

Karratha Renewable Energy Project - Flora, Vegetation and Fauna Habitat Assessment

23-Jan-2023

Karratha Renewable Energy Project - Flora, Vegetation and Fauna Habitat Assessment

Client: Rio Tinto Group

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Acronym	Description
AECOM	AECOM Australia Pty Ltd
ALA	Atlas of Living Australia
BC Act	Biodiversity Conservation Act
BOM	Bureau of Meteorology
CAR	Comprehensive, Adequate and Reserve System
Cons. Status	Conservation Status
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DBCA	Department of Biodiversity Conservation and Attractions
DPaW	Department of Parks and Wildlife
DoEE	Department of Environment and Energy (now known as DCCEEW)
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act
ESA	Environmentally Sensitive Area
GPS	Global Positioning System
Ha	Hectares
IBRA	Interim Biogeographical Region of Australia
Km	Kilometres
M	Metres
NVIS	National Vegetation Information System
NHP	National Heritage Place
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
Rio Tinto	Rio Tinto Group
SRE	Short Range Endemics
sp.	Species
TEC	Threatened Ecological Community
WA	Western Australia
WAH	Western Australian Herbarium

Executive Summary

AECOM Australia Pty Ltd was commissioned by the Rio Tinto Group to undertake ecological investigations for a defined survey area on the Roebourne Plains near Karratha. The investigations included a detailed flora and vegetation assessment and fauna habitat assessment and associated targeted significant flora, and vegetation searches.

The field surveys were undertaken by two botanists and two ecologists across a 1,824.8 ha survey area in August 2022. Recent rainfall led to an excellent survey period, with many annual species present and vigorous growth of grasses and herbs.

A summary of the survey results is outlined below:

- Two Priority Ecological Communities were identified through an assessment of indicator species, soil conditions and landform:
 - Roebourne Plains gilgai grasslands (P1) represented by SsSk, mapped for 277.45 ha.
 - Horseflat Land System of the Roebourne Plains (P3) represented by AcCf, mapped for 454.56 ha. Two communities, ItTw and TwSk were considered analogous to this PEC, mapped for 370.81 ha.
- Vegetation composition varied considerably across the survey area. Vegetation represented hummock grasslands, tussock grasslands, and a combination of the two. Soil characteristics varied from hard flat clays with rocks on surface to soft deep clay loams with crabholes. Several rock formations were noted in the south, and numerous shallow drainage lines intersected the survey area. Thirteen vegetation communities were defined and mapped to represent the diverse vegetation composition.
- Three Priority flora species were recorded:
 - *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) was recorded at eight locations and confirmed from two collected samples. There are known records nearby (1.7 km) and suitable habitat was present.
 - *Euphorbia inappendiculata* var. *inappendiculata* (P2) was collected at one location and recorded at four locations. Considered significant due to the proximity of nearest record (66 km).
 - *Themeda* ?sp. Hamersley Station (M.E. Trudgen 11431) (P3) was collected at one location. Identification was not confirmed with confidence (S. Dillon *pers comm*).
- Flora diversity was high, with 179 native plant species identified, informed by 262 flora samples collected during the survey.
- Five fauna habitats were recorded with Tussock Grassland Plain and Hummock Grassland Plain being the most prolific in the survey area. Fauna habitats are homogenous in the local area and extend beyond the survey area.

The flora, vegetation and fauna habitat survey was undertaken with no significant limitations identified. Survey effort was considered suitable for representing the environmental values within the survey area.

1.0 Introduction

1.1 Background

Rio Tinto Iron Ore (Rio Tinto) has engaged AECOM to complete a flora, vegetation, and fauna habitat assessment for the Karratha Solar Project with the objective to identify and map the environmental values pertaining to flora, vegetation, and fauna.

1.2 Location

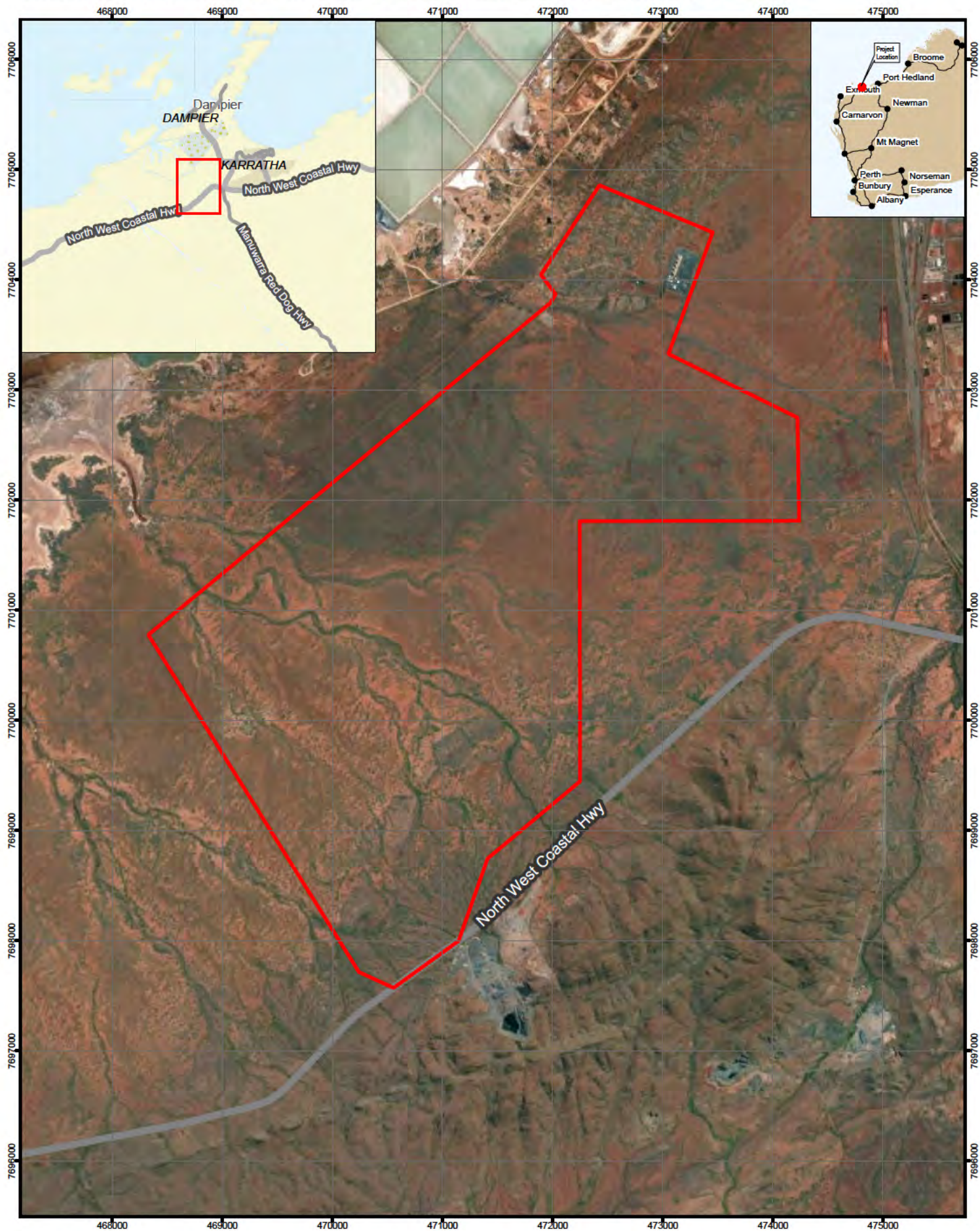
The survey area is located approximately 5 km south-west of the town of Karratha in the Pilbara region of Western Australia. The survey area is 1,824.80 ha and included mostly native vegetation intersected by scattered infrastructure corridors (powerlines, tracks), and a power station (Figure 1).

1.3 Objective and Scope

The purpose of the work is to identify and map environmental values pertaining to flora, vegetation, and fauna. The scope included:

- a detailed flora and vegetation assessment
- targeted significant flora and community searches and assessment
- a fauna habitat assessment.

The results of the assessments are documented in this technical report.



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LEGEND
 Survey Area

Survey Area

RIO TINTO GROUP

KARRATHA RENEWABLE ENERGY
 PROJECT – FLORA, VEGETATION
 AND FAUNA

Figure
1

2.0 Existing Environment

2.1 Climate

The survey area is located in the City of Karratha which experiences a semi-arid climate. The nearest weather station is Karratha Aero (station 4083). Rainfall data from the 12 months preceding the field survey shows higher than average rainfall in May 2022 (Figure 2) (Bureau of Meteorology [BOM] 2022). A total of 271.2 mm of rainfall was recorded in the 12 months preceding the survey (August 2021 to May 2022) which represents a decrease from the mean annual rainfall of 297.5 mm. Adequate rainfall in the months preceding the survey was also evident in the presence of annual species, and flowering of perennial species and grasses.

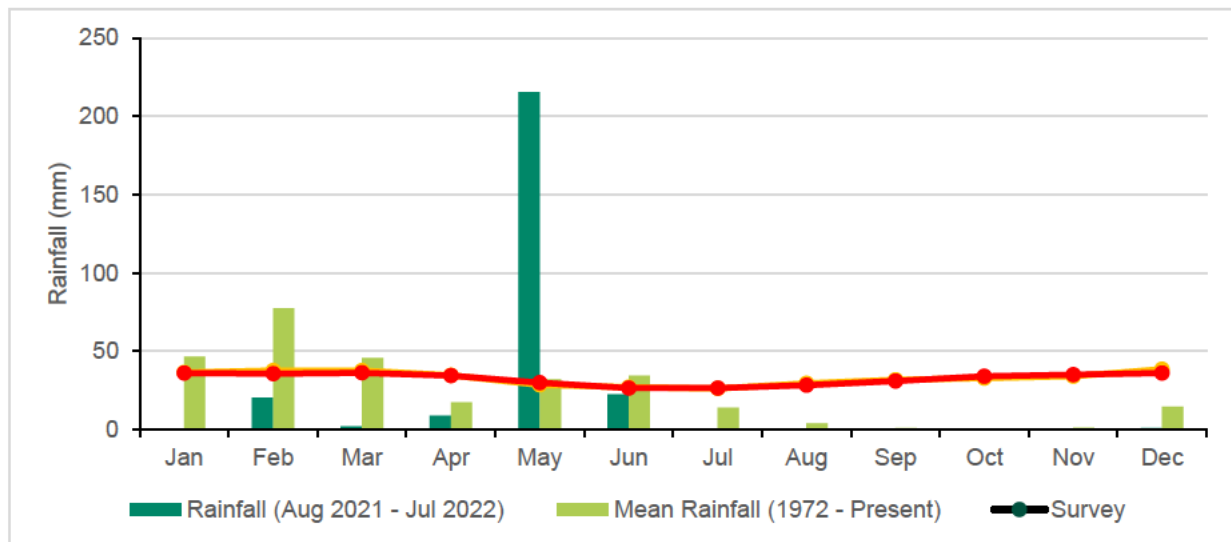


Figure 2 Rainfall Data from Karratha Aero 4083 (BOM 2022)

2.2 IBRA Region

There are 89 recognised IBRA regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (DoEE 2012). The Pilbara bioregion is further divided into four subregions, with the survey area located in the Roebourne subregion.

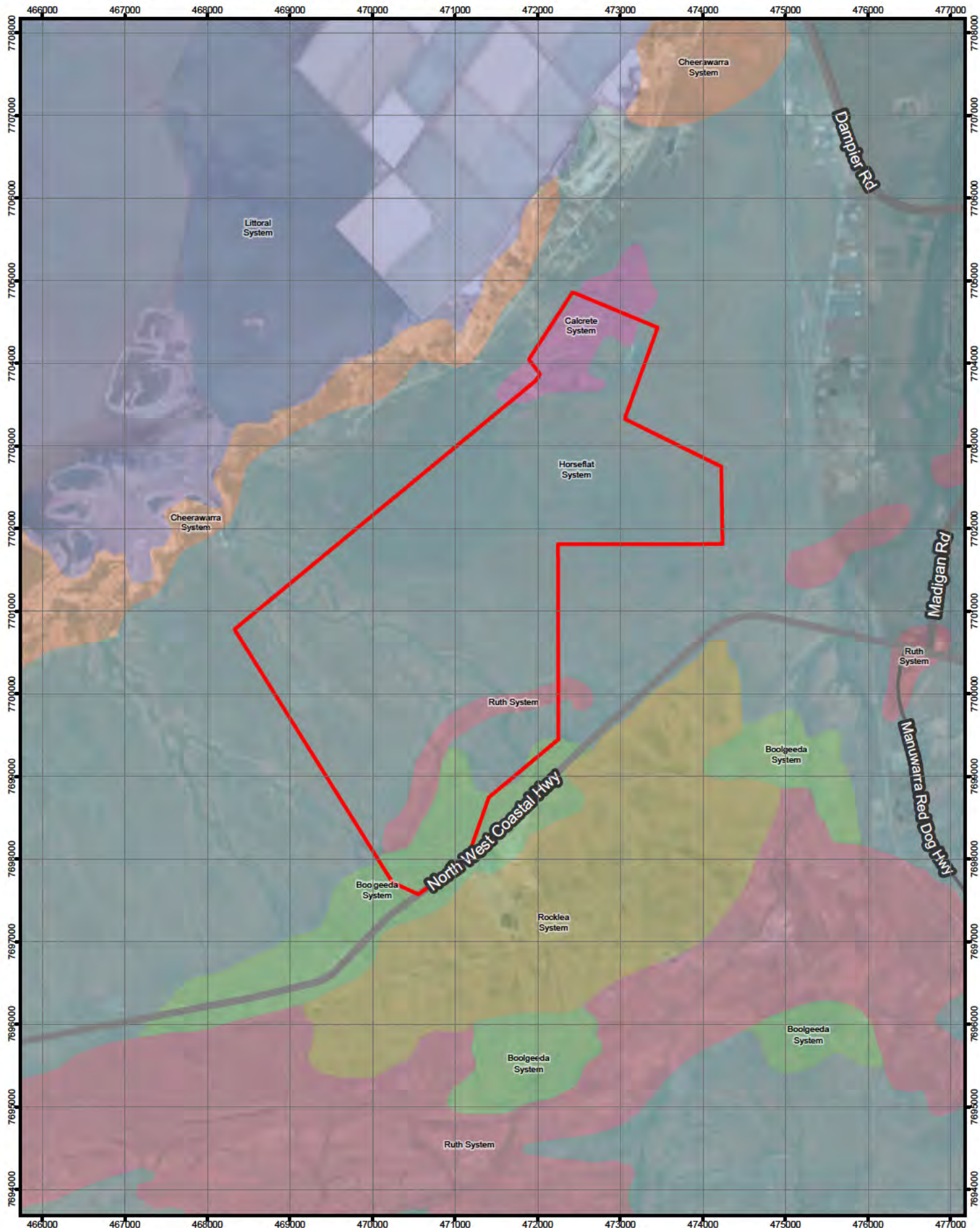
The Roebourne subregion, described by Kendrick & Stanley (2001) is the coastal edge of the Pilbara, characterised by:

“Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three. Climate is arid (semi-desert) tropical with highly variable rainfall, falling mainly in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually.”

2.3 Land Systems

Four land system has been mapped within the survey area (van Vreeswyk et al. 2004) (Figure 3):

- Boolgeeda – stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands (covers small area in southern section of survey area).
- Calcrete – low calcrete platforms and plains supporting shrubby hard spinifex grasslands (north-eastern most section of survey area).
- Horseflat – gilgai clay plains supporting Roebourne Plains grass grasslands and minor grassy snakewood shrublands (majority of survey area).
- Ruth – hills and ridges of volcanic and other rocks supporting shrubby hard spinifex and occasionally soft spinifex grasslands (small section situated above Boolgeeda system in survey area).



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LEGEND

Boundaries

Soil Landscape Mapping - Land Systems (DPIRD-064)

 Boolgeeda System	 Horseflat System
 Calcrete System	 Littoral System
 Cheerawarra System	 Rocklea System
	 Ruth System

Land Systems

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Figure 3

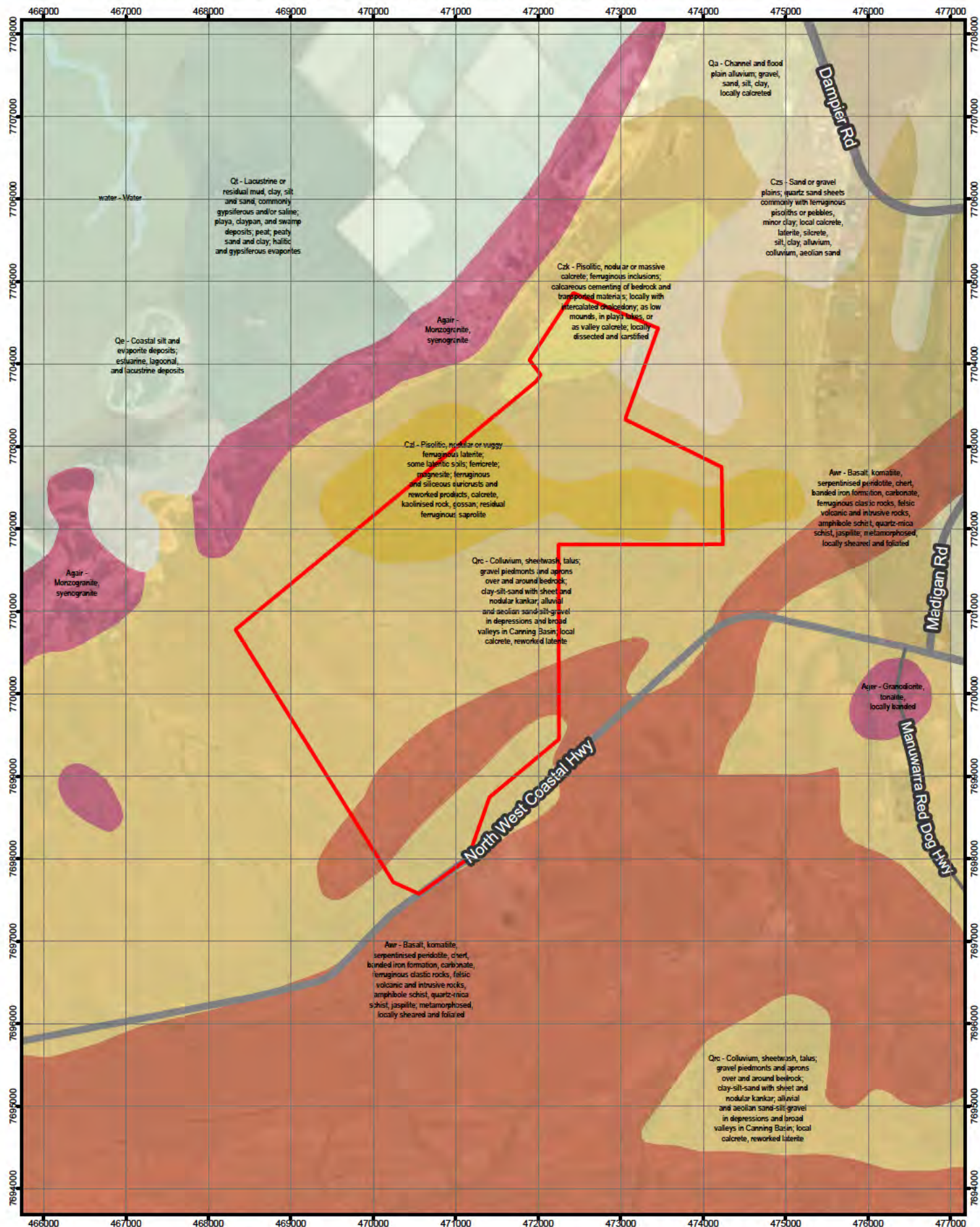
2.4 Geology and Soils

The survey area lies in the Fortescue Province which is described at a regional level by Tille (2006) as hills and ranges (with stony plains and some alluvial plains and sandplains) on the volcanic granitic and sedimentary rocks of the Pilbara Craton. Soils are stony with red loamy earths and red shallow loams (and some red/brown non-cracking clays, red deep sandy duplexes and red deep sands (Tille, 2006).

Five geological units intersect with the survey area (Figure 4).

Table 1 Geological units that occur within the survey area (Geological Series WA 2001)

Unit Code	Geological Description
Czs	Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand
Qrc	Colluvium, sheetwash, talus; gravel piedmonts and aprons over and around bedrock; clay-silt-sand with sheet and nodular kankar; alluvial and aeolian sand-silt-gravel in depressions and broad valleys in Canning Basin; local calcrete, reworked laterite
Czk	Pisolitic, nodular or massive calcrete; ferruginous inclusions; calcareous cementing of bedrock and transported materials; locally with intercalated chalcedony; as low mounds, in playa lakes, or as valley calcrete; locally dissected and karstified
Czl	Pisolitic, nodular or vuggy ferruginous laterite; some lateritic soils; ferricrete; magnesite; ferruginous and siliceous duricrusts and reworked products, calcrete, 7aolinized rock, gossan; residual ferruginous saprolite
Awt	Basalt, komatiite, serpentinitised peridotite, chert, banded iron formation, carbonate, ferruginous clastic rocks, felsic volcanic and intrusive rocks, amphibole schist, quartz-mica schist, jaspilite; metamorphosed, locally sheared and foliated



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Boundaries
Geoscience Australia (2012) Surface Geology of Australia
1:1 000 000 scale, 2012 edition

QUATERNARY

- Qa
- Qe
- Qrc
- Qt

CENOZOIC

- Czk
- Czl
- Czs

ARCHEAN

- Agair
- Ager
- Aw

Geology

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Figure 4

2.5 Vegetation

Beard (1975) mapping is used to determine the current extent of remnant vegetation remaining when compared to pre-European vegetation extent (Table 2; Figure 5). There is one pre-European vegetation association within the survey area, of which more than 99% of pre-European native vegetation is remaining.

Table 2 Pre-European vegetation associations (Beard 1975) extent within the survey area (rounded to whole number) including percentage of pre-European extent remaining (Govt. of WA 2018)

Association Description		State	Pilbara IBRA Region	City of Karratha
589 Mosaic: Short bunch grassland – savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe, soft spinifex	Pre-European Extent	807,699 ha	728,768 ha	312,814 ha
	Current Extent	802,713 ha	724,696 ha	310,512 ha
	% Remaining	99.38%	99.44%	99.26%

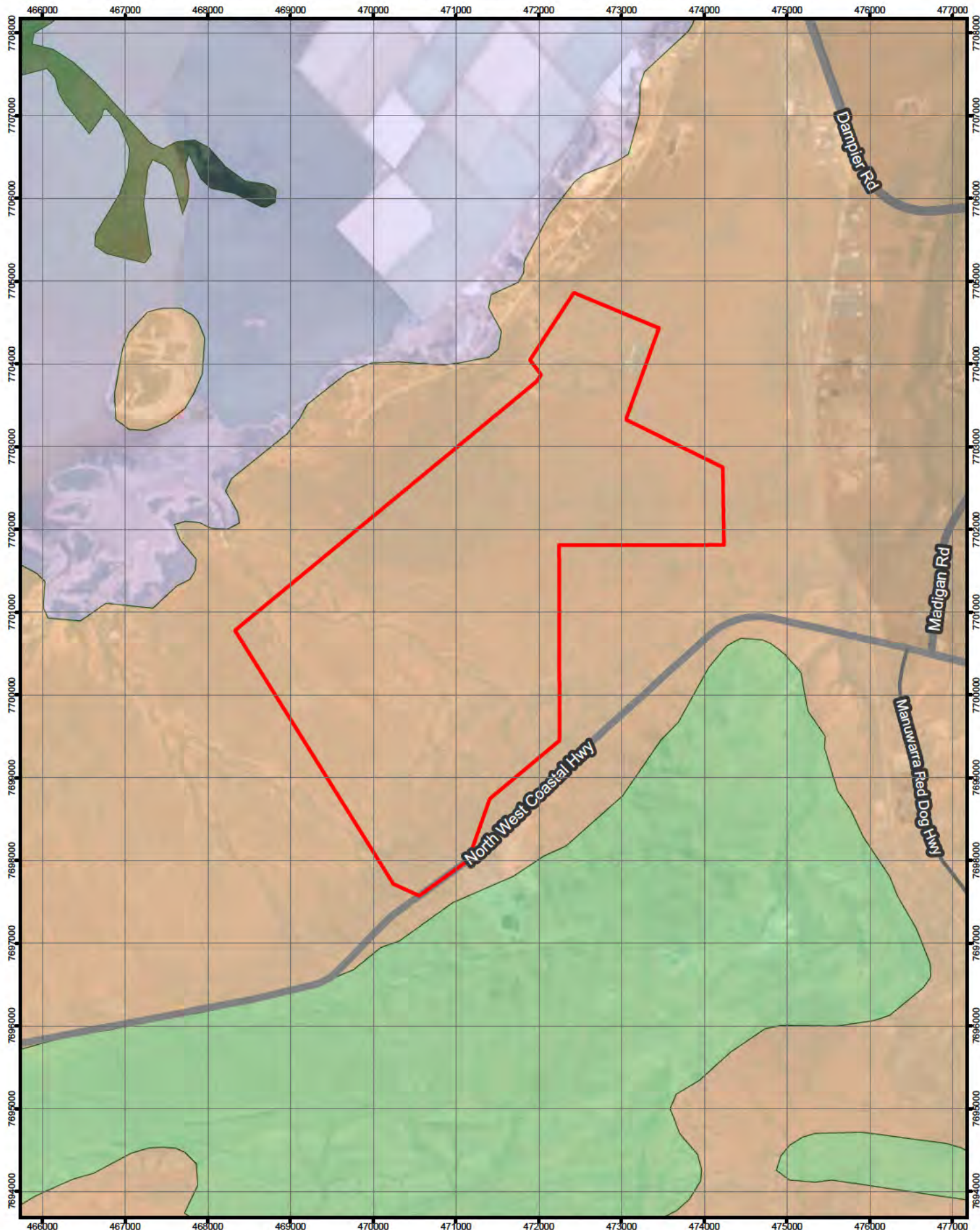
2.6 Conservation Reserves and National Heritage

There are no Conservation Reserves, Environmentally Sensitive Areas, or National Heritage Areas that intersect the survey area. There is one Conservation Reserve, Murujuga National Park, approximately 11.5 km northeast from the survey area.

Two islands, East Lewis and West Lewis Islands are listed as a Recreation Reserve, located 17.5 km north of the survey area. And one Nature Reserve The remaining islands off the coast of Dampier comprise the Dampier Archipelago and are also listed as a Nature Reserve, located 20 km north and northeast of the survey area.

The Dampier Archipelago and Burrup Peninsula (Murujuga N.P.) are listed as a National Heritage Place.

These places are shown on Figure 6.



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- LEGEND**
- Survey Area
- Pre-European Vegetation (DPIRD-006)
- veg_assoc,struct_des,flor_desc
- 127: Tidal mud flat,
 - 157: Grass-steppe, Hummock grassland *Triodia* spp.
 - 589: Short bunch-grass savanna / Grass-steppe

Pre-European Vegetation

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Figure
5



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0 2 4 6 8 km

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LEGEND

- Survey Area
- National Heritage List: Dampier Archipelago (including Burrup Peninsula)
- DBCA - Legislated Lands and Waters (DBCA-011)
- National Park
- Nature Reserve
- Section 5(1)(h) Reserve

National Heritage and Conservation Estates

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Figure 6

3.0 Previous Surveys

Two ecological surveys that are directly relevant to this Project have been undertaken between 2020 and 2021. The author, date, title and significant findings are outlined in Table 3.

Table 3 Previous surveys conducted in the vicinity of the survey area

Author	Title and Short Description	Significant Findings
AECOM 2021	Dampier Desalination Plant Project – Flora, Vegetation and Fauna Assessment. Two-phase detailed survey. Overlaps with survey area.	Vegetation: None Flora: Priority 3 <i>Eragrostis surreyana</i> Fauna: Migratory and Marine Caspian Tern <i>Hydroprogne caspia</i> and Common Sandpiper <i>Actitis hypoleucos</i>
AECOM 2020	Flora and Vegetation Surveys – Rail and 6 Mile Workshop. Near survey area.	Vegetation: Priority 1 ecological community (PEC) Roebourne Plains gilgai grasslands Flora: Priority 4 <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) Fauna: None
GHD 2019	Solar PV Power Plant Fauna Survey Two-phase survey undertaken in June and July of 2019 to conduct reconnaissance survey.	Fauna: None
Vicki Long & Associates, 2019	Woodside Power Project Flora and Vegetation Surveys. Reconnaissance out-of-season survey undertaken in area adjacent to survey area.	Vegetation: inconclusive PEC assessment Flora: <i>Terminalia supranitifolia</i> (P3), <i>Vigna triodiophila</i> (P3) <i>Rhynchosia bungarensis</i> (P4)
Biota 2018	Dampier Resilience Native Vegetation Clearing Permit Supporting Report. Flora, vegetation and terrestrial fauna habitat assessment of area adjacent to survey area.	Vegetation: Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays was recorded. Flora: none recorded however limitations of survey timing was recognised. Fauna: core habitat for Priority 4 Short-tailed Mouse <i>Leggadina lakedownensis</i> . Eastern Osprey (Migratory) was recorded.

4.0 Methodology

4.1 Desktop Assessment

A desktop assessment was undertaken to identify significant environmental values that are likely to be present in the survey area including threatened and priority flora, fauna and vegetation communities. Desktop database searches were requested from the following government databases:

- Department of Biodiversity Conservation and Attractions (DBCA) Threatened Species and Communities database including Threatened and Priority flora and communities with a 100 km buffer
- Western Australian Herbarium (WAH) records
- Protected Matters Search Tool (PMST) with a 50 km buffer (DCCEEW 2022)
- Rio Tinto Flora Database
- Previous surveys outlined in Section 3.0.

All conservation significant matters including flora and communities were reviewed and a likelihood of occurrence was completed based on the categories outlined in Table 4. Habitat suitability uses a score between 0 and 2 with 0 representing no habitat present, 1 representing marginal habitat (i.e some elements of preferred habitat are present), and 2 representing suitable habitat as described for that species.

Table 4 Likelihood categories for species and communities

Likelihood of Occurrence	Score	Definition
Known	6	Species is known to occur in the survey area.
High (Likely)	5	Not known to occur in the survey area however there are records nearby (5 km) and suitable habitat for the species is known or likely to be present within the survey area.
Moderate (Possible)	4 (if suitable habitat may be present within the survey area) 3 (if suitable habitat is known to be, or likely to be present)	Species is not known to occur within the survey area however there are nearby records (5 km) AND/OR recent records OR records within the Local Government Area (LGA) AND suitable habitat for the species is known or likely to be present within the survey area. OR Not known to occur within the survey area but there are records nearby (5 km) AND recent records (<20 years) AND records within the LGA, and suitable habitat for the species may be present (marginal habitat).
Low (Unlikely)	2,3	Species is not known to occur within the survey area but there are records nearby OR recent records OR within the LGA AND suitable habitat for the species may be present (marginal habitat).
Negligible (Suitable Habitat not Present)	1,2,3	Despite records nearby OR being present within the LGA OR recent records, no suitable habitat is present within the survey area and therefore the likelihood of the species occurring is negligible.

4.2 Flora and Vegetation Assessment

A detailed flora and vegetation assessment was undertaken utilising methods outlined in the EPA (2016) Flora Survey Technical Guide. The field survey was undertaken by Floora De Wit (collection permit FB62000137) and Caitlyn Sepkus (collection permit FB62000384).

Floora has 14 years' experience undertaking flora and vegetation assessments. Floora completed a Bachelor of Science in Environmental Biology (Environmental Restoration) and completed a Postgraduate Diploma in Environmental Management and Impact Assessment. Floora was the lead botanist in the nearby Dampier Desalination Surveys (AECOM 2021) and the 6 Mile Flora and Vegetation surveys (AECOM 2020). Caitlyn completed a Bachelor of Science (Conservation and Wildlife Biology) and Environmental Management and Sustainability degree. Caitlyn has been in the botanical team for over two years, involved in numerous flora and vegetation surveys including the Great Victoria Desert Project, and numerous Perth metropolitan projects for Main Roads and Western Power.

The field survey was undertaken between 3 to 10 August 2022. Floora and Caitlyn worked together for the first two days collecting samples and traversing the survey area to get an understanding of likely vegetation communities. Following this, they worked independently, recording floristic data at sample point locations and mapping notes whilst traversing the area on foot.

Floristic data was collected from 45 permanent quadrats, 13 relevés, and mapping notes. Quadrats were demarcated in their northwest corner with a wooden peg. A compass was used to inform the bearing of the measuring tape.

Each site was given a unique site number, and the following parameters recorded:

- date
- location using hand-held GPS (UTM - accuracy of 5 m)
- sample site type and size
- photograph (northwest corner)
- soil details (type, colour, moisture)
- landform
- vegetation condition using the Trudgen (1988) scale and description of disturbance
- fire history
- species list
 - estimated height
 - estimated percentage cover.

Relevés were often used to record dominant species only to represent any changes in vegetation structure as the area was traversed. Some relevés represent a similar level of detail to quadrats, whilst others were used as rapid assessments.

Each quadrat was searched using 5 m linear traverses to ensure that all plant species were recorded. Approximately 1 hour for one person was spent at each quadrat, somewhat dependent on the diversity and density of vegetation. Tussock grasslands took significantly longer compared to Hummock grasslands.

4.2.1 Mapping

Vegetation communities were described and mapped based on changes in dominant species composition and landform. Vegetation community descriptions were based on the National Vegetation Information System (NVIS) framework (DotEE 2018).

Vegetation condition was mapped using the Trudgen (1988) condition scale, including excellent, very good, good, poor, degraded and completely degraded.

Statistical analysis was used to inform delineation of vegetation communities. The software program Primer-E was used to run Bray-Curtis resemblance matrices and produce similarity dendrograms that demonstrate the relationship between quadrats and relevés. The analysis was run using scaled percent foliage cover to reduce data 'noise'.

Table 5 Foliage cover scales

Scale	Range of Cover (%)
0.1	<0.1%
1	0.1-0.9%
2	1-5%
3	6-15%
4	16-49%
5	50-100%

4.2.2 Targeted Searches

Targeted searches were undertaken for conservation significant flora species considered likely to occur. Prior to commencing the field survey, all species were reviewed and field guide booklets made. This included photographs, habitat, and identification details of the plant, flower and/or fruit. Linear traverses were walked approximately 20 m apart in areas of likely habitat. Areas of significantly disturbed areas or those that have been traversed during previous surveys were not intensively targeted.

Significant flora species were marked using a hand-held GPS, a collection was made in representative habitats, photographed, and number of individuals counted where the location represented more than one individual. Samples were submitted to the taxonomist for formal identification at the WA Herbarium. Species that could be mis-identified in the field including *Euphorbia* spp. were sampled a number of times to confirm identification.

4.3 Fauna Habitat Mapping Assessment

A fauna habitat survey was undertaken simultaneously with the flora and vegetation survey. The fauna assessment was undertaken by Ecologist Cassandra House and Graduate Environmental Scientist Nina Sergeev. Cassandra has over 6 years' experience as an ecologist following completion of a Bachelor of Science (Environmental Science and Conservation Biology) and Master of Biological Science (Conservation Biology). Nina Sergeev completed a Bachelor of Science (Zoology) and has been part of the AECOM ecology team since October 2021.

A fauna habitat assessment was completed within each of the fauna habitats informed by on-ground observations and vegetation community mapping. The parameters for assessing fauna habitats include defining the structure, complexity and continuity of the habitat present, and documenting the presence and abundance of habitat features (caves, large mature trees, dense vegetation, rocky hills, open plains, incised creek lines).

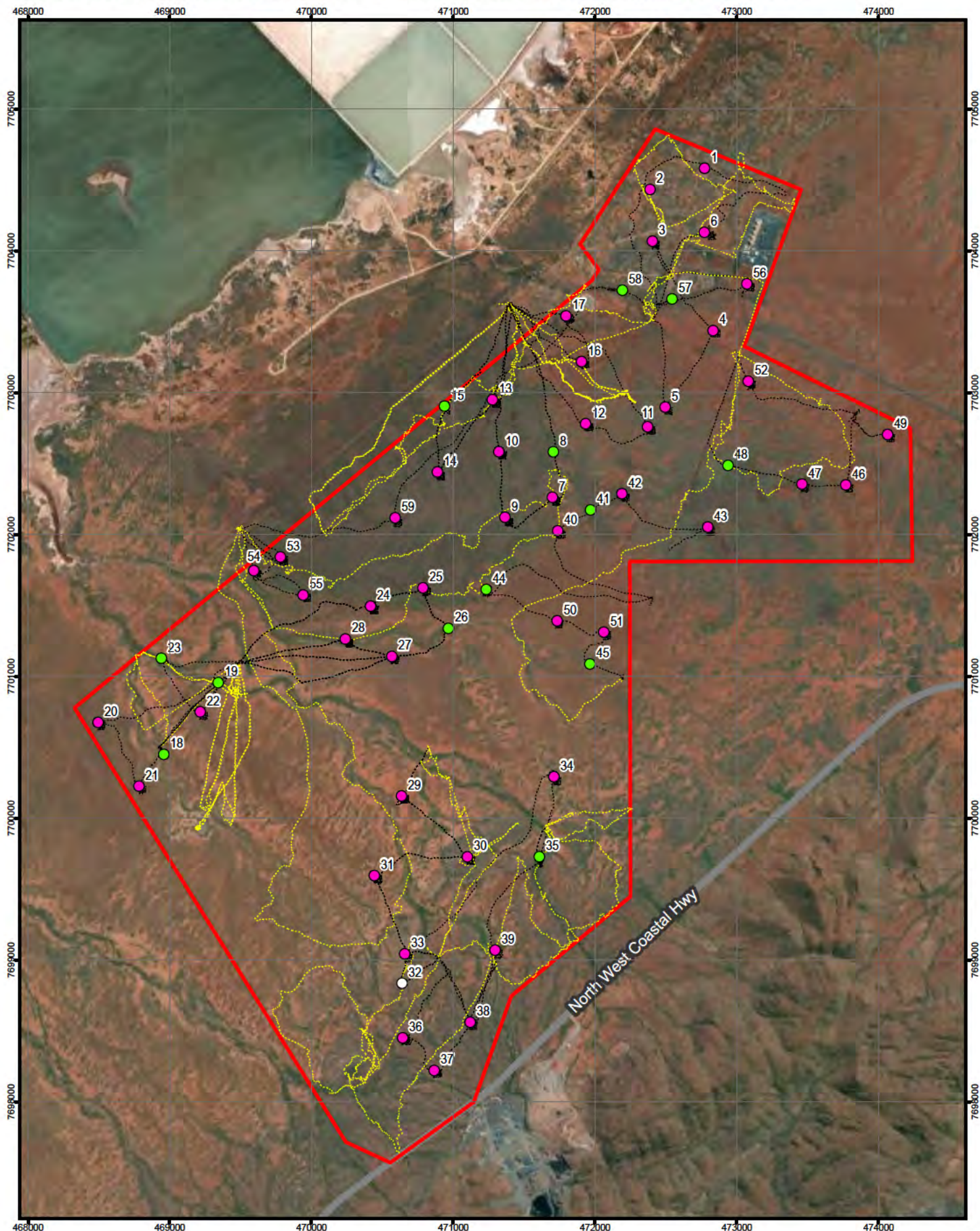
4.4 Limitations

Limitations of the survey are discussed in Table 6.

Table 6 Limitations of the Ecological Surveys

Limitation	Flora and Vegetation
Availability of contextual information on the region	Nil Sufficient resources for assessing significance of flora species was available through DBCA search results, WA Herbarium specimens, taxonomic guides including the Pilbara Priority Flora (Rio Tinto & DPaW, 2015) and FloraBase database. Several surveys have been undertaken in the area as outlined in Section 3.0.
Competency/experience of consultant conducting survey	Nil The flora assessment was led by Floora de Wit who has more than 14 years' experience conducting surveys including previous flora and vegetation surveys for Rio Tinto in the Pilbara.

Limitation	Flora and Vegetation
Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing and intensity)	Nil The survey included recording floristic data from 47 quadrats, 11 relevés and supported by numerous observation points (see Figure 7). All flora species encountered during the survey were sampled, which included 262 specimens. These were dried in accordance with WA Herbarium standards and identified by Margaret Collins assisted by Caitlyn Sepkus and Celia Mitchell. Steve Dillon was consulted for all potential Priority flora and species that were considered difficult to determine (<i>Euphorbia</i>, some Malvaceae spp., <i>Themeda</i> spp.).
Completion (is further work needed)	Minor The identification of <i>Euphorbia appendiculata</i> var <i>appendiculata</i> (P2) and <i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) was confirmed post field work. There is the possibility therefore that more individuals are present in the survey area.
Remoteness and/or access problems	Minor The survey area was accessed from the few existing tracks that intersect the survey area. It was not possible to systematically survey the entire area, instead meandering transects (see Figure 7) were utilised to ensure a representative assessment of vegetation communities and flora species.
Timing, weather, season, cycle	Nil The field surveys were undertaken in August 2022 following significant rainfall in May described in Section 2.1. This was reflected in the presence of many annual species and adequate material for confident identification of grasses and herbs.
Disturbances (e.g. fire flood, accidental human intervention) which affected results of the survey	Nil No disturbances occurred that may have influenced the outcome of the flora and fauna assessment. Parts of the survey area have been previously disturbed including clearing, presence of tracks and various infrastructure corridors such as powerlines.



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- LEGEND**
- Survey Area
 - Fauna Survey
 - Flora and Vegetation Survey
 - Releve
 - Quadrat
 - Mapping Note

Survey Effort

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 AND FAUNA

Figure
7

5.0 Desktop Assessment

5.1 Conservation Significant Communities

No Threatened Ecological Communities listed under the EPBC Act or BC Act are known to occur within the survey area. Seven Priority Ecological Communities (PECs) have been mapped within 50 km of the survey area, including one PEC that is known to occur within the survey area – the Priority 1 PEC Roebourne Plains gilgai grasslands.

All PECs are described in Table 7.

Table 7 Priority Ecological Communities known to occur within 50 km of the survey area

Community Name and Description	Cons. Status	Distance from Survey Area (Km)
Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands) The Roebourne Plains gilgai grasslands occur on microrelief of deep cracking clays, surrounded by clay plains/flats and sandy coastal and alluvial plains. The gilgai depressions supports ephemeral and perennial tussock grasslands dominated by <i>Sorghum</i> sp. and <i>Eragrostis xerophila</i> (Roebourne Plains grass) along with other native species including <i>Astrelba pectinata</i> (Barley Mitchell grass), <i>Eriachne benthamii</i> (swamp wanderrie grass), <i>Chrysopogon fallax</i> (golden beard grass) and <i>Panicum decompositum</i> (native millet).	P1	Within survey area
Chenopod Vegetation Associations of the Roebourne Plains area The community is dominated by <i>Eragrostis xerophila</i> and chenopods (<i>Sclerolaena</i> , <i>Atriplex</i> species) growing in saline clay soils with moderate to dense surface strew of pebbles and cobbles.	P1	39.68
Horseflat Land System of the Roebourne Plains The Horseflat Land System of the Roebourne Plains are extensive, weakly gilgaied clay plains dominated by tussock grasslands on mostly alluvial non-gilgaied, red clay loams or heavy clay loams. Perennial tussock grasses include <i>Eragrostis xerophila</i> (Roebourne Plains grass) and other <i>Eragrostis</i> spp., <i>Eriachne</i> spp. and <i>Dichanthium</i> spp. The community also supports a suite of annual grasses including <i>Sorghum</i> spp. and rare <i>Astrelba</i> spp.	P3	2.02
Burrup Peninsula rock pile communities Comprise a mixture of Pilbara and Kimberley species, communities are different from those of the Hamersley and Chichester Ranges. Short-range endemic land snails. Species usually associated with Burrup rock piles include <i>Ficus brachypoda</i> , <i>Brachychiton acuminatus</i> , <i>Terminalia canescens</i> , as well as the Priority species <i>Terminalia supranitfolia</i> (P3) and <i>Rhynchosia bungarensis</i> (P4).	P1	13.71
Four plant assemblages of the Wona Land System (Cracking clays of the Chichester and Mungaroona Range) Mitchell grass and Roebourne Plain grass (<i>Eragrostis xerophila</i>) plain on gilgai. <i>Astrelba pectinata</i> , <i>A. elymoides</i> , <i>E. xerophila</i> , <i>Aristida latifolia</i> , <i>Eriachne</i> and <i>Sida fibulifera</i> .	P1	37.54
Coastal dune tussock grassland dominated by <i>Whiteochloa airoides</i> Tussock grassland of <i>Whiteochloa airoides</i> occurs on the landward side of fore dunes, hind dunes or remnant dunes with white or pinkish white medium sands with marine fragments. There may be occasional <i>Spinifex longifolius</i> tussock or <i>Triodia epactia</i> hummock grasses and scattered low shrubs of <i>Olearia</i> sp. Kennedy Range (<i>Scaevola spinescens</i> , <i>S. cunninghamii</i> , <i>Trianthema turgidifolia</i> and <i>Corchorus</i> species (<i>C. walcottii</i> , <i>C. laniflorus</i>)).	P3	13.35

Community Name and Description	Cons. Status	Distance from Survey Area (Km)
Burrup Peninsula rock pool communities Calcareous tufa deposits. Interesting aquatic snails.	P1	13.71

5.2 Conservation Significant Flora

No Threatened flora were identified in the desktop assessment. Forty-one (41) Priority flora species were identified as potentially occurring including:

- two species with a high likelihood of occurring,
- twenty-two species with a moderate likelihood of occurring, and
- fifteen species with a low likelihood of occurring.

The largest cause of reduction in likelihood from likely to moderate was the lack of records nearby, and age of record. Furthermore, numerous records associated with the Burrup Peninsula were incorporated for which suitable habitat was not present.

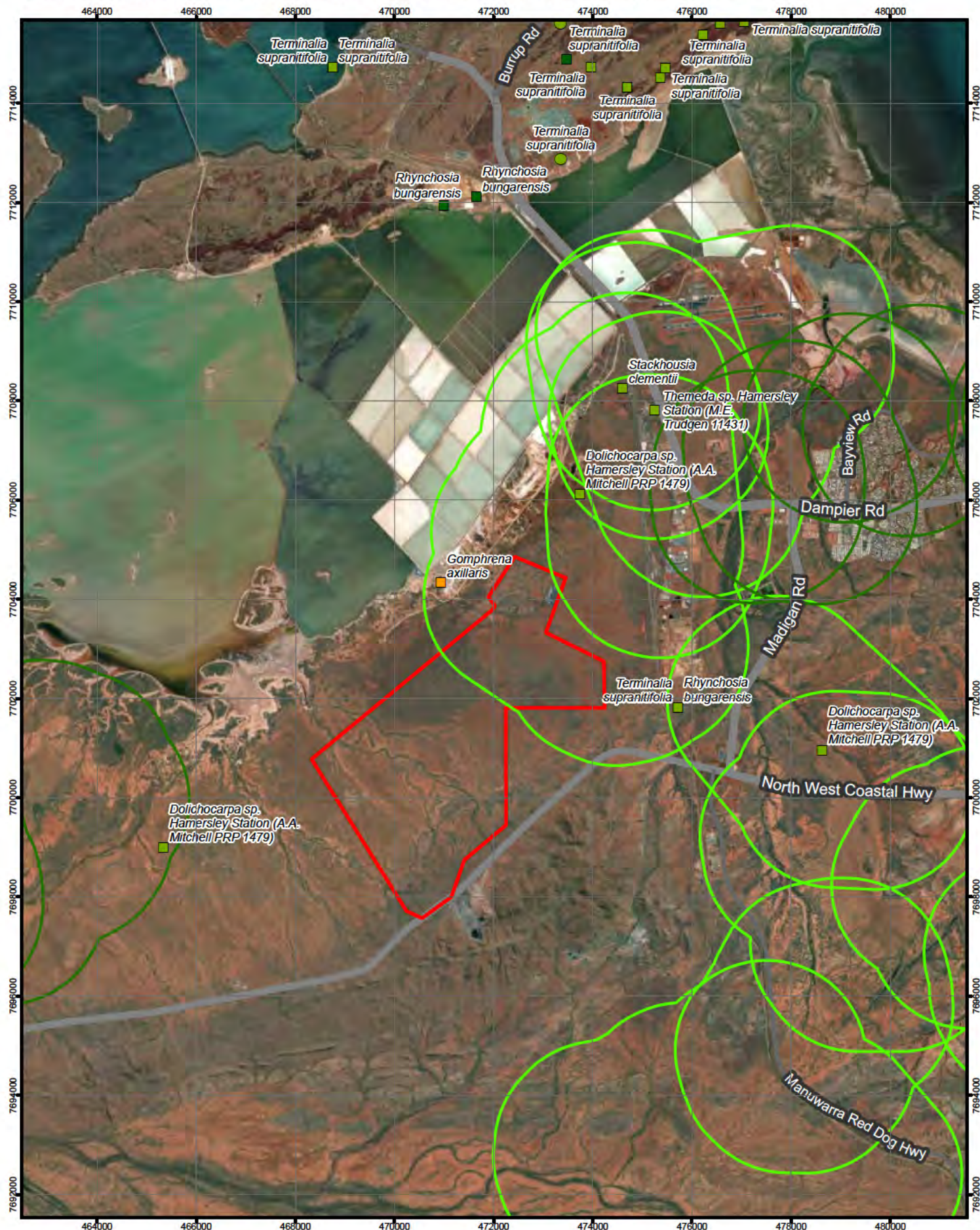
Species with a high or moderate likelihood of occurrence are defined in Table 8. All known locations of significant flora species are mapped in Figure 8a. The comprehensive species list of the desktop flora results, including habitat, count date and likelihood of occurrence is presented in Appendix A.

Table 8 Priority flora species with a 'high' or 'moderate' likelihood of occurrence.

Species	WA Conservation Status	Habitat ¹	Distance from Survey Area (Km)
High			
<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	P3	Cracking clay, basalt. Gently undulating plain with large surface rocks, flat crab-holed plain.	1.7
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	P3	Drainage lines, clay flats, crabhole flats and dark self-mulching clays.	3.8
Moderate			
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	P3	Recorded in isolated low <i>Corymbia hamersleyana</i> and/or <i>C. zygomphyla</i> mallee over isolated mixed shrubs over low <i>Triodia basedowii</i> hummock grassland in red sandy clay on sandplain (Phoenix 2017).	43.1
<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>	P3	Species recorded from highly fragmented populations from Karratha to Dundas. Grows in crabhole plains.	16.3
<i>Euphorbia australis</i> var. <i>glabra</i>	P3	Sump, low in the landscape on alluvial cracking clay loamy soil, gritty with ironstone fragments, saline flats (Astron 2018).	96.7
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	P2	Cracking clays, associated with tussock grassland.	64.4
<i>Euphorbia stevenii</i>	P3	Clay, sandy soils.	57.8
<i>Euploca mutica</i>	P3	Hummock grasslands, flats, sandy clays.	93.5

Species	WA Conservation Status	Habitat ¹	Distance from Survey Area (Km)
<i>Glycine falcata</i>	P3	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.	23.2
<i>Gomphrena axillaris</i>	P1	Prefers sub-saline habitats or margins of salt-lakes and hummock or tussock grasslands on sand (Swainsona).	1.0
<i>Gomphrena cucullata</i>	P3	Occurs in red sandy loam and clayey sand, on open floodplains.	14.0
<i>Gomphrena leptophylla</i>	P3	Grows in a variety of soil types including sand, sandy to clayey loam, granite and quartzite. Often on flats, sandy creek beds, edges of salt pans and marshes, and stony hillsides.	14.0
<i>Owenia acidula</i>	P3	Plains, in grasslands of various types on various substrates, or thin woodlands (DSWEPaC 2013).	85.7
<i>Paspalidium retiglume</i>	P2	Tropical and subtropical sub-humid woodlands, arid and semi-arid low woodland and tussock grasslands. Often in cracking clays.	78.0
<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	P2	Found in <i>Triodia</i> hummock grassland, often in the understorey of a shrubland of <i>Acacia</i> spp., <i>Gossypium</i> spp., <i>Senna</i> spp., <i>Brachychiton</i> spp. and <i>Eucalyptus</i> spp., on summits and slopes of low hills, on basaltic soils, at altitudes to 1150 m (Orchard & Cross 2012).	71.4
<i>Rhynchosia bungarensis</i>	P4	Rock piles, gorges, river beds, alluvial soils in shrubland.	1.5
<i>Solanum albotellatum</i>	P3	Open clay flats associated with <i>Aristida latifolia</i> .	23.2
<i>Stackhousia clementii</i>	P3	Grows in skeletal soils and sandstone hills. Species recorded across the Eremaean Province.	4.0
<i>Swainsona thompsoniana</i>	P3	A prostrate, annual herb, to 10 cm high, flowers mauve with cream - yellow centres. Inhabits open floodplains on heavy clay soils (Davis & Hurter 2013).	76.2
<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114)	P1	Species grows in sandy or sandy loam, on coastal dunes and plains.	38.5
<i>Terminalia supranitifolia</i>	P3	Amongst basalt rocks.	1.5
<i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	P2	Occurs in sand, gibber plain on plains.	19.5
<i>Tribulopsis marliesiae</i>	P3	Restricted to red sands in heath and low pindan, particularly with <i>Acacia tumida</i> .	99.1
<i>Triodia pisoliticola</i>	P3	Skeletal soils on ironstone. Summits and mesas or other hilly areas. Has been found on midslope and valleys. Restricted to Robe Pisolite. Previously known as sp. Robe River.	79.9

1. Habitat derived from Florabase (WAH 1998) unless otherwise referenced.



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North Arrow
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LEGEND

 Survey Area
 WA Herbarium database (WAHERB)

P1
 P3
 P4

Threatened and Priority Flora database (TPFL)

P3

TEC / PEC

 Priority 1: Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands)

 Priority 3: Horseflat Land System of the Roebourne Plains

Conservation Significant Flora Desktop Results

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Figure
8a

6.0 Field Survey Results

6.1 Flora

6.1.1 Conservation Significant Flora

Two Priority flora species were confirmed to occur and one tentative Priority flora species was recorded. The three flora species as shown on Figure 9, locations presented in Appendix H, and described below.

***Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3)**

D. sp. Hamersley Station was recorded at eight locations across the survey area, typically in tussock grasslands on flats with both soft and hard clay loam soils. Samples were collected at Quadrat 6 (FdW220805-130) and Quadrat 15 (CS220807-20) and confirmed by Senior Technical Officer (ID Botanist) Steve Dillon. Foliage cover values varied from 0.01 to 0.1% so individual counts are anticipated to be low within a 50x50 m quadrat.

D. sp. Hamersley Station was considered likely to occur. Suitable habitat is described as gently undulating plain with large surface rocks, flat crabholed plain (WAH, 1998) which was present in the survey area. The nearest WA Herbarium record to the survey area is 1.7 km, with records as recent as 2020.

***Euphorbia inappendiculata* var. *inappendiculata* (Priority 2)**

E. inappendiculata var. *inappendiculata* was collected at Quadrat 5 (FdW220805-114) and confirmed as the Priority species by the Senior Technical Officer (ID Botanist) Steve Dillon. The collection was made in vegetation TwSk representing a combination of tussock and hummock grassland on deeper clay soils. The species is difficult to confidently identify in the field because it is morphologically very similar to common *Euphorbia* species.

This species was recorded at five locations with foliage cover values between 0.01 to 0.7% indicating it varied from rare to relatively common within the quadrat.

The nearest record to the collected location is 66 km associated with the Horseflats PEC on cracking clay. No cracking clay was observed in the survey area. This species was not confirmed as Priority in the field and no photograph was therefore taken.

***Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (Priority 3)**

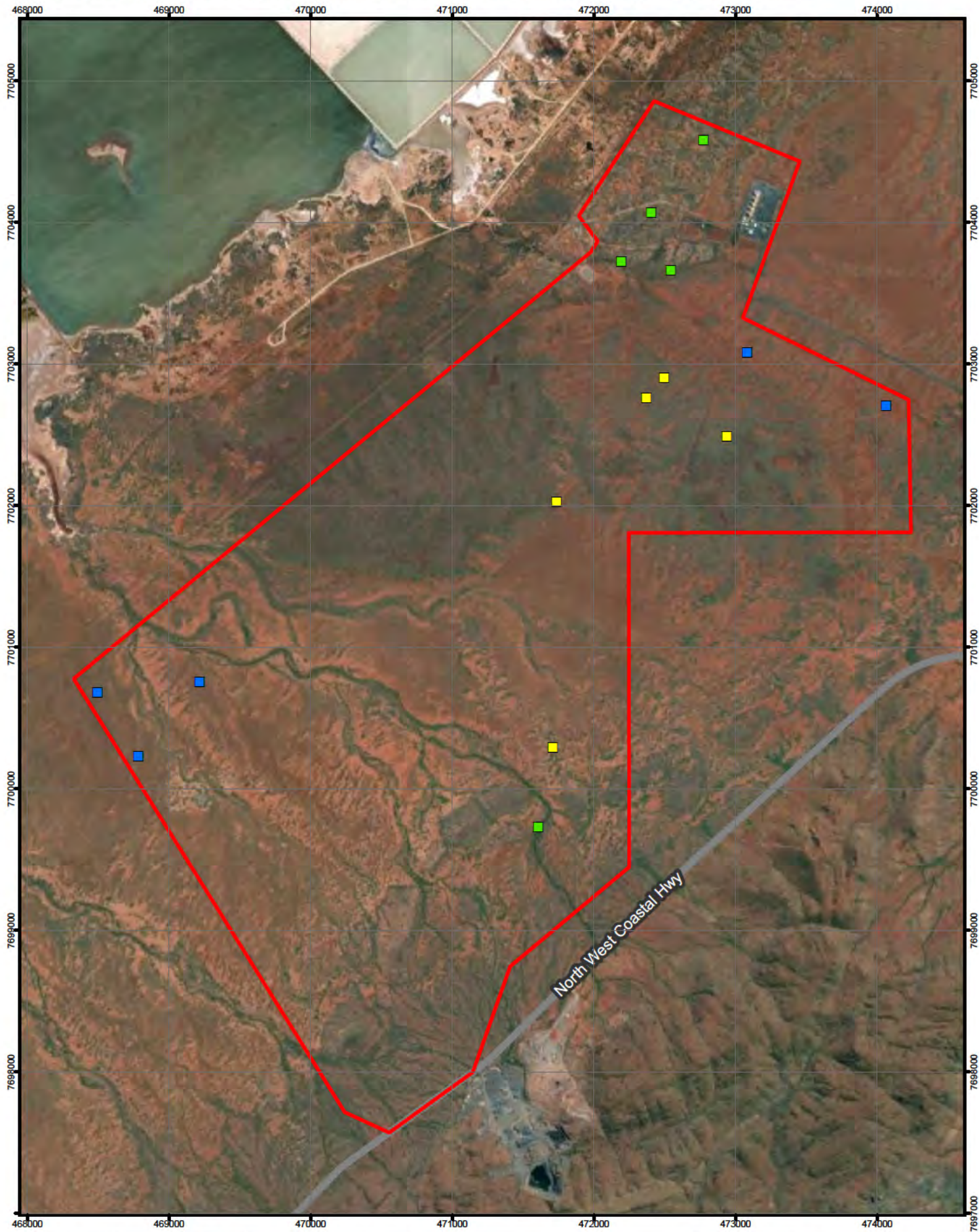
Two *Themeda* spp. samples were collected during the survey. Of these one (FdW220804-38) was tentatively identified as the Priority 3 *Themeda* sp. Hamersley Station. Communication from Senior Technical Officer (ID Botanist) Steve Dillon was as follows: “*Not certain as the callus hair length is in between typical T. sp. Hamersley Station and T. triandra. Overall size of the plant would suggest T. triandra but I have seen short T. sp. Hamersley Station and tall T. triandra so plant height isn’t all that reliable.*” This tentative identification is denoted with a “?” in the species list (Appendix D)

Themeda ?sp. Hamersley Station was recorded at 13 locations both inside and outside the survey area (Figure 9). A second *Themeda* spp. collection was confirmed as the common *Themeda triandra* and not further discussed.

6.1.2 Flora Diversity

A total of 174 native plant species were recorded in the survey area, representing 108 genera and 40 families. The most common families were Fabaceae (33 species) and Poaceae (29 species).

Ten weed species were recorded, with **Cenchrus ciliaris* the most common weed species. No Declared Pest species or Weed of National Significance were recorded. Most weeds were restricted to disturbed areas adjacent to infrastructure and minor drainage.



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- LEGEND**
- ▬ Boundaries
 - *Euphorbia inappendiculata* var. *inappendiculata*, P2
 - *Themeda* ? sp. Hamersley Station (M.E. Trudgen 11431), P3
 - *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479), P3

Significant Flora

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Figure
9

6.2 Vegetation

6.2.1 Community Mapping

Thirteen vegetation communities were defined and mapped. These fell into one of two “super” groups clearly defined in the floristic community analysis (Plate 1) representing Tussock grassland and Hummock grassland. The dendrogram was used to inform the vegetation mapping based on floristic data, as well as the consideration of soil characteristics.

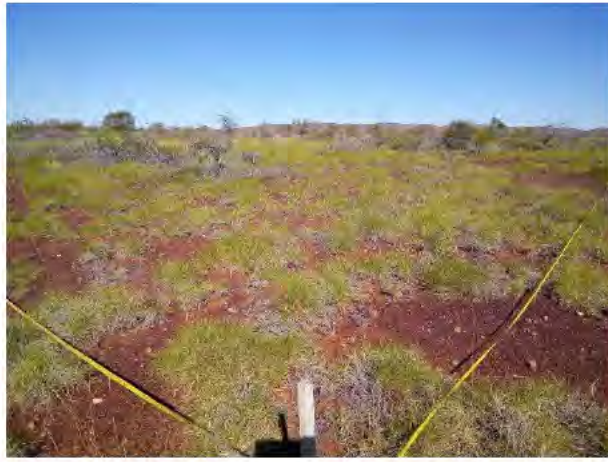
Vegetation communities are described in detail in Table 9 and mapped on Figure 10. They included:

- Tussock grasslands on flats
 - ExPe – tussock on deep clay loam soils representative of Horseflat PEC
 - SsSk – tussocks on gilgai clays, representative of Roebourne Plains PEC
 - SaXI – very bare open grasslands on hard clay
 - ItTw – mix of tussock and hummock grasslands, analogous to Horseflat PEC
- Hummock grasslands on flat to undulating terrain
 - AbTwBp – Triodia on pebbly clay loams
 - TwSk – Triodia with tussock grasses on variable soil from soft clays to hard clay loam, analogous to Horseflat PEC
 - AiTwBe – Triodia with common mid to tall shrubs on hard red clay loam soils
 - CpTw – Triodia and some tussock grasses on hard clay soils
 - TsTw – Triodia on rocky outcrops with skeletal rocky soils.
 - ApTwBp – Acacia shrubland over Triodia on lower slopes associated with adjacent ranges (outside survey area).
- Minor channels
 - ChAcTw – open woodland in shallow drainage near power station
 - AcCf – tussock grassland representing slight variation to adjacent grasslands on plains, represents Horseflat PEC

Table 9 Vegetation Community Descriptions and Photographs

Description	Additional Detail	Photograph
Flats with Gilgai Clay		
T2 SsSk Low Tussock Grassland Eragrostis and Sorghum <i>Sorghum stipoides</i>, <i>Eragrostis xerophila</i> and <i>Iseilema vaginiflorum</i> low tussock grassland with <i>Stemodia kingii</i>, <i>Streptoglossa</i> sp. and <i>Ptilotus gomphrenoides</i> low herbland. Recorded on flat terrain with red deep clay gilgai loams. Includes <i>Panicum decompositum</i> var. <i>decompositum</i>, <i>Astrebla pectinata</i> and <i>Chrysopogon fallax</i> as indicator species for the Roebourne Plains PEC and another 11 native grass species. Considered a good representation of the Roebourne Plains PEC.	Survey effort: Q4, Q6, Q11, Q22, Q36, Q45, Q47, Q50, Q53, Q55 Extent: 277.46 ha Species richness: 87 native and 5 weed species	
Flats with Non-Gilgai Clay		
T1 ExPe Low Tussock Grassland Eragrostis and Sorghum <i>Eragrostis xerophila</i>, <i>Sorghum stipoides</i> and <i>Bothriochloa ewartiana</i> low tussock grassland with <i>Ptilotus axillaris</i>, <i>Goodenia pascua</i> and <i>Sida fibulifera</i> low open shrub and herbland. Recorded on flat terrain with predominantly soft clay loams with occasional patches of harder non-gilgai clays. Represents Horseflat PEC.	Survey effort: Q15, Q17, Q23, Q28, Q39, Q41 Extent: 376.19 ha Species richness: 44 native species	

Description	Additional Detail	Photograph
H1 AbTwBp Low Hummock Grassland Triodia <i>Acacia bivenosa</i>, <i>Scaevola spinescens</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> mid open shrubland over <i>Triodia wiseana</i>, <i>Eulalia aurea</i> and <i>Sorghum stipoides</i> low mixed hummock and tussock grassland with <i>Bonamia pilbarensis</i>, <i>Afrohybanthus aurantiacus</i> and <i>Goodenia microptera</i> low open herbland. Recorded on flat soils with hard clay loam with crusting and/or pebbles on surface. Included quartz and granite rocks.	Survey effort: Q10, Q13, Q46, Q48, Q49 Extent: 90.80 ha Species richness: 104 native and 4 weed species	
T5 SaXI Low Tussock Grassland Xerochloa <i>Salsola australis</i>, <i>Abutilon lepidum</i> and <i>Streptoglossa bubakii</i> low mixed shrub and herbland with <i>Xerochloa laniflora</i>, <i>Eragrostis xerophila</i> and <i>Bothriochloa ewartiana</i> low tussock grassland. Soils are hard flat non-gilgai red clay with pebbles on the surface.	Survey effort: Q32 Extent: 51.46 ha Species richness: 9 native species	

Description	Additional Detail	Photograph
H5 TwSk Low Hummock Grassland Triodia <i>Triodia wiseana</i>, <i>Eragrostis xerophila</i> and <i>Sorghum stipoides</i> low mixed tussock and hummock grassland with <i>Stemodia kingii</i>, <i>Streptoglossa</i> sp. and <i>Ptilotus gomphrenoides</i> low open herbland. Includes low shrub layer. Represents characteristics of both hummock grasslands and tussocks on deeper clays. The tussock grasslands on harder clays form bands intermittent with tussocks on deeper non-gilgai clay loams. It is therefore considered analogous to the Horseflat PEC.	Survey effort: Q05, Q07, Q09 Extent: 153.05 ha Species richness: 79 native and 3 weed species	
Hard Clay with Pebbles		
H2 AiTwBe Low Hummock Grassland Triodia <i>Acacia inaequilatera</i>, <i>Acacia bivenosa</i> and <i>Acacia ancistrocarpa</i> mid open shrubland over <i>Triodia wiseana</i>, <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Chrysopogon fallax</i> low mixed hummock and tussock grassland with <i>Bonamia erecta</i>, <i>Indigofera monophylla</i> and <i>Triumfetta clementii</i> low open shrubland. Recorded on flat terrain with hard red clay loam soils and quartz, calcrete and granite pebbles on the surface. Small pockets of <i>*Cenchrus ciliaris</i> noted near infrastructure.	Survey effort: Q1, Q2, Q3, Q12, Q14, Q18, R20, Q58 Extent: 271.54 ha Species richness: 111 native and 2 weed species	

Description	Additional Detail	Photograph
H3 CpTw Low Hummock Grassland Triodia <i>Corchorus parviflorus</i>, <i>Ptilotus aervoides</i> and <i>Euploca heterantha</i> low mixed shrub and herbland with <i>Triodia wiseana</i>, <i>Aristida contorta</i> and <i>Enneapogon caerulescens</i> low mixed hummock and tussock grassland. Recorded on flat terrain with red clay loam soils (hard) and many granite pebbles on surface.	Survey effort: Q8, Q16, Q24, Q42, R37, R44, Q52, R54 Extent: 104.50 ha Species richness: 100 native and 5 weed species	
T4 ItTw Mixed Tussock and Hummock Grassland Mixed Triodia Sorghum and Eragrostis <i>Indigofera trita</i> subsp. <i>trita</i>, <i>Salsola australis</i> and <i>Alysicarpus muelleri</i> low mixed open shrub and herbland with <i>Triodia wiseana</i>, <i>Sorghum stipoideum</i> and <i>Eragrostis xerophila</i> low mixed tussock and hummock grassland. Recorded on flat terrain with red non-gilgaied hard clay soils sometimes with granite and quartz rocks and pebbles on surface. Analogous to Horseflat PEC.	Survey effort: Q33, Q40, R43, Q51 Extent: 217.76 ha Species richness: 81 native and 3 weed species	
Rocky Outcrops and Slopes		

Description	Additional Detail	Photograph
H4 TsTw Low Hummock Grassland Triodia <i>Tephrosia supina</i>, <i>Solanum diversifolium</i> and <i>Trichodesma zeylanicum</i> mid to low open shrubland over <i>Triodia wiseana</i>, <i>Paraneurachne muelleri</i> and <i>Ptilotus clementii</i> low mixed hummock, tussock and herbland. Recorded on rocky outcrops with skeletal soils.	Survey effort: Q34, Q38 Extent: 33.93 ha Species richness: 48 native species	
A1 ApTwBp Open Shrubland Acacia <i>Acacia pyrifolia</i> var. <i>pyrifolia</i>, <i>Acacia bivenosa</i> and <i>Acacia inaequilatera</i> mid open shrubland over <i>Triodia wiseana</i>, <i>Iseilema dolichotrichum</i> and <i>Aristida contorta</i> low mixed hummock and tussock open grassland with <i>Bonamia pilbarensis</i>, <i>Trachymene oleracea</i> subsp. <i>oleracea</i> and <i>Pterocaulon serrulatum</i> var. <i>velutinum</i> mid to low open herbland. Recorded on lower slopes and flats associated with adjacent ranges. Surface is red hard clay loam soils with rocky outcrops, quartz and granite.	Survey effort: Q27, Q29, Q31 Extent: 133.32 ha Species richness: 53 native and one weed species	

Description	Additional Detail	Photograph
Drainage Lines		
W1 ChAcTw Open Woodland Corymbia <i>Corymbia hamersleyana</i> low open woodland over <i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>Scaevola spinescens</i> and <i>Solanum cleistogamum</i> tall to low open shrubland over <i>Triodia wiseana</i>, <i>Chrysopogon fallax</i> and <i>Eulalia aurea</i> tall to low mixed hummock and tussock grassland. Associated with minor drainage near the power station. Condition mapped as Good caused by the presence of <i>*Cenchrus ciliaris</i> dominating parts of understorey.	Survey effort: R56, R57 Extent: 5.82 ha Species richness: 44 native and 1 weed species	
T3 AcCf Tall Tussock Grassland Chrysopogon and Eriachne <i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>*Vachellia farnesiana</i> and <i>Eremophila longifolia</i> mid open shrubland over <i>Chrysopogon fallax</i>, <i>*Cenchrus ciliaris</i> and <i>Eriachne flaccida</i> tall to low grassland. Recorded in narrow drainage channels with red clay loam soils, sometimes rocks on surface. Floristics are a combination of adjacent hummock and tussock grasslands. Isolated taller shrubs present. Condition considered Very Good due to presence of weeds. Includes considerable herb layer. Represents units 7 of the Horseflat Land System (drainage depressions) – Dense tussock grasslands. Representative of the Horseflat PEC (P3).	Survey effort: R19, R21, R25, R26, Q30, Q35 Extent: 78.37 ha Species richness: 95 native and 7 weed species	
Cleared	Extent: 30.62 ha	

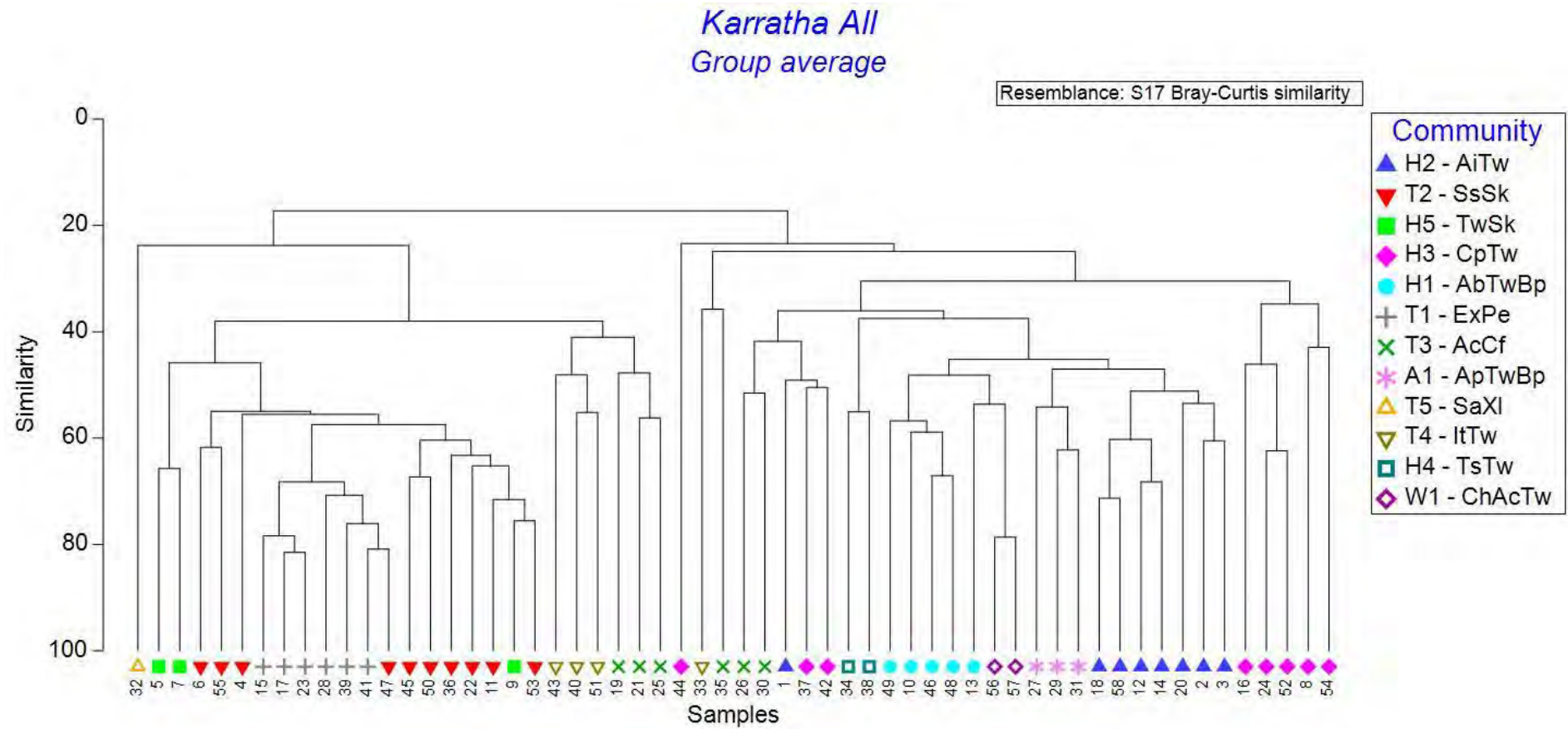
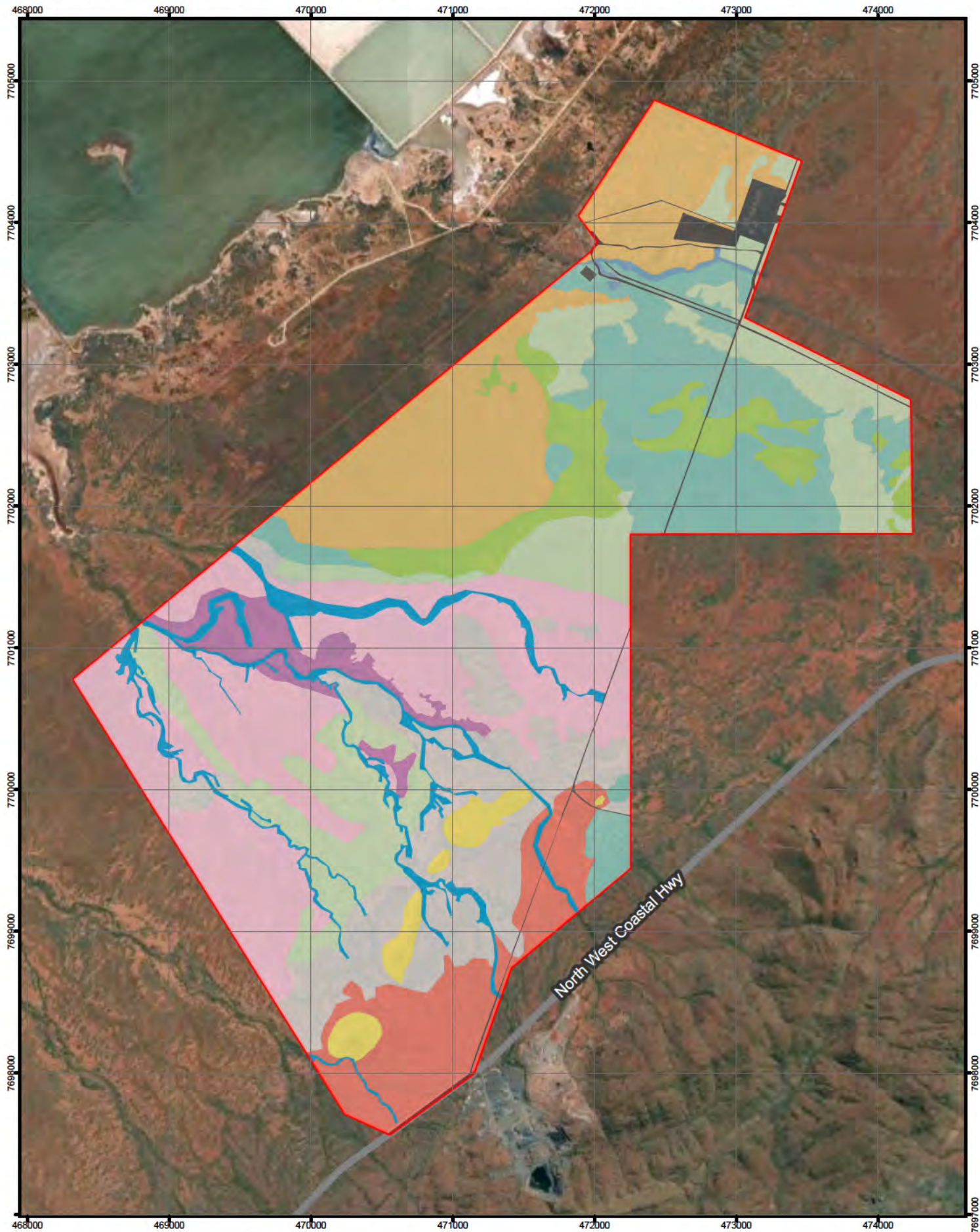


Plate 1 Dendrogram of Bray Curtis similarity of all Karratha Flora data symbolised by understory component



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APPROVED BY [Redacted]
LAST MODIFIED 19 JAN 2023

AECOM
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Datum: GDA 1994 MGA Zone 50
1:35,000
0 200 400 600 800 metres
(when printed at A4)

Data sources:
Base Data: (C) Based on information provided by and with the permission of the Western Australian Land Information Authority (walinga) (2018)
Service Layer Credits: World Imagery: Mapbox

- LEGEND**
- | | | |
|--|--|---|
| Survey Area | ChAcTw | SsSk |
| AbTwBp | CpTw | TsTw |
| AcCf | ExPe | TwSk |
| AiTwBe | ITw | Cleared |
| ApTwBp | SaXI | |

Vegetation Communities

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Figure
10

6.2.2 Significant Vegetation

Two PECs were mapped in the survey area. Their delineation was informed by assessing floristic data, presence of indicator species, soil characteristics, and was further supported with advice from DBCA.

The Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains PEC) is a Priority 1 PEC. This is represented by vegetation community T2 – SsSk described in Table 9 with representative photos in Plate 2. The PEC extends for 277.45 ha and is in Very Good and Excellent condition.

The Horseflat Land System of the Roebourne Plains (Horseflat PEC) is a Priority 3 PEC. This PEC is represented by vegetation communities T1 – SsSk and T3 – AcCf mapped for 454.56 ha. Another two vegetation communities were considered analogous to the PEC, sharing soil and/or floristic characteristics to some extent. These communities include T4 – ItTw and H5 TwSk, mapped for 370.81 ha.

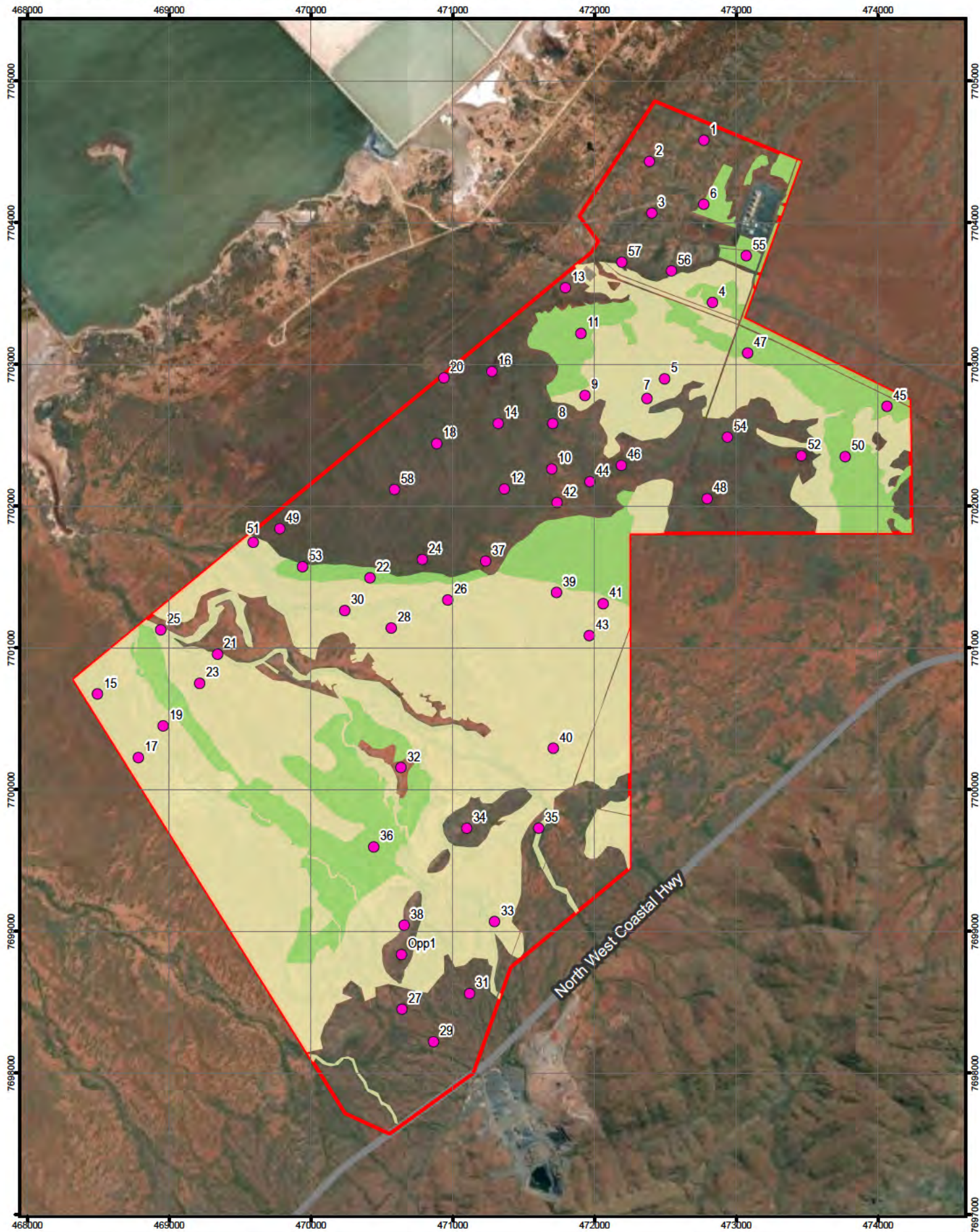
Significant vegetation is mapped in Figure 11. A comprehensive assessment of each site against the PEC criteria from DBCA (2021) is presented in Appendix C.



Plate 2 Sites representing the Roebourne Plains coastal grasslands PEC



Plate 3 Sites representing the Horseflat Land System of the Roebourne Plains PEC



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Scale: 1:35,000
Datum: GDA 1994 MGA Zone 50
0 200 400 600 800 metres

North arrow pointing up.

Other sources:
Base Data: (C) Based on information provided by and with the permission of the Western Australian Land Information Authority (walinga) (2016)
Service Layer Credits: World Imagery: Mapbox

LEGEND

- Survey Area
- Quadrat
- Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays PEC
- Horseflat Land System of the Roebourne Plains PEC

Significant Vegetation	
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KARRATHA RENEWABLE ENERGY PROJECT – FLORA, VEGETATION AND FAUNA	
Figure	11

6.2.3 Condition

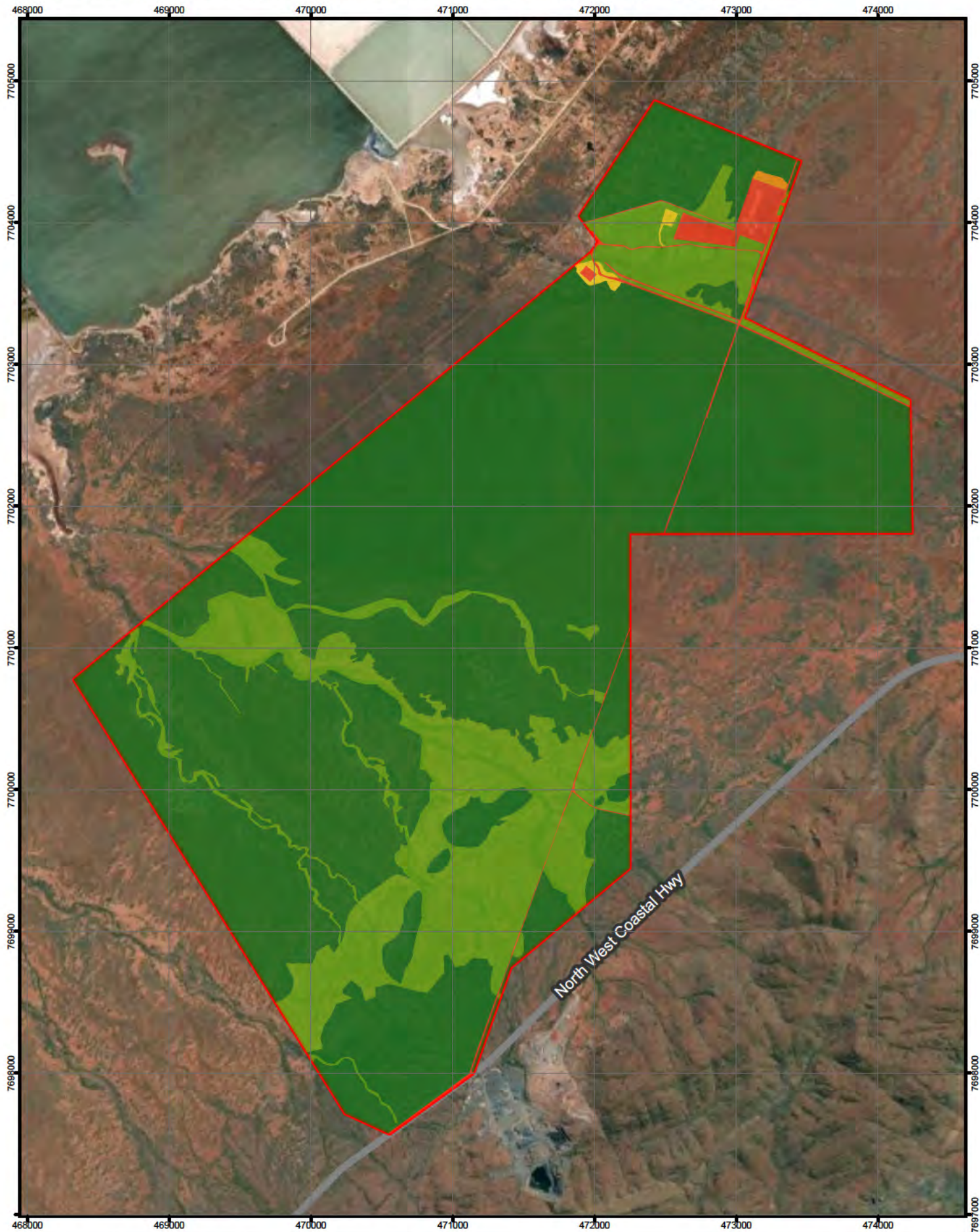
Vegetation condition ranged from Degraded to Excellent, with the majority of the area in Excellent condition (1,044.82 ha, 78%). Condition degradation was caused by weed invasion and historical grazing. Weeds were prevalent near what was presumed to be an old watering area for cattle, along powerlines, and along some shallow drainage lines. Historical clearing and infrastructure also contributed to degradation of some areas.

Table 10 shows the extent of each vegetation condition category and percent of total area. This does not include the 30.62 ha of cleared areas which represents tracks and infrastructure.

Vegetation condition is mapped in Figure 12.

Table 10 Vegetation Condition Extent

Condition Rating	Extent (ha)	Percent of Total Area (%)
Excellent	1,404.82	78
Very Good	384.01	21
Poor	3.74	1
Degraded	1.60	0
Vegetation Total	1,794.18	100
Cleared	30.62	
Survey Area Total	1,824.80 ha	



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Datum: GDA 1994 MGA Zone 50

1:35,000
(when printed at A4)

0 200 400 600 800
metres

Data sources:
Base Data: (C) Based on information provided by and with the permission of the Western Australian Land Information Authority (releasing as Landscape (2018))
Service Layer Credits: World Imagery: Mapbox

- LEGEND**
- Survey Area
 - 1.0 - Excellent
 - 0.8 - Very Good
 - 0.6 - Good
 - 0.4 - Poor
 - 0.2 - Degraded
 - 0.1 - Completely Degraded

Vegetation Condition

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AND FAUNA

Figure
12

6.3 Fauna Habitats

Five fauna habitats were encountered comprising:

- Hummock Grassland Plain
- Acacia and Hummock Grassland
- Tussock Grassland Plain
- Drainage Lines
- Rock outcrop

All habitat types were considered locally common and homogenous in the area. The dominant habitats were Hummock Grassland Plains and Tussock Grassland Plains. Drainage Lines, comprising mostly minor flowlines representing similar feature as the surrounding flats, intersect the survey area in a mostly north-south direction. Isolated occurrences of Rock Outcrop were mapped in the south of the survey area.

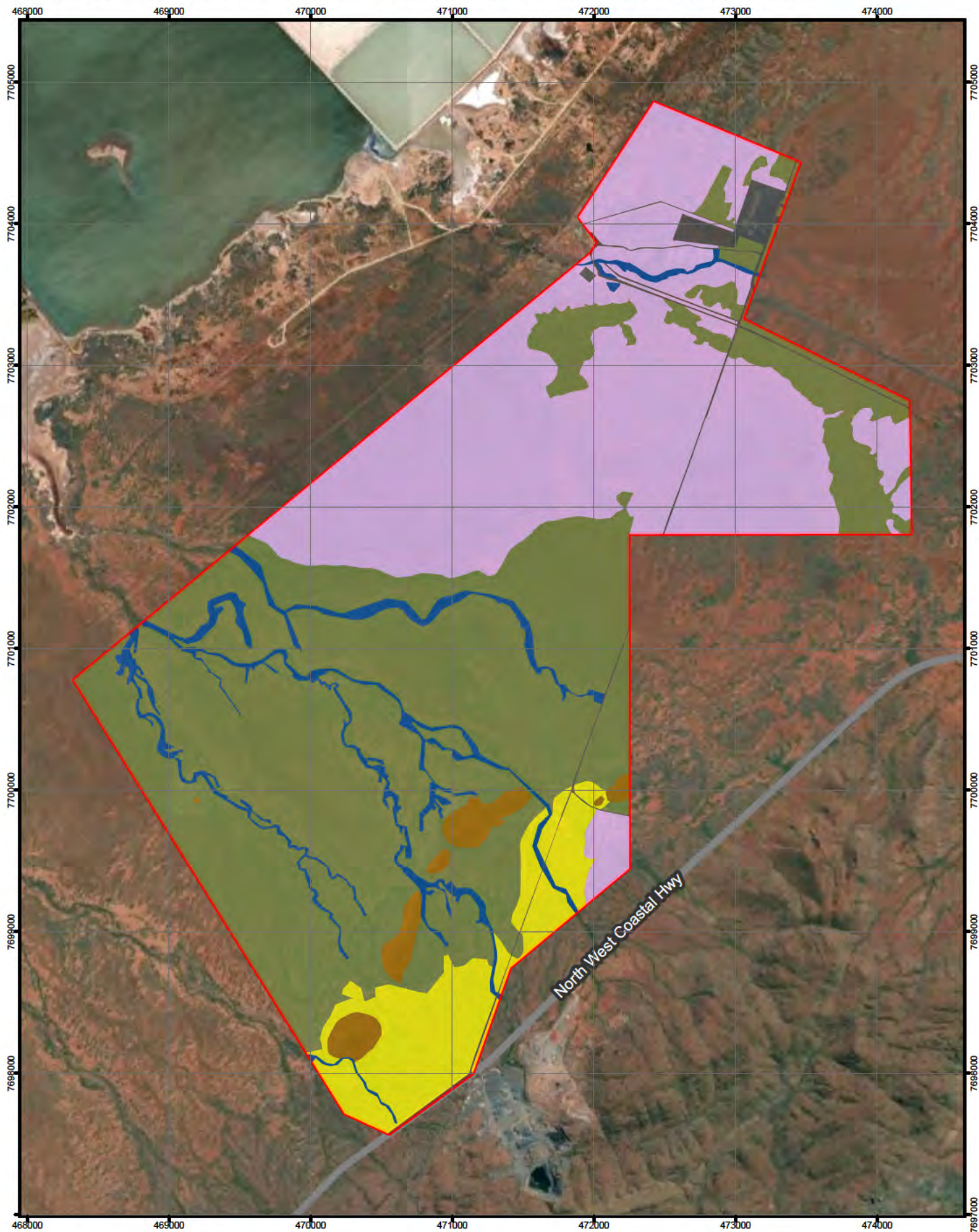
The five habitats are described in Table 11 and mapped in Figure 13.

Table 11 Fauna habitat descriptions including assessment of habitat suitability for conservation significant fauna species and photographs

Description	Photograph
Hummock Grassland Plain – 617.49 ha Grasslands with moderate to high ground cover on flat areas. Occurs on hard cracking clay and rocky slopes. Complexity is low with the presence of vines and small herbs.	
Acacia and Hummock Grassland – 133.32 ha Grasslands with moderate ground cover on flat areas. Includes mature trees in varying densities (no hollows observed), some logs of small to moderate size and groundcover is hummock grasses, herbs, vines and shrubs. Occurs on hard clay with rocky soils.	

Description	Photograph
Tussock Grassland Plain – 927.45 ha Open grasslands with high ground cover on clay flat areas. Occurs on soft crabhole clays, and hardpan clays with scattered rocks on surface. The softer clay soils would provide opportunity for burrowing species. Complexity is moderate to low, with some mid and upper-storey vegetation, logs, and leaf litter. Minor drainage lines are present and provide opportunity for foraging.	
Drainage Lines – 79.48 ha Drainage lines include flowlines and minor creeks that support water following significant rainfall. Stands of trees of varying density present in patches (no hollows observed). Moderate sized logs present. Understorey cover dense along drainage line comprising tussock grasses and scattered shrubs. Complexity is moderate to high with the presence of lower, mid and upper-storey vegetation.	

Description	Photograph
Rocky Outcrops– 36.44ha Low to moderate ground cover with grasses on rocky outcrops and flat areas. Occurs on skeletal rocky slopes and includes isolated rock piles/mounds. Varies in complexity from high to low in the absence of rock piles, and crevices and rocky mounds will provide opportunity for shelter.	
Cleared – 30.62ha Roads and infrastructure providing no fauna refuge or foraging opportunities.	



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0 200 400 600 800 metres
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Scale bar and north arrow.

- LEGEND**
- Acacia and Hummock Grassland
 - Hummock Grasslands
 - Rocky Hills
 - Tussock Grasslands
 - Cleared
 - Drainage Lines - Woodlands and Tussock

Fauna Habitats

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AND FAUNA**

**Figure
13**

7.0 Discussion

The detailed flora and vegetation and fauna habitat survey was undertaken of the 1,824.8 ha survey area. The survey area is situated on the Roebourne Plains approximately 5 km south-west of the town of Karratha. The survey area was predominantly native vegetation in excellent condition on flat to undulating terrain. It contained large areas of hummock grasslands intersected by minor drainage channels, and tussock grasslands.

7.1 Vegetation

The identification of vegetation communities within the survey area were informed by 45 quadrats, 13 relevés, observation points and mapping notes. Due to the limited access tracks, effort in the southwest section of the survey area was more restricted than the remainder of the survey area. As part of the scope of the survey, the northern and eastern sections of the survey area were considered higher priority, and therefore marginally lower survey effort was focused on the southwestern section (i.e. fewer quadrats and relevés, aerial imagery, and mapping notes).

Vegetation composition was variable due to the large size of the area, landform, and soil characteristics. The survey area encompasses hummock grasslands on mostly hard clay flats with pebbles on surface, tussock grasslands on deep clay loam soils and gilgaied clays, banded tussock and hummock grasslands with intermittent hard clays and soft deep clays, low rocky outcrops, drainage lines, and lower slopes with hard rocky surface. Vegetation community delineation was supported by analysis of floristic data and review of soil and landscape characteristics.

Two PECs were considered likely to occur, including the Roebourne Plains PEC and Horseflat PEC. The differentiator of these PECs pertains to soil characteristics rather than floristics DBCA (2021). Soils, floristic data including presence of indicator species, and advice from DBCA was used to inform the PEC mapping.

The Roebourne Plains PEC (P1) is represented by T2 – SsSk vegetation, mapped for 277.45 ha (15% of survey area). This community comprises tussock grasslands on deep gilgaied clay soils. Aerial imagery suggests that this PEC extends north and east of the survey area.

A large proportion of the survey area represents the Horseflat PEC, or is analogous to the Horseflat PEC. This includes true representations by vegetation communities T1 – SsSk and T3 – AcCf mapped for 454.56 ha, and analogous vegetation communities T4 – ItTw and H5 – TwSk mapped for 370.81 ha. The Horseflat PEC is mapped for 45% of the total area. It appears that this PEC extends southwest of the survey area.

Vegetation community H2 – AiTwBe represents hummock grassland with hard clay loam soils and quartz on the surface. Species diversity was high, with on average 56 species/50m². This was notably higher than the other hummock grasslands, notably attributed to the presence of tussock grasses and herbs. The aerial imagery indicates that this community extends for another 1 km north of the survey area.

The south of the survey area is characterised by rocky outcrops, represented in vegetation community H4 – TsTw comprising hummock grasslands with open shrubland and herbs. This vegetation community is situated on the Ruth System and represents the boundary of clay flats (north) and skeletal hills and slopes (south and east).

7.2 Flora

Flora species diversity was high, with ideal conditions leading to an abundance of annual plant germination and prolific growth of herbs and grasses. To facilitate quality control, most plant species were collected, with the dataset representing 262 flora collections.

Three Priority flora species were recorded, summarised with notes below:

- *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) was recorded at eight locations on soft to hard clay loam soils of tussock grasslands (Figure 9). This species is known to occur 1.7 km from the survey area on similar habitat according to the WA Herbarium database and was considered 'likely to occur' in the desktop study.
- *Euphorbia appendiculata* var. *appendiculata* (P2) was recorded on soft deep clays of tussock and hummock mixed grassland (Figure 9). This species is more commonly found on cracking clays further inland. It is likely that at other times of the year this species would be absent or difficult to confirm without collecting and verifying at the State Herbarium. It has a 'moderate' likelihood of occurring in the desktop study.
- *Themeda* ?sp. Hamersley Station (M.E. Trudgen 11431) was collected at one location and recorded at 13 locations both inside and outside the survey area. This species was considered 'likely to occur' in the desktop study. Interestingly the second collection that was made in the minor drainage vegetation only 800 m from *Themeda* sp. ?Hamersley Station, was confirmed as *Themeda triandra* (Steve Dillon, collection FdW220810-211). Furthermore, previous surveys completed for Rail and 6 Mile Workshop for Rio Tinto (AECOM 2020) confirmed large populations of *T. sp.* Hamersley Station less than 1 km northeast from the survey area. These results demonstrate the difficulty in correct identification of this species in the field.

No other significant flora species identified in the desktop study were considered likely to occur.

7.3 Fauna Habitats

The survey area contains five fauna habitat types, informed by the vegetation community mapping and fauna habitat assessments. Tussock Grassland Plains dominate the survey area, representing 927.45 ha. These areas support dense understorey dominated by tussock grasses, low sclerophyllous shrubs, and herbs. The ground surface includes crab-hole clays and soft clays expected to support considerable primary food sources (insects and small reptiles) for larger carnivorous species. These areas also facilitate burrowing due to the soft soils. It is anticipated that this fauna habitat changes significantly following dry periods, with clays becoming hard and potentially cracking, and biomass reducing to perennial plants and skeletons of annual plant species.

Hummock Grassland Plains were prolific, representing 617.49 ha of the survey area. This fauna habitat occurs on hard clay soils, sometimes with pebbles on the surface. Understorey is open providing some refuge for ground-dwelling species in the hummocks.

Acacia and Hummock Grasslands was mapped for 133.32 ha and represents an open overstorey of Acacia shrubs over open Hummock grasses on hard clay soils. Similar to Hummock Grassland Plains, the hummocks and twigs/shrub litter provide refuge for ground-dwelling species.

Drainage Lines were mapped for 79.48 ha and represent minor flow lines and minor creeks. Habitat complexity varied with the presence of stands of Eucalypt trees and density of shrubs, generally over tussock grasses and herbs. All the drainage lines represent ephemeral streams that will support water following rainfall events and will vary in the duration of water presence. Stream beds were largely represented by shallow flow lines, with only a few occurrences of a sandy stream bed with obvious edges.

Two occurrences of Rocky Outcrops were mapped in the south and west of the survey area, representing 35.44 ha. This fauna habitat includes one low, mostly vegetated rock pile, and two rock outcrops predominantly representing exposed rock slabs with weathering leading to small piles of rocks and crevices that vary in depth.

The rest of the survey area, 30.62 ha, is mapped as cleared. This represents powerline and fence tracks and existing infrastructure (powerplant and associated).

8.0 Conclusion

A detailed flora and vegetation and fauna habitat assessment and associated targeted surveys were undertaken for the Karratha Project. The surveys involved traversing the survey area on foot and recording data on hand-held devices. The survey effort was considered adequate for meeting the objective of the Project.

A summary of results is presented below:

- Two Priority Ecological Communities were identified through an assessment of indicator species, soil conditions and landform:
 - Roebourne Plains gilgai grasslands (P1) represented by SsSk, mapped for 277.45 ha.
 - Horseflat Land System of the Roebourne Plains (P3) represented by AcCf, mapped for 454.56 ha. Two communities, ItTw and TwSk were considered analogous to this PEC, mapped for 370.81 ha.
- Vegetation composition varied considerably across the survey area. Vegetation represented hummock grasslands, tussock grasslands, and a combination of the two. Soil characteristics varied from hard flat clays with rocks on surface to soft deep clay loams with crabholes. Several rock formations were noted in the south, and numerous shallow drainage lines intersected the survey area. Thirteen vegetation communities were defined and mapped to represent the diverse vegetation composition.
- Three Priority flora species were recorded:
 - *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3) was recorded at eight locations and confirmed from two collected samples. There are known records nearby (1.7 km) and suitable habitat was present.
 - *Euphorbia appendiculata* var. *appendiculata* (P2) was collected at one location and recorded at four locations. Considered significant due to the proximity of nearest record (66 km).
 - *Themeda* ?sp. Hamersley Station (M.E. Trudgen 11431) (P3) was collected at one location. Identification was not confirmed with confidence (S. Dillon *pers comm*).
- Flora diversity was high, with 174 native plant species identified, informed by 262 flora samples collected during the survey.
- Five fauna habitats were recorded, with hummock and tussock grasslands the most dominant habitat types covering over 90% of the survey area.

The flora and vegetation survey and fauna habitat assessment was completed with no significant limitations identified that may influence the outcome of the survey. The survey was undertaken outside the “typical” ideal survey season as described in the EPA (2016) Flora Survey Technical Guide, however significant rainfall in the months preceding the survey led to prolific germination of annual species and high flora diversity.

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Appendix A

Federal and State Legislation

Appendix A Federal and State Legislation

1.1 Commonwealth

The EPBC Act is the main piece of Federal legislation protecting biodiversity in Australia. Flora species at risk of extinction are recognised at a Commonwealth level and are categorised in one of six categories as outlined in Table 1.

Table 1 Categories of species listed under Schedule 179 of the EPBC Act

Code	Conservation Category
Ex	Extinct Taxa
ExW	Extinct in the Wild
CE	Critically Endangered
E	Endangered
V	Vulnerable
CD	Conservation Dependent

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 2.

Table 2 Categories of TECs that are listed under the EPBC Act

Code	Conservation Category
CE	Critically Endangered If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	Endangered If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	Vulnerable If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

1.2 Western Australia

1.2.1 Flora and Fauna Species

The *Biodiversity Conservation Act 2016* (BC ACT) Provides for the conservation and protection of Western Australia's biodiversity and biodiversity components. Conservation codes and explanations are derived from DBCA (2019).

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

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below. It includes species listed as Threatened (Table 3), extinct (Table 4) or specially protected (Table 5).

Table 3 Categories for Threatened Flora and Fauna Species (Jan 2019)

Code	Conservation Category
CR	Critically Endangered Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".
EN	Endangered Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".
VU	Vulnerable Threatened species considered to be "facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines".

Table 4 Categories for Extinct Flora and Fauna Species (Jan 2019)

Code	Conservation Category
EX	Extinct Species Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
EW	Extinct in the Wild Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Table 5 Categories for Other Protected Species (Jan 2019)

Code	Conservation Category
MI	Migratory Species Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
CD	Species of special conservation interest (conservation dependent fauna). Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
OS	Other specially protected fauna. Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to a Priority Lists under Priorities 1, 2 or 3 by the State Minister for Environment. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. Categories and definitions of Priority flora species are summarised in Table 6.

Table 6 Conservation codes for WA flora and fauna

Code	Conservation Category
P1	Priority One – Poorly Known Species Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation.
P2	Priority Two – Poorly Known Species Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation.
P3	Priority Three – Poorly Known Species Species that are known from several locations, and the species does not appear to be under imminent threat.
P4	Priority Four – Rare, Near Threatened and other species in need of monitoring Includes rare species and near threatened species.

1.2.2 Ecological Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both state and commonwealth legislation.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the Threatened Species Scientific Committee. A TEC is one which is found to fit into one of four categories, summarised in Table 7 (DEC, 2013).

Table 7 Conservation codes for State listed ecological communities

Conservation Code	Category
PD	Presumed Totally Destroyed Adequately searched for but no representative occurrence have been located.
CR	Critically Endangered Adequately surveyed, subject to major contraction, in danger of significant modification in the immediate future.
EN	Endangered Adequately surveyed, subject to major contraction, in danger of significant modification in the near future.
VU	Vulnerable Adequately surveyed, declining in distribution and/or condition, security not yet assured and may move into a category of higher threat in near future.

Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) and listed in one of five categories, summarised in Table 8.

Table 8 Conservation categories for Priority Ecological Communities

Code	Conservation Category
P1	Priority One: poorly-known ecological communities.
P2	Priority Two: poorly-known ecological communities .
P3	Priority Three: poorly known ecological communities.
P4	Priority Four: ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.
P5	Priority Five: conservation dependent ecological communities.

Appendix B

Conservation Significant Flora Desktop Results

Taxon	Habitat	Cons. Code EPBC	Cons. Code WA	Distance from Survey Area WA Herb (Km)	Distance from Survey Area TPFL (Km)	WA Herb	TPFL	BIO	PMST	Likelihood Assessment					Total Score	Likelihood	
										Recorded in survey area	Known nearby (5km)	Recent Record (Last 20 years)	Known within LGA	Presence of suitable habitat (0,1,2)		Pre-Survey	Post-Survey
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	Recorded in isolated low <i>Corymbia hamersleyana</i> and/or <i>C. zygophylla</i> mallee over isolated mixed shrubs over low <i>Triodia basedowii</i> hummock grassland in red sandy clay on sandplain (Phoenix 2017).	-	P3	43.1	-	1/08/1982				0	0	1	1	1	3	Moderate (Possible)	Low
<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>	Species recoded highly fragmented populations from Karratha to Dundas. Grows in crabhole plains.		P3	16.3	-	7/11/1996		Yes		0	0	0	1	2	3	Moderate (Possible)	Low
<i>Cladium procerum</i>	Perennial pools.		P2	89.5	-	28/05/2008				0	0	1	1	0	2	Low (Unlikely)	Low
<i>Corchorus congener</i>	Occurs in sand and red sandy loam with limestone, on sand dunes and plains. Distributed from Exmouth to Karratha.		P3	58.8	-	10/06/2016				0	0	1	1	1	3	Low (Unlikely)	Low, numerous samples collected and not determined as this species.
<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	Cracking clay, basalt. Gently undulating plain with large surface rocks, flat crabholed plain.		P3	1.7	-	24/04/2020		Yes		0	1	1	1	2	5	High (Likely)	Known, recorded in survey area.
<i>Eragrostis crateriformis</i>	Clayey loam or clay. Creek banks, depressions.		P3	66.0	66.0	26/05/1997	26/05/1997			0	0	0	1	2	3	Low (Unlikely)	Low
<i>Eragrostis lanicaulis</i>	Red sandy clay. Flats.		P3	48.3	-	1/03/1921				0	0	0	1	1	2	Low (Unlikely)	Low
<i>Eragrostis surreyana</i>	Seasonally wet areas, grey alluvial soils over rock, deep fine alluvial sands of creeks.		P3	22.8	-	27/05/2009				0	0	1	1	0	2	Low (Unlikely)	Low, no suitable habitat.
<i>Eriochloa fatmensis</i>	Associated with rivers and flooded areas.		P3	42.1	-	16/09/1981				0	0	0	1	0	1	Negligible (Suitable Habitat not Present)	Low
<i>Euphorbia australis</i> var. <i>glabra</i>	Sump, low in the landscape on alluvial cracking clay loamy soil, gritty with ironstone fragments, saline flats (Astron 2018).		P3	96.7	-	16/08/2004		Yes		0	0	1	1	2	4	Moderate (Possible)	Moderate, easily overlooked, small inconspicuous species.
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	Cracking clays, associated with tussock grassland.		P2	64.4	-	16/04/1997				0	0	0	1	2	3	Moderate (Possible)	Known, recorded throughout survey area.
<i>Euphorbia stevenii</i>	Clay, sandy soils.		P3	57.8	-	13/06/2006				0	0	1	1	2	4	Moderate (Possible)	Moderate, easily overlooked, small inconspicuous species.
<i>Euploca mutica</i>	Hummock grasslands, flats, sandy clays.		P3	93.5	-	11/05/2011				0	0	1	1	1	3	Moderate (Possible)	Low
<i>Fimbristylis sieberiana</i>	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.		P3	82.4	92.7	27/05/2021				0	0	1	1	0	2	Low (Unlikely)	Low

Taxon	Habitat	Cons. Code EPBC	Cons. Code WA	Distance from Survey Area WA Herb (Km)	Distance from Survey Area TPFL (Km)	WA Herb	TPFL	BIO	PMST	Likelihood Assessment					Total Score	Likelihood	
										Recorded in survey area	Known nearby (5km)	Recent Record (Last 20 years)	Known within LGA	Presence of suitable habitat (0,1,2)		Pre-Survey	Post-Survey
<i>Glycine falcata</i>	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.		P3	23.2	-	17/05/2011				0	0	1	1	2	4	Moderate (Possible)	Low
<i>Gomphrena axillaris</i>	Prefers sub-saline habitats or margins of salt-lakes and hummock or tussock grasslands on sand (Swainsona)		P1	1.0	-	13/07/2006				0	1	1	1	0	3	Moderate (Possible)	Low, no suitable habitat.
<i>Gomphrena cucullata</i>	Occurs in red sandy loam and clayey sand, on open floodplains.		P3	14.0	-	16/07/2012		Yes		0	0	1	1	2	4	Moderate (Possible)	Moderate, could have been overlooked. Suitable habitat present.
<i>Gomphrena leptophylla</i>	Grows in a variety of soil types including sand, sandy to clayey loam, granite and quartzite. Often on flats, sandy creek beds, edges of salt pans and marshes and stony hillsides.		P3	14.0	-	11/07/2004		Yes		0	0	1	1	1	3	Moderate (Possible)	Low, habitat seems marginal in survey area.
<i>Goodenia nuda</i>	Open shrubland of Acacia anuera, open low woodland. Slight slope well away from hills at one site, another site valley floor between hills.		P4	81.0	81.0	31/07/2002	31/07/2002			0	0	1	1	0	2	Low (Unlikely)	Low, no suitable habitat.
<i>Goodenia pallida</i>	Recorded in Karratha on red soils.		P1	20.9	52.7	11/08/1970	11/08/1970	Yes		0	0	0	1	1	2	Low (Unlikely)	Low
<i>Gymnanthera cunninghamii</i>	Sandy soils.		P3	22.0	29.7	2/09/1987	13/05/1982	Yes		0	0	0	1	1	2	Low (Unlikely)	Low
<i>Helichrysum oligochaetum</i>	Depressions and floodplains in clay soils.		P1	46.3	-	No date				0	0	0	1	1	2	Low (Unlikely)	Low
<i>Ipomoea racemigera</i>	Creeping annual, herb or climber. Fl. white		P2	96.0	-	1/04/1995				0	0	0	1	1	2	Low (Unlikely)	Low
<i>Livistona alfredii</i>	Watercourses and drainage lines.		P4	73.3	-	20/06/2003				0	0	1	1	0	2	Low (Unlikely)	Low
<i>Minuria tridens</i>	Roadsides, dolomite, limestone and calcrete impregnated sandstone hills, rises and ranges.		P1	80.6	-	2/10/2021				0	0	1	1	0	2	Low (Unlikely)	Low, no suitable habitat.
<i>Owenia acidula</i>	Plains, in grasslands of various types on various substrates, or thin woodlands (DSEWPAC 2013)		P3	85.7	96.3	23/09/1990	23/09/1990			0	0	0	1	2	3	Moderate (Possible)	Low, habitat marginal, no records nearby.
<i>Paspalidium retiglume</i>	Tropical and subtropical sub-humis woodlands, arid and semi-arid low woodland and tussock grasslands. Often in cracking clays.		P2	78.0	78.0	18/04/2004	21/05/1997			0	0	1	1	2	4	Moderate (Possible)	Low, no records nearby, habitat marginal.
<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	Found in Triodia hummock grassland, often in the understorey of a shrubland of Acacia spp., Gossypium spp., Senna spp., Brachychiton spp. and Eucalyptus spp., on summits and slopes of low hills, on basaltic soils, at altitudes to 1150 m (Orchard & Cross 2012).		P2	71.4	-	30/09/2015				0	0	1	1	1	3	Moderate (Possible)	Low, no suitable habitat.

Taxon	Habitat	Cons. Code EPBC	Cons. Code WA	Distance from Survey Area WA Herb (Km)	Distance from Survey Area TPFL (Km)	WA Herb	TPFL	BIO	PMST	Likelihood Assessment					Total Score	Likelihood	
										Recorded in survey area	Known nearby (5km)	Recent Record (Last 20 years)	Known within LGA	Presence of suitable habitat (0,1,2)		Pre-Survey	Post-Survey
<i>Rhynchosia bungarensis</i>	Rock piles, gorges, river beds, alluvial soils in shrubland.		P4	1.5	-	7/06/2017		Yes		0	1	1	1	1	4	Moderate (Possible)	Low, no suitable habitat.
<i>Solanum albotellatum</i>	Open clay flats associated with <i>Aristida latifolia</i> .		P3	23.2	-	8/08/2018				0	0	1	1	2	4	Moderate (Possible)	Moderate, could have been overlooked. Suitable habitat present.
<i>Stackhousia clementii</i>	Grows in skeletal soils and sandstone hills. Species recorded across the Eremaean Province.		P3	4.0	14.9	24/02/2013	30/04/2002	Yes		0	1	1	1	1	4	Moderate (Possible)	Low, no suitable habitat.
<i>Swainsona thompsoniana</i>	A prostrate, annual herb, to 10 cm high, flowers mauve with cream - yellow centres. Inhabits open floodplains on heavy clay soils (Davis & Hurter 2013).		P3	76.2	-	29/07/2009				0	0	1	1	1	3	Moderate (Possible)	Low, no suitable habitat.
<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114)	Species grows in sandy or sandy loam, on coastal dunes and plains.		P1	38.5	-	4/09/2012				0	0	1	1	1	3	Moderate (Possible)	Low, no suitable habitat.
<i>Terminalia supranitfolia</i>	Amongst basalt rocks.		P3	1.5	8.1	16/03/2011	31/10/2001	Yes		0	1	1	1	1	4	Moderate (Possible)	Low, no suitable habitat.
<i>Teucrium pilbaranum</i>	Crabhole plains dominated by E. victrix and calcrete tables dominated by grasses.		P2	90.8	-	7/09/1996				0	0	0	1	1	2	Low (Unlikely)	Low, no suitable habitat.
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	Drainage lines, clay flats, crabhole flats and dark self mulching clays.		P3	3.8	-	15/04/2010		Yes		0	1	1	1	2	5	High (Likely)	Known, recorded in survey area.
<i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	Occurs in sand, gibber plain on plains.		P2	19.5	-	28/06/2015				0	0	1	1	2	4	Moderate (Possible)	Low, no suitable habitat.
<i>Tribulopsis marliesiae</i>	Restricted to red sands in heath and low pindan, particularly with <i>Acacia tumida</i>		P3	99.1	-	20/09/2019				0	0	1	1	1	3	Moderate (Possible)	Low, no suitable habitat.
<i>Triodia basitricha</i>	Occurs on slopes or crests of rocky hills		P3	85.9	-	24/05/1997				0	0	0	1	1	2	Low (Unlikely)	Low
<i>Triodia pisoliticola</i>	Skeletal soils on ironstone. Summits and mesas or other hilly areas. Has been found on midslope and valleys. Restricted to Robe Pisolite. Previously known as sp. Robe River.		P3	79.9	-	14/03/2011				0	0	1	1	1	3	Moderate (Possible)	Low, no suitable habitat.
<i>Vigna triodiophila</i>	Species only recorded in basalt rockpile habitats in the northwest of the Pilbara bioregion (known from seven populations near Karratha, the Burrup Peninsula and Port Hedland (Holland & Butcher, 2016). Associated vegetation includes open to scattered shrubs, tall shrubs and low treess, with hummock and tussock grasslands (Holland & Butcher, 2016).		P3	12.1	-	9/06/2011				0	0	1	1	0	2	Low (Unlikely)	Low, no suitable habitat.

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Appendix C Priority Ecological Community Assessment

Vegetation Community	Site	Horseflat PEC indicator grasses (%)	Roebourne PEC indicator grasses (%)	Soils	Soil notes	PEC Assessment	Comments
AcCf	19	30.5	8	Clay loam	None	?No	Minor drainage, unsure if suitable for PEC description.
AcCf	21	2.3	31.5	Clay loam	Scattered ironstone and quartz	?No	Minor drainage, unsure if suitable for PEC description.
AcCf	25	10.7	20.5	Clay loam	outcrops of calcrete	No	Minor drainage, rocks on surface, Triodia present.
AcCf	26	14.5	34.5	clay loam, some sand. soft with microrelief	None	?No	Minor drainage, patchy Triodia in minor channel. Unsure if suitable for PEC.
AcCf	30	20.5	35.5	clay hard, crust on surface	None	No	Minor drainage. Triodia present.
AcCf	35	0.7	5	loam clay	None	None	Minor drainage. Triodia present. Unlikely representative of PECs.
ExPe	15	40.1	40.6	soft clay loam	None	Horseflat Plains PEC	Similar indicator species. Soils not as deep and soft as observed elsewhere.
ExPe	17	30.2	30.7	soft clay loam	scattered quartz in landscape	Horseflat Plains PEC	Similar indicator species. Soils not as deep and soft as observed elsewhere.
ExPe	23	40.1	40.6	hard clay loam	Scattered ironstone and quartz landscape	Horseflat Plains PEC	Presence of rocks on surface, soils mostly clay loams without the deep holes / microrelief.
ExPe	28	50	50	Clay loams, soft, microrelief.	None	Horseflat Plains PEC	From mapping notes appears more representative of Horseflat Plains with slight microrelief and patches of harder clay loams.
ExPe	39	80	80.1	deep clay loam	Scattered granite	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
ExPe	41	65	65.3	deep clay loam	na. scattered ironstone	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
ItCc	43	5	6.2	Clay loam	None	No	Few indicators present. Soils may be consistent, no crab holes or microrelief noted.
ItTw	33	0	0	hard clay loam	skeletal soils Inc granite ?ironstone and quartz	No	No indicator species present. Hard surface.

Appendix C Priority Ecological Community Assessment

Vegetation Community	Site	Horseflat PEC indicator grasses (%)	Roebourne PEC indicator grasses (%)	Soils	Soil notes	PEC Assessment	Comments
ItTw	40	20	21.3	loam clay, crusting, scattered deep holes	quarts granite pebbles	No	Dominated by Triodia.
ItTw	51	24.5	27.1	hard clay loam	scattered small quartz and ironstone	No	Dominated by Triodia
SaXI	32	4	4	clay loam soft, cracking and crust	scattered ironstone and quartz pebbles	No	No indicator species present. Hard surface.
SsSk	4	60.7	61.1	deep clay loam	None	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	6	48	48.5	clay loam		Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	11	60.3	60.6	deep clay loam	Scattered pebbles	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	22	50.7	50.1	clay, deep gilgai	None	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	36	32.11	30.11	loam clay, alternating soft deep to cracking crust	quartz and granite small rocks and pebbles	Horseflat Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	45	73.5	73.5	Soft clay loam	None	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	47	80	80.3	clay loam	scattered pebbles	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	50	24	24.2	clay loam deep soft	scattered pebbles	Roebourne Plains PEC	Indicator species present. Soil description coincides with description.
SsSk	53	65.3	70.3	clay loam	None	Roebourne Plains PEC	Indicator species present. Soils somewhat representative.
SsSk	55	23	23.2	soft clay loam w relief	None	Roebourne Plains PEC	Indicator species present. Soil description coincides.

Appendix D

Flora Species by Community Matrix

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Appendix D Site Data

Site No: 11	Date: 4/8/2022	Longitude: 116.738431	Latitude:-20.758276
Type: Quadrat		Soil Types: clay loam, some crusting	
Topography: gently undulating		Surface Water: no	
Vegetation Type: Triodia grassland		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes: shallow depressions with herbs	



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	2	0.01	FdW220804-18
		<i>Acacia bivenosa</i>	150	1	FdW220804-1
		<i>Acacia inaequilatera</i>	250	1	FdW220804-2
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	80	0.1	FdW220804-48
		<i>Alysicarpus muelleri</i>	10	0.1	FdW220804-16
		<i>Aristida contorta</i>	20	0.1	FdW220804-32
		<i>Aristida latifolia</i>	50	1	FdW220804-39

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Bonamia pilbarensis</i>	2	0.1	FdW220804-25
		<i>Bothriochloa ewartiana</i>	10	0.1	FdW220804-37
		<i>Bulbostylis turbinata</i>	2	0.01	FdW220804-51
*		<i>Cenchrus ciliaris</i>	15	2	FdW220804-33
		<i>Chrysopogon fallax</i>	100	2	FdW220804-40
		<i>Corchorus tridens</i>	3	0.1	FdW220804-23
		<i>Corchorus walcotii</i>	30	0.01	FdW220804-43
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	20	0.2	FdW220804-15
		<i>Cucumis variabilis</i>	2	0.01	FdW220804-19
		<i>Cucumis variabilis</i>	0	0.2	FdW220804-20
		<i>Dactyloctenium radulans</i>	5	0.1	FdW220804-36
		<i>Dysphania plantaginella</i>	15	1	
		<i>Enneapogon caerulescens</i>	10	0.1	FdW220804-34
		<i>Eragrostis setifolia</i>	10	0.01	FdW220804-45
		<i>Eriachne flaccida</i>	50	0.1	FdW220804-50
		<i>Erodium cygnorum</i>	20	1	FdW220804-21
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	5	0.01	FdW220804-11
		<i>Euphorbia biconvexa</i>	5	0.01	FdW220804-26
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	10	0.1	FdW220804-9
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	5	0.01	FdW220804-24
		<i>Goodenia muelleriana</i>	10	0.01	FdW220804-52
		<i>Goodenia muelleriana</i>	30	0.1	FdW220804-31
		<i>Hibiscus sturtii</i>	30	0.01	FdW220804-44
		<i>Indigofera colutea</i>	5	0.01	FdW220804-54
		<i>Indigofera monophylla</i>	30	0.2	FdW220804-7
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.01	FdW220804-22
		<i>Iseilema dolichotrichum</i>	3	0.1	FdW220804-35
		<i>Nellica maderaspatensis</i>	10	0.1	FdW220804-12
		<i>Nicotiana occidentalis</i>	30	0.01	FdW220804-53
		<i>Notoleptopus decaisnei</i>	5	0.01	FdW220804-10
		<i>Notoleptosus decaisnei</i> var. <i>indet</i>	3	0.01	FdW220804-55
		<i>Paspalidium clementii</i>	10	0.01	FdW220804-49
		<i>Portulaca oleracea</i>	2	0.05	FdW220804-47
		<i>Ptilotus aervoides</i>	3	1	
		<i>Ptilotus exaltatus</i>	5	0.01	
		<i>Ptilotus helipteroides</i>	20	0.3	
		<i>Rhodanthe floribunda</i>	20	0.01	FdW220804-27

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Rhodanthe haigii</i>	20	0.01	FdW220804-28
		<i>Rhynchosia minima</i>	5	0.01	FdW220804-8
		<i>Roepera retivalvis</i>			FdW220804-13
		<i>Salsola australis</i>	5	0.01	
		<i>Senna notabilis</i>	50	0.1	
		<i>Solanum cleistogamum</i>	20	0.01	FdW220804-6
		<i>Solanum cleistogamum</i>	2	0.01	FdW220804-56
		<i>Solanum diversiflorum</i>	20	0.01	FdW220804-4
		<i>Solanum lasiophyllum</i>	30	0.1	FdW220804-5
		<i>Sorghum timorense</i>	50	3	FdW220804-41
		<i>Sporobolus australasicus</i>	5	0.01	FdW220804-46
		<i>Stemodia kingii</i>	20	0.01	FdW220804-14
		<i>Streptoglossa</i> sp.	5	0.01	FdW220804-30. Unable to confirm to species.
		<i>Tephrosia supina</i>	20	0.1	FdW220804-3
	P3	<i>Themeda</i> ? sp. Hamersley Station (M.E. Trudgen 11431)	80	0.01	FdW220804-38. The callus hair length is btw typical T. sp. HS and T. triandra. Overall size of the plant would suggest T. triandra but I have seen short T. sp. HS and tall T. triandra so plant height isn't reliable.
		<i>Triodia wiseana</i>	50	60	FdW220804-42
		<i>Triumfetta clementii</i>	40	0.3	FdW220804-17
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	0	0.01	FdW220804-29

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Site No: 2 **Date:** 4/8/2022 **Longitude:** 116.7347398 **Latitude:** -20.7596215

Type: Quadrat

Soil Types: clay loam

Topography: gently undulating

Surface Water: no

Vegetation Type: triodia

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: rocks on surface maybe some calcrete and ?limestone with small shells



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	2	0.01	FdW220804-18
		<i>Abutilon lepidum</i>	30	0.1	FdW220804-60
		<i>Acacia bivenosa</i>	100	0.5	
		<i>Acacia inaequilatera</i>	200	0.5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	180	0.5	
		<i>Afrohybanthus aurantiacus</i>	40	0.5	FdW220804-59
		<i>Bonamia erecta</i>	20	0.1	FdW220804-61
		<i>Bonamia pilbarensis</i>	4	0.1	FdW220804-71
		<i>Bonamia pilbarensis</i>	3	0.01	FdW220804-65
*		<i>Cenchrus ciliaris</i>	10	0.1	
		<i>Chrysopogon fallax</i>	100	0.2	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Dactyloctenium radulans</i>	5	0.01	
		<i>Diplopeltis eriocarpa</i>	30	0.7	FdW220804-63
		<i>Dysphania plantaginella</i>	10	0.1	
		<i>Ehretia saligna</i> var. <i>saligna</i>	250	0.1	FdW220804-69
		<i>Eremophila longifolia</i>	50	0.01	FdW220804-62
		<i>Erodium cygnorum</i>	10	0.1	
		<i>Euphorbia biconvexa</i>	5	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	20	0.01	
		<i>Euploca heterantha</i>	2	0.01	FdW220804-66
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	5	0.01	
		<i>Fimbristylis dichotoma</i>	10	0.01	FdW220804-74
		<i>Goodenia muelleriana</i>	20	0.01	
		<i>Hibiscus coatesii</i>	4	0.01	FdW220804-72
		<i>Hibiscus sturtii</i>	15	0.01	
		<i>Indigofera monophylla</i>	40	0.5	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.01	
		<i>Nelica maderaspatensis</i>	20	0.01	
		<i>Paraneurachne muelleri</i>	50	0.01	FdW220804-73
		<i>Ptilotus clementii</i>	10	0.01	FdW220804-68
		<i>Ptilotus exaltatus</i>	20	0.01	
		<i>Ptilotus gomphrenoides</i>	5	0.01	FdW220804-58
		<i>Ptilotus helipteroides</i>	15	0.01	
		<i>Rhynchosia minima</i>	2	0.01	
		<i>Salsola australis</i>	20	0.01	
		<i>Scaevola spinescens</i>	40	0.1	FdW220804-70
		<i>Sclerolaena costata</i>	5	0.01	FdW220804-57
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	200	0.1	FdW220804-64
		<i>Solanum cleistogamum</i>	40	0.01	
		<i>Solanum diversiflorum</i>	40	0.1	
		<i>Solanum lasiophyllum</i>	50	0.1	
		<i>Sorghum timorense</i>	50	0.1	
		<i>Swainsona kingii</i>	5	0.01	FdW220804-67
		<i>Tephrosia supina</i>	5	0.01	
		<i>Tragus australianus</i>	5	0.01	FdW220804-75
		<i>Trichodesma zeylanicum</i>	20	0.01	
		<i>Triodia wiseana</i>	50	70	
		<i>Triumfetta clementii</i>	30	0.01	

DRAFT

Site No: 3	Date: 4/8/2022	Longitude: 116.73489	Latitude: -20.762918
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Type: Quadrat**Soil Types:** clay loam**Topography:** undulating plains**Surface Water:** no**Vegetation Type:** triodia**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** scattered open areas with herbs in the landscape, isolated cracking clay

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	20	0.01	
		<i>Acacia bivenosa</i>	200	2	
		<i>Acacia inaequilatera</i>	300	1	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	200	0.7	FdW220805-88
		<i>Afrohybanthus aurantiacus</i>	30	0.7	
		<i>Alysicarpus muelleri</i>	11	0.01	
		<i>Bonamia erecta</i>	30	2	
		<i>Bonamia pilbarensis</i>	3	0.1	
		<i>Bothriochloa ewartiana</i>	10	0.1	
		<i>Cassutha capillaris</i>	0	0.01	FdW220805-76

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Cenchrus ciliaris</i>	15	1.5	FdW220805-91
*		<i>Cenchrus setiger</i>	60	0.5	FdW220805-90
		<i>Chrysopogon fallax</i>	50	0.3	
		<i>Corchorus walcottii</i>	70	0.2	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.01	FdW220805-83
		<i>Cucumis variabilis</i>	0	0.2	
		<i>Cynanchum viminale</i> subsp. <i>australe</i>	50	1	FdW220805-92
		<i>Dactyloctenium radulans</i>	5	0.01	
		<i>Diplopeltis eriocarpa</i>	30	0.3	
		<i>Dysphania plantaginella</i>	20	0.1	
		<i>Ehretia saligna</i> var. <i>saligna</i>	240	0.3	
		<i>Eremophila longifolia</i>	60	0.2	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	7	0.1	FdW220805-87
		<i>Erodium cygnorum</i>	20	0.1	
		<i>Eulalia aurea</i>	50	0.1	FdW220805-77
		<i>Euphorbia biconvexa</i>	5	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	3	0.01	
		<i>Fimbristylis dichotoma</i>	20	0.01	
		<i>Goodenia microptera</i>	40	0.01	FdW220805-89
		<i>Grevillea pyramidalis</i>	220	0.3	FdW220805-81
		<i>Hakea loreus</i>	120	0.5	FdW220805-80
		<i>Indigofera linifolia</i>	10	0.01	FdW220805-82
		<i>Indigofera monophylla</i>	40	0.5	
		<i>Indigofera trita</i> subsp. <i>trita</i>	15	0.01	
		<i>Iseilema dolichotrichum</i>	5	0.01	
		<i>Melhania oblongifolia</i>	15	0.01	FdW220805-84
		<i>Nellica maderaspatensis</i>	8	0.01	
		<i>Nicotiana occidentalis</i>	30	0.01	
		<i>Paraneurachne muelleri</i>	40	0.2	
		<i>Paspalidium clementii</i>	5	0.01	
		<i>Polygala glaucifolia</i>	1	0.01	FdW220805-79
		<i>Ptilotus clementii</i>	5	0.01	
		<i>Ptilotus exaltatus</i>	30	0.1	
		<i>Ptilotus helipteroides</i>	30	0.1	
		<i>Scaevola spinescens</i>	60	1	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	10	0.01	
		<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	40	0.01	FdW220805-78

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	100	0.8	
		<i>Senna notabilis</i>	5	0.01	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	8	0.01	FdW220805-85
		<i>Solanum cleistogamum</i>	5	0.2	
		<i>Solanum lasiophyllum</i>	50	0.2	
		<i>Sorghum timorense</i>	50	0.1	
		<i>Sporobolus australasicus</i>	3	0.1	
		<i>Streptoglossa decurrens</i>			
		<i>Swainsona kingii</i>	12	0.01	
		<i>Swainsona leeana</i>	5	0.01	FdW220805-86
		<i>Tephrosia supina</i>	4	0.01	
	P3	<i>Themeda</i> ? sp. Hamersley Station (M.E. Trudgen 11431)	100	0.3	
		<i>Tragus australianus</i>	10	0.1	
		<i>Trichodesma zeylanicum</i>	5	0.01	
		<i>Triodia wiseana</i>	50	80	
		<i>Triumfetta clementii</i>	30	0.1	

DRAFT

Site No: 4	Date: 5/8/2022	Longitude: 116.7389965	Latitude: -20.768621
Type: Quadrat		Soil Types: deep clay loam	
Topography: flats		Surface Water: no	
Vegetation Type: tussock grasses and herbs		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes: cracking clay on surface with crab holes, isolated bare patches	



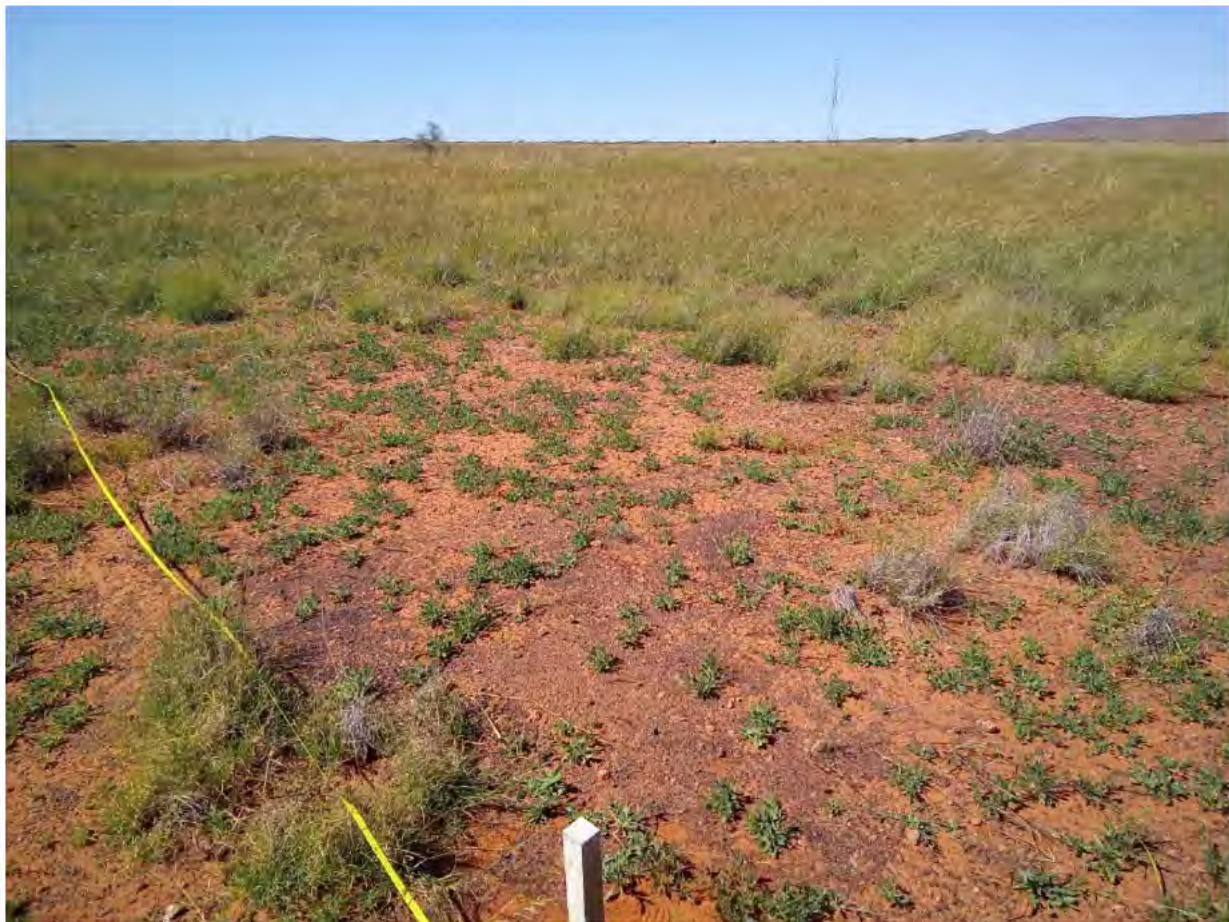
Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Aristida contorta</i>	10	0.01	
		<i>Bothriochloa ewartiana</i>	15	0.1	
*		<i>Cenchrus ciliaris</i>	20	0.1	
		<i>Chrysopogon fallax</i>	100	0.5	
		<i>Corchorus walcottii</i>	15	0.1	
		<i>Dactyloctenium radulans</i>	5	0.4	
		<i>Enneapogon caerulescens</i>	8	0.01	
		<i>Eragrostis setifolia</i>	15	0.2	FdW220805-101
		<i>Eragrostis xerophila</i>	40	40	FdW220805-100

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Eriachne flaccida</i>	40	0.5	
		<i>Erodium cygnorum</i>	12	0.1	
		<i>Euphorbia coghlanii</i>	15	0.1	FdW220805-104
		<i>Euploca heterantha</i>	5	0.2	
*		<i>Flaveria trinervia</i>	6	0.01	FdW220805-109
		<i>Goodenia muelleriana</i>	20	0.5	FdW220805-99
		<i>Grona filiformis</i>	3	0.1	FdW220805-106
		<i>Indigofera linifolia</i>	5	0.01	
		<i>Indigofera monophylla</i>	10	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	4	0.4	
		<i>Iseilema vaginiflorum</i>	30	1	FdW220805-95
		<i>Nellica maderaspatensis</i>	15	5	
		<i>Neptunia dimorphantha</i>	10	1	FdW220805-96
		<i>Operculina aequisejala</i>	5	0.1	FdW220805-97
		<i>Panicum decompositum</i> var. <i>decompositum</i>	25	0.6	FdW220805-94
		<i>Polygala galeocephala</i>	6	0.01	FdW220805-110
		<i>Ptilotus axillaris</i>	30	2	FdW220805-93
		<i>Ptilotus exaltatus</i>	35	0.1	
		<i>Ptilotus gomphrenoides</i>	15	0.5	
		<i>Ptilotus xerophilus</i>	30	0.01	FdW220805-105
		<i>Rhynchosia minima</i>	4	0.01	
		<i>Salsola australis</i>	7	0.01	
		<i>Schenkia clementii</i>	7	0.01	FdW220805-98
		<i>Sclerolaena costata</i>	12	0.01	FdW220805-103
		<i>Sclerolaena costata</i>	5	0.01	FdW220805-102
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	25	0.1	
		<i>Sida fibulifera</i>	5	1	FdW220805-107
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	10	0.01	FdW220805-108
		<i>Sorghum timorense</i>	60	20	
		<i>Sporobolus australasicus</i>	3	0.01	
		<i>Stemodia kingii</i>	3	0.3	
		<i>Streptoglossa</i> sp.	5	0.5	

DRAFT

Site No: 5	Date: 5/8/2022	Longitude: 116.735741	Latitude:-20.77348
Type: Quadrat	Soil Types: clay loam		
Topography: plains	Surface Water: no		
Vegetation Type: tussock and hummock grassland	Vegetation Condition: Excellent		
Fire: 10+	Condition Notes: mosaic of gilgai grassland and tridodia on harder soils. no patch exceeds 50 to 100m width. isolated bare areas.		



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	20	0.1	FdW220805-122
		<i>Alysicarpus muelleri</i>	10	0.01	
		<i>Aristida contorta</i>	10	0.01	
		<i>Aristida latifolia</i>	110	1	FdW220805-111
		<i>Arivela viscosa</i>	20	0.01	FdW220805-124
		<i>Astrebla pectinata</i>	120	0.1	FdW220805-118
		<i>Austrobryonia pilbarensis</i>	10	0.1	FdW220805-121

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Boerhavia paludosa</i>	30	0.1	FdW220805-120
		<i>Bonamia pilbarensis</i>	2	0.1	
		<i>Bothriochloa ewartiana</i>	10	2	
		<i>Calotis porphyroglossa</i>	10	0.01	FdW220805-126
*		<i>Cenchrus ciliaris</i>	20	0.1	
		<i>Chrysopogon fallax</i>	120	15	
		<i>Corchorus tridens</i>	2	0.01	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	10	0.5	FdW220805-123
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.2	
		<i>Cucumis variabilis</i>	10	0.2	
		<i>Cullen cinereum</i>	10	0.1	FdW220805-119
		<i>Dactyloctenium radicans</i>	3	1	
		<i>Dysphania plantaginella</i>	10	0.3	
		<i>Eragrostis xerophila</i>	30	4	
		<i>Eriachne flaccida</i>	50	0.5	
		<i>Euphorbia coghlanii</i>	8	0.1	
	P2	<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	1	0.01	FdW220805-114
		<i>Euploca heterantha</i>	5	0.2	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	3	0.01	
		<i>Fimbristylis dichotoma</i>	10	0.01	
		<i>Goodenia muelleriana</i>	20	0.2	
		<i>Hakea loreus</i>	200	0.5	
		<i>Hibiscus sturtii</i>	15	0.01	
		<i>Indigofera linifolia</i>	10	0.2	FdW220805-117
		<i>Indigofera monophylla</i>	5	0.01	
		<i>Ipomoea lonchophylla</i>	10	0.7	FdW220805-113
		<i>Iseilema dolichotrichum</i>	5	0.5	
		<i>Nelica maderaspatensis</i>	10	0.3	
		<i>Neptunia dimorphantha</i>	20	0.7	FdW220805-115
		<i>Nicotiana occidentalis</i>	5	0.01	FdW220805-125
		<i>Operculina aequisejala</i>	10	0.5	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	30	0.5	
		<i>Polygala galeocephala</i>	5	0.1	
		<i>Portulaca oleracea</i>	1	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	20	0.01	FdW220805-116
		<i>Ptilotus aervoides</i>	2	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Ptilotus axillaris</i>	15	0.1	
		<i>Ptilotus exaltatus</i>	30	0.1	
		<i>Ptilotus gomphrenoides</i>	20	1.5	
		<i>Rhynchosia minima</i>	5	0.1	
		<i>Scaevola spinescens</i>	50	0.5	
		<i>Schenkia clementii</i>	10	0.01	
		<i>Senna notabilis</i>	2	0.01	
		<i>Sida fibulifera</i>	15	0.5	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	15	0.01	
		<i>Solanum cleistogamum</i>	15	0.1	
		<i>Sorghum stipoideum</i>	50	10	
		<i>Stemodia kingii</i>	30	0.5	FdW220805-112
		<i>Streptoglossa</i> sp.	15	0.5	
		<i>Trichodesma zeylanicum</i>	5	0.01	
		<i>Triodia wiseana</i>	50	25	
		<i>Triumfetta clementii</i>	20	0.1	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	10	0.1	

DRAFT

Site No: 6	Date: 5/8/2022	Longitude: 116.738413	Latitude: -20.76235
Type: Quadrat		Soil Types: clay loam	
Topography: undulating plains		Surface Water: no	
Vegetation Type: tussock grasses		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes: cracking red clays with crab holes	



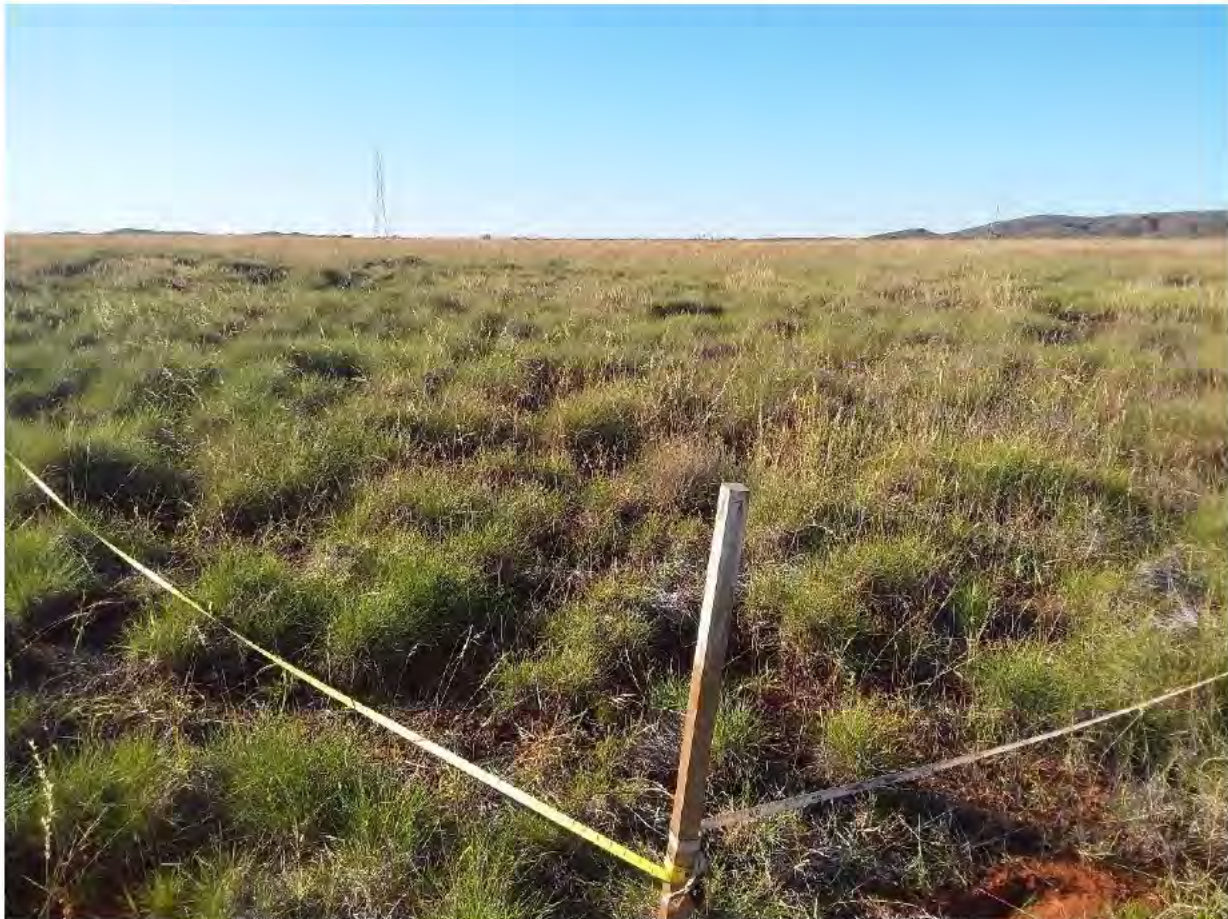
Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	7	0.01	
		<i>Bothriochloa ewartiana</i>	10	1	
		<i>Corchorus tridens</i>	3	0.01	
		<i>Dactyloctenium radulans</i>	5	0.01	
	P3	<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	10	0.01	FdW220805-130
		<i>Eragrostis xerophila</i>	40	40	
		<i>Erodium cygnorum</i>	15	0.01	
		<i>Euphorbia biconvexa</i>	5	0.3	
		<i>Euploca heterantha</i>	3	0.5	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Euploca tenuifolia</i>	8	0.01	FdW220805-129
		<i>Goodenia muelleriana</i>	20	0.5	
		<i>Grona filiformis</i>	10	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	8	0.2	FdW220805-128
		<i>Iseilema vaginiflorum</i>	20	0.5	
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Neptunia dimorphantha</i>	5	0.1	
		<i>Nicotiana occidentalis</i>	15	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	30	0.5	
		<i>Polygala galeocephala</i>	10	0.2	
		<i>Portulaca oleracea</i>	0	0.01	
		<i>Ptilotus aervoides</i>	10	0.01	
		<i>Ptilotus axillaris</i>	15	0.1	
		<i>Ptilotus exaltatus</i>	45	0.2	
		<i>Ptilotus gomphrenoides</i>	10	0.2	
		<i>Rhynchosia minima</i>	3	0.01	
		<i>Roepera retivalvis</i>	12	0.01	
		<i>Salsola australis</i>	8	0.01	
		<i>Sida fibulifera</i>	10	1	
		<i>Solanum cleistogamum</i>	5	0.01	
*		<i>Sonchus oleraceus</i>	5	0.01	
		<i>Sorghum stipoideum</i>	60	8	
		<i>Stemodia kingii</i>	30	0.1	
		<i>Streptoglossa</i> sp.	5	10	
		<i>Tribulus occidentalis</i>	15	0.2	FdW220805-127
		<i>Triumfetta clementii</i>	10	0.01	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	10	0.1	

DRAFT

Site No: 7	Date: 6/8/2022	Longitude: 116.7345461	Latitude:-20.7747
Type: Quadrat	Soil Types: deep clay loam		
Topography: undulating plains	Surface Water: no		
Vegetation Type: mosaic of hummock and tussock grasses and herbs	Vegetation Condition: Excellent		
Fire: 10+	Condition Notes: isolated patches of bare ground with herbs. microrelief common broader landscape mosaic of triodia and tussock grasses		



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	20	0.3	
		<i>Alysicarpus muelleri</i>	15	0.1	
		<i>Arivela viscosa</i>	50	0.2	
		<i>Astrebla pectinata</i>	80	0.8	
		<i>Austrobryonia pilbarensis</i>	3	0.1	
		<i>Bothriochloa ewartiana</i>	10	2	
*		<i>Cenchrus ciliaris</i>	25	0.3	
		<i>Chrysopogon fallax</i>	120	15	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Citrullus amarus</i>	3	0.1	cs01
		<i>Corchorus tridens</i>	20	0.7	
		<i>Corchorus walcottii</i>	10	0.1	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	40	0.5	cs04
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.01	
		<i>Desmodiopsis campylocaulon</i>	5	0.1	cs02
		<i>Dysphania plantaginella</i>	30	0.1	
		<i>Eragrostis setifolia</i>	15	0.1	
		<i>Eragrostis xerophila</i>	35	5	
		<i>Eriachne flaccida</i>	40	1	
		<i>Euphorbia coghlanii</i>	15	0.1	
	P2	<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	1	0.1	
		<i>Euploca heterantha</i>	7	0.1	
		<i>Euploca tenuifolia</i>	8	0.01	cs06
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	5	0.01	
		<i>Goodenia muelleriana</i>	40	0.2	
		<i>Grona filiformis</i>	15	0.01	
		<i>Indigastrum parviflorum</i>	20	0.2	cs03
		<i>Indigofera linifolia</i>	5	0.2	
		<i>Iseilema vaginiflorum</i>	20	0.5	
		<i>Nellica maderaspatensis</i>	8	0.03	
		<i>Neptunia dimorphantha</i>	12	0.1	
		<i>Operculina aequisejala</i>	10	0.3	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	30	0.5	
		<i>Portulaca oleracea</i>	2	0.1	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	2	0.01	
		<i>Ptilotus aervoides</i>	10	0.2	
		<i>Ptilotus axillaris</i>	20	0.3	
		<i>Ptilotus exaltatus</i>	25	0.1	
		<i>Ptilotus gomphrenoides</i>	15	0.3	
		<i>Ptilotus xerophilus</i>	30	0.01	
		<i>Rhynchosia minima</i>	3	0.01	
		<i>Schenkia clementii</i>	5	0.01	
		<i>Schenkia</i> sp.	10	0.01	cs05
		<i>Sida fibulifera</i>	4	0.01	cs07

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Sorghum stipoideum</i>	50	20	
		<i>Sporobolus australasicus</i>	3	0.2	
		<i>Stemodia kingii</i>	40	0.5	
		<i>Streptoglossa</i> sp.	5	0.5	
		<i>Tribulus occidentalis</i>	10	0.01	
		<i>Triodia wiseana</i>	50	25	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	10	0.1	

DRAFT

Site No: 8 **Date:** 5/8/2022 **Longitude:** 116.72815 **Latitude:** -20.776326

Type: Revele

Soil Types: clay loam

Topography: flat

Surface Water: no

Vegetation Type: triodia and herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia ancistrocarpa</i>	200	1	FdW220806-135
		<i>Aristida contorta</i>	10	0.1	
		<i>Arivela viscosa</i>	10	0.1	
		<i>Bonamia erecta</i>	10	0.01	
		<i>Bonamia pilbarensis</i>	2	0.1	
		<i>Corchorus walcottii</i>	20	0.5	FdW220806-134
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	20	0.1	
		<i>Cynanchum viminale</i> subsp. <i>australe</i>	30	0.1	
		<i>Dysphania plantaginella</i>	20	0.5	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Enneapogon caeruleus</i>	5	0.1	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	0.1	
		<i>Euploca heterantha</i>	1	0.1	FdW220806-133
		<i>Goodenia microptera</i>	20	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	20	0.5	
		<i>Iseilema dolichotrichum</i>	5	0.1	
		<i>Polygala glaucifolia</i>	2	0.1	
		<i>Portulaca oleracea</i>	2	0.2	
		<i>Ptilotus aervoides</i>	2	15	
		<i>Ptilotus axillaris</i>	10	0.1	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	30	0.1	
		<i>Sorghum stipoideum</i>	40	0.1	
		<i>Sporobolus australasicus</i>	5	0.1	
		<i>Trichodesma zeylanicum</i>	5	0.1	
		<i>Triodia wiseana</i>	30	8	

DRAFT

Site No: 9 **Date:** 6/8/2022 **Longitude:** 116.730343 **Latitude:** -20.774541

Type: Quadrat

Soil Types: clay loam

Topography: flats with slight undulation

Surface Water: no

Vegetation Type: tussock grasses and herbs with small patches of triodia

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: landscape dominated by tussock grasses microrelief present and cracking clays



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	20	0.5	
		<i>Alysicarpus muelleri</i>	15	0.01	
		<i>Aristida contorta</i>	25	0.3	
		<i>Arivela viscosa</i>	15	0.1	
		<i>Austrobryonia pilbarensis</i>	3	0.1	
		<i>Boerhavia paludosa</i>	20	0.1	cs11
		<i>Bothriochloa ewartiana</i>	10	0.3	
*		<i>Cenchrus ciliaris</i>	30	0.3	
		<i>Chrysopogon fallax</i>	110	5	
		<i>Corchorus tridens</i>	15	0.2	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	40	0.3	cs10
	P3	<i>Dolichocarpa</i> sp. <i>Hamersley Station</i> (A.A. Mitchell PRP 1479)	20	0.1	
		<i>Dysphania plantaginella</i>	25	0.1	
		<i>Enneapogon caerulescens</i>	10	0.1	
		<i>Eragrostis setifolia</i>	20	0.1	
		<i>Eragrostis xerophila</i>	30	20	
		<i>Eriachne flaccida</i>	60	0.3	
		<i>Erodium cygnorum</i>	15	0.1	
		<i>Euphorbia biconvexa</i>	5	0.01	
		<i>Euphorbia coghlani</i>	10	0.1	
		<i>Euploca heterantha</i>	4	0.1	
		<i>Goodenia muelleriana</i>	25	0.1	
		<i>Indigastrium parviflorum</i>	5	0.01	
		<i>Indigofera colutea</i>	8	0.01	cs08
		<i>Indigofera linifolia</i>	10	0.2	
		<i>Ipomoea lonchophylla</i>	5	0.1	
		<i>Iseilema vaginiflorum</i>	30	1	
		<i>Nellica maderaspatensis</i>	7	0.2	
		<i>Neptunia dimorphantha</i>	7	0.2	
		<i>Operculina aequiseipala</i>	6	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	0	0.2	
		<i>Portulaca oleracea</i>	2	0.01	
		<i>Ptilotus axillaris</i>	15	0.5	
		<i>Ptilotus exaltatus</i>	15	0.1	
		<i>Ptilotus gomphrenoides</i>	10	0.2	
		<i>Rhynchosia minima</i>	3	0.1	
		<i>Salsola australis</i>	10	0.1	
		<i>Sida fibulifera</i>	15	0.5	
		<i>Solanum cleistogamum</i>	15	0.3	
*		<i>Sonchus oleraceus</i>	5	0.01	
		<i>Sorghum stipoides</i>	60	15	
		<i>Stemodia kingii</i>	20	2	
		<i>Streptoglossa bubakii</i>	30	0.3	cs09
		<i>Streptoglossa</i> sp.	5	2	
		<i>Trichodesma zeylanicum</i>	35	0.01	
		<i>Triodia wiseana</i>	3	20	

DRAFT

Site No: 10	Date: 6/8/2022	Longitude: 116.728084	Latitude: -20.7792215
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Type: Quadrat**Soil Types:** hard clay loam, crust on surface**Topography:** flat**Surface Water:** no**Vegetation Type:** triodia**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** bare and triodia patches on hard clay

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	5	0.01	
		<i>Acacia bivenosa</i>	50	1	
		<i>Afrohybanthus aurantiacus</i>	30	0.5	
		<i>Alysicarpus muelleri</i>	15	0.01	
		<i>Aristida contorta</i>	10	0.01	
		<i>Boerhavia coccinea</i>	2	0.01	FdW220806-142
		<i>Bonamia pilbarensis</i>	3	0.2	
		<i>Bothriochloa ewartiana</i>	10	0.5	
		<i>Cassytha capillaris</i>	0	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Cenchrus ciliaris</i>	20	0.15	
		<i>Corchorus walcottii</i>	30	0.6	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	20	0.1	
		<i>Cucumis variabilis</i>	0	0.05	
		<i>Diplopeltis eriocarpa</i>	30	3	
		<i>Dysphania plantaginella</i>	10	0.1	
		<i>Enneapogon caerulescens</i>	10	0.01	
		<i>Eremophila longifolia</i>	100	0.2	
		<i>Erodium cygnorum</i>	10	0.3	
		<i>Eulalia aurea</i>	60	3	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	2	0.5	FdW220806-139
		<i>Euphorbia biconvexa</i>	10	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	5	0.01	FdW220806-138
		<i>Euploca heterantha</i>	2	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.01	
		<i>Goodenia microptera</i>	20	0.1	
		<i>Indigofera colutea</i>	3	0.01	
		<i>Indigofera monophylla</i>	30	0.7	FdW220806-141
		<i>Iseilema dolichotrichum</i>	5	0.01	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	10	0.01	
		<i>Polygala glaucifolia</i>	2	0.05	
		<i>Ptilotus clementii</i>	10	0.01	FdW220806-137
		<i>Ptilotus exaltatus</i>	20	0.01	
		<i>Ptilotus helipteroides</i>	20	0.3	
		<i>Rhynchosia minima</i>	5	0.01	
		<i>Roepera retivalvis</i>	10	0.3	
		<i>Rostellularia adscendens</i> var. <i>pogonantha</i>	5	0.01	FdW220806-143
		<i>Salsola australis</i>	20	0.1	
		<i>Scaevola spinescens</i>	50	1	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	50	0.5	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	50	0.1	
		<i>Senna notabilis</i>	3	0.01	
		<i>Solanum cleistogamum</i>	40	0.1	
		<i>Solanum diversiflorum</i>	30	0.01	
		<i>Solanum lasiophyllum</i>	30	0.1	
		<i>Sorghum stipoideum</i>	50	0.3	
		<i>Streptoglossa bubakii</i>	2	0.01	FdW220806-136

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Streptoglossa decurrens</i>	30	0.01	FdW220806-140
		<i>Tephrosia supina</i>	15	0.2	
		<i>Tribulus occidentalis</i>	2	0.1	
		<i>Trichodesma zeylanicum</i>	5	0.1	
		<i>Triodia wiseana</i>	50	35	
		<i>Triumfetta clementii</i>	20	0.1	

DRAFT

Site No: 11 **Date:** 6/8/2022 **Longitude:** 116.7300769 **Latitude:** -20.77058508

Type: Quadrat

Soil Types: deep clay loam

Topography: flats with slight undulation

Surface Water: no

Vegetation Type: tussock grasses and herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: isolated patches of bare ground and herbs in landscape, cracking clay with microrelief, pec



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	5	0.01	
		<i>Abutilon malvifolium</i>	13	0.5	
		<i>Alysicarpus muelleri</i>	2	0.01	
		<i>Astrebla pectinata</i>	60	0.3	
		<i>Austrobryonia pilbarensis</i>	3	0.1	
		<i>Boerhavia paludosa</i>	30	0.1	
		<i>Bothriochloa ewartiana</i>	10	0.4	
*		<i>Cenchrus ciliaris</i>	30	0.4	
		<i>Chrysopogon fallax</i>	110	0.1	
*		<i>Citrullus amarus</i>	5	0.1	
		<i>Corchorus tridens</i>	15	0.3	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	30	0.2	
		<i>Cullen cinereum</i>	10	0.1	
		<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	60	0.3	cs12
		<i>Eragrostis xerophila</i>	40	35	
		<i>Eremophila longifolia</i>	100	0.3	
		<i>Erodium cygnorum</i>	10	0.1	
		<i>Euphorbia coghlanii</i>	10	0.1	
		<i>Euploca heterantha</i>	3	0.1	
		<i>Euploca tenuifolia</i>	5	0.01	
		<i>Grona filiformis</i>	3	0.1	
		<i>Indigastrum parviflorum</i>	15	0.2	
		<i>Indigofera colutea</i>	5	0.01	
		<i>Indigofera linifolia</i>	10	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.3	
		<i>Ipomoea lonchophylla</i>	3	0.1	
		<i>Iseilema dolichotrichum</i>	3	0.01	
		<i>Iseilema vaginiflorum</i>	20	0.6	
*		<i>Malvastrum americanum</i>	15	0.1	cs13
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Neptunia dimorphantha</i>	3	0.2	
		<i>Operculina aequisejala</i>	10	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	20	0.2	
		<i>Ptilotus axillaris</i>	20	0.7	
		<i>Ptilotus exaltatus</i>	30	0.1	
		<i>Ptilotus gomphrenoides</i>	10	0.6	
		<i>Rhynchosia minima</i>	5	0.1	
		<i>Salsola australis</i>	5	0.1	
		<i>Sclerolaena costata</i>	30	0.1	
		<i>Sida fibulifera</i>	15	4	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	10	0.2	
*		<i>Sonchus oleraceus</i>	3	0.01	
		<i>Sorghum stipoideum</i>	50	25	
		<i>Stemodia kingii</i>	40	0.7	
		<i>Streptoglossa bubakii</i>	20	0.1	
		<i>Streptoglossa</i> sp.	5	1	
		<i>Tribulus occidentalis</i>	5	0.1	

DRAFT

Site No: 12 **Date:** 6/8/2022 **Longitude:** 116.7248698 **Latitude:** -20.780493

Type: Quadrat

Soil Types: clay loam

Topography: flat

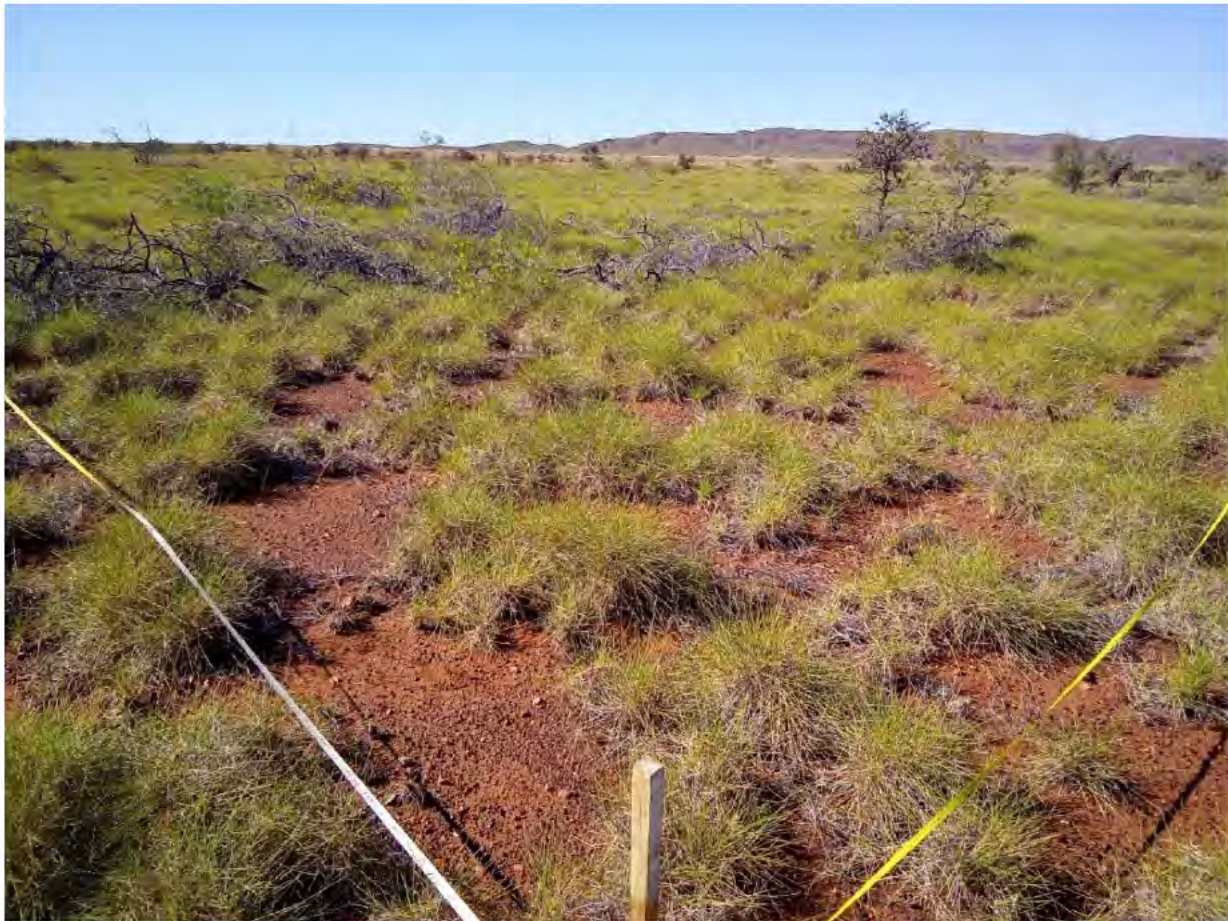
Surface Water: no

Vegetation Type: triodia grassland

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: hummock grassland



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia ancistrocarpa</i>		1	
		<i>Acacia bivenosa</i>	180	1	
		<i>Acacia inaequilatera</i>	220	0.5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	250	0.5	
		<i>Afrohybanthus aurantiacus</i>	20	0.5	
		<i>Bonamia erecta</i>		1	FdW220806-147
		<i>Bonamia pilbarensis</i>	2	0.6	
		<i>Bothriochloa ewartiana</i>		0.1	
		<i>Cassyltha capillaris</i>	0	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Cucumis variabilis</i>	0	0.3	
		<i>Digitaria brownii</i>	50	0.1	FdW220806-148
		<i>Dysphania plantaginella</i>		0.01	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>		0.05	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>		0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>		0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	5	0.01	
		<i>Goodenia microptera</i>	30	0.1	
		<i>Indigofera colutea</i>		0.01	FdW220806-146
		<i>Indigofera monophylla</i>	30	0.1	
		<i>Nellica maderaspatensis</i>	20	0.01	
		<i>Ptilotus astrolasius</i>	30	0.2	FdW220806-144
		<i>Rhodanthe haigii</i>	10	0.01	
		<i>Scaevola spinescens</i>		0.3	
		<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	100	0.2	
		<i>Streptoglossa decurrens</i>	5	0.01	
		<i>Tephrosia</i> sp. clay soils (<i>S. van Leeuwen et al. PBS 0273</i>)	20	0.5	FdW220806-145
		<i>Tribulus occidentalis</i>	2	0.2	
		<i>Trichodesma zeylanicum</i>	10	0.1	
		<i>Triodia wiseana</i>	40	60	
		<i>Triumfetta clementii</i>		0.1	

DRAFT

Site No: 13 **Date:** 6/8/2022 **Longitude:** 116.729030 **Latitude:** -20.767668

Type: Quadrat

Soil Types: hard clay loam

Topography: flats with slight undulation

Surface Water: no

Vegetation Type: triodia dominant with some tussock grasses

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: on Rocky quartz



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	120	5.3	cs14. almost dead sterile
		<i>Acacia xiphophylla</i>	250	1	cs17
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	80	0.5	
		<i>Afrohybanthus aurantiacus</i>	50	0.2	
		<i>Aristida latifolia</i>	20	0.1	
		<i>Bonamia erecta</i>	15	0.1	
		<i>Bonamia pilbarensis</i>	3	0.1	
		<i>Bothriochloa ewartiana</i>	15	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Cassythia capillaris</i>	0	0.5	
*		<i>Cenchrus ciliaris</i>	30	0.2	
		<i>Chrysopogon fallax</i>	100	1	
		<i>Corchorus tridens</i>	10	0.01	
		<i>Corchorus walcottii</i>	15	0.2	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	30	0.5	
		<i>Cucumis variabilis</i>	2	0.01	
		<i>Diplopeltis eriocarpa</i>	40	0.3	
		<i>Enneapogon caerulescens</i>	5	0.01	
		<i>Eragrostis setifolia</i>	10	0.01	
		<i>Eremophila longifolia</i>	80	0.5	cs15
		<i>Eriachne flaccida</i>	30	0.1	
		<i>Erodium cygnorum</i>	10	0.3	
		<i>Eulalia aurea</i>	40	0.2	
		<i>Euphorbia biconvexa</i>	18	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	25	0.02	
		<i>Euploca heterantha</i>	3	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.01	
		<i>Flaveria trinervia</i>	10	0.01	
		<i>Goodenia muelleriana</i>	15	0.1	
		<i>Hibiscus coatesii</i>	40	0.1	
		<i>Indigofera monophylla</i>	30	0.2	
		<i>Iseilema dolichotrichum</i>	4	0.01	
*		<i>Malvastrum americanum</i>	40	0.2	
		<i>Nellica maderaspatensis</i>	10	0.1	
		<i>Neptunia dimorphantha</i>	5	0.5	
		<i>Notoleptopus decaisnei</i>	4	0.01	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	15	0.01	
		<i>Polygala galeocephala</i>	2	0.01	
		<i>Polygala glaucifolia</i>	3	0.01	
		<i>Ptilotus aervoides</i>	30	0.2	
		<i>Ptilotus axillaris</i>	15	0.01	
		<i>Ptilotus clementii</i>	4	0.01	
		<i>Ptilotus exaltatus</i>	10	0.1	
		<i>Rhynchosia minima</i>	2	0.01	
		<i>Roepera retivalvis</i>	25	0.2	
		<i>Scaevola spinescens</i>	150	0.4	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Schenkia clementii</i>	8	0.01	
		<i>Schenkia</i> sp.	8	0.01	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	45	0.4	
		<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	100	0.4	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	120	0.7	
		<i>Sida fibulifera</i>	20	0.1	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	6	0.01	
		<i>Solanum cleistogamum</i>	30	0.2	
		<i>Solanum diversiflorum</i>	30	0.2	
		<i>Solanum lasiophyllum</i>	25	0.2	
*		<i>Sonchus oleraceus</i>	20	0.01	
		<i>Sorghum stipoideum</i>	50	0.5	
		<i>Stemodia kingii</i>	15	0.2	
		<i>Streptoglossa</i> sp.	4	0.01	
		<i>Tephrosia supina</i>	15	0.01	
		<i>Trichodesma zeylanicum</i>	5	0.01	
		<i>Triodia wiseana</i>	50	25	
		<i>Triumfetta clementii</i>	20	0.1	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	4	0	

DRAFT

Site No: 14	Date: 6/8/2022	Longitude: 116.724461	Latitude: -20.77631483
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Type: Quadrat**Soil Types:** clay loam**Topography:** gentle undulation**Surface Water:** no**Vegetation Type:** triodia grassland**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** hummock grassland

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	3	0.01	
		<i>Acacia bivenosa</i>	100	1	
		<i>Acacia inaequilatera</i>	300	0.5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	180	0.1	
		<i>Afrohybanthus aurantiacus</i>	30	0.5	
		<i>Bonamia erecta</i>	20	2	
		<i>Bonamia pilbarensis</i>	5	0.5	
		<i>Bothriochloa ewartiana</i>	5	0.01	
		<i>Cassytha capillaris</i>	0	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Corchorus walcottii</i>	10	0.2	
		<i>Diplopeltis eriocarpa</i>	30	1	
		<i>Dysphania plantaginella</i>	10	0.01	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	0.2	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	5	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	5	0.01	
		<i>Goodenia microptera</i>	30	0.01	
		<i>Hibiscus coatesii</i>	30	0.01	FdW220806-149
		<i>Indigofera monophylla</i>	20	0.5	
		<i>Iseilema dolichotrichum</i>	3	0.01	
		<i>Nellica maderaspatensis</i>	15	0.1	FdW220806-150
		<i>Polygala glaucifolia</i>	2	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	1	0.01	
		<i>Ptilotus aervoides</i>	1	0.01	
		<i>Ptilotus astrolasius</i>	30	0.5	
		<i>Scaevola spinescens</i>	30	0.2	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	30	0.2	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	30	0.01	
		<i>Senna notabilis</i>	2	0.05	
		<i>Solanum diversiflorum</i>	20	0.3	
		<i>Streptoglossa bubakii</i>	3	0.01	
		<i>Tephrosia</i> sp. clay soils (<i>S. van Leeuwen et al. PBS 0273</i>)	10	0.1	
		<i>Tribulus occidentalis</i>	1	0.01	
		<i>Trichodesma zeylanicum</i>	5	0.05	
		<i>Triodia wiseana</i>	30	50	
		<i>Triumfetta clementii</i>	10	0.2	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	5	0.01	

DRAFT

Site No: 15	Date: 7/8/2022	Longitude: 116.697266	Latitude: -20.793514
Type: Quadrat	Soil Types: soft clay loam		
Topography: flats with slight undulation	Surface Water: no		
Vegetation Type: tussock grasses and herbs	Vegetation Condition: Excellent		
Fire: 10+	Condition Notes: landscape dominated by eragrostis grass. species richness lower isolated areas of hard clay loam dominated by herbs in the landscape some microrelief present		



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	20	0.2	
		<i>Bothriochloa ewartiana</i>	15	8	
		<i>Corchorus tridens</i>	3	0.01	
	P3	<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	3	0.01	cs20
		<i>Eragrostis xerophila</i>	35	40	
		<i>Euphorbia biconvexa</i>	6	0.01	
		<i>Euphorbia coghlanii</i>	13	0.1	
		<i>Euploca heterantha</i>	3	0.01	
		<i>Euploca tenuifolia</i>	7	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Goodenia pascua</i>	30	0.3	cs19. 10-15 plants
		<i>Grona filiformis</i>	15	0.3	
		<i>Indigofera linifolia</i>	7	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.1	
		<i>Iseilema vaginiflorum</i>	20	0.5	
		<i>Nellica maderaspatensis</i>	10	0.8	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	25	0.5	
		<i>Ptilotus axillaris</i>	15	5	
		<i>Ptilotus exaltatus</i>	40	0.3	
		<i>Ptilotus gomphrenoides</i>	7	0.5	
		<i>Rhynchosia minima</i>	3	0.1	
		<i>Rostellularia adscendens</i> var. <i>pogonantha</i>	20	0.01	cs18. Range Extension
		<i>Salsola australis</i>	12	0.1	
		<i>Sida fibulifera</i>	20	0.2	
		<i>Sorghum stipoideum</i>	60	0.1	
		<i>Streptoglossa</i> sp.	5	0.5	

DRAFT

Site No: 16 **Date:** 6/8/2022 **Longitude:** 116.7240315 **Latitude:** -20.77299983

Type: Quadrat

Soil Types: clay loam

Topography: flat

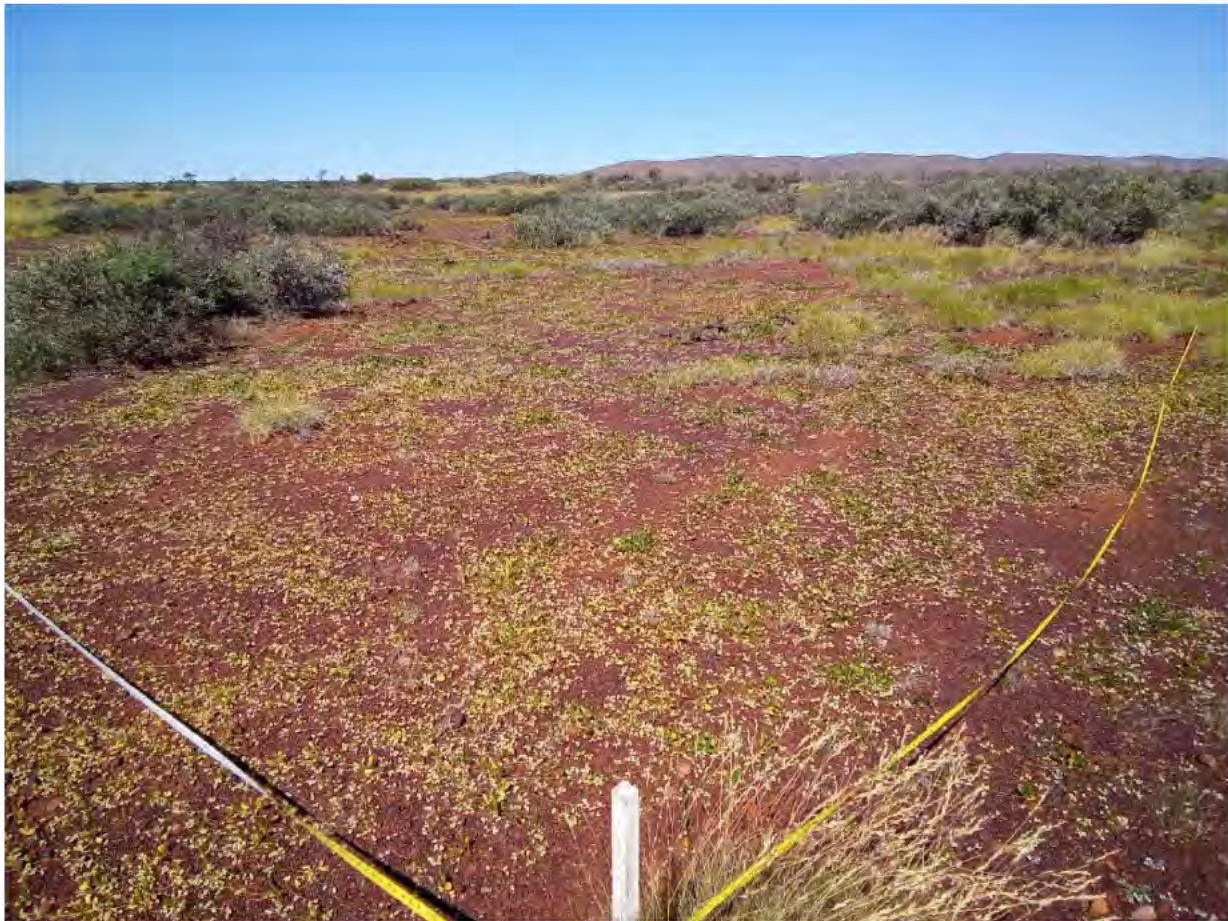
Surface Water: no

Vegetation Type: ptilotus and trodia

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: open acacia shrubland



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	40	1	
		<i>Acacia xiphophylla</i>	180	15	FdW220806-151
		<i>Alysicarpus muelleri</i>	10	0.01	
		<i>Aristida contorta</i>	15	0.5	
		<i>Arivela viscosa</i>	20	0.05	
		<i>Bonamia pilbarensis</i>	2	0.01	
*		<i>Cenchrus ciliaris</i>	0	0.2	
*		<i>Cenchrus setiger</i>	20	0.1	
		<i>Corchorus walcottii</i>	20	0.3	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Dactyloctenium radulans</i>	20	0.7	
		<i>Dysphania plantaginella</i>	20	0.3	
		<i>Enneapogon caerulescens</i>	5	0.01	
		<i>Enteropogon ramosus</i>	40	0.1	FdW220806-153
		<i>Eragrostis xerophila</i>	20	0.5	
		<i>Eremophila longifolia</i>	80	0.5	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	0.5	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.01	
		<i>Euploca heterantha</i>	2	0.5	
		<i>Goodenia microptera</i>	20	0.01	
		<i>Indigastrium parviflorum</i>	5	0.1	FdW220806-154
		<i>Maireana planifolia</i>	30	0.1	FdW220806-152
		<i>Nellica maderaspatensis</i>	10	0.01	
		<i>Portulaca oleracea</i>	1	0.01	
		<i>Ptilotus aervoides</i>	2	20	
		<i>Ptilotus astrolasius</i>	30	0.1	
		<i>Ptilotus exaltatus</i>	20	0.01	
		<i>Ptilotus helipteroides</i>	10	0.01	
		<i>Rhodanthe floribunda</i>	5	0.01	
		<i>Rhynchosia minima</i>	10	0.01	
		<i>Salsola australis</i>	10	0.01	
		<i>Scaevola spinescens</i>	60	0.5	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	50	0.3	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	50	0.1	
		<i>Solanum cleistogamum</i>	30	0.1	
		<i>Solanum lasiophyllum</i>	30	0.1	
		<i>Sporobolus australasicus</i>	5	0.3	
		<i>Streptoglossa bubakii</i>	10	0.1	
		<i>Trichodesma zeylanicum</i>	10	0.01	
		<i>Triodia wiseana</i>	50	8	

DRAFT

Site No: 17	Date: 7/8/2022	Longitude: 116.70003	Latitude: -20.7975787
Type: Quadrat	Soil Types: soft clay loam		
Topography: flats with slight undulation	Surface Water: no		
Vegetation Type: tussock grasses and herbs	Vegetation Condition: Excellent		
Fire: 10+	Condition Notes: landscape dominated by eragrostis grass. species richness lower isolated areas of hard clay loam dominated by herbs in the landscape some microrelief present		



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	15	0.2	
		<i>Bothriochloa ewartiana</i>	15	25	
		<i>Corchorus tridens</i>	6	0.2	
	P3	<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	4	0.01	
		<i>Eragrostis xerophila</i>	35	30	
		<i>Euphorbia coghlanii</i>	10	0.5	
		<i>Euploca heterantha</i>	5	0.01	
		<i>Euploca tenuifolia</i>	6	0.1	
		<i>Goodenia pascua</i>	30	2.1	cs21

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Grona filiformis</i>	8	0.5	
		<i>Indigofera linifolia</i>	12	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.1	
		<i>Ipomoea lonchophylla</i>	10	0.1	
		<i>Iseilema vaginiflorum</i>	20	2	
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Neptunia dimorphantha</i>	3	0.1	
		<i>Operculina aequisejala</i>	5	0.2	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	15	0.5	
		<i>Ptilotus axillaris</i>	14	1	
		<i>Ptilotus exaltatus</i>	20	0.2	
		<i>Rhynchosia minima</i>	5	0.2	
		<i>Salsola australis</i>	8	0.1	
		<i>Sida fibulifera</i>	30	0.4	
		<i>Sorghum stipoides</i>	60	0.2	
		<i>Streptoglossa bubakii</i>	30	0.1	
		<i>Streptoglossa</i> sp.	4	0.5	
		<i>Tribulus occidentalis</i>	5	0.01	

DRAFT

Site No: 18 **Date:** 6/8/2022 **Longitude:** 116.7202931 **Latitude:** -20.77759650

Type: Quadrat

Soil Types: clay loam

Topography: gentle undulation

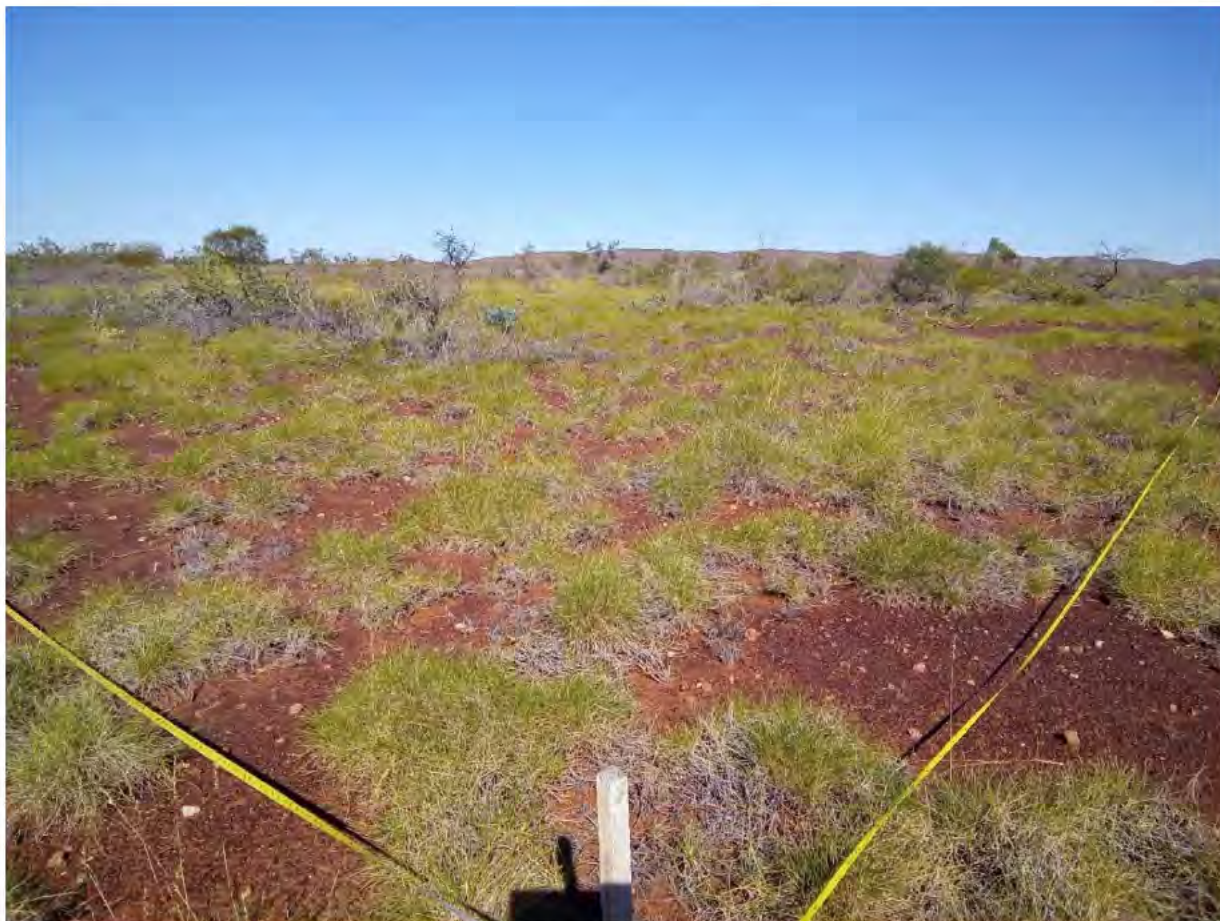
Surface Water: no

Vegetation Type: triodia grassland

Vegetation Condition: Excellent

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	80	0.1	FdW220806-157
		<i>Acacia ancistrocarpa</i>	200	1.5	
		<i>Acacia bivenosa</i>	150	5	
		<i>Acacia inaequilatera</i>	300	0.5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	180	0.5	
		<i>Afrohybanthus aurantiacus</i>	30	1	
		<i>Bonamia erecta</i>	20	2	
		<i>Bonamia pilbarensis</i>	2	0.3	
		<i>Cassytha capillaris</i>	0	0.01	
*		<i>Cenchrus ciliaris</i>	30	0.5	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Chrysopogon fallax</i>	80	0.8	
		<i>Corchorus walcottii</i>	10	0.5	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	20	0.01	
		<i>Cymbopogon oblectus</i>	80	0.1	FdW220806-156
		<i>Digitaria brownii</i>	50	0.1	
		<i>Dysphania plantaginella</i>	10	0.1	
		<i>Eremophila longifolia</i>	40	0.1	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	0.5	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.01	
		<i>Euphorbia biconvexa</i>	1	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	15	0.01	
		<i>Euploca chrysocarpa</i>	30	0.05	FdW220806-155
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	20	0.01	FdW220806-158
		<i>Goodenia microptera</i>	40	1	
		<i>Indigofera monophylla</i>	30	0.5	
		<i>Iseilema dolichotrichum</i>	5	0.1	
		<i>Portulaca oleracea</i>	1	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	1	0.01	
		<i>Ptilotus astrolasius</i>	40	1	
		<i>Scaevola spinescens</i>	40	1	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	30	0.1	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	30	0.1	
		<i>Senna notabilis</i>	2	0.01	
		<i>Sida echinocarpa</i>	40	0.3	FdW220806-154a
		<i>Solanum cleistogamum</i>	30	0.2	
		<i>Solanum diversiflorum</i>	30	0.5	
		<i>Solanum lasiophyllum</i>	30	0.1	
		<i>Sorghum stipoideum</i>	50	0.1	
		<i>Tephrosia</i> sp. clay soils (<i>S. van Leeuwen et al. PBS 0273</i>)	10	0.1	
		<i>Tribulus occidentalis</i>	1	0.01	
		<i>Trichodesma zeylanicum</i>	5	0.1	
		<i>Triodia wiseana</i>	50	40	
		<i>Triumfetta clementii</i>	10	0.6	

DRAFT

Site No: 19 **Date:** 7/8/2022 **Longitude:** 116.70171 **Latitude:** -20.795559

Type: Revele

Soil Types: Clay loam

Topography: Drainage channel

Surface Water: Not at time of survey

Vegetation Type: Tussock grasses and herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: Past 10m either side of the drainage line vegetation dominated by *Eragrostis* grassland on red cracking clay



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Bothriochloa ewartiana</i>	20	0.7	
*		<i>Cenchrus ciliaris</i>	20	1	
		<i>Chrysopogon fallax</i>	110	7	
*		<i>Citrullus amarus</i>	5	0.1	
		<i>Corchorus tridens</i>	5	0.01	
		<i>Cullen cinereum</i>	30	2	
		<i>Digitaria brownii</i>	50	1	cs27
		<i>Dysphania plantaginella</i>	10	0.01	

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Eragrostis xerophila</i>	20	0.5	
		<i>Eriachne flaccida</i>	50	30	
		<i>Euploca heterantha</i>	15	0.1	
		<i>Grona filiformis</i>	6	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	3	0.1	
		<i>Ipomoea lonchophylla</i>	6	0.01	
		<i>Ipomoea muelleri</i>	3	0.01	cs23
		<i>Iseilema vaginiflorum</i>	15	0.7	
		<i>Mimulus gracilis</i>	5	0.01	cs24
		<i>Nellica maderaspatensis</i>	7	0.1	
		<i>Neptunia dimorphantha</i>	4	0.1	
		<i>Operculina aequisejala</i>	10	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	60	0.5	
		<i>Ptilotus axillaris</i>	15	0.5	
		<i>Ptilotus exaltatus</i>	8	0.1	
		<i>Ptilotus gomphrenoides</i>	15	0.5	
		<i>Rhynchosia minima</i>	10	0.2	
		<i>Salsola australis</i>	25	0.3	cs26
		<i>Schenkia</i> sp.	5	0.1	cs25
		<i>Sida fibulifera</i>	10	0.2	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	10	0.01	
		<i>Sporobolus australasicus</i>	10	0.2	
		<i>Stemodia kingii</i>	40	0.8	
		<i>Streptoglossa</i> sp.	5	0.01	
*		<i>Vachellia farnesiana</i>	200	2	cs22

DRAFT

Site No: 20 **Date:** 6/8/2022 **Longitude:** 116.720784 **Latitude:** -20.773403

Type: Releve

Soil Types: loam clay silt, crypto crust on surface

Topography: gentle undulating

Surface Water: no

Vegetation Type: triodia grassland

Vegetation Condition: Excellent

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	50	0.1	
		<i>Acacia ancistrocarpa</i>	100	0.2	
		<i>Acacia bivenosa</i>	100	0.5	
		<i>Acacia inaequilatera</i>	220	1	
		<i>Acacia monticola</i>	50	0.6	FdW220806-159
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	150	0.2	
		<i>Afrohybanthus aurantiacus</i>	30	0.8	
		<i>Bonamia erecta</i>	20	0.5	
		<i>Bonamia pilbarensis</i>	5	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Cenchrus ciliaris</i>	30	0.1	
		<i>Corchorus walcottii</i>	20	0.5	
		<i>Corymbia hamersleyana</i>	350	0.5	
		<i>Cucumis variabilis</i>	0	0.1	
		<i>Diplopeltis eriocarpa</i>	20	0.3	
		<i>Eulalia aurea</i>	30	0.1	
		<i>Euploca chrysocarpa</i>	20	0.1	
		<i>Hibiscus coatesii</i>	10	0.01	FdW220806-160
		<i>Indigofera monophylla</i>	30	0.2	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	30	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	20	0.1	
		<i>Ptilotus clementii</i>	20	0.1	
		<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	60	0.5	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	50	0.1	
		<i>Solanum diversiflorum</i>	20	0.01	
		<i>Tribulus occidentalis</i>	2	0.01	
		<i>Triodia wiseana</i>	50	60	
		<i>Triumfetta clementii</i>	20	0.2	

DRAFT

Site No: 21 **Date:** 7/8/2022 **Longitude:** 116.70541 **Latitude:** -20.790996

Type: Revele

Soil Types: Clay loam

Topography: Drainage channel

Surface Water: Not during survey

Vegetation Type: Tussock grasses

Vegetation Condition: Very Good

Fire: 10+

Condition Notes: Surrounding landscape is Eragrostis dominated grassland



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	10	0.01	
		<i>Acacia bivenosa</i>	150	0.5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	200	0.8	
*		<i>Aerva javanica</i>	30	2	
		<i>Alysicarpus muelleri</i>	15	0.1	
		<i>Austrobryonia pilbarensis</i>	5	0.1	
		<i>Boerhavia burbridgeana</i>	2	0.1	cs28
		<i>Boerhavia paludosa</i>	40	0.1	
*		<i>Cenchrus ciliaris</i>	20	9	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Chrysopogon fallax</i>	100	30	
		<i>Cucumis variabilis</i>	3	0.2	
		<i>Eragrostis xerophila</i>	35	0.8	
		<i>Eremophila longifolia</i>	100	2	
		<i>Eriachne flaccida</i>	40	1	
		<i>Eulalia aurea</i>	70	0.4	cs30
		<i>Euploca heterantha</i>	20	0.3	
		<i>Indigofera linifolia</i>	5	0.1	
		<i>Ipomoea lonchophylla</i>	6	0.01	
		<i>Ipomoea muelleri</i>	5	0.1	
		<i>Nellica maderaspatensis</i>	3	0.1	
		<i>Neptunia dimorphantha</i>	3	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	30	0.2	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	2	0.1	
		<i>Ptilotus exaltatus</i>	50	0.2	
		<i>Rhynchosia minima</i>	5	0.5	
		<i>Salsola australis</i>	10	0.2	
		<i>Salsola australis</i>	30	0.2	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	60	0.5	
		<i>Sida fibulifera</i>	10	0.2	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	25	0.01	
		<i>Solanum diversiflorum</i>	10	0.01	cs29
		<i>Sorghum stipoideum</i>	50	0.5	
		<i>Stemodia kingii</i>	20	0.3	
		<i>Triodia wiseana</i>	50	0.7	
*		<i>Vachellia farnesiana</i>	150	1	

DRAFT

Site No: 22	Date: 6/8/2022	Longitude: 116.71575	Latitude: -20.786139
Type: Quadrat		Soil Types: clay, deep gilgai	
Topography: flat		Surface Water: no	
Vegetation Type: tussock grasses and herbs		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes: grassland mixed, patches of hardie clay and pebbles	



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	15	0.5	
		<i>Aristida contorta</i>	10	0.1	
		<i>Austrobryonia pilbarensis</i>	10	0.01	
		<i>Boerhavia paludosa</i>	30	0.01	
		<i>Bothriochloa ewartiana</i>	10	1	
*		<i>Citrullus amarus</i>	5	0.01	FdW220807-161
		<i>Corchorus tridens</i>	3	0.1	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	15	0.01	FdW220807-162
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.2	
		<i>Cullen cinereum</i>	15	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Eragrostis setifolia</i>	20	0.5	
		<i>Eragrostis xerophila</i>	30	20	
		<i>Eriachne flaccida</i>	30	0.2	
		<i>Euphorbia coghlani</i>	10	0.2	
		<i>Euploca heterantha</i>	3	0.05	
		<i>Grona filiformis</i>	15	0.2	
		<i>Indigastrum parviflorum</i>	20	0.5	FdW220807-163
		<i>Indigofera linifolia</i>	10	0.5	
		<i>Iseilema vaginiflorum</i>	10	5	
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Neptunia dimorphantha</i>	10	2	FdW220807-163
		<i>Nicotiana occidentalis</i>	10	0.1	
		<i>Operculina aequisejala</i>	10	0.5	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	20	0.1	
		<i>Ptilotus aervoides</i>	2	0.1	
		<i>Ptilotus axillaris</i>	15	2	
		<i>Ptilotus exaltatus</i>	20	0.1	
		<i>Ptilotus gomphrenoides</i>	15	0.5	
		<i>Rhynchosia minima</i>	5	0.01	
		<i>Salsola australis</i>	10	0.2	
		<i>Sida fibulifera</i>	16	12	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	10	0.01	
		<i>Solanum cleistogamum</i>	15	0.1	
		<i>Sorghum stipoideum</i>	40	30	
		<i>Stemodia kingii</i>	20	1	
		<i>Streptoglossa</i> sp.	10	5	
		<i>Xerochloa laniflora</i>	5	0.01	FdW220807-164

DRAFT

Site No: 23	Date: 7/8/2022	Longitude: 116.7041931	Latitude: -20.792853
Type: Quadrat		Soil Types: hard clay loam	
Topography: flats with slight undulation		Surface Water: no	
Vegetation Type: tussock grasses and herbs		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes: landscape dominated by eragrostis grass. species richness lower isolated bare areas of hard clay loam dominated by herbs in the landscape cracking red hard clays	



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Boerhavia paludosa</i>	10	0.01	
		<i>Bothriochloa ewartiana</i>	15	0.5	
		<i>Corchorus tridens</i>	4	0.1	
	P3	<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	5	0.01	
		<i>Eragrostis xerophila</i>	30	40	
		<i>Euphorbia coghlanii</i>	5	0.1	
		<i>Euploca heterantha</i>	5	0.1	
		<i>Goodenia pascua</i>	20	0.6	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Grona filiformis</i>	10	0.5	
		<i>Indigofera linifolia</i>	8	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	4	0.2	
		<i>Iseilema vaginiflorum</i>	20	1	
		<i>Nellica maderaspatensis</i>	7	0.2	
		<i>Neptunia dimorphantha</i>	3	0.1	
		<i>Operculina aequisejala</i>	5	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	15	0.5	
		<i>Ptilotus axillaris</i>	20	0.5	
		<i>Ptilotus exaltatus</i>	30	0.2	
		<i>Rhynchosia minima</i>	3	0.1	
		<i>Salsola australis</i>	20	0.1	
		<i>Sida fibulifera</i>	10	0.2	
		<i>Sorghum stipoideum</i>	50	0.1	
		<i>Streptoglossa bubakii</i>	20	0.1	
		<i>Streptoglossa</i> sp.	10	0.2	
		<i>Xerochloa laniflora</i>	10	0.1	cs31

DRAFT

Site No: 24 **Date:** 7/8/2022 **Longitude:** 116.7193025 **Latitude:** -20.78497

Type: Quadrat

Soil Types: clay loam hard

Topography: flat

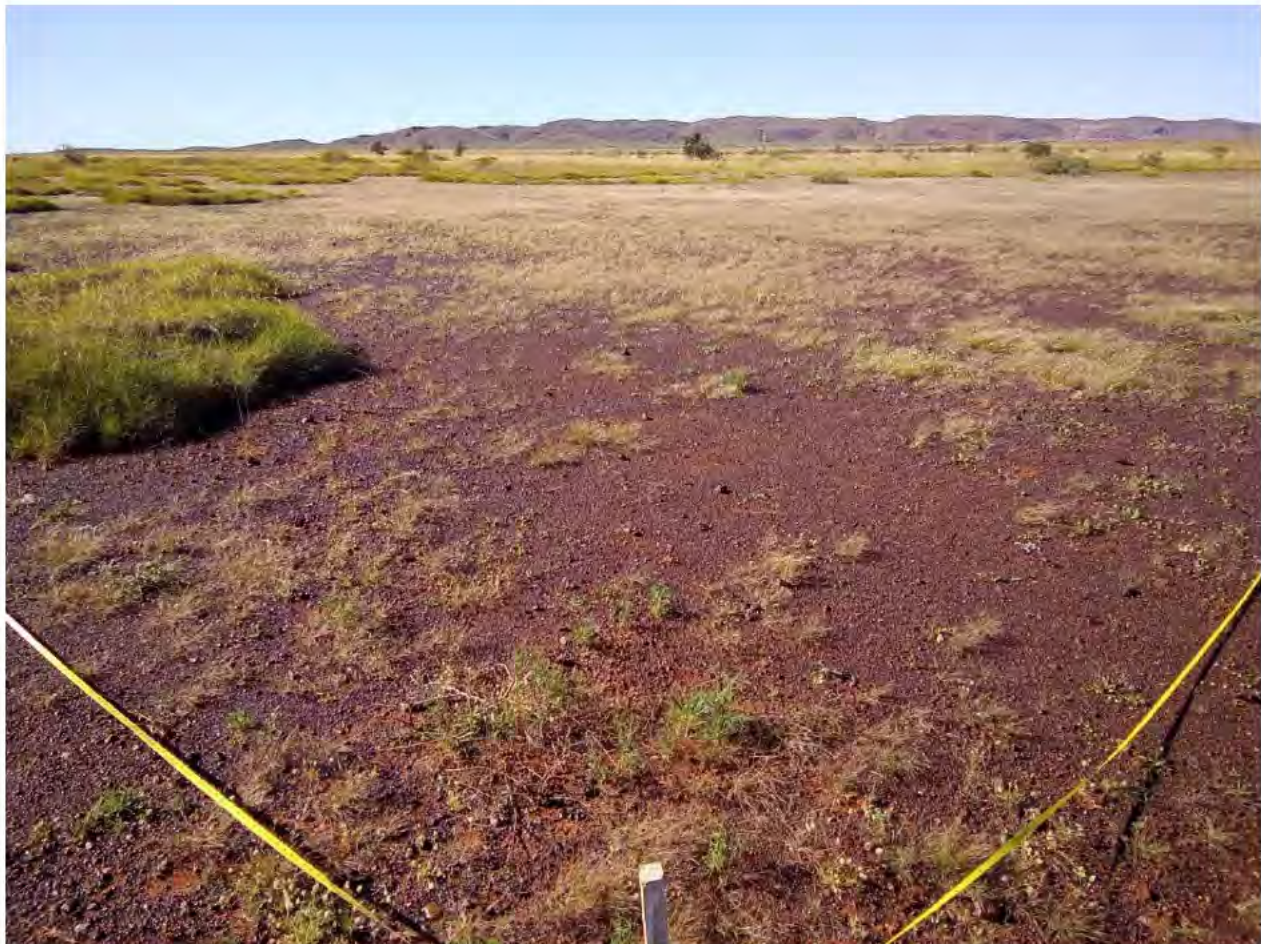
Surface Water: no

Vegetation Type: aristida and herbs w patches of hummock

Vegetation Condition: Excellent

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	15	0.1	
		<i>Acacia bivenosa</i>	60	0.5	
		<i>Alysicarpus muelleri</i>	20	0.05	
		<i>Areocleome oxalidea</i>	3	0.01	FdW220807-166
		<i>Aristida contorta</i>	10	15	
		<i>Arivela viscosa</i>	5	0.05	
		<i>Boerhavia paludosa</i>	30	0.05	
		<i>Bonamia pilbarensis</i>	2	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Bothriochloa ewartiana</i>	10	0.1	
*		<i>Cenchrus ciliaris</i>	20	0.5	
		<i>Chrysopogon fallax</i>	80	0.2	
		<i>Corchorus tridens</i>	2	0.01	
		<i>Corchorus walcottii</i>	20	0.6	
		<i>Dactyloctenium radulans</i>	10	0.2	
		<i>Dysphania plantaginella</i>	5	0.01	
		<i>Ehretia saligna</i> var. <i>saligna</i>	220	0.6	FdW220807-169
		<i>Enneapogon caerulescens</i>	5	0.8	
		<i>Eragrostis xerophila</i>	20	0.3	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	1	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.5	
		<i>Euploca heterantha</i>	3	0.5	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.01	
		<i>Gomphrena canescens</i> subsp. <i>canescens</i>	5	0.1	FdW220807-174
		<i>Goodenia muelleriana</i>	20	0.2	FdW220807-171
		<i>Goodenia muelleriana</i>	20	0.2	FdW220807-172
		<i>Hibiscus sturtii</i>	20	0.01	
		<i>Indigastrium parviflorum</i>	15	0.1	
		<i>Iseilema dolichotrichum</i>	10	0.1	
		<i>Nellica maderaspatensis</i>	5	0.01	
		<i>Notoleptosus decalanei</i> var. <i>indet</i>	10	0.01	FdW220807-170
		<i>Portulaca oleracea</i>	1	0.01	
		<i>Ptilotus aervoides</i>	1	10	
		<i>Rhynchosia minima</i>	10	0.1	FdW220807-173
		<i>Salsola australis</i>	10	0.1	
		<i>Senna notabilis</i>	2	0.1	
		<i>Solanum cleistogamum</i>	20	0.05	
		<i>Solanum diversiflorum</i>	20	0.01	
		<i>Sorghum stipoideum</i>	30	1	
		<i>Streptoglossa decurrens</i>	5	0.01	FdW220807-167
		<i>Streptoglossa</i> sp.	10	0.05	
		<i>Tephrosia supina</i>	15	0.2	
		<i>Trichodesma zeylanicum</i>	10	0.1	
		<i>Triodia wiseana</i>	60	7	FdW220807-168
		<i>Triumfetta clementii</i>	15	0.1	

DRAFT

Site No: 25 **Date:** 7/8/2022 **Longitude:** 116.701562 **Latitude:** -20.78943

Type: Revele

Soil Types: clay loam

Topography: drainage channel

Surface Water: no

Vegetation Type: tussock grasses and herbs with small patches of triodia

Vegetation Condition: Very Good

Fire: 10+

Condition Notes: drainage channel is about 10m wide



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	350	5	
		<i>Alysicarpus muelleri</i>	15	0.5	
		<i>Boerhavia paludosa</i>	50	0.2	
		<i>Bonamia pilbarensis</i>	15	0.1	
		<i>Bothriochloa ewartiana</i>	10	0.5	
*		<i>Cenchrus ciliaris</i>	30	25	
		<i>Chrysopogon fallax</i>	130	10	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.2	
		<i>Cucumis variabilis</i>	3	0.3	

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Cullen cinereum</i>	10	0.5	
		<i>Eragrostis xerophila</i>	30	0.5	
		<i>Eriachne flaccida</i>	30	0.2	
		<i>Eulalia aurea</i>	50	0.5	
		<i>Euphorbia coghlanii</i>	10	0.01	
		<i>Euploca heterantha</i>	5	0	
		<i>Goodenia pascua</i>	30	0.2	
		<i>Indigofera linifolia</i>	5	0.01	
*		<i>Malvastrum americanum</i>	20	0.01	cs32
		<i>Nellica maderaspatensis</i>	5	0.1	
		<i>Neptunia dimorphantha</i>	10	0.3	
		<i>Operculina aequisejala</i>	5	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	1	0.01	
		<i>Rhynchosia minima</i>	5	2	
		<i>Salsola australis</i>	30	0.1	
		<i>Schenkia clementii</i>	5	0.01	
		<i>Sclerolaena costata</i>	10	0.01	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	10	0.01	
		<i>Sorghum stipoideum</i>	80	10	
		<i>Streptoglossa</i> sp.	5	0.1	
		<i>Tephrosia supina</i>	30	0.2	
		<i>Trichodesma zeylanicum</i>	8	0.01	
		<i>Triodia wiseana</i>	50	10	
*		<i>Vachellia farnesiana</i>	200	3	

DRAFT

Site No: 26 **Date:** 7/8/2022 **Longitude:** 116.721021 **Latitude:** -20.78756

Type: Revele

Soil Types: clay loam, some sand. soft w microrelief

Topography: shallow drainage

Surface Water: no

Vegetation Type: tussock, herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: acacia pyri over tussock



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	15	0.1	
		<i>Acacia bivenosa</i>	50	0.5	
		<i>Acacia inaequilatera</i>	250	5	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	250	0.2	
*		<i>Aerva javanica</i>	30	0.1	
		<i>Alysicarpus muelleri</i>	20	0.01	
		<i>Boerhavia paludosa</i>	15	0.01	
		<i>Bonamia pilbarensis</i>	2	0.2	
		<i>Bothriochloa ewartiana</i>	10	0.5	
*		<i>Cenchrus ciliaris</i>	30	5	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Chrysopogon fallax</i>	120	30	
		<i>Corchorus walcottii</i>	30	1	
		<i>Dactyloctenium radulans</i>	10	0.5	
		<i>Eragrostis xerophila</i>	20	0.5	
		<i>Eremophila longifolia</i>	60	0.5	
		<i>Eriachne flaccida</i>	30	10	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.01	
		<i>Goodenia muelleriana</i>	20	0.2	
		<i>Hakea loreus</i>	220	0.2	
		<i>Indigofera colutea</i>	3	0.01	
		<i>Indigofera linifolia</i>	10	0.1	
		<i>Iseilema dolichotrichum</i>	10	0.5	
		<i>Notoleptosus decaisnei</i> var. <i>indet</i>	3	0.01	
		<i>Polymeria ambigua</i>	5	0.5	
		<i>Ptilotus exaltatus</i>	30	0.05	
		<i>Ptilotus gomphrenoides</i>	15	0.01	
		<i>Ptilotus helipteroides</i>	30	0.3	
		<i>Ptilotus xerophilus</i>	20	0.01	
		<i>Rhynchosia minima</i>	15	0.01	
		<i>Scaevola spinescens</i>	50	0.6	
		<i>Sida fibulifera</i>	15	0.1	
		<i>Solanum cleistogamum</i>	20	0.1	
		<i>Solanum diversiflorum</i>	30	0.5	
		<i>Solanum lasiophyllum</i>	30	0.1	
		<i>Sorghum stipoideum</i>	40	4	
		<i>Streptoglossa decurrens</i>	10	0.01	
		<i>Tephrosia supina</i>	30	2	
		<i>Triumfetta clementii</i>	20	0.2	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	5	0.01	

DRAFT

Site No: 27	Date: 8/8/2022	Longitude: 116.71787	Latitude: -20.813649
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Type: Quadrat**Soil Types:** hard clay loam**Topography:****Surface Water:** none, drainage line either side of quadrat**Vegetation Type:** triodia grassland**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** very hard clay loam with large expanses of Rocky outcrops in landscape. drainage lines present in broader landscape dominated by acacia shrubs

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	140	1	
		<i>Acacia inaequilatera</i>	160	0.5	
		<i>Afrohybanthus aurantiacus</i>	30	0.1	
		<i>Aristida contorta</i>	15	0.1	
		<i>Bonamia pilbarensis</i>	10	0.7	cs34
		<i>Bothriochloa ewartiana</i>	10	0.2	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.1	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	7	0.1	

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Euphorbia coghlanii</i>	8	0.1	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	10	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	6	0.01	
		<i>Indigofera colutea</i>	5	0.01	
		<i>Indigofera linifolia</i>	5	0.01	
		<i>Iseilema dolichotrichum</i>	5	0.1	
		<i>Polygala galeocephala</i>	10	0.1	
		<i>Polygala glaucifolia</i>	3	0.01	
		<i>Portulaca oleracea</i>	2	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	1	0.1	
		<i>Ptilotus auriculifolius</i>	5	0.01	cs37
		<i>Rhynchosia minima</i>	3	0.01	
		<i>Salsola australis</i>	8	0.1	
		<i>Senna notabilis</i>	5	0.01	
		<i>Tephrosia supina</i>	5	0.01	
		<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	25	0.5	cs33
		<i>Tribulus hirsutus</i>	5	0.01	cs35
		<i>Trichodesma zeylanicum</i>	10	0.1	
		<i>Triodia wiseana</i>	60	70	
		<i>Triumfetta clementii</i>	40	0.3	

DRAFT

Site No: 28	Date: 7/8/2022	Longitude: 116.71718	Latitude: -20.78934
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Type: Quadrat**Soil Types:** clay loam, soft, microrelief**Topography:** flat**Surface Water:** no**Vegetation Type:** tussock grassland**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:**

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Bothriochloa ewartiana</i>	10	0.2	
		<i>Eragrostis xerophila</i>	30	30	
		<i>Euphorbia coghlanii</i>	10	0.5	
		<i>Euploca tenuifolia</i>	5	0.01	
		<i>Goodenia muelleriana</i>	20	3	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.01	
		<i>Iseilema vaginiflorum</i>	20	1	
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Polygala galeocephala</i>	5	0.01	
		<i>Ptilotus axillaris</i>	20	2	

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Ptilotus exaltatus</i>	20	0.1	
		<i>Ptilotus helipteroides</i>	20	0.01	
		<i>Rhynchosia minima</i>	3	0.1	
		<i>Sida fibulifera</i>	15	0.5	
		<i>Sorghum stipoideum</i>	50	20	
		<i>Streptoglossa</i> sp.	10	3	

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Site No: 29	Date: 8/8/2022	Longitude: 116.72000	Latitude: -20.815730
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Type: Quadrat**Soil Types:** hard clay loam**Topography:** slight undulation, minor drainage depressions**Surface Water:** no**Vegetation Type:** triodia**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** landscape predominantly triodia grassland. acacia shrubs are associated with minor drainage depressions
hard Rocky cracking red clays

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	160	10	
		<i>Acacia inaequilatera</i>	80	3	
		<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	150	1	cs40
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	220	1	
		<i>Afrohybanthus aurantiacus</i>	40	0.5	
		<i>Aristida contorta</i>	15	0.01	
		<i>Bonamia erecta</i>	15	0.3	

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Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Bonamia pilbarensis</i>	8	0.6	
		<i>Bothriochloa ewartiana</i>	10	0.1	
*		<i>Cenchrus ciliaris</i>	40	0.3	
		<i>Corchorus walcottii</i>	40	0.2	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.2	
		<i>Eremophila longifolia</i>	30	0.3	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	10	0.1	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	2	0.01	
		<i>Euphorbia coghlanii</i>	10	0.1	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	12	0.01	
		<i>Euploca chrysocarpa</i>	30	0.5	cs38
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.1	
		<i>Goodenia microptera</i>	40	0.5	
		<i>Indigofera colutea</i>	4	0.01	
		<i>Indigofera linifolia</i>	7	0.1	
		<i>Indigofera monophylla</i>	40	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	30	0.2	
		<i>Iseilema dolichotrichum</i>	10	0.1	
		<i>Nellica maderaspatensis</i>	10	0.1	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	50	0.4	
		<i>Paspalidium clementii</i>	10	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	10	0.1	
		<i>Ptilotus aervoides</i>	7	0.1	
		<i>Ptilotus axillaris</i>	10	0.1	
		<i>Ptilotus clementii</i>	15	0.2	
		<i>Ptilotus helipteroides</i>	15	0.01	
		<i>Rhynchosia minima</i>	7	0.1	
		<i>Salsola australis</i>	5	0.01	
		<i>Scaevola spinescens</i>	60	1.3	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	30	0.2	
		<i>Solanum cleistogamum</i>	30	0.5	
		<i>Solanum diversiflorum</i>	30	0.1	
		<i>Sporobolus australasicus</i>	6	0.01	
		<i>Tephrosia supina</i>	5	0.3	
		<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	30	0.7	
		<i>Tribulus hirsutus</i>	3	0.1	
		<i>Trichodesma zeylanicum</i>	9	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Triodia wiseana</i>	50	60	
		<i>Triumfetta clementii</i>	20	0.2	



DRAFT

Site No: 30 **Date:** 7/8/2022 **Longitude:** 116.7140365 **Latitude:** -20.7882281

Type: Quadrat

Soil Types: clay hard, crust on surface

Topography: minor drainage and edge

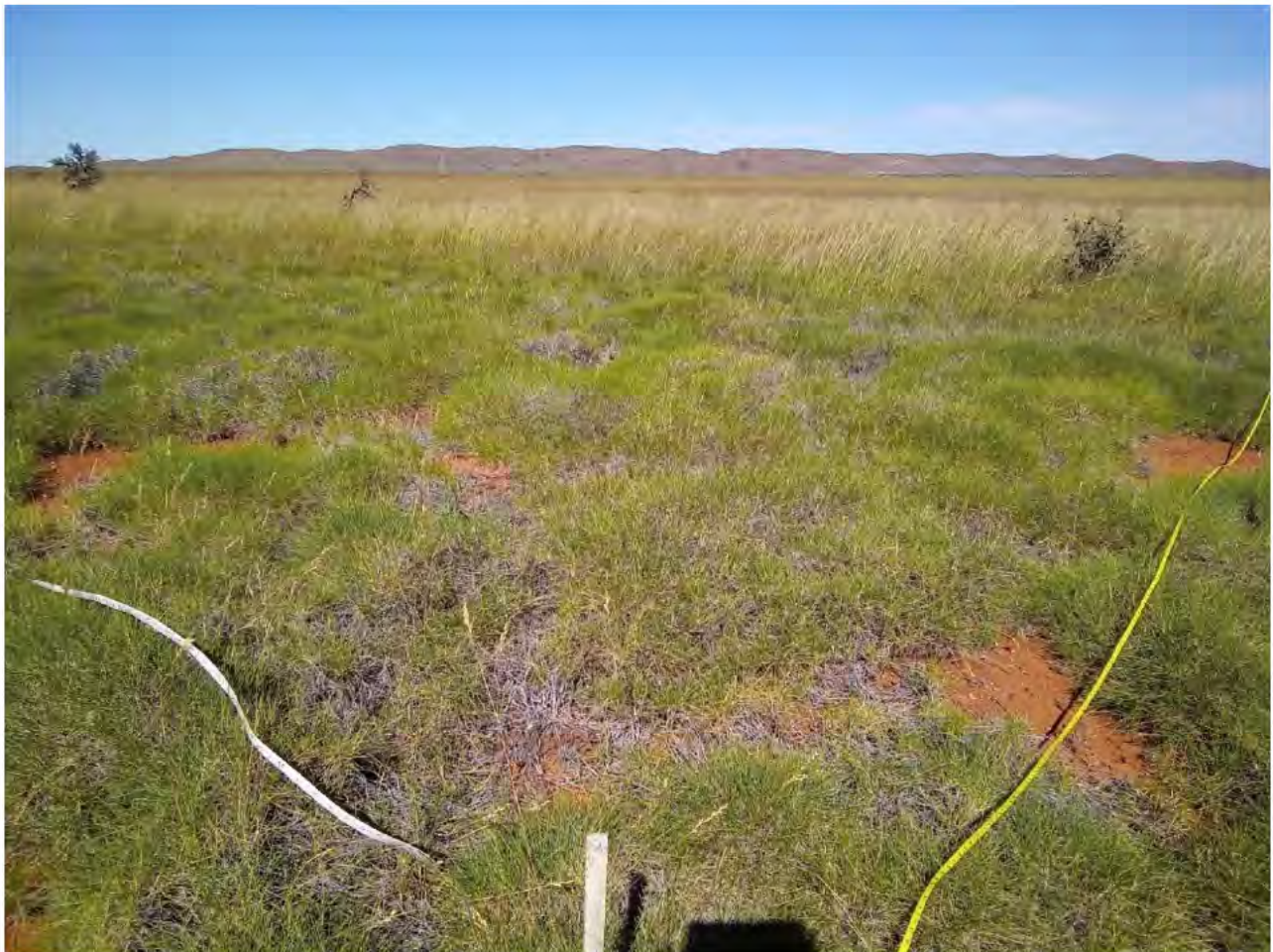
Surface Water: no

Vegetation Type: hummock and tussock grasses

Vegetation Condition: Excellent

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia inaequilatera</i>	250	0.2	
		<i>Afrohybanthus aurantiacus</i>	30	0.1	
		<i>Alysicarpus muelleri</i>	30	0.01	
		<i>Arivela viscosa</i>	10	0.01	
		<i>Boerhavia paludosa</i>	30	1	
		<i>Bonamia pilbarensis</i>	2	1	
		<i>Bothriochloa ewartiana</i>	10	0.1	
*		<i>Cenchrus ciliaris</i>	30	1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Cenchrus setiger</i>	20	0.01	
		<i>Chrysopogon fallax</i>	100	20	
		<i>Corchorus tridens</i>	3	0.01	
		<i>Corchorus walcottii</i>	20	1	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	20	0.2	
		<i>Cucumis variabilis</i>	0	0.5	
		<i>Cullen cinereum</i>	5	0.01	
		<i>Dactyloctenium radulans</i>	10	1	
		<i>Digitaria brownii</i>	50	0.3	
		<i>Eragrostis xerophila</i>	20	0.5	
		<i>Eriachne flaccida</i>	30	5	
		<i>Euphorbia biconvexa</i>	10	0.05	
		<i>Euphorbia coghlanii</i>	10	0.1	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	5	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.01	
		<i>Goodenia microptera</i>	30	0.01	
		<i>Goodenia muelleriana</i>	20	0.01	
		<i>Indigofera colutea</i>	3	0.01	
		<i>Indigofera linifolia</i>	5	0.1	
		<i>Indigofera trita</i> subsp. <i>trita</i>	30	2	
		<i>Ipomoea lonchophylla</i>	10	0.1	
		<i>Ipomoea muelleri</i>	10	0.01	FdW220807-176
		<i>Iseilema dolichotrichum</i>	10	0.01	
		<i>Iseilema vaginiflorum</i>	15	0.5	
		<i>Nicotiana occidentalis</i>	15	0.1	
		<i>Polygala galeocephala</i>	2	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	20	0.01	
		<i>Ptilotus exaltatus</i>	30	0.2	
		<i>Ptilotus xerophilus</i>	30	0.1	
		<i>Rhodanthe haigii</i>	10	0.01	
		<i>Salsola australis</i>	5	0.01	
		<i>Sida fibulifera</i>	10	0.05	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	15	0.01	
		<i>Solanum cleistogamum</i>	10	0.1	
		<i>Solanum diversiflorum</i>	20	0.1	
		<i>Solanum lasiophyllum</i>	30	0.5	
		<i>Sorghum stipoideum</i>	40	15	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Streptoglossa bubakii</i>	5	0.05	
		<i>Streptoglossa decurrens</i>	20	0.01	
		<i>Streptoglossa</i> sp.	5	0.1	
		<i>Swainsona kingii</i>	20	0.5	
		<i>Tephrosia supina</i>	20	0.1	
		<i>Trichodesma zeylanicum</i>	10	0.1	
		<i>Triodia wiseana</i>	30	25	
		<i>Triumfetta clementii</i>	30	0.5	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	0	0.3	

DRAFT

Site No: 31	Date: 8/8/2022	Longitude: 116.7224	Latitude: -20.8126617
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Type: Quadrat**Soil Types:** hard clay loam**Topography:** flats with shallow drainage depressions**Surface Water:** no**Vegetation Type:** tridonia**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** broader landscape comprises of tridonia grassland flats, acacia shrubs associated with shallow drainage. species richness higher in shallow depressions

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	200	4	
		<i>Acacia inaequilatera</i>	300	2	
		<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	150	1	
		<i>Afrohybanthus aurantiacus</i>	30	0.3	
		<i>Alysicarpus muelleri</i>	10	0.01	
		<i>Bonamia erecta</i>	6	0.2	
		<i>Bonamia pilbarensis</i>	4	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
*		<i>Cenchrus ciliaris</i>	40	0.5	
		<i>Corchorus walcottii</i>	30	0.1	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.2	
		<i>Eremophila longifolia</i>	50	0.1	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	1	0.01	
		<i>Euphorbia coghlanii</i>	7	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	7	0.01	
		<i>Indigofera monophylla</i>	40	0.5	
		<i>Indigofera trita</i> subsp. <i>trita</i>	20	0.01	
		<i>Iseilema dolichotrichum</i>	6	0.01	
		<i>Paspalidium clementii</i>	6	0.01	
		<i>Polygala galeocephala</i>	4	0.2	
		<i>Pterocaulon sphaeranthoides</i>	40	0.1	cs39
		<i>Ptilotus auriculifolius</i>	10	0.01	
		<i>Ptilotus exaltatus</i>	50	0.1	
		<i>Rhynchosia minima</i>	3	0.1	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	30	0.2	
		<i>Solanum diversiflorum</i>	30	0.1	
		<i>Tephrosia supina</i>	3	0.2	
		<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	20	0.7	
		<i>Tribulus hirsutus</i>	4	0.01	
		<i>Trichodesma zeylanicum</i>	4	0.01	
		<i>Triodia wiseana</i>	60	65	
		<i>Triumfetta clementii</i>	40	0.5	

DRAFT

Site No: 32	Date: 8/8/2022	Longitude: 116.71782	Latitude: -20.7982381
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Type: Quadrat**Soil Types:** clay loam soft, cracking and crust**Topography:** flat**Surface Water:** no**Vegetation Type:** tussock and herbs**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:**

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	2	0.01	
		<i>Bothriochloa ewartiana</i>	15	2	
		<i>Eragrostis xerophila</i>	30	4	
		<i>Iseilema vaginiflorum</i>	10	0.5	
		<i>Nellica maderaspatensis</i>	10	0.01	
		<i>Ptilotus exaltatus</i>	15	0.5	
		<i>Salsola australis</i>	10	1	
		<i>Streptoglossa bubakii</i>	3	10	
		<i>Xerochloa laniflora</i>	15	8	

DRAFT

Site No: 33 **Date:** 8/8/2022 **Longitude:** 116.724150 **Latitude:** -20.80807

Type: Quadrat

Soil Types: hard clay loam

Topography: flats

Surface Water: no

Vegetation Type: tussock grasses and herbs

Vegetation Condition: Very Good

Fire: 10+

Condition Notes: bare patch in mosaic landscape w tridodia grassland



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	100	0.5	
		<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	100	0.5	
		<i>Alysicarpus muelleri</i>	10	0.01	
		<i>Aristida contorta</i>	8	0.1	
		<i>Bonamia erecta</i>	4	0.01	
*		<i>Cenchrus ciliaris</i>	30	30	
		<i>Corchorus tridens</i>	3	0.01	
		<i>Corchorus walcottii</i>	40	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Corymbia hamersleyana</i>	170	0.3	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	15	0.01	
		<i>Enneapogon caeruleus</i>	4	0.2	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	2	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	6	0.01	
		<i>Indigofera linifolia</i>	7	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	9	0.01	
		<i>Iseilema dolichotrichum</i>	4	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	2	0.01	
		<i>Ptilotus helipteroides</i>	10	0.01	
		<i>Salsola australis</i>	5	0.1	
		<i>Sporobolus australasicus</i>	6	0.01	
		<i>Trichodesma zeylanicum</i>	10	0.01	
		<i>Triodia wiseana</i>	70	3	

DRAFT

Site No: 34 **Date:** 8/8/2022 **Longitude:** 116.72228 **Latitude:** -20.80212

Type: Quadrat

Soil Types: loam silt clay

Topography: low rocky hilltop

Surface Water: no

Vegetation Type: hummock grassland w herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: hill with triodia w gentle slopes



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	30	0.05	
		<i>Acacia synchronicia</i>	150	0.7	FdW220808-176a
		<i>Afrohybanthus aurantiacus</i>	20	0.1	
		<i>Bonamia pilbarensis</i>	5	0.2	
		<i>Dolichocarpa crouchiana</i>	5	0.3	FdW220808-182
		<i>Dysphania plantaginella</i>	5	0.1	
		<i>Euphorbia australis</i> var. <i>australis</i>	2	0.1	FdW220808-179
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	15	0.01	
		<i>Gnephosis brevifolia</i>	10	0.01	FdW220808-180

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Gomphrena cunninghamii</i>	10	0.1	FdW220808-177
		<i>Indigofera colutea</i>	5	0.1	
		<i>Indigofera linifolia</i>	8	0.01	
		<i>Indigofera monophylla</i>	30	0.5	
		<i>Lepidium pedicellulosum</i>	20	0.4	FdW220808-181
		<i>Nellica maderaspatensis</i>	10	0.01	
		<i>Polygala galeocephala</i>	2	0.05	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	1	0.01	
		<i>Ptilotus clementii</i>	30	0.2	
		<i>Ptilotus exaltatus</i>	20	0.5	
		<i>Rhynchosia minima</i>	10	0.01	
		<i>Salsola australis</i>	10	0.5	
		<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	100	0.05	
		<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	40	0.1	
		<i>Senna notabilis</i>	5	0.01	
		<i>Solanum cleistogamum</i>	20	0.01	
		<i>Solanum diversiflorum</i>	30	0.2	
		<i>Sporobolus australasicus</i>	8	0.01	
		<i>Tephrosia supina</i>	20	0.2	
		<i>Tephrosia</i> sp. clay soils (<i>S. van Leeuwen et al. PBS 0273</i>)	10	0.1	
		<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	10	0.5	FdW220808-178
		<i>Tribulus occidentalis</i>	5	0.7	
		<i>Trichodesma zeylanicum</i>	10	0.1	
		<i>Triodia wiseana</i>	50	40	
		<i>Triumfetta clementii</i>	20	0.01	

DRAFT

Site No: 35	Date: 8/8/2022	Longitude: 116.72715	Latitude: -20.80212
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Type: Transect

Soil Types: loam clay

Topography: minor drainage

Surface Water: no

Vegetation Type: tussock

Vegetation Condition: Very Good

Fire: 10+

Condition Notes:



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon amplum</i>	150	0.7	FdW220808-196
		<i>Acacia bivenosa</i>	150	0.3	
		<i>Acacia inaequilatera</i>	100	0.1	
		<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	130	0.6	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	200	4.5	FdW220808-195
		<i>Afrohybanthus aurantiacus</i>	20	0.3	
		<i>Alysicarpus muelleri</i>	20	0.1	
		<i>Bothriochloa ewartiana</i>	10	0.01	
		<i>Cassutha capillaris</i>	0	0.1	
*		<i>Cenchrus ciliaris</i>	80	70	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Chrysopogon fallax</i>	100	5	
		<i>Corchorus walcottii</i>	30	0.6	
		<i>Corymbia hamersleyana</i>	400	10	
		<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	30	0.1	
		<i>Cucumis variabilis</i>	0	1	
		<i>Desmodiopsis campylocaulon</i>	20	0.01	
		<i>Dichrostachys spicata</i>	200	2	FdW220808-194
		<i>Ehretia saligna</i> var. <i>saligna</i>	200	0.7	
		<i>Eriachne flaccida</i>	30	0.7	
		<i>Eulalia aurea</i>	50	0.7	
		<i>Euphorbia biconvexa</i>	8	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	10	0.01	
		<i>Goodenia microptera</i>	30	0.1	
		<i>Indigofera linifolia</i>	10	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.2	
*		<i>Malvastrum americanum</i>	20	0.2	
		<i>Nellica maderaspatensis</i>	15	0.01	
		<i>Operculina aequisejala</i>	0	0.4	
*		<i>Passiflora foetida</i>	0	0.3	
		<i>Polymeria ambigua</i>	0	0.5	FdW220808-197
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	20	0.01	
		<i>Rhynchosia minima</i>	10	0.1	
		<i>Santalum lanceolatum</i>	200	3	
		<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	40	0.2	
		<i>Sida fibulifera</i>	20	0.1	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	20	0.01	
		<i>Swainsona kingii</i>	10	0.01	
	P3	<i>Themeda</i> ? sp. Hamersley Station (M.E. Trudgen 11431)	100	3	
		<i>Trichodesma zeylanicum</i>	8	0.01	
		<i>Triodia wiseana</i>	50	5	
		<i>Triumfetta clementii</i>	20	0.2	
		<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	0	0.1	

DRAFT

Site No: 36	Date: 8/8/2022	Longitude: 116.7159731	Latitude: -20.803304
Type: Quadrat		Soil Types: loam clay, alternating soft deep to cracking crust	
Topography: flat		Surface Water: no	
Vegetation Type: tussock grasses and herbs		Vegetation Condition: Excellent	
Fire: 10+		Condition Notes:	



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon lepidum</i>	20	0.1	
		<i>Abutilon malvifolium</i>	15	0.5	
		<i>Alysicarpus muelleri</i>	20	0.05	
		<i>Aristida contorta</i>	10	0.01	
		<i>Arivela viscosa</i>	10	0.01	
		<i>Boerhavia paludosa</i>	2	0.5	
		<i>Bothriochloa ewartiana</i>	20	0.5	
*		<i>Cenchrus ciliaris</i>	20	0.1	
*		<i>Citrullus amarus</i>	5	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Corchorus tridens</i>	2	0.01	
		<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	20	0.2	
		<i>Cullen cinereum</i>	10	0.1	
		<i>Dactyloctenium radulans</i>	10	0.1	
		<i>Enneapogon caerulescens</i>	5	0.01	
		<i>Eragrostis setifolia</i>	20	0.1	
		<i>Eragrostis xerophila</i>	30	30	
		<i>Eriachne flaccida</i>	30	2	
		<i>Euphorbia coghlanii</i>	10	0.1	
		<i>Euploca heterantha</i>	2	0.01	
		<i>Grona filiformis</i>	15	0.5	
		<i>Indigastrium parviflorum</i>	20	0.1	
		<i>Indigofera linifolia</i>	10	0.05	
		<i>Indigofera trita</i> subsp. <i>trita</i>	10	0.1	
		<i>Iseilema vaginiflorum</i>	20	5	
		<i>Nellica maderaspatensis</i>	10	0.5	
		<i>Neptunia dimorphantha</i>	5	0.5	
		<i>Nicotiana occidentalis</i>	20	0.01	
		<i>Operculina aequisejala</i>	10	0.5	
		<i>Panicum decompositum</i> var. <i>decompositum</i>	20	0.1	
		<i>Panicum laevinode</i>	40	0.3	FdW220808-184
		<i>Polygala galeocephala</i>	5	0.01	
		<i>Ptilotus aervoides</i>	1	0.01	
		<i>Ptilotus exaltatus</i>	20	0.2	
		<i>Ptilotus gomphrenoides</i>	10	0.3	FdW220808-183
		<i>Ptilotus xerophilus</i>	20	0.01	
		<i>Rhynchosia minima</i>	10	0.3	
		<i>Salsola australis</i>	20	0.5	
		<i>Sida fibulifera</i>	10	0.3	
		<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	20	0.05	
		<i>Sorghum stipoideum</i>	50	0.01	
		<i>Stemodia kingii</i>	20	0.2	
		<i>Streptoglossa</i> sp.	2	2	
		<i>Tribulus occidentalis</i>	2	0.01	

DRAFT

Site No: 37 **Date:** 8/8/2022 **Longitude:** 116.7235937 **Latitude:** -20.7850874

Type: Releve

Soil Types: Hard clay loam

Topography: Flats

Surface Water: no

Vegetation Type: Sparse Triodia and tussock grasses with herbs

Vegetation Condition: Excellent

Fire: 10+

Condition Notes: Broader landscape Triodia grassland with some pec to the south



Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	60	1	
		<i>Acacia inaequilatera</i>	350	2	
		<i>Acacia coriacea</i> subsp. <i>pendens</i>	200	0.3	
*		<i>Aerva javanica</i>	40	0.1	
		<i>Afrohybanthus aurantiacus</i>	60	0.2	
		<i>Alysicarpus muelleri</i>	10	0.1	
		<i>Aristida contorta</i>	15	2	
		<i>Arivela viscosa</i>	7	0.01	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Boerhavia coccinea</i>	4	0.2	cs44
		<i>Bonamia erecta</i>	5	0.1	
		<i>Bothriochloa ewartiana</i>	6	2	
*		<i>Cenchrus ciliaris</i>	40	0.8	
		<i>Corchorus walcottii</i>	20	0.5	
		<i>Dysphania plantaginella</i>	10	0.01	
		<i>Enneapogon caerulescens</i>	3	0.1	
		<i>Eremophila longifolia</i>	100	0.2	
		<i>Erodium cygnorum</i>	10	7	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	3	0.1	
		<i>Euphorbia coghlanii</i>	10	0.01	
		<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	14	0.01	
		<i>Euploca heterantha</i>	10	0.01	
		<i>Euploca heterantha</i>	2	0.3	cs45
		<i>Hakea loreus</i>	200	1	
		<i>Indigofera colutea</i>	5	0.01	
		<i>Indigofera trita</i> subsp. <i>trita</i>	4	0.1	
		<i>Ipomoea muelleri</i>	10	0.1	cs43
		<i>Iseilema dolichotrichum</i>	6	0.1	
		<i>Ixioclamys cuneifolia</i>	5	0.01	cs42
		<i>Nellica maderaspatensis</i>	5	0.01	
		<i>Notoleptopus decaisnei</i>	6	0.1	
		<i>Polygala galeocephala</i>	5	0.01	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	3	0.01	
		<i>Ptilotus aervoides</i>	3	0.5	
		<i>Ptilotus helipteroides</i>	14	5	
		<i>Rhynchosia minima</i>	5	0.1	
		<i>Salsola australis</i>	10	0.1	
		<i>Senna notabilis</i>	5	0.01	
		<i>Solanum diversiflorum</i>	20	0.1	
		<i>Solanum lasiophyllum</i>	20	0.3	
		<i>Sorghum stipodeum</i>	40	0.1	
		<i>Sporobolus australasicus</i>	15	0.01	
		<i>Streptoglossa decurrens</i>	15	0.01	cs41
		<i>Streptoglossa</i> sp.	4	0.1	
		<i>Tephrosia supina</i>	5	0.1	
		<i>Trichodesma zeylanicum</i>	15	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Triodia wiseana</i>	50	4	
		<i>Triumfetta clementii</i>	30	0.2	



DRAFT

Site No: 38	Date: 8/8/2022	Longitude: 116.7180248	Latitude: -20.808296
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Type: Quadrat**Soil Types:** loam clay fine**Topography:** low hill crest**Surface Water:** no**Vegetation Type:** hummock grassland**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:**

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Acacia bivenosa</i>	50	0.2	
		<i>Afrohybanthus aurantiacus</i>	15	0.1	
		<i>Bonamia pilbarensis</i>	5	0.3	
		<i>Cassytha capillaris</i>	0	0.01	
		<i>Eriachne pulchella</i> subsp. <i>dominii</i>	5	0.01	
		<i>Euphorbia australis</i> var. <i>australis</i>	1	0.01	
		<i>Euphorbia biconvexa</i>	10	0.01	
		<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	15	0.01	
		<i>Grevillea pyramidalis</i>	50	0.1	

DRAFT

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Hibiscus coatesii</i>	30	0.05	
		<i>Indigofera colutea</i>	10	0.01	
		<i>Indigofera monophylla</i>	30	0.5	
		<i>Paraneurachne muelleri</i>	30	0.3	
		<i>Polygala galeocephala</i>	5	0.1	
		<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	3	0.1	
		<i>Ptilotus auriculifolius</i>	30	0.3	
		<i>Ptilotus clementii</i>	30	0.3	
		<i>Ptilotus exaltatus</i>	10	0.01	
		<i>Salsola australis</i>	10	0.6	
		<i>Senna notabilis</i>	2	0.01	
		<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	30	0.5	
		<i>Solanum cleistogamum</i>	20	0.1	
		<i>Solanum diversiflorum</i>	20	0.1	
		<i>Swainsona kingii</i>	20	0.01	
		<i>Tephrosia supina</i>	20	0.5	
		<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	20	0.05	
		<i>Tribulus occidentalis</i>	2	0.01	
		<i>Trichodesma zeylanicum</i>	20	0.1	
		<i>Trigastrotheca molluginea</i>	5	0.01	FdW220808-189
		<i>Triodia wiseana</i>	50	30	
		<i>Triumfetta clementii</i>	20	0.5	

DRAFT

Site No: 39	Date: 9/8/2022	Longitude: 116.7283935	Latitude: -20.787095
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Type: Quadrat**Soil Types:** deep clay loam**Topography:** flat, slight undulation**Surface Water:** no**Vegetation Type:** tussock grasses and herbs**Vegetation Condition:** Excellent**Fire:** 10+**Condition Notes:** microrelief. prominent cracking clays

Weed	Cons. Status	Taxon	height (cm)	% Cover	Comment
		<i>Abutilon malvifolium</i>	7	0.01	
		<i>Bothriochloa ewartiana</i>	20	0.5	
		<i>Calotis porphyroglossa</i>	10	0.01	cs46
		<i>Corchorus tridens</i>	4	0.01	
		<i>Eragrostis xerophila</i>	35	45	
		<i>Euphorbia australis</i> var. <i>subtomentosa</i>	2	0.01	
		<i>Euphorbia coghlanii</i>	7	0.3	
		<i>Euploca heterantha</i>	3	0.01	
		<i>Euploca tenuifolia</i>	5	0.01	