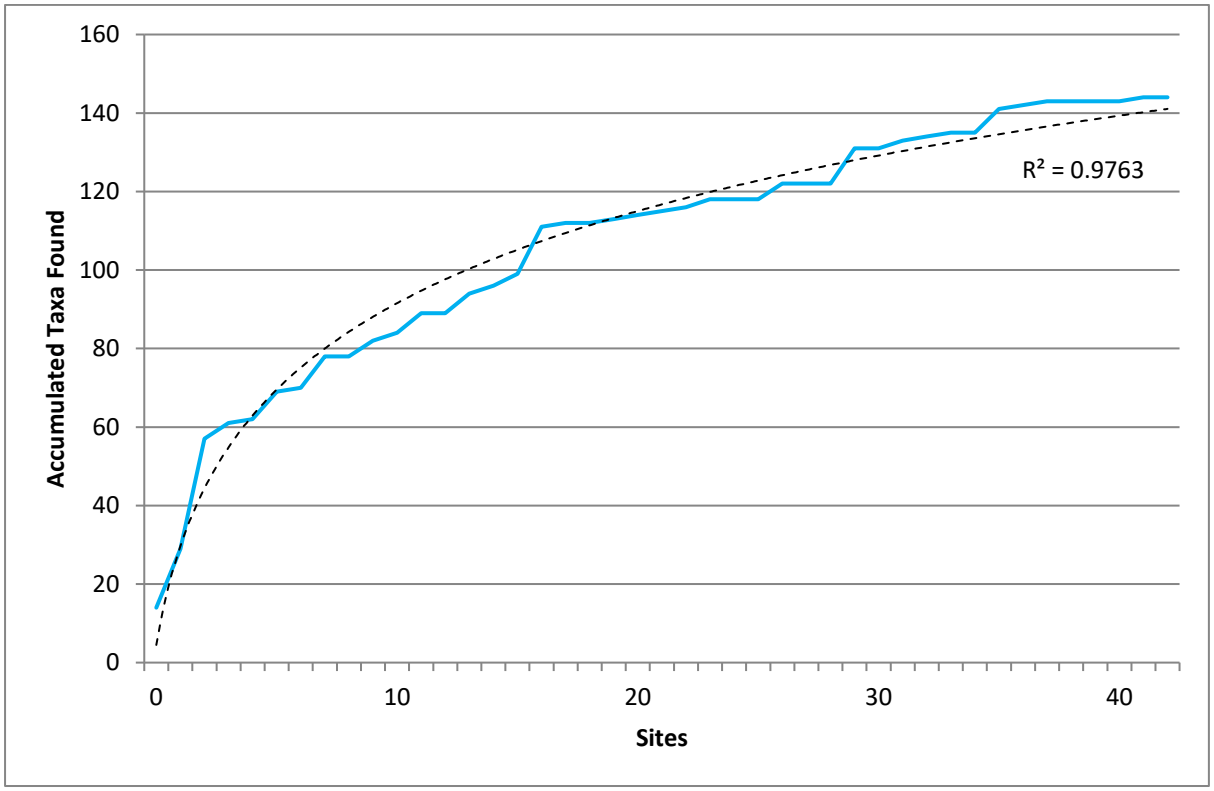

Figure 5-3 **Species accumulation curve for Phoenix survey sites. The accumulation curve is shown in blue in a solid line and the best-fit trendline is displayed as a dotted line**

5.2.1.2 Significant flora

One Priority flora was recorded during the field survey: *Tephrosia rosea* var. Port Hedland (A.S. George 1114), P1 (DBCA) (Table 5-5; Figure 5-4).

Significant range extensions were recorded for 3 species: *Eragrostis setifolia*, *Maireana georgei*, and *Santalum spicatum* (Table 5-5). Therefore, these records are also considered significant flora (refer to section 2.2.4).

The likelihood of occurrence assessment (section 4.2.2.2) for the remaining significant species identified in the desktop review (section 5.1.1.2) determined that 6 species may possibly occur and 7 species are unlikely to occur in the project (Table 5-6).

Table 5-5 Details of significant flora recorded during the field survey

Species	Status	WA Herbarium accession no.	Distribution and ecology	Survey records	Photograph
Tephrosia rosea var. Port Hedland (A.S. George 1114)	P1 (DBCA)	NA	Occurs in the northern Pilbara. Distributed across the following IBRA regions: Great Sandy Desert and Pilbara. (WA Herbarium 2024) Its suitable habitats include sand dunes, sandy plains, and road verges. Its suitable habitat consistently shows the presence of sand in the soil texture with listings of reddish-brown sand, coastal dunes sands, yellow deep sands, red sand, and red-brown loamy sand soil. This species is described in the Florabase records as abundant when present, with individuals' frequencies often describing more than 50 and up to 300 individuals at a site of collection.	49 plants recorded at 6 locations, with only one population occurring within the study area. This species was recorded on road verges on plains with red-brown loamy sand.	 (Phoenix 2024)

Species	Status	WA Herbarium accession no.	Distribution and ecology	Survey records	Photograph
Eragrostis setifolia	RE 150 km NE of the nearest record	NA	Occurring in most of the state, *E. setifolia* is distributed across the following IBRA Regions: Carnarvon, Central Ranges, Coolgardie, Dampierland, Gascoyne, Geraldton Sandplains, Gibson Desert, Great Sandy Desert, Great Victoria Desert, Little Sandy Desert, Murchison, Nullarbor, Ord Victoria Plain, Pilbara, Tanami and Yalgoo (WA Herbarium 2024). Its habitat ranges from claypans and slopes to creek banks, and depressions. It occurs in seasonally flooded habitats. This plant grows along a wide variety of soils including clay, loam, alluvium, grey sand, and sometimes saline soils.	Sparse tussocks of *E. setifolia* were found covering near 1 percent of quadrat BI010 in a locally significant vegetation type in the study area. The population of *E. setifolia* was found in a *Eucalyptus victrix* woodland over a sparse grassland of mixed Poaceae species. The soil was described as a light-brown, grey, and red-brown sandy loam.	 (Phoenix 2024)

Species	Status	WA Herbarium accession no.	Distribution and ecology	Survey records	Photograph
Maireana georgei	RE 160 km E of nearest record	NA	Occurring in most of the state, *M. gerogei* is distributed across the following 17 IBRA Regions: Avon Wheatbelt, Carnarvon, Central Kimberley, Central Ranges, Coolgardie, Gascoyne, Gibson Desert, Great Sandy Desert, Great Victoria Desert, Little Sandy Desert, Mallee, Murchison, Nullarbor, Ord Victoria Plain, Pilbara, Tanami, Yalgoo (WA Herbarium 2024). Occurs in a wide variety of habitats including plains, claypans, slopes, and ironstone. The soil textures where it grows are variable too, including quartz pebbles, sandy clay soils, gravelly ground, and red loam.	An opportunistic collection of one plant was recorded 160 Km E of the nearest record. This species currently represents the closest record to Port Hedland.	 (Phoenix 2024)
Santalum spicatum	RE 225 km NE of nearest record	NA	*S. spicatum* is widely distributed across the state in the following 16 IBRA Regions: Avon Wheatbelt, Carnarvon, Coolgardie, Esperance Plains, Gascoyne, Geraldton Sandplains, Gibson Desert, Great Victoria Desert, Jarrah Forest, Little Sandy Desert, Mallee, Murchison, Nullarbor, Pilbara, Swan Coastal Plain, Yalgoo. Reported to grow in rocky basalt areas with red to brown clay loam soils.	This species was opportunistically collected just outside of the study area. There was a small population of *S. spicatum* in the playa of a dry saline flood line. This collection represents the northernmost record in the state.	 (ALA 2024)

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Study area

Species, status

Tephrosia rosea var. Port Hedland (A.S. George 1114), P1 (DBCA list)

Figure 5-4

Significant flora records from the field survey

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Table 5-6 Likelihood of occurrence for significant flora identified in the desktop review

Species	Status	Likelihood of occurrence
Tephrosia rosea var. Port Hedland (A.S. George 1114)	P1 (DBCA)	**Recorded** It is occurring in the eastern part of the study area where the habitat is suitable, i.e. on loam sand on a road verge. However, anywhere outside of the area where it was recorded, the combination of habitat and disturbance where this species occur does not appear as likely anymore.
Gomphrena pusilla	P2 (DBCA)	**Unlikely** There are no records of *Acacia bivenosa* in the study area, a species normally associated with *G. pusilla*. Furthermore, its suitable habitat, limestone ridgetops and calcareous coastal dunes, is not present in the study area.
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	P3 (DBCA)	**Possible** Suitable habitat for this species was found within the study area. This species has also been recorded 1 km away from the study area.
Eragrostis crateriformis	P3 (DBCA)	**Possible** This species is associated with soils with clay in the soil, and in drainage lines. While its occurrence is possible in the study area, only two quadrats (BI003 and BI025) have descriptions of clay in its soil texture and therefore potential habitat is limited.
Euphorbia clementii	P3 (DBCA)	**Unlikely** There is no suitable habitat for this species in the study area.
Euploca mutica	P3 (DBCA)	**Possible** Suitable habitat across most vegetation types in the study area with collection records nearby.
Gomphrena leptophylla	P3 (DBCA)	**Possible** Habitat especially suitable in the floodplains in the grasslands.
Gymnanthera cunninghamii	P3 (DBCA)	**Unlikely** This species is associated with *Eucalyptus* and *Melaleuca* woodlands on creeks. While site BI010 has a *Eucalyptus* woodland on what appears to be a floodplain, this habitat doesn't exactly match the habitat descriptions shown in FloraBase for this species (Herbarium 2024).
Rothia indica subsp. *Australis*	P3 (DBCA)	**Possible** Suitable habitat, and collections near the study area.
Triodia chichesterensis	P3 (DBCA)	**Unlikely** No suitable habitat. The study area is not represented by quartzite on undulating plains on woodlands which is the known habitat for this species.
Bulbostylis burbidgeae	P4 (DBCA)	**Unlikely** While this species grows in hummock grasslands, the study area does not contain granite boulders, hill tops, or outcrops, the habitat requirement of *B. burbidgeae*.
Ptilotus mollis	P4 (DBCA)	**Unlikely** No suitable habitat found in the study area, i.e. no outcrops or hill slopes.

Species	Status	Likelihood of occurrence
Phyllanthus sp. B Kimberley Flora (T.E.H. Aplin et al. 809)	Indeterminate	**Unlikely** This species is associated with riparian habitats, there is only one likely habitat for this species within the study area. The riparian habitat is located in the northeastern corridor. However, due to heritage restrictions the creek line was not surveyed.

5.2.1.3 Introduced flora

Four introduced flora species were recorded during the survey, none of them are listed neither as declared pests nor as WoNS (Table 5-7).

Table 5-7 Introduced flora recorded in the field survey

Family	Species	Declared Pest	WoNS
Amaranthaceae	**Aerva javanica*	No	No
Fabaceae	**Stylosanthes hamata*	No	No
Poaceae	**Cenchrus ciliaris*	No	No
Poaceae	**Cenchrus setiger*	No	No

5.2.1.4 Unidentified flora

Three specimens collected during the survey could not be identified to species level (Table 5-8), mainly as a result of insufficient taxonomic characters, as plants were sterile (lacking reproductive structures) and damaged.

Table 5-8 Unidentified taxa recorded during the field survey

Taxon	Comments
Corymbia sp.	Sterile and available material damaged by fire.
Eucalyptus sp.	Sterile and available material damaged by fire.
Poaceae sp.	Sterile.

5.2.1.5 Vegetation types

Six vegetation types were defined for the study area based on the cluster analysis (Figure 5-5). Four of these vegetation types are sparse to open shrublands of mixed *Acacia* species over open hummock *Triodia* species grasslands. One vegetation type consists of a hummock grassland of *Triodia;* and one vegetation type was a *Eucalyptus victrix* woodland over a forbland of *Goodenia lamprosperma*, and mixed species of tussock grasses (Table 5-9; Figure 5-6). The four vegetation types consisting of *Acacia* shrublands over *Triodia* hummock grasslands dominated the project, comprising nearly 85% of the study area; followed by the hummock grasslands of *Triodia epactia* and *T. secunda* (TeTsec), comprising 11% of the study area. Of the remaining 4% of the study area, 2% was cleared, and less that 1% consisted of a 'not assessed' area, and a *Eucalyptus victrix* woodland respectively (Table 5-9). The <1% that was not assessed, wasn't surveyed do to restricted access. On the other hand, the <1% of *Eucalyptus victrix* woodland over mixed species of tussock grasses, appeared to be a unique vegetation type in the study area and should be regarded as locally significant.

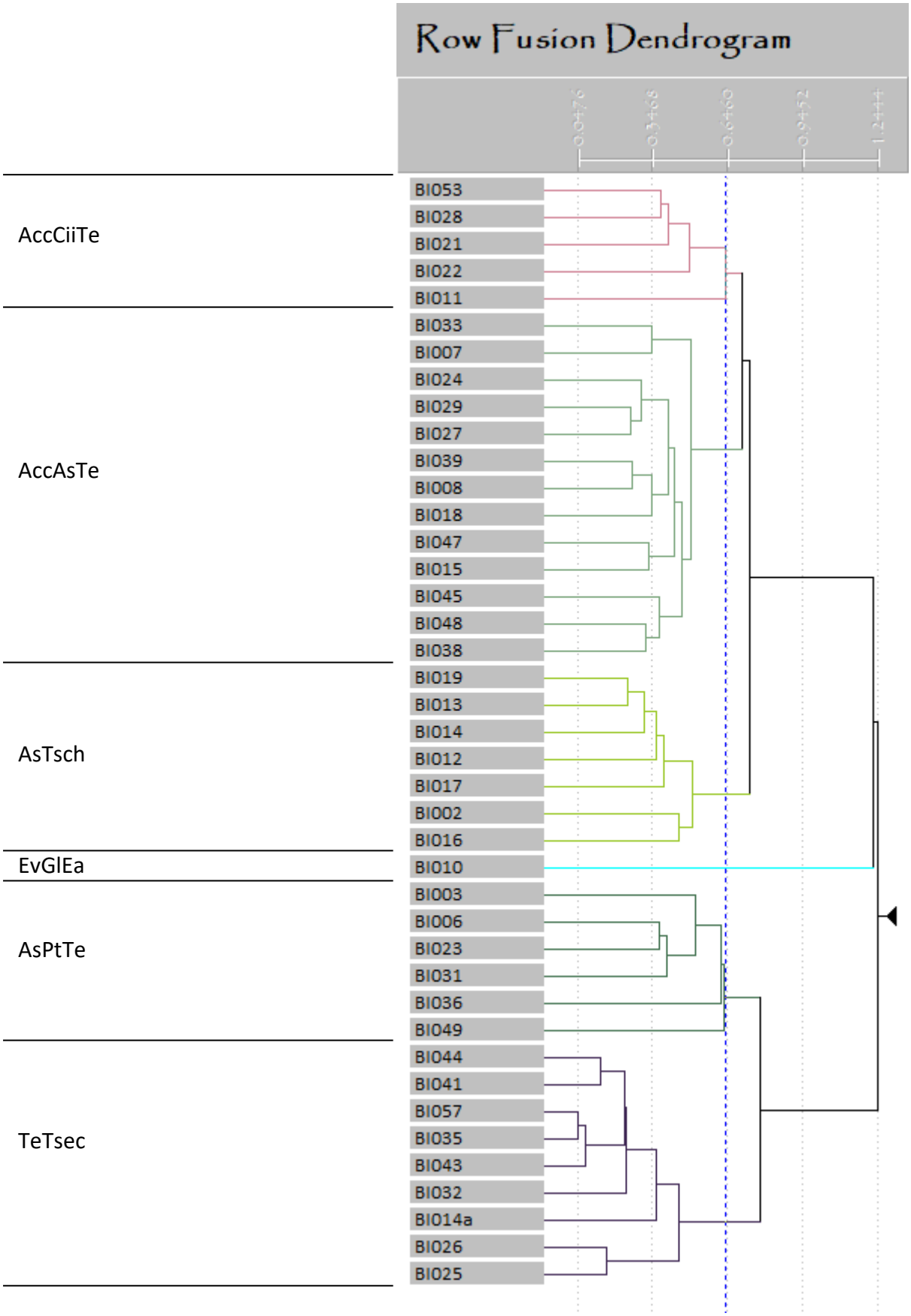
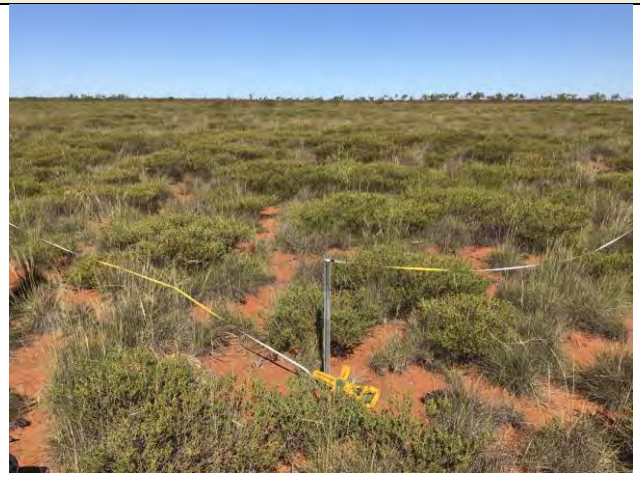


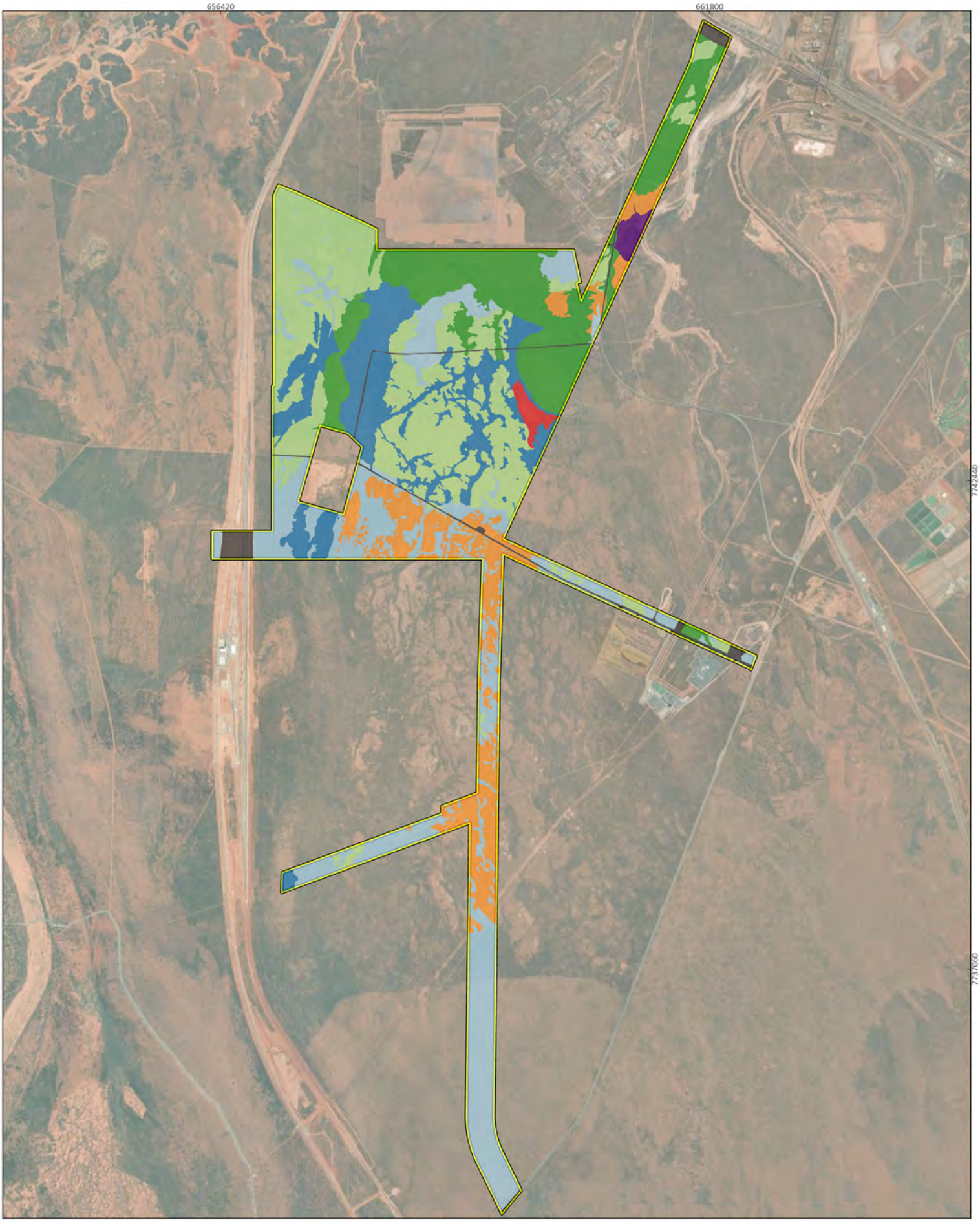
Figure 5-5 Hierarchical clustering (UPGMA) of the flora quadrats of the study area

Table 5-9 Vegetation types, description and extent in the study area

Vegetation type	Site/s	Vegetation description	Extent in study area (ha) and % of study area	Representative photograph
AccCiiTe	5	Tall sparse shrubland of *Acacia colei* var. *colei, A. tumida* var. *tumida,* and *Acacia sericophylla,* over low isolated shrubs of *Corchorus incanus* subsp. *incanus, Solanum lasiophyllum,* and *Acacia stellaticeps,* over a low open hummock grassland of *Triodia epactia,* with *Eragrostis eriopoda,* and *Chrysopogon fallax.*	224.8 ha (15.2%)	
AccAsTe	13	Variably present low isolated trees of *Corymbia candida* or *Eucalyptus victrix,* over a tall sparse shrubland of *Acacia colei* var. *colei,* occasionally with *Acacia tumida* var. *tumida,* and *Acacia sericophylla,* over a low open shrubland of *Acacia stellaticeps, Corchorus incanus* subsp. *incanus,* and *Sida* sp. Pilbara (A.A. Mitchell PRP 1543), over a low hummock grassland of *Triodia epactia,* with *Chrysopogon fallax,* and *Eragrostis eriopoda.*	344.2 ha (23.3%)	

Vegetation type	Site/s	Vegetation description	Extent in study area (ha) and % of study area	Representative photograph
AsTsch	7	Low open shrubland of *Acacia stellaticeps, Corchorus incanus* subsp. *incanus,* and *Ptilotus astrolasius,* over a low open hummock grassland of *Triodia schinzii*, and *Triodia epactia,* with variably present *Eragrostis eriopoda.*	266.8 (18.1%)	
EvGlEa	1	Low woodland of *Eucalyptus victrix,* over a sparse forbland of *Goodenia lamprosperma, Alternanthera angustifolia,* and *Nellica maderaspatensis,* over a low sparse tussock grassland of *Eulalia aurea, Chrysopogon fallax,* and *Eragrostis setifolia.*	11.9 (0.8%)	

Vegetation type	Site/s	Vegetation description	Extent in study area (ha) and % of study area	Representative photograph
AsPtTe	6	Low sparse shrubland of *Acacia stellaticeps, Pluchea tetranthera*, and *Afrohybanthus aurantiacus,* over a low open to hummock grassland *of Triodia epactia* and/or *T. secunda,* with *Eriachne mucronata.*	413.6 ha (28%)	
TeTsec	9	Low hummock grassland of *Triodia epactia,* and *Triodia secunda,* occasionally with *Triodia longiceps.*	167.2 ha (11.3%)	



Western Australia

PERTH

Port Hedland Green Steel Pty Ltd
Port Hedland Green Steel Project

Project No	1558
Date	12/12/2024
Drawn by	JL
Map author	LB

0 1 2
Kilometers

1:53,800(at A4) GDA 1994 MGA Zone 50

Study area

Vegetation type

- AccAsTe
- AccCiiTe
- AsPtTe
- AsTsch
- Cleared
- EvGlEa
- Not assessed
- TeTsec

Figure 5-6
Vegetation types recorded in the field survey

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5.2.1.6 Vegetation condition

Remnant vegetation in the study area was recorded to be in Good to Excellent condition (Figure 5-7) with 91.4% of the vegetation in Excellent condition (Table 5-10).

Table 5-10 Vegetation condition – extent of each condition rating in study area

Condition rating	Area (ha)	% of study area
Excellent	1349.5	91.4
Very Good	77.2	5.2
Good	1.9	0.1
Poor	0	0
Degraded	0	0
Completely Degraded	0	0
Not assessed	47.7	3.2

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0 1 2
Kilometers

1:53,800(at A4) GDA 1994 MGA Zone 50

Study area

Vegetation condition

Excellent

Good

Not assessed

Very good

Figure 5-7

Vegetation condition in the study area

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5.2.1.7 Significant vegetation

The DBCA Threatened and Priority Ecological Communities database search identified the presence of one PEC within the desktop search extent (Figure 5-1). This PEC, the Eighty Mile Land System, P3 (DBCA), does not intersect and does not occur in the study area, since the PEC refers to coastal ecological communities, and the Project is not located in the coast. Furthermore, this PEC is also located ~38 km away from the study area.

In total, two vegetation types were considered to have local significance in the study area (Table 5-11).

Table 5-11 Significant vegetation types in the study area

Vegetation type	Significance	Level of significance
EvGlEa	There are 11.9 ha of this unique vegetation type represented in one sole region of the study area.	Locally significant
AsTsch	This vegetation is suitable habitat for the P1 *Tephrosia rosea* var. Port Hedland, although apparently only when there is disturbance through the vegetation, i.e. a road. While the extent of this vegetation type consists of 266.8 ha in the study area, there was only one collection of the priority flora in the study area. *T. rosea* var. Port Hedland was collected along a road that extends for 800m within the AsTsch vegetation type. All other recordings of the priority flora were also collected along road verges but outside of the study area.	Locally significant

5.3 SURVEY LIMITATIONS

The limitations of the flora and vegetation survey have been considered in accordance with the EPA Technical guidance (2016b) (Table 5-12).

Table 5-12 Consideration of potential survey limitations

Limitations	Comments
Availability of contextual information at a regional and local scale	Not a limitation Regional information was found in the ENV (2011) report. Additionally, previous surveys have been conducted in the vicinity of the study area.
Competency/experience of the team carrying out the survey	Not a limitation Dr Grant Wells who led the field surveys for this project, has more than 18 years of experience conducting surveys in the Pilbara region.
Scope and completeness	Not a limitation All items in the scope were achieved.
Proportion of flora recorded and/or collected, any identification issues	Not a limitation Sufficient sites were surveyed to capture the flora of the project during the time of survey (refer to section 5.2) The 3 of the total 140 taxa that were not identified due to insufficient taxonomic characters, had affinity to common species and thus there was no concern of confusion with significant flora.
Access within the study area	Limitation Over 12 ha (<1% of the study area) in the NE corridor were not surveyed as a result of restricted access due to cultural significance in the area. No similar textures occur in the study area and therefore vegetation type was not assigned to this area.
Timing, rainfall, season	Not a limitation Surveys were conducted during the primary and supplementary survey periods appropriate for the botanical province (EPA 2016b).
Disturbance that may have affected the results of the survey	Limitation There is evidence of fire across the study area. In particular the northernmost and southernmost areas appear to be more fire affected than the central region. The vegetation types will change with the pass of time as the vegetation matures depending on the occurrence and frequency of fires.

6 DISCUSSION

6.1 FLORA AND VEGETATION

More than a quarter of the taxa listed in the desktop were recorded in the current survey, half the families were recorded in the survey, and over a third of the genera were recorded. The dominant families showed similar numbers for both the desktop and the survey with Poaceae, Fabaceae, and Malvaceae being the most families surveys in both cases. Convolvulaceae was equally dominant to Malvaceae with 8% occurrence during the field survey. However, this was not the case for the desktop assessment, where Amaranthaceae was the fourth dominant family, albeit with 5.9% occurrence.

6.1.1 Significant flora

The P1, *Tephrosia rosea* var. Port Hedland was recorded inside and outside the study area. One population was identified within the study area consisting of 6 individuals. A further three populations were recorded outside the study area, containing 26, 2, and 15 individuals respectively. All the populations of *T. rosea* var. Port Hedland were recorded in disturbed areas in road verges.

From the habitats in which *T. rosea* var. Port Hedland has been recorded in this and a previous survey (Phoenix Environmental Sciences 2022), *T. rosea* var. Port Hedland appears to occur opportunistically along areas of disturbance. This species was recorded in the vegetation type AsTsc, which comprises over 18% of the study area. It is possible that disturbance within this vegetation type may result in the establishment of further individuals/populations of this species.

Other significant flora besides *T. rosea* var. Port Hedland were deemed as possibly occurring in the study area; however, none of these species were recorded during the survey. The field team made collections while searching for *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095), however, the collections were determined in the WA Herbarium as *Abutilon lepidum,*, which is not a significant flora species.

Eragrostis crateriformis, a species that could possibly occur in the study area, was not recorded. The likelihood of recording this species was low since it is an annual species which flowers from May to July and the area was not surveyed in those months.

The habitat of *Euploca mutica* is described as *Acacia* shrubland over hummock grassland on plains and floodplains. However, while much of the study area consists of *Acacia* shrublands over hummock grasslands, this species was not recorded during the survey.

Gomphrena leptophylla, an annual herb shows records of flowering from March through September. While its occurrence is possible, no species of the genus *Gomphrena* were recorded in the study area.

Rothia indica subsp. *australis,* an annual herb, was not recorded during the survey. A collection with the fieldname *Rothia* was made in an effort to find the Priority *Rothia* species*,* however, taxonomical work determined the collection as *Grona filiformis.*

While the *Phyllanthus* sp. B Kimberley Flora may occur in the study area, with its habitat requirements associated with riparian vegetation (Phoenix Environmental Sciences 2022); targeted searches for this species were not conducted in the study area. There was no access to the riparian vegetation of the study area due to heritage value restrictions.

Range extensions were recorded for three species, with their extended distribution ranging from 150 to 225 km from their nearest known records. *Eragrostis setifolia* was recorded 150 km NE of the nearest record in a locally significant vegetation in the study area, EvGlEa. *Maireana georgei* was recorded 160 km east the nearest record. It is a species that occurs in a wide variety of habitats, and it is reasonable for it to occur in the study area, it was found in the vegetation type AsPtTe. *Santalum spicatum* was collected 225 km NE of the nearest record, in a saline playa where a salt tolerant species,

namely, *Tecticornia indica* was collected too. *S. spicatum* was collected near the boundary of a pre-European vegetation association that does not occur in the study area: vegetation 127 - Tidal mudflat.

None of the unidentified species in the survey were considered likely to be Priority flora. Both the *Eucalyptus* and the *Corymbia* species resemble many of the commonly occurring species in the area; they were simply unidentifiable due to the absence of fertile material in combination with fire damage. Furthermore, WA Herbarium (2024) shows that there are no Priority flora of the aforementioned genera in the Roebourne subregion.

The indetermined Poaceae species resembles the genus *Eriachne*. While there was no specimen collected for this entity, the field team correctly identified the *Eriachne* genus when making collections. WA Herbarium (2024) shows only four Priority species of the Poaceae family occurring in the Roebourne subregion: *Eragrostis crateriformis*, *Eragrostis surreyana*, *Themeda* sp. Hamersley Station (M.E. Trudgen 11431), and *Triodia degreyensis*. Since none of the Priority species belong in the genus *Eriachne*, the Poaceae sp. record is unlikely to be a Priority species.

6.1.2 Introduced flora

None of the weed species recorded are a Declared Pest or WoNs. All of the introduced flora recorded during the field survey have previously been recorded in the Pilbara bioregion with all of them having an extensive range in WA (WA Herbarium 1998).

6.1.3 Vegetation

The pre-European vegetation association 647 (Beard *et al.* 2013), Hummock grasslands, dwarf shrub steppe; *Acacia translucens* over soft spinifex was relevant to the study area. The vegetation types, AccAsTe, AccCiiTe, AsPtTe recorded in the vegetation association 647 in the current survey represent *Triodia* grasslands with or without a low shrub layer of *Acacia stellaticeps*. A review of the distribution of *Acacia translucens* (WA Herbarium 1998) has determined that the species is predominantly recorded in the Kimberley bioregion and the closest record of the species to the study area is approximately 125 km to the east of Port Hedland/the study area. *Acacia translucens* is closely related to *A. stellaticeps* which are both part of the *A. stigmatophylla* group (Kodela et al. 2001). *A. stellaticeps* is conspecific with *Acacia translucens* var. *humilis* but was determined to represent a separate species in 2001 (Kodela et al. 2001). Subsequently the vegetation recorded in the study area in the current survey is considered representative of vegetation association 647 (Government of Western Australia 2019), a vegetation classed as Least Concern. Furthermore, the vegetation defined for the Study Area does not represent any listed TEC or PEC.

The vegetation type EvGlEa from the current survey was considered locally significant due to its restricted distribution in the study area. This vegetation type, while locally significant due to its uniqueness in the study area, does not contain any Priority or Threatened flora. This area can probably be preserved during upcoming developments as it represents less than 1% of the study area. A very small patch of a similar vegetation type occurs in the west of the study area, where quadrat BI020 was surveyed. This quadrat was excluded from the analysis because the software found it as an outlier in the dendrogram. After investigating the species collected in this quadrat, and the aerial view of the area, it was determined that while this area is somewhat analogous to the locally significant EvGlEa, it is too small to place a quadrat in it. With a shared soil texture of sandy loam, an overstory of *Eucalyptus victrix,* and with the occurrence of the range extension flora *Eragrostis setifolia,* this quadrat appears to be a very similar vegetation type to EvGlEa. However, several differences between the flora species recorded at each location confirm these two quadrats are not strictly replicates of each other. The major differences are: BI020 does not contain *Goodenia lamprosperma* (a species of high cover in BI010), and it contains three species which are not present in BI010; namely, *Eriachne*

helmsii, *Triodia epactia*, and *Acacia colei* var. *colei*. The occurrence of the latter mentioned species is an artifact of the small size of the sampled area, displaying species established in that area as a result of an interzone with the adjacent vegetation types, particularly with AccAsTe. It would be reasonable to exercise care when developing near both BI010 and BI020 and treat BI020 as a Locally Significant area too.

The vegetation type AsTsch appears to be suitable habitat for *T. rosea* var. Port Hedland P1 (DBCA). However, careful interpretation is required to determine the ideal growing conditions for this significant flora as it was only found along the disturbed 800m of road in the eastern part of the study area in the AsTsch vegetation type. Care should also be taken when operating near the Priority flora.

6.2 CONCLUSION

The population of *Tephrosia rosea* var. Port Hedland (A.S. George 1114) is the most significant botanical value in the study area.

The vegetation type EvGlEa is locally significant and provides habitat for *Eragrostis setifolia,* a species showing a range extension from its nearest record. A small area with a similar vegetation type appears to occur in the west and it is recommended to treat this area as locally significant too.

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Appendix 1 Survey site locations

Sitename	Latitude	Longitude
BI002	-20.37732	118.54639
BI003	-20.37331	118.54805
BI006	-20.42565	118.55114
BI007	-20.42056	118.54025
BI008	-20.3914	118.51011
BI010	-20.40274	118.53167
BI011	-20.40662	118.52458
BI012	-20.39742	118.53342
BI013	-20.39474	118.53655
BI014	-20.38805	118.51818
BI014a	-20.39153	118.53857
BI015	-20.38747	118.53465
BI016	-20.38704	118.5301
BI017	-20.39499	118.52443
BI018	-20.39599	118.52001
BI019	-20.39575	118.51252
BI020	-20.39516	118.50604
BI021	-20.39912	118.50715
BI022	-20.40245	118.51306
BI023	-20.4086	118.51654
BI024	-20.41271	118.52066
BI025	-20.41261	118.51815
BI026	-20.41281	118.51263
BI027	-20.41294	118.50614
BI028	-20.41681	118.50732
BI029	-20.41295	118.51473
BI031	-20.38651	118.50678
BI032	-20.41655	118.53033
BI033	-20.4233	118.5465
BI035	-20.43897	118.52754
BI036	-20.43334	118.5264
BI038	-20.44476	118.52088
BI039	-20.44461	118.52674
BI041	-20.44562	118.52809
BI043	-20.45163	118.52718
BI044	-20.44312	118.52587
BI045	-20.45743	118.52712

Sitename	Latitude	Longitude
BI047	-20.46534	118.52706
BI048	-20.47773	118.52931
BI049	-20.44578	118.5139
BI053	-20.44881	118.50641
BI057	-20.42283	118.52794

Appendix 2 Flora survey site descriptions

Site details			
Site	BI002	**Position (WGS84), xyz**	(118.546375374731 -20.3772627005424 7.958640488694)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps, Corchorus incanus subsp. incanus, and Afrohybanthis aurantiacus, over a low open hummock grassland of Triodia schinzii, with *Cenchrus ciliaris.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	55.0	**Tree cover (%)**	3.0
Shrub cover (%)	26.0	**Grass cover (%)**	25.0
Herb cover (%)	1.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GM
Quadrat	2	14 Sep 2023	50m x 50m	NR

Species (23)	Status	Cover (%)	Height (m)
Acacia stellaticeps		18.0	0.6
Triodia schinzii		17.0	0.6
Corchorus incanus subsp. *incanus*		6.0	0.7
Afrohybanthus aurantiacus		3.0	0.4
Eragrostis eriopoda		3.0	0.25
Eriachne mucronata		3.0	0.25
Corymbia candida subsp. *candida*		2.0	1.8
Eucalyptus sp.		1.0	1.9
Hakea lorea subsp. *lorea*		0.5	1.4
Ptilotus astrolasius		0.4	0.35
Bonamia linearis		0.3	0.3
Indigofera monophylla		0.3	0.3
Ptilotus polystachyus		0.2	0.2
**Cenchrus ciliaris*	Weed	0.1	0.2
Cassytha capillaris		0.1	0.3
Digitaria brownii		0.1	0.3
Dodonaea coriacea		0.1	0.7
Eriachne obtusa		0.1	0.25
Evolvulus alsinoides var. *villosicalyx*		0.1	0.1
Sida rohlenae subsp. *rohlenae*		0.1	0.2
Solanum diversiflorum		0.1	0.3
Trigastrotheca molluginea		0.1	0.1
Waltheria indica		0.1	0.1

Site details			
Site	BI003	**Position (WGS84), xyz**	(118.548457128936 -20.3735079781083 1.18636906744597)
Slope	gentle	**Topography**	undulating plain
Soil colour	red-orange	**Soil texture**	sandy clay
Rock cover (%)	0	**Rock type**	quartz,calcrete,ferrous - ironstone

Observation details - visit 1 (18 Apr 2023)

Site description	Low sparse shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia secunda and T. epactia.
Habitat	hummock grassland
Disturbance	None

Vegetation condition	Excellent	**Fire age**	Recent
Total veg. cover (%)	38	**Tree cover (%)**	0.0
Shrub cover (%)	6.0	**Grass cover (%)**	38.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	NR

Species (18)	Status	Cover (%)	Height (m)
Triodia secunda		30.0	0.15
Triodia epactia		7.0	0.5
Acacia stellaticeps		5.0	0.5
Eriachne mucronata		0.3	0.3
Euploca pachyphylla		0.3	0.3
Acacia ampliceps		0.1	0.4
Afrohybanthus aurantiacus		0.1	0.2
Cassytha capillaris		0.1	0.1
Chrysopogon fallax		0.1	0.4
Goodenia forrestii		0.1	0.1
Goodenia lamprosperma		0.1	0.2
Murdannia graminea		0.1	0.2
Ptilotus astrolasius		0.1	0.3
Salsola australis		0.1	0.1
Trigastrotheca molluginea		0.1	0.1
Ptilotus axillaris		0.0	0.03
Tecticornia indica subsp. *bidens*		0.0	0.2
Tecticornia indica subsp. *leiostachya*			

Site details			
Site	BI006	**Position (WGS84), xyz**	(118.551149140412 -20.4256478534365 0)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (15 Apr 2023)

Site description	Low sparse shrubland of Acacia stellaticeps, and Pluchea ferdinandi-muelleri, over a low hummock grassland of Triodia epactia, with *Cenchrus setiger.
Habitat	hummock grassland
Disturbance	current operations, weed infestation

Vegetation condition	Very Good	**Fire age**	>5
Total veg. cover (%)	55.0	**Tree cover (%)**	0.0
Shrub cover (%)	5.0	**Grass cover (%)**	50.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	15 Apr 2023	50m x 50m	GBW
Quadrat	2	13 Sep 2023	50m x 50m	GBW

Species (15)	Status	Cover (%)	Height (m)
Triodia epactia		50.0	0.5
Acacia stellaticeps		4.0	0.6
Pluchea ferdinandi-muelleri		1.1	0.7
**Cenchrus setiger*	Weed	0.1	0.3
Bulbostylis barbata		0.1	0.1
Dactyloctenium radulans		0.1	0.05
Eriachne aristidea		0.1	0.15
Eriachne ciliata		0.1	0.2
Eriachne mucronata		0.1	0.1
Fimbristylis dichotoma		0.1	0.15
Mitrasacme exserta		0.1	
Pluchea tetranthera		0.1	0.3
Salsola australis		0.1	0.7
Sporobolus australasicus		0.1	0.1
Trianthema triquetrum		0.1	0.15

Site details			
Site	BI007	**Position (WGS84), xyz**	(118.540255270431 -20.4205695088027 0)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (15 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low open hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	50.0	**Tree cover (%)**	0.0
Shrub cover (%)	30.0	**Grass cover (%)**	20.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	15 Apr 2023	50m x 50m	GM
Quadrat	2	13 Sep 2023	50m x 50m	CW

Species (18)	Status	Cover (%)	Height (m)
Acacia stellaticeps		29.0	0.6
Triodia epactia		19.0	0.5
Cassytha capillaris		1.0	0.5
Pluchea ferdinandi-muelleri		0.2	1.2
Pluchea tetranthera		0.2	0.5
Acacia sericophylla		0.1	1.5
Afrohybanthus aurantiacus		0.1	0.2
Chrysopogon fallax		0.1	0.25
Digitaria brownii		0.1	0.2
Dodonaea coriacea		0.1	0.3
Eragrostis eriopoda		0.1	0.2
Evolvulus alsinoides		0.1	0.15
Grevillea pyramidalis subsp. *leucadendron*		0.1	0.4
Leptosema anomalum		0.1	0.15
Ptilotus astrolasius		0.1	0.4
Trigastrotheca molluginea		0.1	0.1
Triodia schinzii		0.1	0.5
Waltheria indica		0.1	0.5

Site details			
Site	BI008	**Position (WGS84), xyz**	(118.509743795418 -20.3912790605568 0)
Slope	negligible	**Topography**	plain
Soil colour	light brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	None

Observation details - visit 1 (17 Apr 2023)

Site description	Isolated tall shrubs of Acacia colei var. colei, over a low shrubland of Acacia stellaticeps, with Corchorus incanus subsp. incanus, over a low open hummock grassland of Tirodia epactia, with *Cenchrus ciliaris.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Very Good	**Fire age**	>5
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	35.0	**Grass cover (%)**	25.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	GM
Quadrat	2	13 Sep 2023	50m x 50m	NR

Species (15)	Status	Cover (%)	Height (m)
Acacia stellaticeps		34.0	0.6
Triodia epactia		24.0	0.7
Acacia colei var. *colei*		1.0	3.0
Chrysopogon fallax		1.0	0.3
Corchorus incanus subsp. *incanus*		0.5	0.0
**Cenchrus ciliaris*	Weed	0.2	0.3
Abutilon otocarpum		0.1	0.15
Cassytha capillaris		0.1	0.5
Eragrostis eriopoda		0.1	0.2
Evolvulus alsinoides		0.1	0.1
Hakea lorea subsp. *lorea*		0.1	1.2
Pluchea tetranthera		0.1	1.4
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.5
Solanum lasiophyllum		0.1	0.15
Trigastrotheca molluginea		0.1	0.1

Site details			
Site	BI010	**Position (WGS84), xyz**	(118.53167210794 -20.4027981959146 10.4850064342398)
Slope	negligible	**Topography**	plain
Soil colour	light-brown, grey,red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low open woodland of Eucalyptus victrix, over a low open forbland of Goodenia lamprosperma, over a low sparse tussock grassland of Eulaia aurea, Aristida holathera var. holathera, and Eragrostis setifolia.
Habitat	woodland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	30.0	**Tree cover (%)**	20.0
Shrub cover (%)	0.1	**Grass cover (%)**	8.0
Herb cover (%)	8.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (12)	Status	Cover (%)	Height (m)
Eucalyptus victrix		20.0	4.5
Goodenia lamprosperma		10.0	0.2
Eulalia aurea		5.0	0.6
Chrysopogon fallax		2.0	0.8
Aristida holathera var. *holathera*		0.8	0.4
Eragrostis setifolia		0.8	0.3
Eriachne flaccida		0.2	0.2
Alternanthera angustifolia		0.1	0.2
Eriachne ciliata		0.1	0.2
Nellica maderaspatensis		0.1	0.1
Pluchea tetranthera		0.1	0.2
Trigastrotheca molluginea		0.1	0.1

Site details			
Site	BI011	**Position (WGS84), xyz**	(118.524580579472 -20.4066200093427 12.689508239577)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	None

Observation details - visit 1 (16 Apr 2023)

Site description	Low open woodland of Corymbia candida, over a tall open shrubland of Acacia colei var. colei, over a low tussock grassland of Chrysopogon fallax, with Triodia secunda.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	60.0	**Tree cover (%)**	4.0
Shrub cover (%)	20.0	**Grass cover (%)**	45.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	UNK
Quadrat	2	13 Sep 2023	50m x 50m	CW

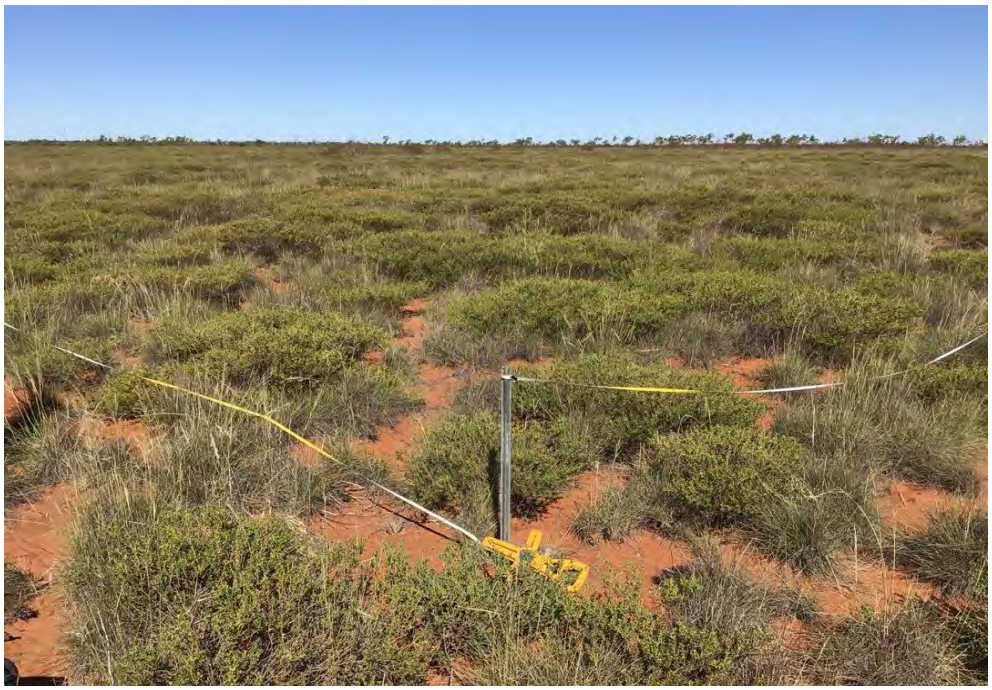
Species (22)	Status	Cover (%)	Height (m)
Triodia epactia		40.1	0.5
Acacia colei var. *colei*		25.0	3.0
Corymbia candida subsp. *candida*		2.5	3.0
Carissa lanceolata		2.0	1.5
Chrysopogon fallax		2.0	0.5
Corymbia candida subsp. *lautifolia*		2.0	2.5
Eriachne flaccida		2.0	0.2
Acacia tumida var. *tumida*		0.5	1.7
Dolichandrone occidentalis		0.5	2.0
Acacia sericophylla		0.2	1.5
Enchylaena tomentosa var. *tomentosa*		0.2	0.6
Pluchea tetranthera		0.2	0.5
Triodia secunda		0.2	0.3
Afrohybanthus aurantiacus		0.1	0.1
Bonamia linearis		0.1	0.2
Corchorus incanus subsp. *incanus*		0.1	0.6
Eragrostis eriopoda		0.1	0.2
Eulalia aurea		0.1	0.6
Goodenia lamprosperma		0.1	0.03
Grevillea pyramidalis subsp. *leucadendron*		0.1	0.5
Indigofera monophylla		0.1	0.6
Solanum lasiophyllum		0.1	0.2

Site details			
Site	BI012	**Position (WGS84), xyz**	(118.533424003826 -20.3974355832015 10.2509534287686)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low hummock grassland of Triodia schinzii.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	45.0	**Tree cover (%)**	0.0
Shrub cover (%)	30.0	**Grass cover (%)**	20.0
Herb cover (%)	0.0		



Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	LB

Species (9)	Status	Cover (%)	Height (m)
Acacia stellaticeps		30.0	0.9
Triodia schinzii		20.0	1.0
Triodia epactia		0.3	0.6
Capparis spinosa subsp. *nummularia*		0.2	0.8
Ptilotus astrolasius		0.2	0.2
Afrohybanthus aurantiacus		0.1	0.2
Eragrostis eriopoda		0.1	0.2
Eriachne mucronata		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.15

Site details			
Site	BI013	**Position (WGS84), xyz**	(118.536571147256 -20.3947557578691 10.0705585596339)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low hummock grassland of Triodia schinzii.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	40.0	**Tree cover (%)**	0.0
Shrub cover (%)	19.0	**Grass cover (%)**	20.0
Herb cover (%)	2.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	NR

Species (17)	Status	Cover (%)	Height (m)
Triodia schinzii		19.0	1.0
Acacia stellaticeps		18.0	0.5
Triodia epactia		2.0	0.6
Eriachne mucronata		0.8	0.4
Corchorus incanus subsp. *incanus*		0.3	0.4
Cassytha capillaris		0.2	0.3
Chrysopogon fallax		0.2	0.5
Evolvulus alsinoides var. *villosicalyx*		0.2	0.2
Sida sp. Rabbit Flat (B.J. Carter 626)		0.2	0.1
Afrohybanthus aurantiacus		0.1	0.1
Bonamia linearis		0.1	0.4
Hibiscus leptocladus		0.1	0.2
Ipomoea plebeia		0.1	0.1
Ptilotus fusiformis		0.1	0.2
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.1
Solanum lasiophyllum		0.1	0.2
Triumfetta chaetocarpa		0.1	0.1

Site details			
Site	BI014	**Position (WGS84), xyz**	(118.5182516 -20.38800204 4.45635367871285)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low open hummock grassland of Triodia schinzii.
Habitat	shrubland
Disturbance	None

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	42.0	**Tree cover (%)**	0.0
Shrub cover (%)	22.0	**Grass cover (%)**	20.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	LB
Quadrat	2	13 Sep 2023	50m x 50m	CW

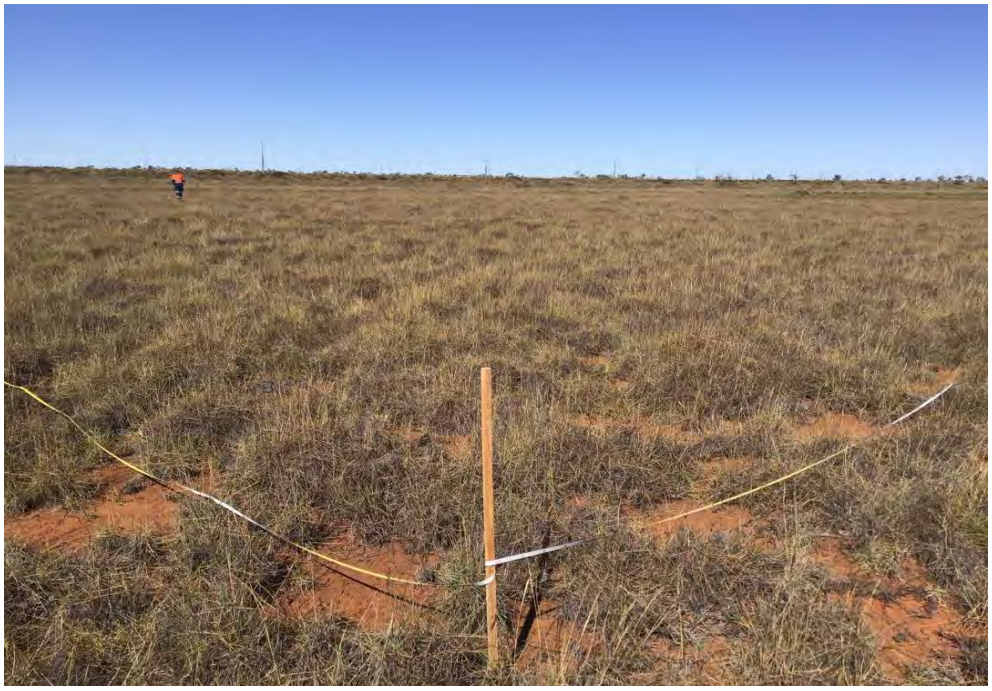
Species (11)	Status	Cover (%)	Height (m)
Acacia stellaticeps		20.0	0.9
Triodia schinzii		18.1	0.8
Triodia epactia		2.0	0.6
Hakea lorea subsp. *lorea*		0.2	1.0
Ptilotus astrolasius		0.2	0.2
Afrohybanthus aurantiacus		0.1	0.2
Bonamia linearis		0.1	0.1
Chrysopogon fallax		0.1	0.6
Corchorus incanus subsp. *incanus*		0.1	0.35
Eriachne obtusa		0.1	0.4
Senna notabilis		0.1	0.1

Site details			
Site	BI014a	**Position (WGS84), xyz**	(118.538475092611 -20.3915132302981 0)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (23 Jun 2023)

Site description	Low isolated shrubs of Acacia stellaticeps over a low hummock grassland of Triodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.1	**Grass cover (%)**	60.0
Herb cover (%)	0.0		



Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	23 Jun 2023	50m x 50m	GBW

Species (3)	Status	Cover (%)	Height (m)
Triodia epactia		59.0	0.4
Triodia secunda		1.0	0.2
Acacia stellaticeps		0.1	0.3

Site details			
Site	BI015	**Position (WGS84), xyz**	(118.534640683693 -20.3874821392541 8.69660776759886)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	quartz,ferrous - ironstone

Observation details - visit 1 (18 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1
Total veg. cover (%)	55	**Tree cover (%)**	0.0
Shrub cover (%)	25	**Grass cover (%)**	30
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	NR

Species (9)	Status	Cover (%)	Height (m)
Triodia epactia		35.0	0.6
Acacia stellaticeps		18.0	0.9
Triodia schinzii		0.6	0.8
Eriachne mucronata		0.3	0.3
Ptilotus astrolasius		0.2	0.3
Acacia colei var. *colei*		0.1	0.3
Chrysopogon fallax		0.1	0.5
Corchorus incanus subsp. *incanus*		0.1	0.3
Corymbia candida		0.1	1.6

Site details			
Site	BI016	**Position (WGS84), xyz**	(118.530079623662 -20.3870738211512 10.3596876328543)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low sparse shrubland of Acacia stellaticeps over a low hummock grassland of Triodia schinzii with T. epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	56.0	**Tree cover (%)**	0.0
Shrub cover (%)	6.0	**Grass cover (%)**	50.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GM
Quadrat	2	14 Sep 2023	50m x 50m	NR

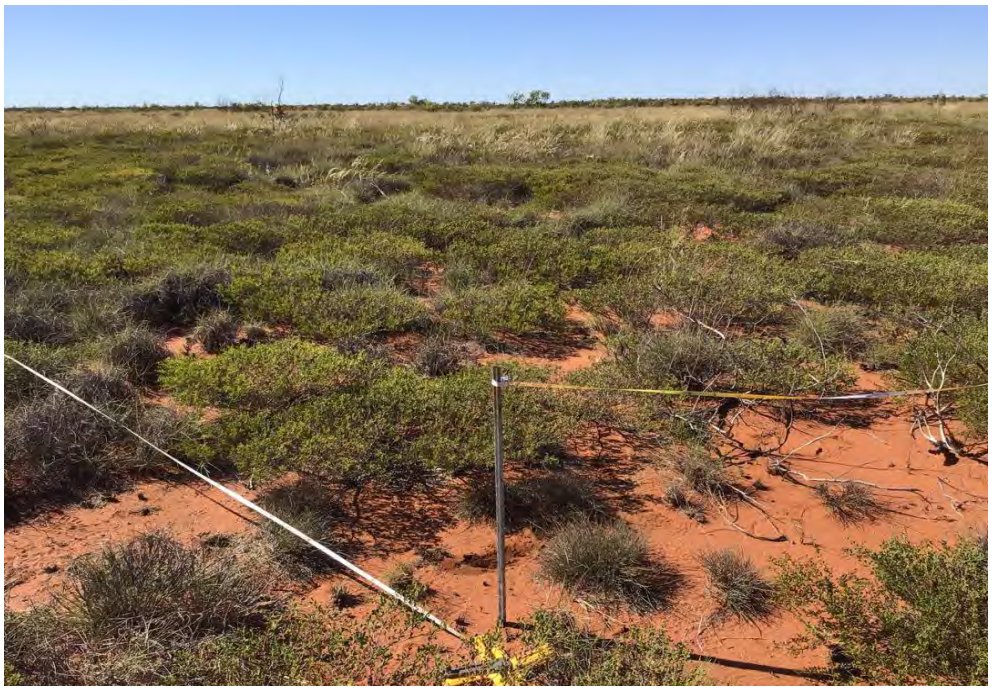
Species (12)	Status	Cover (%)	Height (m)
Triodia schinzii		45.0	0.6
Triodia epactia		4.8	0.6
Acacia stellaticeps		3.1	0.3
Corchorus incanus subsp. *incanus*		1.0	0.4
Ptilotus astrolasius		1.0	0.3
Hakea lorea subsp. *lorea*		0.2	0.8
Sida sp. Pindan (B.G. Thomson 3398)		0.2	0.4
Afrohybanthus aurantiacus		0.1	0.3
Eragrostis eriopoda		0.1	0.3
Evolvulus alsinoides var. *villosicalyx*		0.1	0.1
Indigofera monophylla		0.1	0.25
Triumfetta chaetocarpa		0.1	0.3

Site details			
Site	BI017	**Position (WGS84), xyz**	(118.524439724785 -20.3950213090478 10.1726782252885)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps over a low open hummock grassland of Triodia schinzii, and T. epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	55.0	**Tree cover (%)**	0.0
Shrub cover (%)	17.0	**Grass cover (%)**	38.0
Herb cover (%)	0.0		



Sample and effort summary

Sample method	Visit	Sample date	Dimensions	Observer
Quadrat	1	17 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (14)	Status	Cover (%)	Height (m)
Triodia schinzii		20.0	0.6
Acacia stellaticeps		14.0	0.4
Triodia epactia		10.1	0.5
Ptilotus astrolasius		1.1	0.3
Acacia tumida var. *tumida*		0.4	0.9
Carissa lanceolata		0.4	0.8
Chrysopogon fallax		0.3	0.3
Cassytha filiformis		0.2	0.3
Corchorus incanus subsp. *incanus*		0.1	0.3
Eriachne helmsii		0.1	0.2
Leptosema anomalum		0.1	0.15
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.4
Solanum lasiophyllum		0.1	0.3
Triodia lanigera		0.1	0.2

Site details			
Site	BI018	**Position (WGS84), xyz**	(118.520076880174 -20.3960020616227 5.44774965240301)
Slope	negligible	**Topography**	plain
Soil colour	red-orange, light-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low open woodland of Eucalyptus victrix, over a low sparse shrubland of Acacia stellaticeps, and Pluchea tetranthera, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	litter

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	49.0	**Tree cover (%)**	1.0
Shrub cover (%)	10.0	**Grass cover (%)**	38.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (15)	Status	Cover (%)	Height (m)
Triodia epactia		35.0	0.5
Acacia stellaticeps		17.0	0.8
Eucalyptus victrix		1.9	1.75
Pluchea tetranthera		1.2	0.4
Carissa lanceolata		1.0	1.2
Chrysopogon fallax		1.0	0.4
Eragrostis eriopoda		1.0	0.3
Evolvulus alsinoides var. *villosicalyx*		0.3	0.2
Cassytha capillaris		0.2	0.3
Acacia colei var. *colei*		0.1	1.5
Corchorus incanus subsp. *incanus*		0.1	0.3
Ptilotus astrolasius		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.3
Tephrosia leptoclada		0.1	0.1
Triodia schinzii		0.1	0.8

Site details			
Site	BI019	**Position (WGS84), xyz**	(118.512531384012 -20.3957606442432 12.12613037936)
Slope	gentle	**Topography**	sandy rise
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Mid isolated shrubs of Acacia colei var. colei, over a low sparse shrubland of Acacia stellaticeps over a low open hummock grassland of Triodia schinzii and T. epactia.
Habitat	hummock grassland
Disturbance	historic clearing

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	30.0	**Tree cover (%)**	0.0
Shrub cover (%)	10.0	**Grass cover (%)**	20.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	GBW
Quadrat	2	13 Sep 2023	50m x 50m	NR

Species (24)	Status	Cover (%)	Height (m)
Triodia schinzii		15.0	0.6
Acacia stellaticeps		10.0	0.8
Triodia epactia		5.0	0.6
Acacia colei var. *colei*		0.2	1.5
Eragrostis eriopoda		0.2	0.2
**Cenchrus setiger*	Weed	0.1	0.2
Afrohybanthus aurantiacus		0.1	0.5
Aristida holathera var. *holathera*		0.1	0.1
Bonamia linearis		0.1	0.1
Chrysopogon fallax		0.1	0.2
Corchorus incanus subsp. *incanus*		0.1	0.4
Dactyloctenium radulans		0.1	0.1
Eriachne ciliata		0.1	0.3
Eriachne helmsii		0.1	0.4
Euphorbia vaccaria var. *vaccaria*		0.1	0.01
Evolvulus alsinoides		0.1	0.1
Ptilotus astrolasius		0.1	0.5
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.4
Sida sp. Rabbit Flat (B.J. Carter 626)		0.1	0.1
Solanum lasiophyllum		0.1	1.0
Sporobolus australasicus		0.1	0.1
Trianthema triquetrum		0.1	0.1
Tribulopis angustifolia		0.1	0.1
Trigastrotheca molluginea		0.1	0.1

Site details			
Site	BI021	**Position (WGS84), xyz**	(118.507167659327 -20.3990946014271 10.1103133005928)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	Sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Tall open shrubland of Acacia colei var. colei, and Acacia tumida var. tumida, over a low open shrubland of Acacia stellaticeps over a low sparse tussock grassland of Eragrostis eriopoda.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	30.0	**Tree cover (%)**	0.5
Shrub cover (%)	3.0	**Grass cover (%)**	30.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	GBW
Quadrat	2	9 Sep 2023	50m x 50m	GBW

Species (22)	Status	Cover (%)	Height (m)
Triodia epactia		20.0	0.8
Eragrostis eriopoda		9.0	0.2
Acacia stellaticeps		2.0	1.1
Triodia schinzii		1.0	0.8
Acacia colei var. *colei*		0.5	2.5
Acacia tumida var. *tumida*		0.5	2.5
Solanum lasiophyllum		0.5	0.2
Corymbia candida		0.2	2.0
**Cenchrus ciliaris*	Weed	0.1	0.2
Afrohybanthus aurantiacus		0.1	0.2
Aristida holathera var. *holathera*		0.1	0.2
Bonamia linearis		0.1	0.1
Chrysopogon fallax		0.1	0.25
Corchorus incanus subsp. *incanus*		0.1	0.8
Distimake davenportii		0.1	0.4
Eriachne ciliata		0.1	0.2
Evolvulus alsinoides		0.1	0.2
Ipomoea polymorpha		0.1	0.1
Sida rohlenae subsp. *rohlenae*		0.1	0.2
Sida sp. Pindan (B.G. Thomson 3398)		0.1	0.4
Trigastrotheca molluginea		0.1	0.1
Waltheria indica		0.1	0.4

Site details			
Site	BI022	**Position (WGS84), xyz**	(118.513250534411 -20.4023322978588 16.4318944162206)
Slope	negligible	**Topography**	plain
Soil colour	Light-brown, orange	**Soil texture**	Sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Tall open shrubland of Acacia tumida var. tumida over an open shrubland of Corchorus incanus subsp. Incanus, with *Stylosanthes hamata, over a low open tussock grassland of Eragrostis eriopoda.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	70.0	**Tree cover (%)**	1.0
Shrub cover (%)	20.0	**Grass cover (%)**	45.0
Herb cover (%)	15.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	NR
Quadrat	2	13 Sep 2023	50m x 50m	NR

Species (22)	Status	Cover (%)	Height (m)
Eragrostis eriopoda		20.0	0.4
Bonamia linearis		5.0	0.3
Evolvulus alsinoides var. *villosicalyx*		5.0	0.3
Corchorus incanus subsp. *incanus*		1.5	0.4
Acacia tumida var. *tumida*		1.0	3.0
Owenia reticulata		1.0	4.0
Triodia epactia		1.0	0.5
Waltheria indica		1.0	0.5
Eriachne aristidea		0.5	0.3
Acacia stellaticeps		0.3	0.5
Solanum lasiophyllum		0.3	0.3
**Stylosanthes hamata*	Weed	0.2	0.3
Aristida holathera var. *holathera*		0.2	0.4
Crotalaria ramosissima		0.2	0.3
Evolvulus alsinoides var. *decumbens*		0.2	0.3
Trigastrotheca molluginea		0.2	0.2
Acacia sericophylla		0.1	1.2
Boerhavia coccinea		0.1	0.1
Euphorbia vaccaria var. *vaccaria*		0.1	0.2
Portulaca filifolia		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.4
Sida sp. Rabbit Flat (B.J. Carter 626)		0.1	0.1

Site details			
Site	BI023	**Position (WGS84), xyz**	(118.516523996816 -20.4086910954499 0)
Slope	gentle	**Topography**	plain
Soil colour	orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Low open shrubland of Acacia stellaticeps, over a low hummock grassland of Tiodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	55.0	**Tree cover (%)**	0.0
Shrub cover (%)	10.0	**Grass cover (%)**	45.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	GM

Species (9)	Status	Cover (%)	Height (m)
Triodia epactia		40.0	0.5
Acacia stellaticeps		7.0	0.5
Triodia secunda		5.0	0.25
Eriachne mucronata		0.5	0.15
Pluchea ferdinandi-muelleri		0.2	1.0
Pluchea tetranthera		0.2	0.5
Afrohybanthus aurantiacus		0.1	0.15
Cyperus blakeanus		0.1	0.3
Eriachne obtusa		0.1	0.15

Site details			
Site	BI024	**Position (WGS84), xyz**	(118.520686615321 -20.4126897927506 0)
Slope	None	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Tall open shrubland of Acacia tumida var. tumida, A. colei var. colei, and A. sericophylla, over a low shrubland of Acacia stellaticeps, with Corchorus incanus subsp. incanus, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	historic clearing

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	71.0	**Tree cover (%)**	0.0
Shrub cover (%)	30.0	**Grass cover (%)**	40.0
Herb cover (%)	1.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	25x100	LB
Quadrat	2	13 Sep 2023	25x100	GBW

Species (23)	Status	Cover (%)	Height (m)
Triodia epactia		38.0	1.0
Acacia stellaticeps		30.0	1.5
Acacia tumida var. *tumida*		1.0	3.0
Chrysopogon fallax		1.0	1.0
Sida sp. Pindan (B.G. Thomson 3398)		0.3	0.1
Acacia colei var. *colei*		0.2	3.0
Acacia sericophylla		0.2	2.0
Corchorus incanus subsp. *incanus*		0.2	0.6
Afrohybanthus aurantiacus		0.1	0.3
Bonamia linearis		0.1	0.1
Cucumis variabilis		0.1	0.1
Digitaria brownii		0.1	0.2
Eragrostis eriopoda		0.1	0.2
Evolvulus alsinoides		0.1	0.1
Poaceae sp.		0.1	0.2
Ptilotus fusiformis		0.1	0.25
Ptilotus polystachyus		0.1	0.4
Senna notabilis		0.1	0.3
Sida rohlenae subsp. *rohlenae*		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.5
Solanum lasiophyllum		0.1	1.0
Tribulus hirsutus		0.1	0.4
Waltheria indica		0.1	0.6

Site details			
Site	BI025	**Position (WGS84), xyz**	(118.51814857 -20.41260848 2.33795518270635)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy clay
Rock cover (%)	0	**Rock type**	quartz, ferrous - ironstone

Observation details - visit 1 (16 Apr 2023)

Site description	Low hummock grassland of Triodia epactia, T. longiceps, and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	60.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	LB

Species (4)	Status	Cover (%)	Height (m)
Triodia epactia		40.0	0.5
Triodia longiceps		10.0	0.7
Triodia secunda		10.0	0.2
Fimbristylis dichotoma		0.1	0.1

Site details			
Site	BI026	**Position (WGS84), xyz**	(118.512647764266 -20.4128234500706 6.98904519163971)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	ferrous - ironstone,quartz

Observation details - visit 1 (16 Apr 2023)

Site description	Low hummock grassland of Triodia lanigera with Triodia secunda and T. epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	40.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	40.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	LB

Species (6)	Status	Cover (%)	Height (m)
Triodia secunda		22.0	0.5
Triodia longiceps		18.0	0.5
Fimbristylis dichotoma		0.1	0.1
Sporobolus australasicus		0.1	0.1
Trianthema triquetrum		0.1	0.1
Triodia epactia		0.1	0.4

Site details			
Site	BI027	**Position (WGS84), xyz**	(118.506090693748 -20.412900218645 21.3634555466415)
Slope	gentle	**Topography**	sandy rise
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Isolated tall shrubs of Acacia tumida var. tumida over a low open shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	25.0	**Grass cover (%)**	40.0
Herb cover (%)	0.5		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	GBW
Quadrat	2	13 Sep 2023	50m x 50m	GBW

Species (15)	Status	Cover (%)	Height (m)
Triodia epactia		40.0	1.0
Acacia stellaticeps		25.0	1.2
Acacia tumida var. *tumida*		0.2	2.0
Bonamia linearis		0.2	0.15
Afrohybanthus aurantiacus		0.1	0.2
Chrysopogon fallax		0.1	0.6
Corchorus incanus subsp. *incanus*		0.1	0.3
Cucumis variabilis		0.1	1.0
Eragrostis eriopoda		0.1	0.2
Eriachne helmsii		0.1	0.2
Evolvulus alsinoides		0.1	0.15
Solanum cleistogamum		0.1	0.2
Solanum lasiophyllum		0.1	0.25
Trigastrotheca molluginea		0.1	0.1
Triodia schinzii		0.1	0.9

Site details			
Site	BI028	**Position (WGS84), xyz**	(118.507361212072 -20.4168350900356 14.1275668116189)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Tall open shrubland of Acacia tumida var. tumida over a low sparse shrubland of Corchorus incanus subsp. incanus, and Acacia stellaticeps, over a low hummock grassland of Tiodia epactia, with Eragrostis eriopoda.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	45.0	**Tree cover (%)**	0.0
Shrub cover (%)	8.0	**Grass cover (%)**	35.0
Herb cover (%)	2.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	LB
Quadrat	2	13 Sep 2023	50m x 50m	GBW

Species (28)	Status	Cover (%)	Height (m)
Triodia epactia		35.0	0.5
Eragrostis eriopoda		4.0	0.2
Bonamia linearis		2.0	0.2
Corchorus incanus subsp. *incanus*		2.0	0.9
Acacia tumida var. *tumida*		1.0	3.0
Acacia stellaticeps		0.5	1.1
Waltheria indica		0.5	0.8
Evolvulus alsinoides		0.2	0.2
Indigofera monophylla		0.2	0.25
Acacia colei var. *colei*		0.1	2.5
Acacia sericophylla		0.1	2.0
Aristida hygrometrica		0.1	0.2
Chrysopogon fallax		0.1	0.3
Crotalaria ramosissima		0.1	0.1
Cucumis variabilis		0.1	1.5
Eriachne aristidea		0.1	0.3
Eriachne ciliata		0.1	0.2
Eriachne helmsii		0.1	0.2
Euphorbia coghlanii		0.1	0.15
Euphorbia vaccaria var. *vaccaria*		0.1	0.01
Ipomoea muelleri		0.1	0.4
Ptilotus astrolasius		0.1	0.4
Ptilotus polystachyus		0.1	0.6
Senna notabilis		0.1	0.3
Sida rohlenae subsp. *rohlenae*		0.1	0.5
Solanum cleistogamum		0.1	0.4
Solanum lasiophyllum		0.1	0.4
Trigastrotheca molluginea		0.1	0.1

Site details			
Site	BI029	**Position (WGS84), xyz**	(118.514713900203 -20.4129163505564 5.79273376713647)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Isolated mid shrubs of Acacia tumida var. tumida, over a low shrubland of Acacia stellaticeps over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	75.0	**Tree cover (%)**	0.0
Shrub cover (%)	35.0	**Grass cover (%)**	40.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	LB
Quadrat	2	13 Sep 2023	50m x 50m	GBW

Species (17)	Status	Cover (%)	Height (m)
Triodia epactia		40.0	0.8
Acacia stellaticeps		35.0	1.3
Corchorus incanus subsp. *incanus*		0.2	0.9
Acacia melleodora		0.1	1.4
Acacia tumida var. *tumida*		0.1	1.8
Bonamia erecta		0.1	0.3
Chrysopogon fallax		0.1	0.5
Eragrostis eriopoda		0.1	0.2
Eriachne helmsii		0.1	0.3
Evolvulus alsinoides var. *villosicalyx*		0.1	0.1
Hakea lorea subsp. *lorea*		0.1	1.6
Indigofera monophylla		0.1	0.4
Paraneurachne muelleri		0.1	0.25
Ptilotus fusiformis		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	1.2
Sida sp. Pindan (B.G. Thomson 3398)		0.1	1.2
Triodia schinzii		0.1	0.3

Site details			
Site	BI031	**Position (WGS84), xyz**	(118.506785062772 -20.386533416278 8.00402700649291)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	Sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (17 Apr 2023)

Site description	Low sparse shrubland of Acacia stellaticeps over a low hummock grassland of Triodia epactia, and Triodia schinzii.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	50.0	**Tree cover (%)**	0.0
Shrub cover (%)	5.0	**Grass cover (%)**	45.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	17 Apr 2023	50m x 50m	GM
Quadrat	2	13 Sep 2023	50m x 50m	CW

Species (13)	Status	Cover (%)	Height (m)
Triodia schinzii		20.0	0.6
Acacia stellaticeps		5.0	0.25
Eriachne mucronata		0.2	0.3
Afrohybanthus aurantiacus		0.1	0.6
Chrysopogon fallax		0.1	0.2
Eriachne ciliata		0.1	0.2
Fimbristylis dichotoma		0.1	0.1
Hakea lorea subsp. *lorea*		0.1	1.4
Leptosema anomalum		0.1	0.2
Pluchea tetranthera		0.1	0.3
Tephrosia simplicifolia		0.1	0.6
Trigastrotheca molluginea		0.1	0.1
Triodia epactia		25.0	0.5

Site details			
Site	BI032	**Position (WGS84), xyz**	(118.530359483917 -20.4161366818311 0)
Slope	negligible	**Topography**	plain
Soil colour	Light brown, orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (16 Apr 2023)

Site description	Isolated low shrubs of Pluchea fernandi-muelleri over a low hummock grassland of Triodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	50.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.1	**Grass cover (%)**	50.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	16 Apr 2023	50m x 50m	GM

Species (5)	Status	Cover (%)	Height (m)
Triodia epactia		25.0	0.3
Triodia secunda		25.0	0.3
Cassytha capillaris		0.1	0.3
Eriachne ciliata		0.1	0.2
Pluchea ferdinandi-muelleri		0.1	0.6

Site details			
Site	BI033	**Position (WGS84), xyz**	(118.546510425769 -20.4233116616825 10.7845106059953)
Slope	negligible	**Topography**	plain
Soil colour	red-brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (15 Apr 2023)

Site description	Low shrubland of Acacia stellaticeps, Corchorus incanus subsp. incanus, and Pluchea ferdinandi-muelleri, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	30.0	**Grass cover (%)**	30.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	15 Apr 2023	50m x 50m	NR
Quadrat	2	13 Sep 2023	50m x 50m	NR

Species (31)	Status	Cover (%)	Height (m)
Triodia epactia		30.0	0.5
Acacia stellaticeps		28.0	0.6
Cassytha capillaris		1.0	0.5
Corchorus incanus subsp. *incanus*		1.0	0.7
Bonamia erecta		0.5	0.3
Pluchea ferdinandi-muelleri		0.5	0.6
Cassytha filiformis		0.2	1.1
Chrysopogon fallax		0.2	0.5
Distimake davenportii		0.2	0.2
Ptilotus polystachyus		0.2	0.7
Afrohybanthus aurantiacus		0.1	0.2
Aristida holathera var. *holathera*		0.1	0.2
Bonamia alatisemina		0.1	0.2
Bonamia linearis		0.1	0.1
Codonocarpus cotinifolius		0.1	1.75
Corymbia sp.		0.1	0.3
Cucumis variabilis		0.1	0.3
Digitaria brownii		0.1	0.3
Dodonaea coriacea		0.1	0.2
Eragrostis eriopoda		0.1	0.2
Evolvulus alsinoides var. *decumbens*		0.1	0.3
Hibiscus leptocladus		0.1	0.2
Indigofera monophylla		0.1	0.3
Polymeria ambigua		0.1	0.15
Senna notabilis		0.1	0.3
Sida rohlenae subsp. *rohlenae*		0.1	0.2
Sida sp. Pindan (B.G. Thomson 3398)		0.1	0.4
Solanum cleistogamum		0.1	0.2
Trigastrotheca molluginea		0.1	0.1
Triodia schinzii		0.1	0.3
Waltheria indica		0.1	0.8

Site details			
Site	BI035	**Position (WGS84), xyz**	(118.527537873269 -20.4389740287734 14.2729936316785)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	ferrous - ironstone

Observation details - visit 1 (18 Apr 2023)

Site description	Low hummock grassland of Triodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	40.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	40.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	NR

Species (3)	Status	Cover (%)	Height (m)
Triodia epactia		25.0	0.3
Triodia secunda		15.0	0.3
Fimbristylis dichotoma		0.1	0.05

Site details			
Site	BI036	**Position (WGS84), xyz**	(118.526349774212 -20.4333290670357 14.1572983527636)
Slope	gentle	**Topography**	undulating plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low open woodland of Eucalyptus victrix, over low isolated shrubs of Acacia sericophylla, over a low sparse shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia epactia.
Habitat	woodland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	40.0	**Tree cover (%)**	10.0
Shrub cover (%)	1.0	**Grass cover (%)**	35.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GBW
Quadrat	2	14 Sep 2023	50m x 50m	NR

Species (13)	Status	Cover (%)	Height (m)
Triodia epactia		35.0	0.8
Eucalyptus victrix		10.0	8.0
Acacia stellaticeps		1.0	0.8
Acacia colei var. *colei*		0.1	0.2
Acacia sericophylla		0.1	2.0
Carissa lanceolata		0.1	0.3
Chrysopogon fallax		0.1	0.2
Cyperus blakeanus		0.1	0.25
Enteropogon ramosus		0.1	0.25
Hakea lorea subsp. *lorea*		0.1	0.5
Melaleuca lasiandra		0.1	1.6
Murdannia graminea		0.1	0.2
Panicum australiense		0.1	0.1

Site details			
Site	BI038	**Position (WGS84), xyz**	(118.520905166581 -20.4447670251059 16.0811657954829)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low open woodland of Corymbia candida over a low shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>10
Total veg. cover (%)	85.0	**Tree cover (%)**	1.0
Shrub cover (%)	35.0	**Grass cover (%)**	65.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GBW
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (12)	Status	Cover (%)	Height (m)
Triodia epactia		65.0	0.9
Acacia stellaticeps		34.0	1.2
Acacia colei var. *colei*		1.0	2.0
Acacia sphaerostachya		1.0	1.4
Corymbia candida subsp. *candida*		1.0	2.5
Acacia sericophylla		0.2	2.8
Acacia inaequilatera		0.1	4.0
Chrysopogon fallax		0.1	0.2
Enteropogon ramosus		0.1	
Indigofera monophylla		0.1	0.3
Owenia reticulata		0.1	2.5
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.3

Site details			
Site	BI039	**Position (WGS84), xyz**	(118.526745780939 -20.4445985670161 16.2353621369027)
Slope	gentle	**Topography**	sandy rise
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low open woodland of Corymbia candida over a tall sparse shrubland of Acacia colei var. colei, over a low open shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	75.0	**Tree cover (%)**	1.0
Shrub cover (%)	30.0	**Grass cover (%)**	60.0
Herb cover (%)	0.1		

Sample and effort summary

Sample method	Visit	Sample date	Dimensions	Observer
Quadrat	1	18 Apr 2023	40x62.5	GBW
Quadrat	2	14 Sep 2023	40x62.5	NR

Species (22)	Status	Cover (%)	Height (m)
Triodia epactia		60.0	0.8
Acacia stellaticeps		25.0	1.4
Acacia colei var. *colei*		5.0	3.0
Corymbia candida		1.0	4.0
Eragrostis eriopoda		0.5	0.15
Afrohybanthus aurantiacus		0.1	0.4
Bonamia erecta		0.1	0.3
Cassytha capillaris		0.1	0.5
Chrysopogon fallax		0.1	0.2
Corchorus incanus subsp. *incanus*		0.1	0.8
Enteropogon ramosus		0.1	0.4
Eriachne ciliata		0.1	0.2
Euphorbia tannensis subsp. *eremophila*		0.1	0.7
Evolvulus alsinoides		0.1	0.1
Hakea lorea subsp. *lorea*		0.1	2.0
Paraneurachne muelleri		0.1	0.2
Pluchea tetranthera		0.1	0.9
Ptilotus astrolasius		0.1	0.3
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.4
Sida sp. Pindan (B.G. Thomson 3398)		0.1	0.3
Trigastrotheca molluginea		0.1	0.1
Waltheria indica		0.1	0.6

Site details			
Site	BI041	**Position (WGS84), xyz**	(118.528094401995 -20.4456237100341 14.6714867224319)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (19 Apr 2023)

Site description	Low hummock grassland of Triodia secunda and T. epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	30.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	30.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	19 Apr 2023	50m x 50m	NR

Species (3)	Status	Cover (%)	Height (m)
Triodia secunda		25.0	0.2
Triodia epactia		5.0	0.4
Fimbristylis dichotoma		0.1	0.1

Site details			
Site	BI043	**Position (WGS84), xyz**	(118.527100451034 -20.4515676277331 16.6885478616733)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	ferrous - ironstone

Observation details - visit 1 (19 Apr 2023)

Site description	Low hummock grassland of Triodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	35.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	35.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	19 Apr 2023	50m x 50m	NR

Species (3)	Status	Cover (%)	Height (m)
Triodia epactia		30.0	0.4
Triodia secunda		5.0	0.2
Fimbristylis dichotoma		0.1	0.1

Site details			
Site	BI044	**Position (WGS84), xyz**	(118.525883840923 -20.4431141077103 15.625091252371)
Slope	negligible	**Topography**	depression
Soil colour	red-orange	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	ferrous - ironstone,quartz

Observation details - visit 1 (18 Apr 2023)

Site description	Low isolated shrubs of Acacia stellaticeps over a low hummock grassland of Triodia secunda and T. epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	>5
Total veg. cover (%)	35.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.1	**Grass cover (%)**	35.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GBW
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (7)	Status	Cover (%)	Height (m)
Triodia secunda		25.0	0.3
Triodia epactia		10.0	0.4
Acacia stellaticeps		0.1	0.4
Eriachne obtusa		0.1	0.1
Fimbristylis dichotoma		0.1	0.1
Sporobolus australasicus		0.1	0.03
Trianthema triquetrum		0.1	0.1

Site details			
Site	BI045	**Position (WGS84), xyz**	(118.527150016997 -20.4574500019683 17.1664341648296)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (19 Apr 2023)

Site description	Mid sparse shrubland of Acacia colei var. colei and A. inaequilatera, over a low open shrubland of Acacia stellaticeps, over a low hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	UN
Total veg. cover (%)	60.0	**Tree cover (%)**	0.0
Shrub cover (%)	20.0	**Grass cover (%)**	40.0
Herb cover (%)	0.0		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	19 Apr 2023	50m x 50m	GM
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (17)	Status	Cover (%)	Height (m)
Triodia epactia		37.0	0.6
Acacia stellaticeps		15.0	0.6
Acacia colei var. *colei*		4.0	1.8
Acacia inaequilatera		0.5	0.9
Aristida inaequiglumis		0.3	0.3
Cassytha filiformis		0.3	0.3
Paraneurachne muelleri		0.3	0.3
Bonamia alatisemina		0.2	0.1
Bonamia erecta		0.2	0.3
Leptosema anomalum		0.2	0.1
Pluchea tetranthera		0.2	0.5
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.2	0.3
Solanum lasiophyllum		0.2	0.5
Afrohybanthus aurantiacus		0.1	0.1
Chrysopogon fallax		0.1	0.3
Cucumis variabilis		0.1	0.3
Waltheria indica		0.1	0.4

Site details			
Site	BI047	**Position (WGS84), xyz**	(118.527095344635 -20.4653833136089 18.2422472950175)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (19 Apr 2023)

Site description	Low isolated trees of Corymbia candida over mid isolated shrubs of Acacia sericophylla, Acacia tumida var. tumida, and Acacia colei var. colei, over a low open shrubland of Acacia stellaticeps over a low open hummock grassland of Triodia epactia with T. lanigera.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1
Total veg. cover (%)	41.0	**Tree cover (%)**	0.8
Shrub cover (%)	30.0	**Grass cover (%)**	10.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	19 Apr 2023	50m x 50m	LB
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (13)	Status	Cover (%)	Height (m)
Acacia stellaticeps		28.0	0.7
Triodia epactia		9.0	0.6
Triodia lanigera		1.0	0.25
Corymbia candida		0.8	2.5
Acacia sericophylla		0.2	1.7
Acacia tumida var. *tumida*		0.2	1.2
Acacia colei var. *colei*		0.1	0.5
Chrysopogon fallax		0.1	0.2
Corchorus incanus subsp. *incanus*		0.1	0.25
Eragrostis eriopoda		0.1	0.2
Paraneurachne muelleri		0.1	0.2
Ptilotus astrolasius		0.1	0.15
Sida sp. Pindan (B.G. Thomson 3398)		0.1	0.1

Site details			
Site	BI048	**Position (WGS84), xyz**	(118.529315198339 -20.4777374346954 20.9008801226484)
Slope	negligible	**Topography**	plain
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (19 Apr 2023)

Site description	Tall sparse shrubland of Acacia mixed Acacia species over a low shrubland of Acacia stellaticeps, over a low open hummock grassland of Triodia epactia.
Habitat	shrubland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	45.0	**Tree cover (%)**	0.0
Shrub cover (%)	30.0	**Grass cover (%)**	20.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	19 Apr 2023	50m x 50m	GBW
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (14)	Status	Cover (%)	Height (m)
Acacia stellaticeps		30.0	0.5
Triodia epactia		15.0	0.2
Acacia tumida var. *tumida*		3.0	3.0
Acacia colei var. *colei*		1.0	3.0
Acacia ancistrocarpa		0.1	1.0
Acacia inaequilatera		0.1	1.2
Acacia sericophylla		0.1	3.2
Bonamia linearis		0.1	0.05
Chrysopogon fallax		0.1	0.3
Eragrostis eriopoda		0.1	0.2
Leptosema anomalum		0.1	0.15
Sida sp. Pilbara (A.A. Mitchell PRP 1543)		0.1	0.1
Triodia lanigera		0.1	0.4
Waltheria indica		0.1	0.15

Site details			
Site	BI049	**Position (WGS84), xyz**	(118.513899158844 -20.4457708934661 16.8345630384117)
Slope	gentle	**Topography**	depression
Soil colour	red-orange	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	ferrous - ironstone, quartz

Observation details - visit 1 (18 Apr 2023)

Site description	Isolated mid shrubs of Acacia colei var. colei, over a low open hummock grassland of Triodia epactia.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	20.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.1	**Grass cover (%)**	20.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GBW

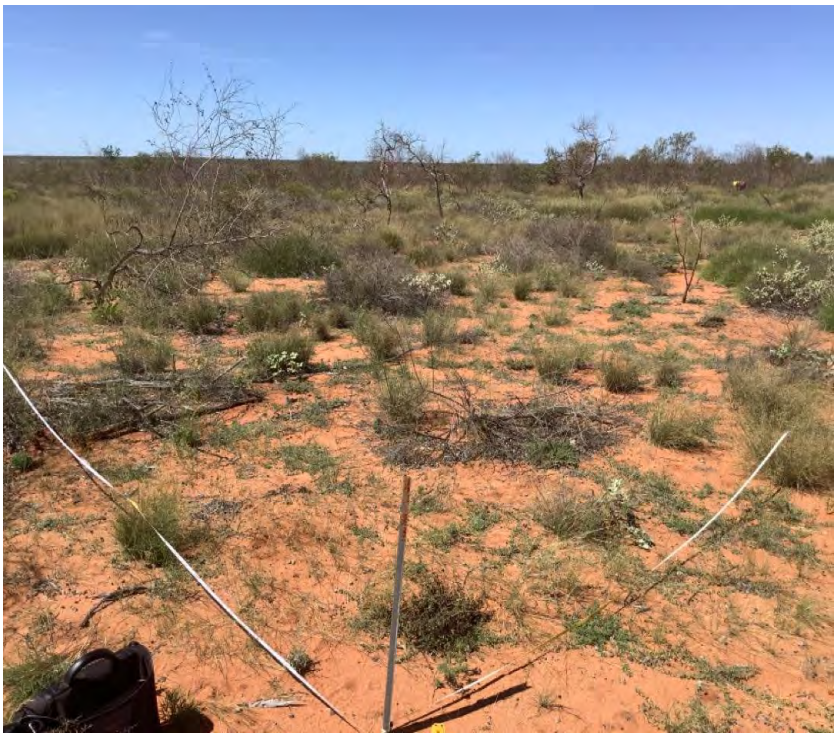
Species (8)	Status	Cover (%)	Height (m)
Triodia epactia		20.0	0.4
Acacia colei var. *colei*		0.1	3.0
Aristida hygrometrica		0.1	0.15
Eragrostis dielsii		0.1	0.07
Fimbristylis dichotoma		0.1	0.1
Pluchea tetranthera		0.1	0.5
Portulaca conspicua		0.1	0.01
Solanum cleistogamum		0.1	0.1

Site details			
Site	BI053	**Position (WGS84), xyz**	(118.506415639447 -20.4488120921567 23.0969055340214)
Slope	gentle	**Topography**	sand dune
Soil colour	red-orange	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Tall sparse shrubland of Acacia colei var. colei, over a low sparse shrubland of Acacia stellaticeps, with *Aerva javanica, over a low open shrubland of Triodia epactia, with T. schinzii.
Habitat	shrubland
Disturbance	historic clearing, weed infestation,livestock tracks,evidence of feral animals

Vegetation condition	Very Good	**Fire age**	1-5
Total veg. cover (%)	25.0	**Tree cover (%)**	0.1
Shrub cover (%)	3.0	**Grass cover (%)**	20.0
Herb cover (%)	2.0		



Sample and effort summary

Sample method	Visit	Sample date	Dimensions	Observer
Quadrat	1	18 Apr 2023	50m x 50m	NR
Quadrat	2	14 Sep 2023	50m x 50m	GBW

Species (49)	Status	Cover (%)	Height (m)
Triodia epactia		9.0	0.7
Eragrostis eriopoda		5.0	0.3
Bonamia linearis		1.1	0.05
Acacia colei var. *colei*		1.0	3.0
Acacia stellaticeps		1.0	1.2
Triodia schinzii		1.0	0.8
Triumfetta chaetocarpa		1.0	1.0
**Aerva javanica*	Weed	0.2	1.0
Acacia sericophylla		0.2	3.5
Boerhavia coccinea		0.2	0.1
Corchorus incanus subsp. *incanus*		0.2	0.8
Eriachne ciliata		0.2	0.3
Paraneurachne muelleri		0.2	0.3
**Cenchrus ciliaris*	Weed	0.1	0.3
Abutilon otocarpum		0.1	0.4
Acacia inaequilatera		0.1	3.0
Afrohybanthus aurantiacus		0.1	0.4
Amaranthus undulatus		0.1	0.3
Aristida hygrometrica		0.1	0.2
Arivela viscosa		0.1	0.4
Bonamia erecta		0.1	0.25
Chrysopogon fallax		0.1	0.2
Cucumis variabilis		0.1	0.7
Distimake davenportii		0.1	1.2
Dolichandrone occidentalis		0.1	1.8
Eriachne helmsii		0.1	0.3
Euphorbia vaccaria var. *vaccaria*		0.1	0.01
Evolvulus alsinoides		0.1	0.15
Grevillea pyramidalis subsp. *leucadendron*		0.1	2.0
Grona muelleri		0.1	0.1
Indigofera colutea		0.1	0.1
Indigofera linifolia		0.1	0.2
Indigofera monophylla		0.1	0.25
Owenia reticulata		0.1	6.0
Panicum australiense		0.1	0.1
Pimelea ammocharis		0.1	1.0
Portulaca filifolia		0.1	0.15
Portulaca oleracea		0.1	0.01
Ptilotus polystachyus		0.1	1.0
Senna notabilis		0.1	0.25
Sida rohlenae subsp. *rohlenae*		0.1	0.5
Sida sp. Rabbit Flat (B.J. Carter 626)		0.1	0.3
Solanum cleistogamum		0.1	0.1
Solanum lasiophyllum		0.1	0.3
Streptoglossa odora		0.1	0.15
Tephrosia leptoclada		0.1	0.3

Tinospora smilacina	0.1	0.4
Trigastrotheca molluginea	0.1	0.15
Waltheria indica	0.1	0.45

Site details			
Site	BI057	**Position (WGS84), xyz**	(118.527610989158 -20.4225992805845 0)
Slope	negligible	**Topography**	plain
Soil colour	Red-orange	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Observation details - visit 1 (18 Apr 2023)

Site description	Low hummock grassland of Triodia epactia and T. secunda.
Habitat	hummock grassland
Disturbance	none evident

Vegetation condition	Excellent	**Fire age**	1-5
Total veg. cover (%)	55.0	**Tree cover (%)**	0.0
Shrub cover (%)	0.0	**Grass cover (%)**	55.0
Herb cover (%)	0.1		

Sample and effort summary				
Sample method	**Visit**	**Sample date**	**Dimensions**	**Observer**
Quadrat	1	18 Apr 2023	50m x 50m	GBW

Species (4)	Status	Cover (%)	Height (m)
Triodia epactia		45.0	0.4
Triodia secunda		10.0	0.15
Fimbristylis dichotoma		0.1	0.1
Senna notabilis		0.1	0.05

Appendix 3 NVIS hierarchy

Western Australia Current Practice			National Standard		
Hierarchy of terms	**Brief description in WA**	**Indicative scale**	**NVIS Level**	**Description**	**NVIS structural/floristic components required**
Vegetation formation	Structure and growth form – e.g. Forest, Woodland.	1:5 000 000	I	Class	Dominant growth form for the ecologically or structurally dominant stratum.
Vegetation sub-formation	Structural and dominant vegetation layer - Eucalypt Forest, Banksia Woodland	1:2 500 000 I	II	Structural Formation	Dominant growth form, cover and height for the ecologically or structurally dominant stratum.
Vegetation association	Structural form and dominant species – e.g. Medium woodland; York gum (*Eucalyptus loxophleba*) & Wandoo	1:1 000 000 to 1:250 000	III	Broad Floristic Formation	Dominant growth form, cover, height and dominant land cover genus for the uppermost or dominant stratum.
Vegetation complex	Structural and floristic description linked to geomorphology – e.g. Quindalup Complex.	1:250 000 to 1:100 000	IV	Sub-Formation	Dominant growth form, cover, height and dominant genus and Family for the three traditional strata. (i.e. Upper, Mid and Ground).
Vegetation type	Floristic definition by strata with structural detail. Often represented with a code and floristic description.	1:100 000 to 1:10 000	V	Association	Dominant growth form, height, cover and up to 3 species for the three traditional strata. (i.e. Upper, Mid and Ground).
Plant community	Basic unit of vegetation classification, site specific and highly localised with detailed floristics for each stratum.	1:10 000	VI	Sub-Association	Dominant growth form, height, cover and up to 5 species for all layers/ strata.
Floristic Community Type	Floristic composition definition; e.g. Northern banksia woodlands over herb rich shrublands on the Swan Coastal Plain.	No absolute scale			

Appendix 4 Introduced flora identified in the desktop review

Family	Species
Aizoaceae	**Trianthema portulacastrum*
Amaranthaceae	**Aerva javanica*
Amaranthaceae	**Gomphrena celosioides*
Amaranthaceae	**Pupalia lappacea*
Apocynaceae	**Calotropis procera*
Arecaceae	**Washingtonia filifera*
Asparagaceae	**Yucca aloifolia*
Asphodelaceae	**Aloe vera*
Asphodelaceae	**Aloe vera* var. *officinalis*
Asteraceae	**Cyanthillium cinereum* var. *cinereum*
Asteraceae	**Erigeron bonariensis*
Asteraceae	**Flaveria trinervia*
Asteraceae	**Lactuca serriola*
Asteraceae	**Sonchus oleraceus*
Asteraceae	**Symphyotrichum squamatum*
Asteraceae	**Tridax procumbens*
Cactaceae	**Opuntia stricta*
Convolvulaceae	**Distimake dissectus*
Convolvulaceae	**Distimake dissectus* var. *dissectus*
Cucurbitaceae	**Coccinia grandis*
Cucurbitaceae	**Citrullus amarus*
Cucurbitaceae	**Citrullus colocynthis*
Euphorbiaceae	**Euphorbia hirta*
Euphorbiaceae	**Euphorbia tirucalli*
Fabaceae	**Parkinsonia aculeata*
Fabaceae	**Indigofera hochstetteri*
Fabaceae	**Clitoria ternatea*
Fabaceae	**Indigofera oblongifolia*
Fabaceae	**Indigofera sessiliflora*
Fabaceae	**Leucaena leucocephala*
Fabaceae	**Senna bicapsularis*
Fabaceae	**Senna occidentalis*
Fabaceae	**Stylosanthes guianensis* var. *guianensis*
Fabaceae	**Stylosanthes hamata*
Fabaceae	**Vachellia farnesiana*
Malvaceae	**Gossypium hirsutum*
Passifloraceae	**Passiflora foetida* var. *hispida*
Poaceae	**Cenchrus ciliaris*
Poaceae	**Cenchrus echinatus*
Poaceae	**Cenchrus setiger*
Poaceae	**Chloris barbata*

Family	Species
Poaceae	**Chloris virgata*
Poaceae	**Cynodon dactylon*
Poaceae	**Cynodon radiatus*
Poaceae	**Dactyloctenium aegyptium*
Poaceae	**Digitaria ciliaris*
Poaceae	**Echinochloa colona*
Poaceae	**Eragrostis cilianensis*
Poaceae	**Eragrostis curvula*
Poaceae	**Eragrostis minor*
Poaceae	**Eragrostis pilosa*
Poaceae	**Lamarckia aurea*
Poaceae	**Melinis repens*
Poaceae	**Setaria verticillata*
Polygonaceae	**Rumex vesicarius*
Portulacaceae	**Portulaca pilosa*
Solanaceae	**Physalis angulata*
Solanaceae	**Solanum nigrum*
Tamaricaceae	**Tamarix aphylla*
Verbenaceae	**Phyla nodiflora* var. *nodiflora*

Appendix 5 Flora species inventory

Family	Species	Status
Aizoaceae	*Trianthema triquetrum*	
Amaranthaceae	*Ptilotus astrolasius*	
Amaranthaceae	*Ptilotus fusiformis*	
Amaranthaceae	*Ptilotus polystachyus*	
Amaranthaceae	*Amaranthus undulatus*	
Amaranthaceae	**Aerva javanica*	Weed
Amaranthaceae	*Alternanthera angustifolia*	
Amaranthaceae	*Achyranthes aspera*	
Amaranthaceae	*Ptilotus axillaris*	
Amaranthaceae	*Alternanthera nana*	
Apocynaceae	*Carissa lanceolata*	
Apocynaceae	*Cynanchum floribundum*	
Asteraceae	*Pluchea tetranthera*	
Asteraceae	*Pluchea ferdinandi-muelleri*	
Asteraceae	*Streptoglossa odora*	
Asteraceae	*Pluchea rubelliflora*	
Asteraceae	*Pterocaulon serrulatum* var. *serrulatum*	
Asteraceae	*Pterocaulon sphacelatum*	
Bignoniaceae	*Dolichandrone occidentalis*	
Boraginaceae	*Euploca pachyphylla*	
Capparaceae	*Capparis spinosa* subsp. *nummularia*	
Chenopodiaceae	*Salsola australis*	
Chenopodiaceae	*Tecticornia indica* subsp. *bidens*	
Chenopodiaceae	*Tecticornia indica* subsp. *leiostachya*	
Chenopodiaceae	*Maireana georgei*	Range extension
Chenopodiaceae	*Enchylaena tomentosa* var. *tomentosa*	
Cleomaceae	*Arivela viscosa*	
Commelinaceae	*Murdannia graminea*	
Convolvulaceae	*Evolvulus alsinoides*	
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*	
Convolvulaceae	*Bonamia linearis*	
Convolvulaceae	*Distimake davenportii*	
Convolvulaceae	*Bonamia alatisemina*	
Convolvulaceae	*Polymeria ambigua*	
Convolvulaceae	*Evolvulus alsinoides* var. *decumbens*	
Convolvulaceae	*Bonamia erecta*	
Convolvulaceae	*Ipomoea polymorpha*	
Convolvulaceae	*Ipomoea plebeia*	
Convolvulaceae	*Ipomoea muelleri*	
Cucurbitaceae	*Cucumis variabilis*	
Cyperaceae	*Fimbristylis dichotoma*	
Cyperaceae	*Cyperus blakeanus*	

Family	Species	Status
Cyperaceae	*Bulbostylis barbata*	
Euphorbiaceae	*Euphorbia tannensis* subsp. *eremophila*	
Euphorbiaceae	*Euphorbia vaccaria* var. *vaccaria*	
Euphorbiaceae	*Euphorbia coghlanii*	
Fabaceae	*Tephrosia simplicifolia*	
Fabaceae	*Leptosema anomalum*	
Fabaceae	*Acacia stellaticeps*	
Fabaceae	*Acacia colei* var. *colei*	
Fabaceae	*Indigofera monophylla*	
Fabaceae	*Senna notabilis*	
Fabaceae	*Acacia tumida* var. *tumida*	
Fabaceae	*Acacia sericophylla*	
Fabaceae	*Acacia inaequilatera*	
Fabaceae	*Acacia sphaerostachya*	
Fabaceae	*Indigofera linifolia*	
Fabaceae	*Grona muelleri*	
Fabaceae	*Tephrosia leptoclada*	
Fabaceae	*Indigofera colutea*	
Fabaceae	*Rhynchosia minima*	
Fabaceae	*Acacia ampliceps*	
Fabaceae	*Crotalaria ramosissima*	
Fabaceae	*Tephrosia rosea* var. Port Hedland (A.S. George 1114)	P1 (DBCA list)
Fabaceae	*Tephrosia* sp. D Kimberley Flora (R.D. Royce 1848)	
Fabaceae	**Stylosanthes hamata*	Weed
Fabaceae	*Acacia melleodora*	
Fabaceae	*Acacia ancistrocarpa*	
Fabaceae	*Cajanus pubescens*	
Fabaceae	*Grona filiformis*	
Goodeniaceae	*Goodenia lamprosperma*	
Goodeniaceae	*Goodenia forrestii*	
Gyrostemonaceae	*Codonocarpus cotinifolius*	
Lauraceae	*Cassytha capillaris*	
Lauraceae	*Cassytha filiformis*	
Loganiaceae	*Mitrasacme exserta*	
Malvaceae	*Sida* sp. Pilbara (A.A. Mitchell PRP 1543)	
Malvaceae	*Corchorus incanus* subsp. *incanus*	
Malvaceae	*Triumfetta chaetocarpa*	
Malvaceae	*Sida* sp. Pindan (B.G. Thomson 3398)	
Malvaceae	*Waltheria indica*	
Malvaceae	*Sida rohlenae* subsp. *rohlenae*	
Malvaceae	*Hibiscus leptocladus*	
Malvaceae	*Sida* sp. Rabbit Flat (B.J. Carter 626)	
Malvaceae	*Abutilon otocarpum*	

Family	Species	Status
Malvaceae	*Abutilon lepidum*	
Malvaceae	*Gossypium australe*	
Marsileaceae	*Marsilea hirsuta*	
Meliaceae	*Owenia reticulata*	
Menispermaceae	*Tinospora smilacina*	
Molluginaceae	*Trigastrotheca molluginea*	
Myrtaceae	*Corymbia* sp.	
Myrtaceae	*Corymbia candida*	
Myrtaceae	*Corymbia candida* subsp. *candida*	
Myrtaceae	*Eucalyptus victrix*	
Myrtaceae	*Melaleuca lasiandra*	
Myrtaceae	*Eucalyptus* sp.	
Myrtaceae	*Corymbia candida* subsp. *lautifolia*	
Nyctaginaceae	*Boerhavia coccinea*	
Phyllanthaceae	*Nellica maderaspatensis*	
Poaceae	*Triodia schinzii*	
Poaceae	*Eriachne ciliata*	
Poaceae	*Chrysopogon fallax*	
Poaceae	*Triodia epactia*	
Poaceae	*Eragrostis eriopoda*	
Poaceae	**Cenchrus ciliaris*	Weed
Poaceae	*Eriachne obtusa*	
Poaceae	*Triodia secunda*	
Poaceae	*Eriachne mucronata*	
Poaceae	*Triodia longiceps*	
Poaceae	*Sporobolus australasicus*	
Poaceae	*Poaceae* sp.	
Poaceae	*Digitaria brownii*	
Poaceae	*Aristida holathera* var. *holathera*	
Poaceae	*Paraneurachne muelleri*	
Poaceae	*Enteropogon ramosus*	
Poaceae	*Eragrostis dielsii*	
Poaceae	*Aristida hygrometrica*	
Poaceae	*Eriachne helmsii*	
Poaceae	*Panicum australiense*	
Poaceae	*Eriachne aristidea*	
Poaceae	**Cenchrus setiger*	Weed
Poaceae	*Dactyloctenium radulans*	
Poaceae	*Paspalidium rarum*	
Poaceae	*Eriachne flaccida*	
Poaceae	*Triodia lanigera*	
Poaceae	*Eragrostis setifolia*	Range extension
Poaceae	*Eulalia aurea*	

Family	Species	Status
Poaceae	*Aristida inaequiglumis*	
Portulacaceae	*Portulaca conspicua*	
Portulacaceae	*Portulaca oleracea*	
Portulacaceae	*Portulaca filifolia*	
Proteaceae	*Hakea lorea* subsp. *lorea*	
Proteaceae	*Grevillea pyramidalis* subsp. *leucadendron*	
Santalaceae	*Santalum spicatum*	Range extension
Sapindaceae	*Dodonaea coriacea*	
Solanaceae	*Solanum lasiophyllum*	
Solanaceae	*Solanum cleistogamum*	
Solanaceae	*Solanum diversiflorum*	
Thymelaeaceae	*Pimelea ammocharis*	
Violaceae	*Afrohybanthus aurantiacus*	
Zygophyllaceae	*Tribulus hirsutus*	
Zygophyllaceae	*Tribulopis angustifolia*