

CPS 6110/6 – Supporting Report

Desktop, Reconnaissance and Targeted Flora,
Vegetation and Fauna Habitat assessment - Upgrades
to the Water Bore and Powerlines in Paraburdoo

AR-20-15923 and AR-21-16545

9 June 2023



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Document Status					
Rev	Author	Reviewer/s	Date	Approved for issue	
				Distributed to	Date
1	M. Roberts	A. Michael	23/05/2023		
		D. Dundon			
2	M. Roberts	J. Quartermaine	01/06/2023		
Final	M. Roberts		09/06/2023	M. Roberts	06/06/2023

Desktop and Targeted Flora, Vegetation and Fauna Habitat assessment - Upgrades to the Water Bore and Powerlines in Paraburdoo

1. Introduction

1.1 Project background and study area location

Rio Tinto Iron Ore (Rio Tinto) proposes to bury powerlines at the road and rail crossings surrounding Paraburdoo Town (Study Area 1 (1.59 ha)), as well as replace the towns water-supply bore (Study Area 2 (0.38 ha)) to ensure an ongoing and reliable water supply. From here on, the term 'the study area' refers to both Study Area 1 & Study Area 2.

The study area comprises multiple small polygons totalling 1.97 ha of mostly developed land (road) and previously disturbed/cleared land, located within close proximity to the township of Paraburdoo, Western Australia (Figure 1-1). Up to 1.05 hectares of native vegetation clearing is required to support the proposed activities at this location.

The purpose of the current report is as follows:

1. To meet the following conditions of CPS 6110/6 for Study Area 1 & 2:
 - 8(a) - Prior to undertaking any clearing authorised under this Permit, the Permit Holder must engage a botanist to undertake a targeted flora survey of the area(s) to be cleared in accordance with Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment to identify possible occurrences of, and habitat suitable for, threatened flora listed under the *Biodiversity Conservation Act 2016* and priority flora.
 - 9(a) - Undertake a desktop study of the areas to be cleared to identify areas of habitat on which fauna listed in the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*, have a specific dependence.
2. To perform a 10 Clearing Principles assessment on Study Area 2 to amend the boundary of CPS 6110/6 to include Study Area 2.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* has been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016* (BC Act). For the purpose of having the most up to date information (i.e., accounting for any changes to species listings), this report concerns fauna listed under the BC Act in operation at the time of preparation of this report.

1.2 Scope of survey

This report is intended as a supporting document to amend CPS 6110/6 to include an additional area (Study Area 2 – 0.38 ha) to enable clearing of native vegetation, as required under Section 51A of the *Environmental Protection Act 1986* (EP Act) and has been prepared on the basis of a review of existing information for the study area, and a targeted flora, vegetation and fauna habitat survey of the study area. This report includes a description of the:

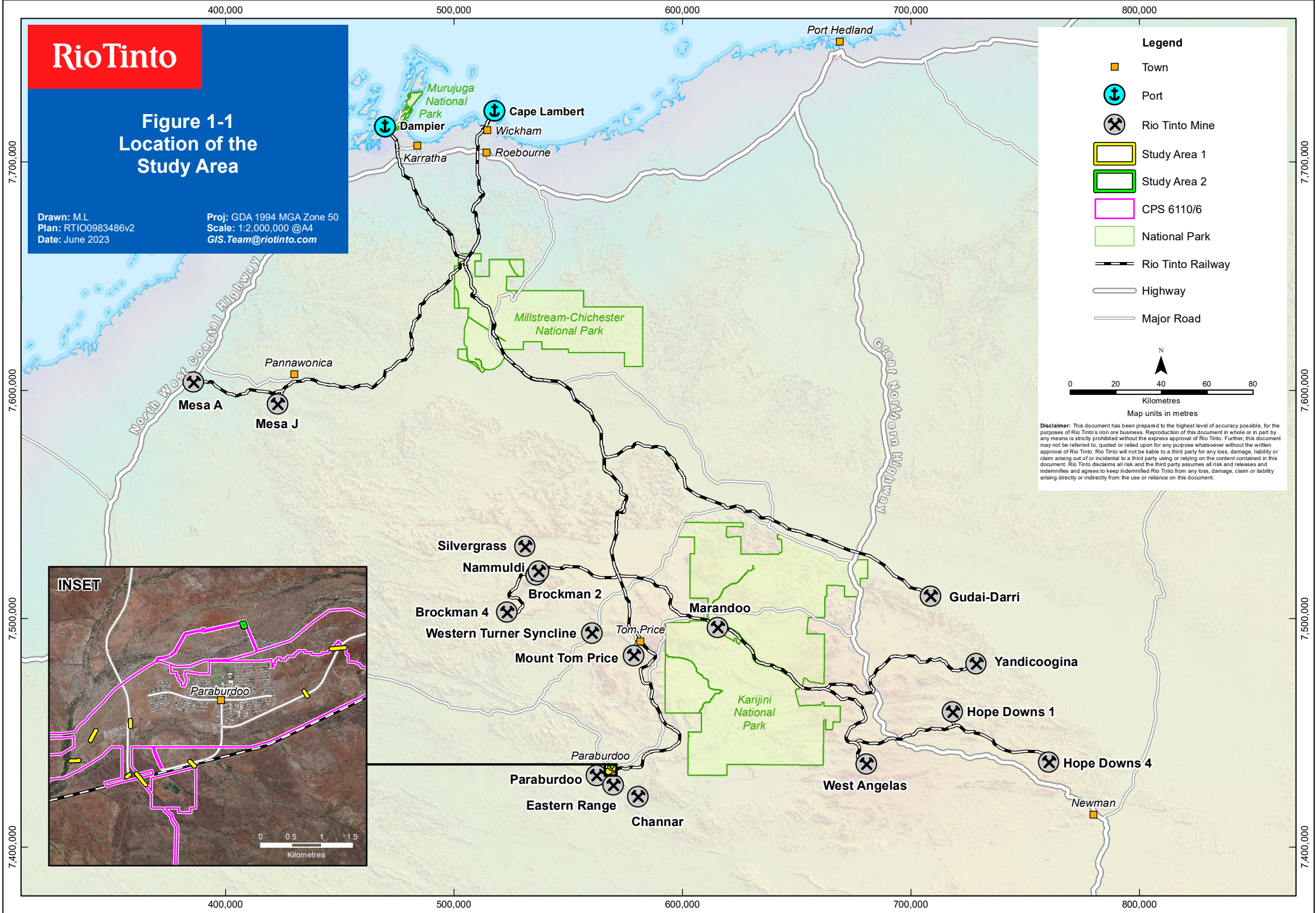
- Local environment of the study area including flora, vegetation, geology, landforms, and hydrology;

- Methods employed during the desktop assessment and field survey;
- Locations and populations of conservation listed flora;
- Vegetation associations occurring in the study area, an assessment on their condition and conservation significance for the locality and sub-region;
- Fauna habitats present, assessment of their significance for the locality and sub-region, including mapping, and likelihood assessment of conservation listed fauna (BC Act); and
- Potential impacts of the proposal on the local environment through assessment of the ten clearing principles, as outlined in Schedule 5 of the *Environment Protection Act 1986* (EP Act).

Figure 1-1 Location of the Study Area

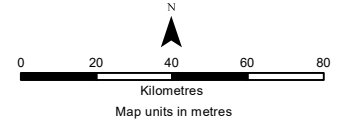
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Plan: RTIO0983486v2
Date: June 2023

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GIS.Team@riotinto.com

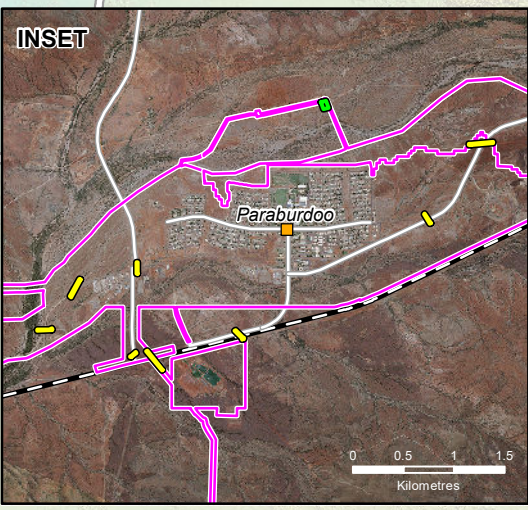


Legend

- Town
- Port
- Rio Tinto Mine
- Study Area 1
- Study Area 2
- CPS 6110/6
- National Park
- Rio Tinto Railway
- Highway
- Major Road



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1.3 Constraints and Limitations

Limitations of the current survey of the study area are summarised in Table 1-1.

Table 1-1: Constraints and limitations of the current study

Constraint	Limitation
Sources of information	Parts of the study area had been previously surveyed and relevant reports were available for literature review as part of the desktop assessment. RTIO internal data and external publicly available data were used to complete the remainder of the desktop assessment. Sources of information are not considered a limitation to this study.
Scope of works	The requirements of a fauna desktop assessment and targeted flora and vegetation survey for a clearing permit application were met. Flora, vegetation, and fauna habitat information was assessed and summarised from previous survey reports, available data and a field survey conducted on the 30 th March 2023.
Completeness of survey	The study area has been comprehensively surveyed to provide an adequate level of information for this assessment.
Intensity of survey	A targeted flora, vegetation and fauna habitat survey was completed over the entirety of the study area. Due to the relatively small sizes of the surveyed polygons comprising the study area, an additional 50 m buffer was placed on the study area and included in the targeted searches to ensure adequate coverage.
Timing, weather, season, cycle	The survey was conducted between the 29- 30 th March, which is within recommended survey timing for the Eremaean Botanical Province as per EPA Technical Guidelines (2016). Rainfall preceding the survey was well above average. Therefore, timing, weather etc. is not seen as a limitation for this report.
Disturbances	A majority of the study area (83.52%) has been disturbed by historical clearing for tracks and infrastructure. At the time of survey there was no evidence of fire within the study area.
Resources	The biologists undertaking the desktop assessment and reviews were suitably qualified (> 20 years' combined experience conducting environmental surveys within Australia) and a sponsored taxonomist (Steve Dillon) was used to verify flora records following the survey. Resources were not considered to be a limitation in this study.
Accessibility / remoteness	The survey area was completely accessible via road and on foot. Accessibility/remoteness is not considered to be a limitation.

2. Methodology

2.1 Desktop assessment

A desktop assessment was undertaken to identify environmental information relevant to the study area. This desktop assessment included a review of:

- Overall site characteristics including:
 - A review of rainfall data from the closest reliable weather station (BoM 2023);
 - A review of major geological units based on 1:250,000 scale map sheet series (Department of Mines, Industry Regulation and Safety 2022);
 - Surface hydrology and groundwater;
 - Land systems mapping adapted by van Vreeswyk *et al.* (2004);
 - Bioregional assessments (including IBRA bioregion, Beard's regional vegetation mapping, pre-European vegetation mapping); and
 - Conservation areas and environmentally sensitive areas.
- Relevant reports previously prepared for Rio Tinto as outlined as Section 2.1.1
- Databases maintained by state and federal government and Rio Tinto as described at Section 2.1.2

2.1.1 Literature review

A literature review of the study area was conducted and found six flora and fauna related reports either intersecting or within a 2 km buffer of the study area (Figure 2-1).

These reports have been consulted as part of the literature review to determine conservation significant species that may occur within the study area, as well as flora, vegetation units, ecological communities and fauna habitats. A summary of the findings of each report utilised in the desktop review is presented in Table 2-1. The previous surveys in relation to the current survey area are shown in Figure 2-1.

Table 2-1: Summary of previous flora, vegetation and fauna reports utilised for the desktop assessment

Report and level of survey	Size (ha)	Number of taxa	Conservation listed flora / fauna recorded	Habitats identified	Weeds	Vegetation / Fauna Habitat of significance
RTIO (2017) Flora Vegetation and Fauna Habitat Assessment Paraburdoo Additional Water Pipeline – Native Vegetation Clearing Permit – Supporting Document RTIO-HSE-0317979 (NVCP-level survey)	3	NA	None.	<ul style="list-style-type: none"> Creeks Stony Plain 	<ul style="list-style-type: none"> *<i>Cenchrus ciliaris</i> *<i>Aerva javanica</i> 	None.
Astron Environmental Services (2018) <i>Greater Paraburdoo Level 2 Fauna Survey</i> RTIO-HSE-0328335 (Multi-phase detailed fauna survey)	11,203.4	154	<ul style="list-style-type: none"> Northern Quoll (<i>Dasyurus hallucatus</i>) (EN) Pilbara Leaf-nosed Bat (<i>Rhinonicteris aurantia</i>) (VU) Ghost Bat (<i>Macroderma gigas</i>) (VU) Grey Falcon (<i>Falco hypoleucos</i>) (VU) Common Sandpiper (<i>Actitis hypoleucos</i>) (MI) 	<ul style="list-style-type: none"> Riverine Drainage Line Gorge Breakaway Rocky Hill Low Hill Stony Plain 	NA	Gorge, Riverine and Breakaway habitats may support MNES species. The survey area does not intersect with the study area.
RTIO (2019) Metadata Statement – Paraburdoo PTP2 Bore to Town Water Main Upgrade RTIO-HSE-0331992 (Targeted flora survey)	10.58	NA	None.	NA	* <i>Cenchrus</i> sp.	None.

<p>Biologic Environmental Sciences (2021)</p> <p><i>Paraburdoo Targeted Flora and Fauna Survey</i></p> <p>RTIO-HSE-0351187</p> <p>(Targeted flora and fauna survey)</p>	26.8	40	<ul style="list-style-type: none"> Peregrine Falcon (<i>Falco peregrinus</i>) (OS) Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>) (P4) 	<ul style="list-style-type: none"> Stony Plain Hillcrest/Hillslope Major Drainage Line Cleared/disturbed 	<p>*<i>Aerva javanica</i>,</p> <p>*<i>Argemone ochroleuca</i>,</p> <p>*<i>Cenchrus ciliaris</i>,</p> <p>*<i>Cenchrus setiger</i>,</p> <p>*<i>Chloris barbata</i>,</p> <p>*<i>Citrullus amarus</i>,</p> <p>*<i>Cynodon dactylon</i>,</p> <p>*<i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>,</p> <p>*<i>Echinochloa colona</i>,</p> <p>*<i>Flaveria trinervia</i>,</p> <p>*<i>Malvastrum americanum</i>, *<i>Passiflora foetida</i>, *<i>Rumex vesicarius</i>, *<i>Sisymbrium orientale</i>, *<i>Sonchus oleraceus</i>, *<i>Tribulus terrestris</i>, *<i>Vachellia farnesiana</i>.</p>	<p>No core MNES habitat present within the survey area, however foraging habitat (including permanent pools) present.</p>
<p>Rio Tinto (2021)</p> <p><i>Paraburdoo Town Wastewater Treatment Plant Spray Field</i></p> <p>RTIO-HSE-0354142</p> <p>(Targeted flora and fauna survey)</p>	5.59	n/a.	None	No habitat – heavily degraded	NA	<p>No core MNES habitat present within the survey area.</p>
<p>Astron Environmental Sciences (2022)</p> <p><i>Western Range Construction Camp and Access Road</i></p> <p>RTIO-HSE-0955023</p> <p>(Targeted flora and fauna survey)</p>	69.89	28	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Stony Plain Low Hills and Slopes Rocky Hills Riparian Major Drainage Line Minor Drainage Line 	<p>*<i>Cenchrus ciliaris</i></p> <p>*<i>Aerva javanica</i></p>	<p>No core MNES habitat present within the survey area, however foraging habitat (including permanent pools) present.</p>

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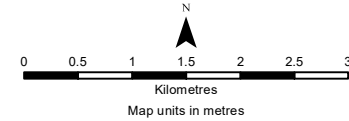
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Figure 2-1: Previous Surveys in Vicinity of the Study Areas

Drawn: M.L
Plan: RTIO0983486v2
Date: May 2023

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Scale: 1:70,000 @A4
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- Legend**
-  Study Area 1
 -  Study Area 2
 - Previous Surveys
 -  Astron Environmental Services (2022)
 -  Biologic Environmental Survey (2021)
 -  Astron Environmental Services (2018)
 -  RTIO (2021)
 -  RTIO (2019)
 -  RTIO (2017)



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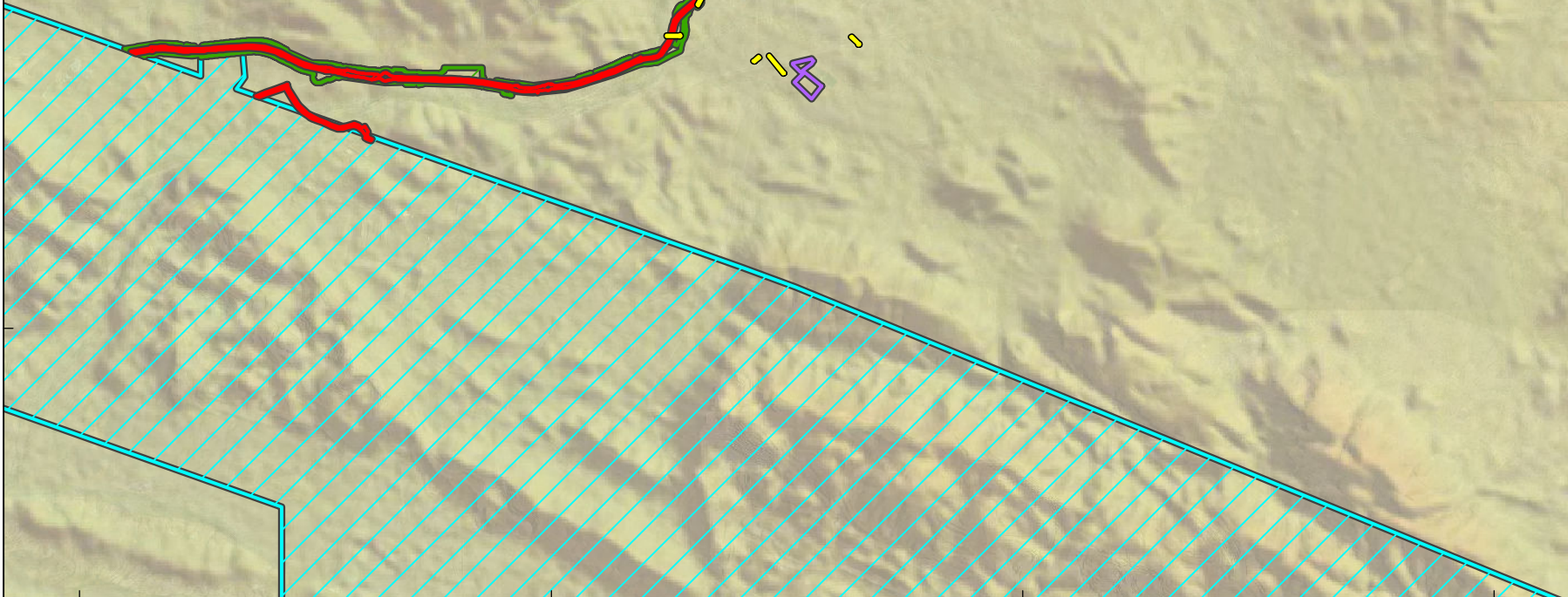
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2.1.2 Database searches

The Department of Biodiversity, Conservation and Attractions (DBCA) and WA Museum's (WAM) NatureMap database was reviewed for Threatened and Priority Flora and Threatened and Priority Fauna (EPBC Act and BC Act) that have the potential to utilise the habitats present within the study area. The Commonwealth Department of Agriculture, Water and the Environment (DAWE) administered EPBC Act Protected Matters Search Tool (PMST) was also reviewed for Matters of National Environmental Significance (MNES) listed under the EPBC Act including Threatened flora and fauna and Threatened Ecological Communities (TECs) (DCCEEW 2023b).

Spatial data for conservation significant flora and fauna held and maintained by Rio Tinto was also reviewed as part of the desktop study (Rio Tinto Flora and Fauna Database). Any Environmentally Sensitive Area (ESA), Reserves and/or conservation areas within or surrounding the study area were identified using relevant GIS layers held by Rio Tinto. A buffer of 20 km from the study area boundary was used for the NatureMap, Rio Tinto and Protected Matters search tool (PMST) database searches. Result outputs of NatureMap and PMST searches undertaken are presented in Appendix 1 and summarised in sections 3.9 and 3.10 .

2.2 Likelihood of occurrence assessment

2.2.1 Flora

The results of the database searches were used to create a list of conservation significant flora (BC Act and priority flora) previously recorded or with potential to occur within the study area. The likelihood of conservation significant flora occurring within the study area were assessed through consideration of available habitats in the study area and each species' ecology.

The likelihood of conservation significant flora species occurring within study areas were determined prior to the field survey based on the location of database records, availability of potentially suitable habitat and knowledge of the species ecology (section 3.9.2). This list was then updated following the field survey to better reflect the habitats observed.

2.2.2 Fauna

A likelihood of occurrence assessment was performed to identify habitats within the study area for which fauna listed under the current BC Act may have specific dependence (DBCA, 2018b). For the purpose of this study, 'specific dependence' is defined as core habitat including roosting, denning, shelter and breeding habitat.

The likelihood of conservation significant fauna species (BC Act) occurring within the study area was determined prior to the field survey based on the location of database records, availability of potentially suitable habitat and knowledge of the species ecology (section 3.10.2). This list was then updated following the field survey to better reflect the habitats. Exclusively marine fauna were excluded from the likelihood assessment as the study area does not contain marine habitat and is therefore not able to support these species.

2.3 Field Survey

The study area was surveyed by Rio Tinto Ecologists Bridget Duncan, Alicia Michael and Daenia Dundon on the 30th March 2023.

The study area was assessed in accordance with the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a) and *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016b). Fauna habitats were confirmed with reference to *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) and *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c).

Following the literature review and review of the desktop search output the study area was accessed by light vehicle and on foot for a targeted flora and vegetation assessment in accordance with condition 8(a) of CPS 6110/6. Where the study area was located outside of the area subject to CPS 6110/6 (Study Area 2), an NVCP level survey (targeted and reconnaissance flora and vegetation, and targeted fauna habitat survey) was completed which included relevés and targeted fauna habitat assessment to inform and amend the permit area. Data was collected on the flora species present, including percentage cover; average height of each vegetation stratum; site slope; topography; soil texture and colour; and landform type and habitat features. Tracklogs for the targeted flora and NVCP level survey are displayed on Figure 2-2.

Locations of conservation significant flora were recorded using a hand-held GPS (GDA 94 Z50). Where populations of conservation significant flora were encountered; estimates of density or numbers of individuals, habitats and associated flora were recorded.

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INSET



**Figure 2-2:
Tracklogs within the
Study Areas**

Drawn: M.L
Plan: RTIO0983486v2
Date: May 2023




Proj: GDA 1994 MGA Zone 50
Scale: 1:20,000 @A4
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Legend

-  Study Area 1
-  Study Area 2
-  Tracklog

N

0 0.25 0.5 0.75 1
Kilometres
Map units in metres

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2.3.1 Vegetation descriptions, condition assessment and mapping

Vegetation descriptions for the study areas were based on Specht (1970) with modification by Aplin (1979). Assessment of the overall condition of each vegetation association was made based on Trudgen (1988) (Appendix 3).

Vegetation types were mapped in the field and confirmed following data processing post-survey. The vegetation boundaries were digitised on-screen using ArcMap 10.7.1. The resulting polygons were attributed with the relevant information including the vegetation association, description of key components in each stratum and condition.

2.3.2 Flora identification

An interim species list was compiled in the field covering common species identified with confidence by the field personnel. Voucher samples of unknown and Priority flora were collected, pressed and dried in the field and assigned a unique reference number for each sample.

Flora samples collected in the field were taken to the Western Australian Herbarium (WAH) to be formally identified by Rio Tinto sponsored taxonomist Steve Dillon using relevant taxonomic publications and comparisons to collections at the WAH.

2.3.3 Fauna habitat assessment

Prior to survey, a desktop assessment was completed to identify areas of habitat on which fauna listed in the BC Act in operation at the time have specific dependence. This included a review of the landscape characteristics, literature review, database searches and likelihood of occurrence assessments.

Habitat assessments are used to identify fauna habitat types and quantify their extents within the study areas. Habitat assessments incorporate information obtained through the desktop assessment (i.e. vegetation and geological information) as well as information obtained through the field survey (i.e. physical characteristics). Unique habitats can be identified based on their combinations of landforms, soil and vegetation which determine their ability to support specific fauna assemblages or significant fauna.

Significant habitats include rare or isolated habitats and habitat features, such as rock piles, caves, gullies, significant trees, drainage lines or waterholes, damplands and springs as well as those that are likely to provide special resources to fauna. Other important habitats include ecological linkages and migration pathways, refugia, islands, areas that support large or seasonal aggregations of fauna and areas that are important to significant fauna, e.g. for breeding, roosting or foraging.

Broad fauna habitats were identified and mapped based on information obtained through the desktop assessment and confirmed during the field survey. Following the desktop assessment and survey, habitats were assessed for their potential to be of specific dependence to conservation significant species, taking into account species habitat preferences and availability of habitat resources within the study area. Supporting evidence such as sightings, the presence of microhabitats including caves, water holes, tree hollows and burrows were recorded throughout the study area.

Fauna habitats were assessed and mapped as per *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

3. Desktop assessment results

3.1 Climate

The closest meteorological station providing climate data is Paraburdoo Aero (station number: 007185), located approximately 8 km east of the study area (BOM, 2023). The Paraburdoo climate is generally semi-arid with warm to hot temperatures year-round. Annual rainfall is low with most rain falling in the late summer due to the influence of tropical cyclones and monsoons. A second peak in rainfall can occur in early winter due to cold fronts developed in the south. Rainfall varies in frequency and volume from year to year. The summer wet months extend January to March when temperatures can exceed 48°C. Winter temperature maximums stay in the mid to high 20°C and rarely drop below 10°C.

Rainfall for the three month period preceding the survey was 224.8 mm, which is 40.1 mm above the long-term average for this period (184.7 mm) (BOM 2023). Annual average climate statistics for Paraburdoo Aero are displayed in **Figure 3-1**.

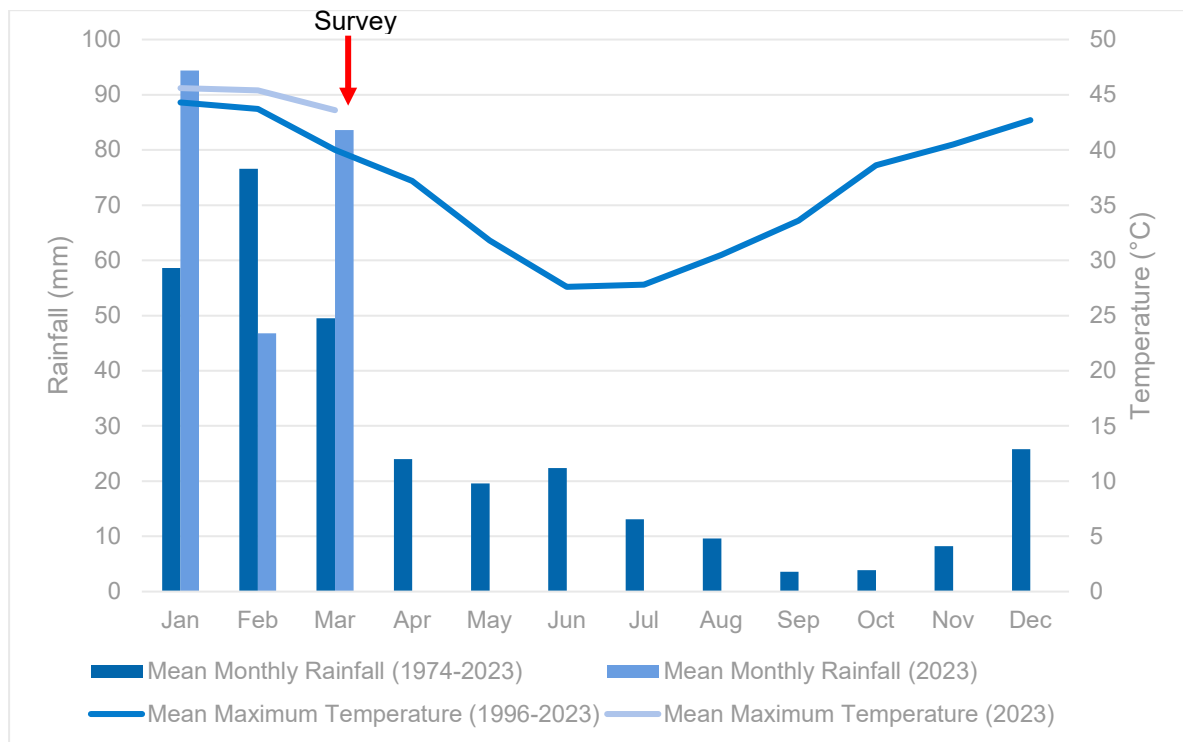


Figure 3-1: Annual average climate statistics for Paraburdoo Aero (Station No. 007185) (BOM, 2023).

3.2 Geology and soils

The study area is comprised of five major geological units based on 1:100,000 scale map sheet series (**is described** as basalt hills and restricted stony plains supporting grassy mulga shrublands).

; Stewart, *et al.* 2008). The geological units are:

- AF: Bunjinah Formation – metabasaltic pillow lava and breccia; metatuff and minor chert
- AFj: Jeerinah Formation – pelite, metasandstone, chert and metabasaltic pillow lava and breccia
- AFp: Pyradie Formation – pyroxene spinifex-textured metabasalt flows and pillow lava; metatuff and minor chert; contains komatiite locally
- Czc: Colluvium – unconsolidated quartz and rock fragments in soil; partly consolidated valley-fill deposits
- Qa: Alluvium – unconsolidated silt, sand and gravel

Land system (rangeland) mapping is based on regional patterns in topography, soils and vegetation (Christian & Stewart 1953). The most recent land system mapping of the Pilbara bioregion, in which the study area lies, was completed by Van Vreeswyk, *et al.* 2004. The mapping classifies the Pilbara region into 102 land systems. An assessment of land systems provides an indication of the occurrence and distribution of flora and vegetation types as well as fauna habitats present in the study areas.

The study area is comprised of two land systems: River Land System and Marandoo Land System (Figure 3-3). The River Land System is described as narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of Acacias and fringing communities of Eucalyptus sometimes with tussock grasses or spinifex. The Marandoo Land System is described as basalt hills and restricted stony plains supporting grassy mulga shrublands.

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Figure 3-2: Geology within the Study Areas

Drawn: M.L.
Plan: RTIO0983486v2
Date: May 2023

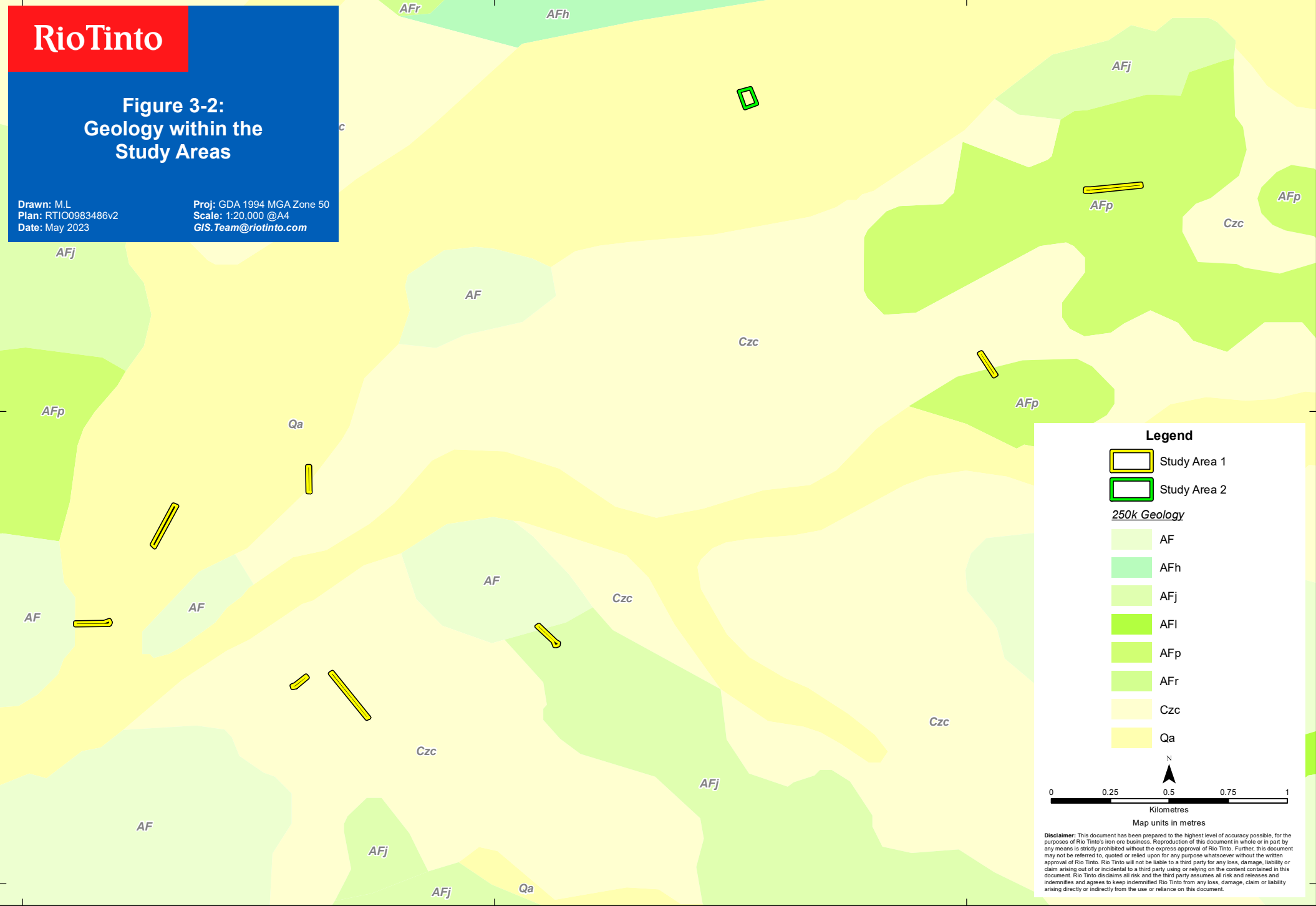
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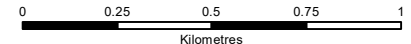
Legend

- Study Area 1
- Study Area 2

250k Geology

- AF
- AFh
- AFj
- AFi
- AFp
- AFr
- Czc
- Qa

N



Map units in metres

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566,000

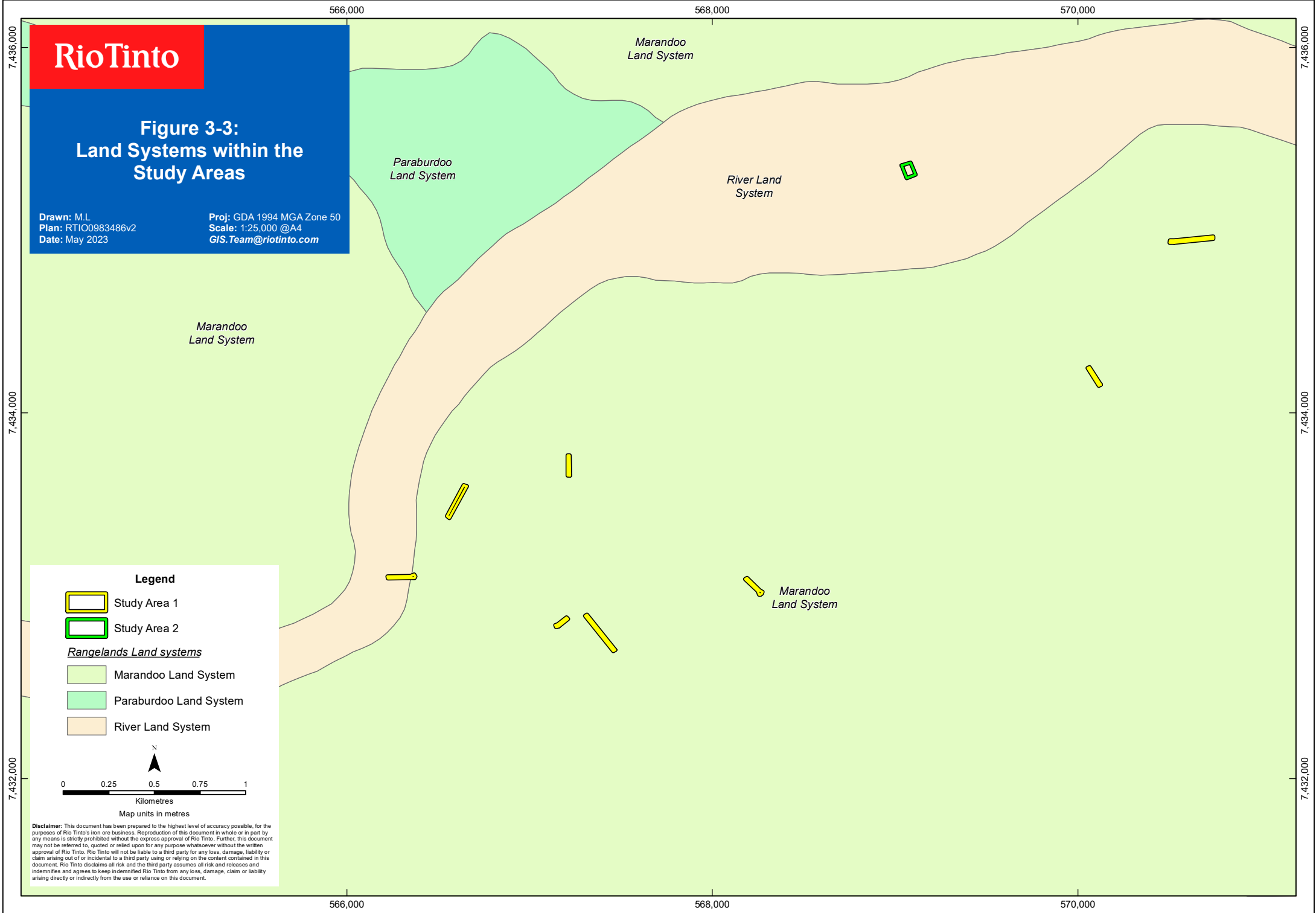
568,000

570,000

Figure 3-3: Land Systems within the Study Areas

Drawn: M.L.
Plan: RTIO0983486v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:25,000 @A4
GIS.Team@riotinto.com

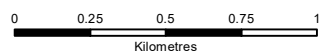


Legend

- Study Area 1
- Study Area 2

Rangelands Land systems

- Marandoo Land System
- Paraburdoo Land System
- River Land System



Map units in metres

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3.3 Surface hydrology and groundwater

The study area lies within the Pilbara Groundwater Area and the Roebourne/Ashburton Groundwater Subarea (DWER, 2021).

Topography is generally flat and surface water is expected to be either internally draining or drain into Paraburdoo's road drainage system. Surface hydrology and groundwater within the study area are presented in Figure 3-4.

3.4 Regional biogeography

The Interim Biogeographic Regionalisation of Australia (**IBRA7**) recognises 89 bioregions (DCCEEW, 2023a). The study area is located in the Pilbara (**PIL**) bioregion as defined by IBRA. The Pilbara bioregion has been further subdivided into four subregions: Chichester (**PIL1**); Fortescue Plains (**PIL2**); Hamersley (**PIL3**); and Roebourne (**PIL4**).

The study area falls within the Hamersley (**PIL3**) sub-region and is described by Kendrick & Stanley 2001 as:

- 'Southern section of the Pilbara Craton. Mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite). Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges. The climate is Semi-desert tropical, average 300mm rainfall, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon. Drainage into either the Fortescue (to the north), the Ashburton to the south, or the Robe to the west.'

564,000

566,000

568,000

570,000

572,000

574,000



Figure 3-4: Surface Hydrology and Groundwater of Study Areas

Drawn: M.L
Plan: RTIO0983486v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:40,000 @A4
GIS.Team@riotinto.com

7,436,000

7,436,000





7,434,000

7,434,000

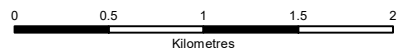
7,432,000

7,432,000

Legend

-  Study Area 1
-  Study Area 2
-  Major Creek
-  Minor Creek

N



Map units in metres

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564,000

566,000

568,000

570,000

572,000

574,000

Bellary Creek

3.5 Beard's regional vegetation mapping

Vegetation type and extent has been mapped at a regional scale by Beard (1975) who categorised vegetation into broad vegetation associations. Based on this mapping at a scale of 1:1,000,000, the Department of Primary Industries and Regional Development (**DPIRD**) has compiled a list of vegetation extent and types across WA (Shepherd, *et al.* 2002).

The study area falls within two vegetation units:

- Hamersley (181): Shrublands: Mulga and snakewood scrub.
- Hamersley (567): Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex and *Triodia basedowii*.

Given the broad nature of Beard's mapping; these vegetation associations are only broadly applicable to the vegetation types occurring in the study area.

3.6 Pre-European vegetation extent

The pre-European and current extent of native vegetation associations in Western Australia has been interpreted by Shepherd, *et al.* (2002) using data from Beard's (1975) regional vegetation mapping and other vegetation mapping, as well as satellite imagery and orthophoto interpretation.

Shepherd, *et al.* (2002) identified the Pilbara bioregion as having largely intact native vegetation owing to the lack of intensive agricultural land use practices. Although the native vegetation remains widespread and largely intact, the floristic composition and structural characteristics have almost certainly changed since European settlement by grazing and altered fire regimes (Shepherd, *et al.* 2002).

Table 3-1 and Figure 3-5 present the pre-European and current extent of Beard's mapping units within the study area.

Table 3-1: Beard's mapping current and pre-European extent within the Pilbara bioregion and across the study area

Beard's mapping unit (Shepherd vegetation association)	Pre-European extent (ha) [^]	Current extent (ha) [^]	Percentage remaining (%)
181	63,144.46	61,257.91	97.01
567	777,187.88	774,576.94	99.66

[^] Department of Biodiversity, Conservation and Attractions (2019)

**Figure 3-5:
Pre-European Vegetation
Associations within the
Study Areas**

Drawn: M.L.
Plan: RTIO0983486v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:25,000 @A4
GIS.Team@riotinto.com

7,434,000

7,434,000

7,432,000

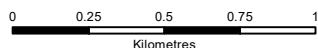
7,432,000

566,000 568,000 570,000

566,000 568,000 570,000

Legend

- Study Area 1
- Study Area 2
- Pre-European Vegetation (associations)



Map units in metres

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HAMMERSLEY_181

HAMMERSLEY_567

HAMMERSLEY_82

3.7 Conservation areas and environmentally sensitive areas

Environmentally Sensitive Areas (**ESAs**) are defined in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* under section 51B of the WA State Environmental Protection Act 1986. ESAs include areas declared as: World Heritage; included on the Register of the National Estate; defined wetlands; vegetation containing rare (Threatened) flora; Threatened Ecological Communities (**TEC**); and Bush Forever sites.

The study area does not lie within any conservation areas or ESAs, nor are any within 20 km of the study area.

3.8 Priority ecological communities

Priority Ecological Communities (**PECs**) are possible TECs that do not meet survey criteria or are not adequately defined for the TEC list by the DBCA - Parks and Wildlife Service (Parks and Wildlife), they are ranked as Priorities 1, 2 and 3 (1 being the highest).

The study area does not lie within any PECs or their buffers, nor are any located within 20 km of the study area.

3.9 Flora

3.9.1 Flora diversity

The DBCA NatureMap database search results cover all species detected previously within 20 km of the study area. The DBCA NatureMap search returned a total of 459 taxa from 65 species and 174 genera (Table 3-2). The combined DBCA NatureMap and Rio Tinto databases returned a total of 19 conservation significant flora species (Table 3-4). The PMST database search did not return any listed flora species.

Table 3-2 Flora diversity of the study area based on desktop assessment (DBCA. 2007-)

Flora group	NatureMap database
Families	65
Genera	174
Species	459
Conservation listed	19
Weeds	5

3.9.2 Conservation significant flora likelihood of occurrence

Nineteen (19) conservation significant flora species were returned by the database searches (Table 3-3). Of these, one is listed as Threatened, two as Priority 1 (P1), two as Priority 2 (P2), 11 as Priority 3 (P3) and four as Priority 4 (P4). Seven on these species are considered to possibly occur within the study area (Figure 3-3).

Table 3-3: Flora likelihood of occurrence assessment

Taxon	WA listing	NM	RT	PMST	Flowering period	Habitat	Number of records within 20 km of study area*	Likelihood of occurrence
<i>Aluta quadrata</i>	T	X	X		May - Jun	Edge of creek beds, base of cliffs, rocky crevices, near crest of ridge.	There are 1413 records within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Hibiscus campanulatus</i>	P1	X	X		Jul - Aug	Rocky gully, steep slopes, base of breakaways, minor drainage lines through ironstone hills. Brown sandy loam soils.	527 records within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Isotropis forrestii</i>	P1		X		Apr - Sep or Dec	Stony clay loam, sandy alluvium. Along drainage lines.	There are two records within 20 km of the study area.	Potential The study area may contain suitable habitat to support this species.
<i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	P2	X	X		May - Jul	Rocky slopes, gullies, breakaways, scree slopes, creeks. Gravelly, red brown loam.	There are four records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Solanum octona</i>	P2		X			Silty clays or loams associated with hydrological features in the landscape, such as riverbanks and claypans.	There are 35 records of this species within 20 km of the study area.	Potential The study area may contain suitable habitat to support this species.
<i>Eremophila coacta</i>	P3	X	X		Jun - Jul or Sep	Laterite, shale soils. Ironstone hills, creeklines.	There are 130 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Eremophila naaykensis</i>	P3		X		Aug - Sep	Hillslopes, scree slopes, ironstone outcrops. Brown-red soil, silty loam.	There are 263 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.

<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	X	X	Aug - Sep	Red-brown clay soil, calcrete pebbles. Low undulating plain, swampy plains.	There are 96 records of this species within the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Grevillea saxicola</i>	P3	X	X	Feb - Mar	Hillslopes, incised gully systems, steep cliffs. Loamy soils.	There are 239 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Olearia mucronata</i>	P3	X		Aug - Jan	Schistose hills, along drainage channels.	There is one record of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Pilbara trudgenii</i>	P3	X		Sep - Oct	Skeletal, red stony soil over ironstone. Hill summits, steep slopes, screes, cliff faces.	There are 30 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	P3		X	Jul - Aug	Skeletal red soils pockets. Steep slope.	There are 104 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	P3	X	X	Aug - Oct	Gullies, breakaways, in ironstone crevices. Brown loamy sand.	There is one record of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Solanum kentrocaule</i>	P3		X	May or Jul - Oct	Rocky hills, steep slopes of ironstone hills, cliff faces, gullies, seasonal creeks. Stony soils, red-brown skeletal loam.	There are seven records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.

<i>Swainsona thompsoniana</i>	P3	X		Mar or Aug - Sep	Floodplains, bank slopes, cracking clay plains. Red-brown clay loam. Ironstone pebbles and rocks.	There is one record of this species within 20 km of the study area.	Potential The study area may contain suitable habitat to support this species.
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	P4	X		Jul - Sep	Skeletal soils over ironstone. Rocky screes.	There are two records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4	X		Jan or Mar or Jun or Aug - Sep	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	There is one record of this species within 20 km of the study area.	Potential The study area may contain suitable habitat to support this species.
<i>Ptilotus mollis</i>	P4	X	X	May or Sep	Stony hills and screes.	There are 12 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.
<i>Ptilotus trichocephalus</i>	P4	X	X	Sep	Sandy soils. Colluvial plains.	There are 122 records of this species within 20 km of the study area.	Unlikely The study area is not expected to contain habitat to support this species.

3.10 Fauna

3.10.1 Fauna diversity

A NatureMap search was performed for terrestrial vertebrate fauna species within a 20 km buffer of the study area. This includes conservation significant fauna, feral (introduced) fauna and fauna not considered rare, threatened or conservation dependent.

A total of 273 terrestrial vertebrate fauna species have been previously recorded within the buffered study area. This comprises 153 bird species, 81 reptile species, 36 mammals and three amphibians. Thirteen (13) of these species are listed under the BC Act (Table 3-4).

Twelve (12) additional BC Act listed fauna were detected from the Rio Tinto database or PMST searches (Table 3-5).

Table 3-4 presents a summary of terrestrial vertebrate fauna species returned by the NatureMap database search.

Table 3-4: Summary of terrestrial vertebrate fauna species returned by NatureMap search

Fauna group	No. of species
Amphibians	3
Reptiles	81
Birds	153
Mammals	36
Total	273
BC Act listed	13

3.10.2 Conservation significant (BC Act) fauna likelihood of specific dependence

Twenty-five conservation significant (BC Act) fauna species were returned by the database searches (Table 3-5). Of these, two were listed as Critically Endangered, two as Endangered, seven as Vulnerable, 10 as Migratory, three as Priority 4 and one as Other Specially Protected Species. The study area is not considered to contain habitat of specific dependence for any of these species (Table 3-4).

Table 3-5: Likelihood of study area containing habitat for which fauna listed in the BC Act have specific dependence

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
Birds								
<i>Actitis hypoleucos</i>	Common Sandpiper	MI	X		X	This species has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The species generally forages in shallow water and on bare soft mud at the edges of wetlands. They sometimes venture into grassy areas adjoining wetlands (Higgins & Davies 1996).	There is one record of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Apus pacificus</i>	Fork-tailed Swift	MI			X	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over a wide range of habitats from inland plains, dry or open habitats, riparian woodland, tea-tree swamps, low scrub, heathland, saltmarsh, over cliffs, beaches, islands and well out to sea, above foothills or in coastal areas. They also occur over settled areas, including towns, urban areas and cities (DCCEEW, 2023c).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI	X		X	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry (DCCEEW, 2023c).	There are two records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR			X	The Curlew Sandpiper prefers habitats such as tidal mudflats, saltmarsh, salt fields, fresh, brackish or saline wetlands and sewerage ponds. It is also found at lagoons and mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters. The Curlew Sandpiper does not breed in Australia (Pizzey & Knight 2012).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI			X	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species can be found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Although this species is usually found in coastal or near coastal habitat, it can occasionally be found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire (DCCEEW, 2023c).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Calidris subminuta</i>	Long-toed Stint	MI	X			In Australia, the preferred habitat of the Long-toed Stint includes tussocky, weedy margins of shallow coastal and inland wetlands, sewerage ponds and tidal mudflats (Pizzey & Knight 2012). They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire (DCCEEW, 2023c).	There is one record of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Charadrius veredus</i>	Oriental Plover	MI			X	Immediately after the Oriental Plover arrives in their non-breeding grounds in northern Australia, they spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps, or open areas that have been recently burnt (DCCEEW, 2023c).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Erythrotriorchis radiatus</i>	Red Goshawk	VU			X	The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993). Riverine forests are also used frequently (Debus 1991, 1993). The Red Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water (Aumann & Baker-Gabb 1991).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Falco hypoleucos</i>	Grey Falcon	VU	X			Grey Falcon is a wide roaming species and prefers habitats such as lightly treed inland plains, gibber deserts, sand ridges, pastoral lands, timbered watercourses. They are seldom in the driest deserts (Pizzey & Knight 2012).	There are two records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
<i>Falco peregrinus</i>	Peregrine Falcon	OS		X		The Peregrine Falcon inhabits cliffs, gorges, timbered waterways, riverine environments, wetlands, plains and open woodlands. It also inhabits pylons, spires and buildings. Nesting habitat includes cliff edges or crevices, large tree hollows, other raptor or corvid nests and ledges of city buildings (Pizzey & Knight 2012).	There is one record of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Hirundo rustica</i>	Barn Swallow	MI			X	In Australia, the Barn Swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Barn Swallows are often sighted perched on overhead wires and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland (Schodde & Mason 1999).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Malurus lamberti</i> subsp. <i>bernieri</i>	Shark Bay Variegated Fairywren	VU	X			The Shark Bay Variegated Fairy Wren is found only on Dirk Hartog Island in Shark Bay, Western Australia. It occurs in dense heath and low shrubs.	There is one record of this species within 20 km of the study area.	Unlikely This sub species is not known from the area and is considered to be a misidentification.
<i>Motacilla cinerea</i>	Grey Wagtail	MI			X	The Grey Wagtail can be found in Australia near running water and in disused quarries. It is also found in sandy, rocky streams in escarpments and rainforests, sewage ponds, ploughed fields and airfields (Pizzey & Knight 2012).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Motacilla flava</i>	Yellow Wagtail	MI			X	The Yellow Wagtail is mostly found in open country near water. Little information is available on this species.	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
<i>Pezoporus occidentalis</i>	Night Parrot	CR			X	Night Parrot is a highly cryptic bird which was presumed extinct until its rediscovery in 2013. As such, habitat requirements are still being researched. At the time of this report Night Parrots are thought to roost and nest in clumps of dense vegetation, primarily old and large spinifex (<i>Triodia</i>) clumps, but sometimes other vegetation types are used. Little is known about foraging sites, but favoured sites are considered likely to vary across the range of the species. <i>Triodia</i> is also likely to provide a good food resource for night parrots, in times of mass flowering and seeding, but they also rely heavily on a range of other food species (DCCEEW, 2023c).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Rostratula australis</i>	Australian Painted Snipe	EN			X	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. Though some individuals are apparently resident in some areas, other individuals appear to be nomadic, temporarily occupying areas where suitable habitat exists (DCCEEW, 2023c).	No previous records of this species occur within 20 km of the study area. This species was returned by the PMST as having habitat which may occur within the area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Tringa glareola</i>	Wood Sandpiper	MI	X			Wood Sandpiper prefers well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops (Pizzey & Knight 2012).	There are two records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
Mammals								
<i>Dasyurus hallucatus</i>	Northern Quoll	EN	X			Northern Quoll occupy a diverse range of habitats including rocky areas, eucalypt forest, woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (Threatened Species Scientific Committee, 2005). Habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Dens are made in rock crevices, tree holes or occasionally termite mounds. In the Pilbara region, the species appears to prefer the Rocklea, Macroy and Robe land systems. The Northern Quoll has also been recorded in other land systems which comprise sandstone and dolomite hills and ridges, shrublands, sandy plains, clay plans and tussock grasslands and coastal fringes including dunes islands and beaches (Biota, 2008).	There are six records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
<i>Macroderma gigas</i>	Ghost Bat	VU	X			The Ghost Bat is patchily distributed across the northern half of Australia. This species requires undisturbed roost sites which are often complex and contain multiple entrances; it has been known to utilise old abandoned mine shafts (Menkhorst & Knight 2017).	There are two records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse	P4	X			The Western Pebble-mound Mouse is found on stony hillsides with hummock grassland (Menkhorst & Knight, 2021). This species favours scree and stony plains habitat where it constructs conspicuous, extensive mounds of small stones. The pebble-mounds are found on gently sloping hills where the ground is stony with continuous small pebbles.	There are 14 records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Rhinonictis aurantia</i>	Pilbara Leaf-nosed Bat	VU	X			The Pilbara leaf-nosed bat (PLNB) inhabits abandoned mine shafts, granite rock pile terrain of the east Pilbara and caves formed in gorges that dissect sedimentary geology in the west. This species is more influenced by the availability of suitable roost caves than by habitat type and high humidity is particularly important to this species (Van Dyck & Strahan 2008).	There are 33 records of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	X			The Long-tailed Dunnart inhabits exposed rock and stony soils with hummock grasses and shrubs. They can be found on flat-topped hills, lateritic plateaus, sandstone ranges and breakaways as well as sparse mulga over spinifex (Van Dyck, Gynther and Baker, 2013).	There is one record of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.
Reptiles								
<i>Liasis olivaceus</i> subsp. <i>barroni</i>	Pilbara Olive Python	VU	X			Pilbara Olive Python habitat includes escarpments, gorges and water holes in the ranges of the Pilbara region (Wilson & Swan 2008). Individuals are usually recorded in close proximity to water and rock outcrops that attract suitably sized prey species (Pearson, 2003).	There is one record of this species within 20 km of the study area.	Unlikely The study area does not contain habitat of specific dependence to support this species.

Species	Common name	BC Act	NM	RT	PMST	Habitat and discussion	Number of records within 20 km of study area*	Likelihood of study area containing habitat of specific dependence
<i>Pogona minor</i> subsp. <i>minima</i>	Abrolhos Bearded Dragon	VU	X			The Abrolhos Bearded Dragon occurs in sandy habitats or outcrops of limestone and is restricted to three islands off the mainland of Western Australia; North Island, East Wallabi Island and West Wallabi Island. It is not known from the mainland of Western Australia.	There are two records of this species within 20 km of the study area.	Unlikely This species is not known from the mainland and is considered to be a misidentification.

NM – NatureMap; **RT** –Rio Tinto Priority Fauna Database; **PMST** – EPBC Act Protected Matters Search Tool. * Please note that due to NatureMap being taken offline indefinitely as of 17 December 2021, location of closest record has been derived from the Rio Tinto internal database. If no record is present within this database, number of species within buffered (20km) study area has been presented.

4. Field results

4.1 Flora

4.1.1 Flora diversity

Flora diversity was recorded for Study Area 2 to comply with the request to extend the area subject to CPS 6110/6. A total of 34 flora species from 15 families were identified during the survey. The most specious family was Fabacea (7) and Poacea (7) followed by Chenopodiaceae (3). A full list of species is presented in Appendix 5.

4.1.2 Conservation significant flora

No conservation significant flora was detected during the survey at any of the study areas.

4.1.3 Introduced flora

Five (5) species of introduced flora were detected during the survey at Study Area 2. These comprised:

- *Aerva javanica*
- *Cenchrus ciliaris*
- *Cenchrus setiger*
- *Cynodon dactylon*
- *Malvastrum americanum*

None of these species are listed as Weeds of National Significance (WONS).

As Study Area 1 was subject to a targeted survey only to comply with condition 8(a) of CPS 6110/6, weeds were not surveyed at this site.

4.2 Vegetation of the study area



The study area comprised one vegetation type: *Acacia citrinoviridis* tall sparse shrubland over *Acacia tetragonophylla* and *Eremophilla cuneifolia* mid sparse shrubland over **Cenchrus setiger* and **Cenchrus ciliaris* tussock grassland. This vegetation type covers 16.48% of the study area (0.32 ha), the remaining 1.65 ha (83.52%) of the study area had been cleared for tracks and infrastructure (powerlines, rail, tracks and water bore).

The vegetation within the study area was assessed as being in Poor condition with disturbances from weeds, tracks, cattle, litter, previous clearing and infrastructure (Table 4-1).

4.3 Vegetation of conservation significance

The vegetation within the study area was considered to be common within the region and did not represent a potential PEC or TEC.

Table 4-1 Vegetation types within the study area

Vegetation code	Description	Extent (ha) within study area	Proportion (%) within study area	Photo
AcAtEcCsCc	<p><i>Acacia citrinoviridis</i> tall sparse shrubland over <i>Acacia tetragonophylla</i> and <i>Eremophilla</i></p> <p>(Fauna habitat = Alluvial <i>cuneifolia</i> mid sparse shrubland over *<i>Cenchrus setiger</i> and *<i>Cenchrus ciliaris</i> tussock grassland.</p> <p>This vegetation type had disturbances from weeds, tracks, cattle, litter, previous clearing and infrastructure and overall was in Poor condition.</p>	0.32	16.48	
HD	<p>Highly modified</p> <p>Areas that are heavily disturbed, degraded, weed infested or cleared.</p>	1.65	83.52	
Total		1.97	100	

562,000

564,000

566,000

568,000

570,000

572,000

574,000

RioTinto

Figure 4-1: Vegetation Mapping of the Study Areas

Drawn: M.L.
Plan: RTIO0983486v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:50,000 @A4
GIS.Team@riotinto.com

7,438,000

7,436,000

7,434,000

7,432,000

7,430,000

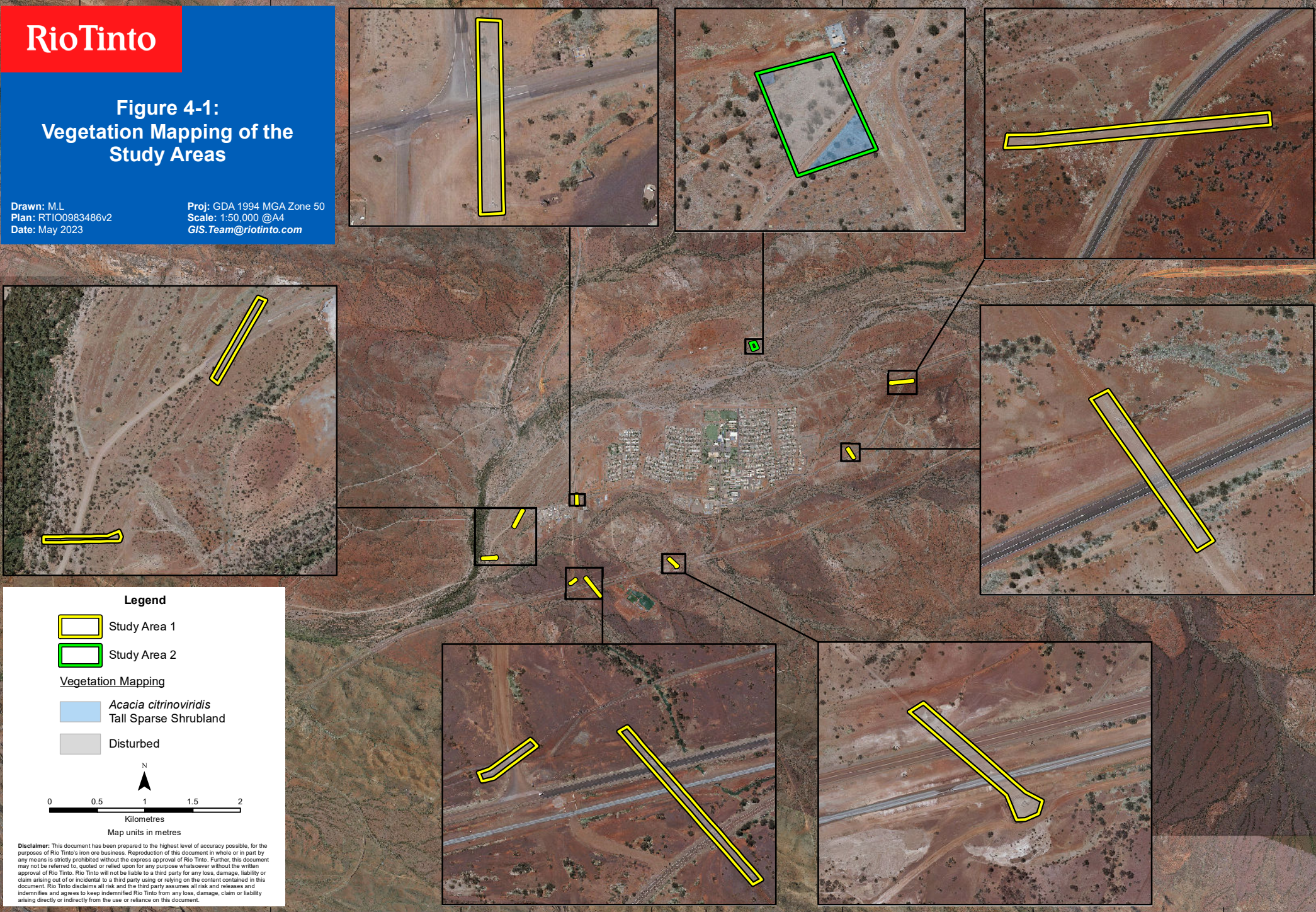
7,438,000

7,436,000

7,434,000

7,432,000



7,430,000



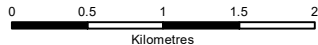
Legend

-  Study Area 1
-  Study Area 2

Vegetation Mapping

-  *Acacia citrinoviridis*
Tall Sparse Shrubland
-  Disturbed

N



Map units in metres

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562,000

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4.4 Fauna habitat

The majority of the study area contains disturbed habitat with no complex vegetation, accounting for 1.65 ha (83.52%). The other 0.32 ha (16.48%) of the study area is Alluvial Plain habitat, which comprises of alluvial, silt, clay or loams associated with floodplains adjacent to drainage lines. The habitats within the study area have been largely cleared/disturbed and the remaining vegetation is in poor condition. Due to the low vegetation complexity and heavily disturbed nature of the habitats (which lie along roads and powerline corridors), the habitats are considered to have little value to most fauna, including BC Act listed fauna.

The fauna habitat types are described below, accompanied by mapping of the habitat types (Table 4-2, Figure 4-2).

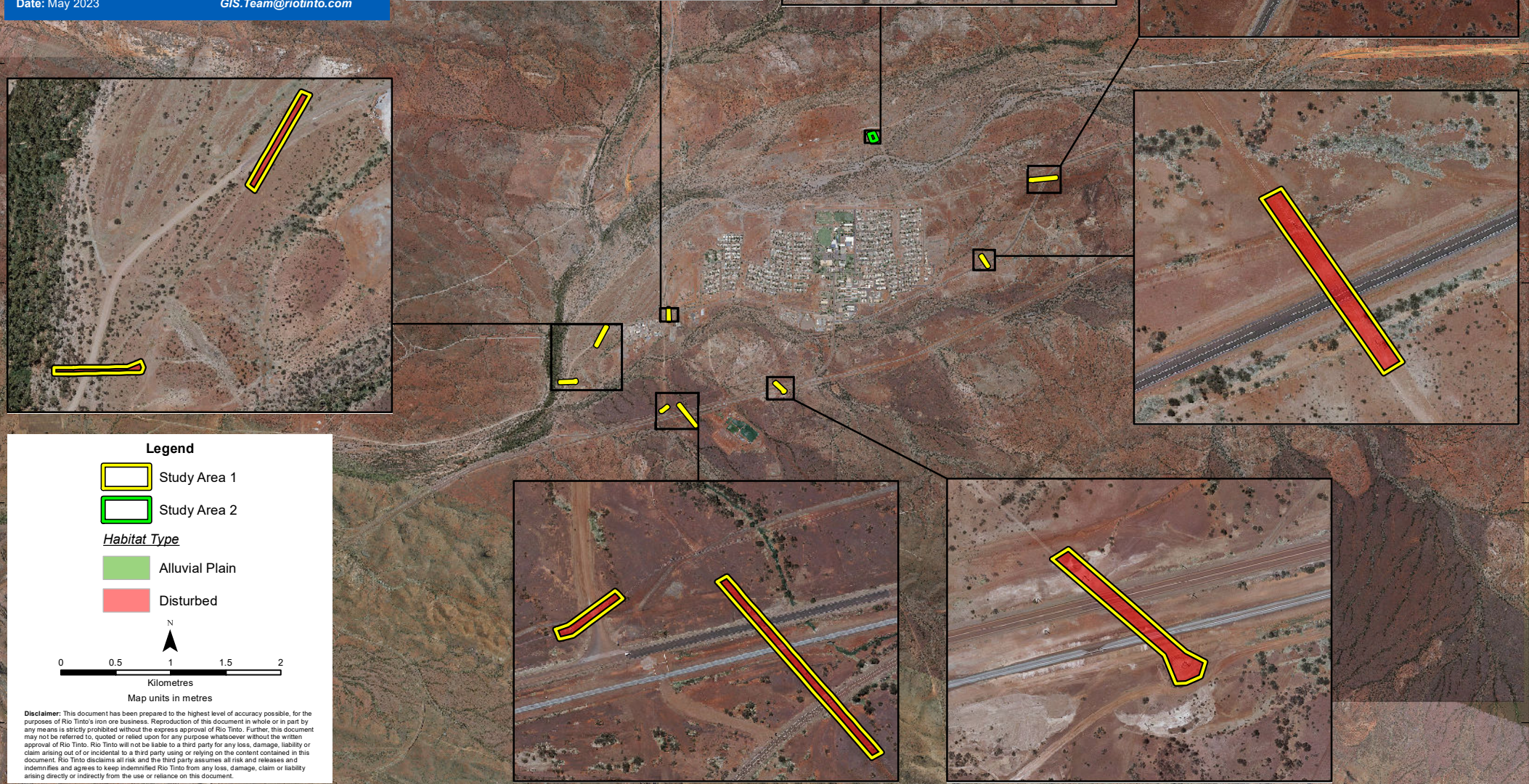
Table 4-2: Fauna habitats within the study area

Habitat	Fauna habitat description	Significant microhabitat	Extent (ha) within study area	Proportion (%) within study area
Alluvial Plain	<p>This habitat is comprised of low lying, often disturbed vegetation including tussock grasses. The landscape is generally low lying with very slight to no gradient. Some areas may be seasonally inundated with water but do not provide a permanent water source for fauna. Typical substrate of this habitat includes alluvial, silt and/or loamy/clay.</p> <p>Habitat connectivity is considered good with linear infrastructure providing minor barriers to ground dwelling fauna movement.</p> <p>Very few microhabitats are expected to occur in this habitat within the study area. The soft soil strata may be suitable for some soil dwelling/burrowing/digging fauna however little other microhabitats are expected to occur.</p> <p>Conservation significant fauna which may utilise habitat: None.</p> <p>Conservation significant fauna with specific dependence on this habitat: None.</p>	None.	0.32	16.48
Disturbed	<p>Areas where the natural vegetation and microhabitats have been disturbed (tracks, laydown areas etc.). This habitat also contains previously disturbed areas with some natural vegetation regrowth.</p> <p>Where natural regrowth has occurred, the habitat appears to be in degraded or completely degraded condition.</p>	None.	1.65	83.52
TOTAL			1.97	100.0

**Figure 4-2:
Fauna Habitat Mapping of
the Study Areas**

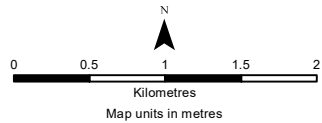
Drawn: M.L.
Plan: RTIO0983486v2
Date: May 2023

Proj: GDA 1994 MGA Zone 50
Scale: 1:50,000 @A4
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Legend

- Study Area 1
- Study Area 2
- Habitat Type**
- Alluvial Plain
- Disturbed



Map units in metres

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5. Conclusion

The study area has been subject to a flora, vegetation and fauna desktop assessment, and a targeted flora, vegetation and fauna habitat survey. No conservation significant flora, vegetation or habitats of specific dependence to BC Act fauna were observed during the survey or are considered likely to occur with the study area.

6. Statement addressing the 10 Clearing Principles

Rio Tinto proposes to install a replacement bore for the damaged town water supply bore at Paraburdoo, Western Australia (Study Area 2). The study area comprises 0.38 ha of native vegetation and previously cleared tracks.

Based on specialist assessment of the survey area and discussion below, it is deemed that:

- Principles a-j are not at variance;

6.1 Principle a: Comprises high level of biological diversity

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

The Pilbara is one of Australia's 15 National Biodiversity Hotspots (DotEE 2018a) and is a secondary centre of endemism and species richness for *Acacia*, *Triodia*, *Corymbia* and *Sida* in Western Australia (Maslin 2001, Kendrick 2001 and Maslin and van Leeuwen 2008). The Hamersley sub-region of the Pilbara has been identified by the Threatened Species Scientific Committee for the Australian Government Biodiversity Hotspots as it provides habitat for a number of threatened, endemic and fire-sensitive species and communities.

The study area occurs within the Hamersley sub-region of the Pilbara bioregion. The Hamersley sub-region is described as: 'Mountainous area of Proterozoic sedimentary ranges and plateaux, supporting Mulga (*Acacia aneura*) low woodland over bunch grasses on fine textured soils, and *Eucalyptus leucophloia* woodlands over *Triodia brizoides* hummock grasslands on skeletal sandy soils' (Kendrick 2001).

Special features of the Hamersley sub-region include rare features such as gorges, centres of endemism including calcrete deposits, refugia and the *Themeda* grasslands TEC (Kendrick 2001).

One vegetation unit was described from the study area; *Acacia citrinoviridis* tall sparse shrubland over *Acacia tetragonophylla* and *Eremophilla cuneifolia* mid sparse shrubland over *Cenchrus setiger* and *Cenchrus ciliaris* tussock grassland.. This vegetation unit does not represent a TEC under either the EPBC Act or under the State listing maintained by DBCA, and does not represent a PEC under the State listing maintained by DBCA (DBCA, 2018a, DBCA, 2022). The vegetation unit identified within the study area is considered to be of low conservation value and widely distributed both locally and throughout the Hamersley sub-region.

A total of 34 flora species from 28 genera representing 15 families were recorded during the current survey. The number of species recorded during the current survey is reflective of the small survey area, low landscape diversity and heavily disturbed nature of the study area.

No conservation significant flora species were detected during the survey, however five weed species were recorded. None of the weed species recorded are listed WONS.

One broad fauna habitat was recorded within the study area; Alluvial Plain. This fauna habitat is not considered to be restricted at a local or regional level.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.2 Principle b: Potential impact to any significant habitat for fauna indigenous to Western Australia

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

One broad fauna habitat was detected during the survey; Alluvial Plain. This habitat is not considered to be of specific dependence to conservation significance fauna. Due to the small size of clearing within this habitat, it is considered unlikely the Proposal will negatively impact on the conservation status of any species, on either a local or regional scale.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.3 Principle c: Potential impact to any rare flora

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

No Declared Rare / Threatened flora species were recorded, nor were any EPBC Act listed Threatened flora observed. It is considered highly unlikely that any Threatened Flora species would have been overlooked, nor is any preferred landforms/habitat present that is likely to support Threatened flora.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.4 Principle d: Presence of any threatened ecological communities

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

There are no State or Commonwealth listed TECs within or adjacent to the study area.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.5 Principle e: Significance as a remnant of native vegetation in the area that has been extensively cleared

Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared.

The majority of the Pilbara region has not been extensively cleared. However grazing, inappropriate fire regimes and weed invasion have greatly altered the vegetation in some areas. The study area lies within two of Beard's mapping units - Hamersley 181 and Hamersley 567.

The current extent of the Beard (1975) mapping units Hamersley 181 and Hamersley 567 has been estimated to be over 97% of their pre-European extent remaining and are considered to be of 'least concern'. Vegetation types within the study area would not represent remnant stands of extensively cleared vegetation.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.6 Principle f: Impact on any watercourse and / or wetlands

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

No flow lines are evident within the study area and the study area is not considered to be associated with watercourses or wetlands.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.7 Principle g: Potential to cause appreciable land degradation

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

The study area lies within vegetation considered to be of low conservation value which has been partly disturbed and is in Poor condition. The Proposal is not expected to result in soil erosion, nutrient export, water-logging/flooding, acidification, salinization or deep subsoil compaction.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.8 Principle h: Potential to impact on the environmental values of adjacent or nearby conservation areas

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

There are no nearby conservation areas.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.9 Principle i: Potential deterioration in the quality of surface or underground water

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

No permanent or semi-permanent water features occur in or adjacent to the study area. The study area lies within the Pilbara Groundwater Area and the Roebourne/Ashburton Groundwater Subarea. Due to the small size of the study area, it is considered unlikely the Proposal will negatively impact on this Water Reserve.

Based on specialist assessment, the proposal is considered not at variance to this principle.

6.10 Principle j: Potential of clearing to cause, or exacerbate, the incidence or intensity of flooding

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

Local flooding occurs seasonally in the Pilbara region as a result of cyclonic activity and sporadic thunderstorm activity. The small scale of cleared proposed is not expected to exacerbate the incidence or intensity of flooding in the area.

Based on specialist assessment, the proposal is considered not at variance to this principle.

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8. Appendices

Appendix 1: Results of NatureMap and EPBC Protected Matters database searches

TAXON	CLASS	CONS	KINGDOM
<i>Cyclorana maini</i>	AMPHI		Animalia
<i>Litoria rubella</i>	AMPHI		Animalia
<i>Uperoleia saxatilis</i>	AMPHI		Animalia
<i>Acanthagenys rufogularis</i>	BIRD		Animalia
<i>Acanthiza apicalis</i>	BIRD		Animalia
<i>Acanthiza robustirostris</i>	BIRD		Animalia
<i>Acanthiza uropygialis</i>	BIRD		Animalia
<i>Accipiter cirrocephalus</i>	BIRD		Animalia
<i>Accipiter cirrocephalus</i> subsp. <i>cirrocephalus</i>	BIRD		Animalia
<i>Accipiter fasciatus</i>	BIRD		Animalia
<i>Accipiter fasciatus</i> subsp. <i>fasciatus</i>	BIRD		Animalia
<i>Acrocephalus australis</i>	BIRD		Animalia
<i>Acrocephalus australis</i> subsp. <i>gouldi</i>	BIRD		Animalia
<i>Actitis hypoleucos</i>	BIRD	MI	Animalia
<i>Actitis hypoleucos</i> (<i>Tringa hypoleucos</i>)	BIRD		Animalia
<i>Aegothales cristatus</i>	BIRD		Animalia
<i>Amytornis striatus</i>	BIRD		Animalia
<i>Anas gracilis</i>	BIRD		Animalia
<i>Anas superciliosa</i>	BIRD		Animalia
<i>Anhinga novaehollandiae</i>	BIRD		Animalia
<i>Anthus novaeseelandiae</i>	BIRD		Animalia
<i>Aquila audax</i>	BIRD		Animalia
<i>Ardea modesta</i>	BIRD		Animalia
<i>Ardea novaehollandiae</i>	BIRD		Animalia
<i>Ardea pacifica</i>	BIRD		Animalia
<i>Ardeotis australis</i>	BIRD		Animalia
<i>Artamus cinereus</i>	BIRD		Animalia
<i>Artamus cinereus</i> subsp. <i>melanops</i>	BIRD		Animalia
<i>Artamus minor</i>	BIRD		Animalia
<i>Artamus personatus</i>	BIRD		Animalia
<i>Aythya australis</i>	BIRD		Animalia
<i>Barnardius zonarius</i>	BIRD		Animalia
<i>Cacatua roseicapilla</i>	BIRD		Animalia
<i>Cacatua roseicapilla</i> subsp. <i>roseicapilla</i>	BIRD		Animalia
<i>Cacatua sanguinea</i>	BIRD		Animalia
<i>Cacomantis pallidus</i>	BIRD		Animalia
<i>Calidris acuminata</i>	BIRD	MI	Animalia
<i>Calidris subminuta</i>	BIRD	MI	Animalia
<i>Centropus phasianinus</i>	BIRD		Animalia
<i>Certhionyx variegatus</i>	BIRD		Animalia
<i>Chrysococcyx basalis</i>	BIRD		Animalia

<i>Cincloramphus cruralis</i>	BIRD		Animalia
<i>Cinclosoma castaneothorax</i>	BIRD		Animalia
<i>Circus approximans</i>	BIRD		Animalia
<i>Circus assimilis</i>	BIRD		Animalia
<i>Colluricincla harmonica</i>	BIRD		Animalia
<i>Coracina novaehollandiae</i>	BIRD		Animalia
<i>Coracina novaehollandiae</i> subsp. <i>subpallida</i>	BIRD		Animalia
<i>Corvus bennetti</i>	BIRD		Animalia
<i>Corvus orru</i>	BIRD		Animalia
<i>Corvus orru</i> subsp. <i>ceciliae</i>	BIRD		Animalia
<i>Cracticus nigrogularis</i>	BIRD		Animalia
<i>Cracticus tibicen</i>	BIRD		Animalia
<i>Cracticus torquatus</i>	BIRD		Animalia
<i>Cygnus atratus</i>	BIRD		Animalia
<i>Dacelo leachii</i>	BIRD		Animalia
<i>Dacelo leachii</i> subsp. <i>leachii</i>	BIRD		Animalia
<i>Dicaeum hirundinaceum</i>	BIRD		Animalia
<i>Dicrurus bracteatus</i>	BIRD		Animalia
<i>Egretta novaehollandiae</i>	BIRD		Animalia
<i>Elanus caeruleus</i>	BIRD		Animalia
<i>Euseyonis melanops</i>	BIRD		Animalia
<i>Emblema pictum</i>	BIRD		Animalia
<i>Eolophus roseicapillus</i>	BIRD		Animalia
<i>Epthianura tricolor</i>	BIRD		Animalia
<i>Eremiornis carteri</i>	BIRD		Animalia
<i>Erythrogonyx cinctus</i>	BIRD		Animalia
<i>Eurostopodus argus</i>	BIRD		Animalia
<i>Falco berigora</i>	BIRD		Animalia
<i>Falco cenchroides</i>	BIRD		Animalia
<i>Falco hypoleucos</i>	BIRD	VU	Animalia
<i>Falco longipennis</i>	BIRD		Animalia
<i>Falco longipennis</i> subsp. <i>longipennis</i>	BIRD		Animalia
<i>Fulica atra</i>	BIRD		Animalia
<i>Gavicalis virescens</i>	BIRD		Animalia
<i>Geopelia cuneata</i>	BIRD		Animalia
<i>Geopelia striata</i>	BIRD		Animalia
<i>Geopelia striata</i> subsp. <i>placida</i>	BIRD		Animalia
<i>Geophaps plumifera</i>	BIRD		Animalia
<i>Gerygone fusca</i>	BIRD		Animalia
<i>Gerygone fusca</i> subsp. <i>mungii</i>	BIRD		Animalia
<i>Gallina cyanoleuca</i>	BIRD		Animalia
<i>Haliastur sphenurus</i>	BIRD		Animalia
<i>Hamirostra melanosternon</i>	BIRD		Animalia
<i>Hieraaetus morphnoides</i>	BIRD		Animalia
<i>Himantopus himantopus</i>	BIRD		Animalia

<i>Lalage tricolor</i>	BIRD	Animalia
<i>Lichenostomus penicillatus</i>	BIRD	Animalia
<i>Lichenostomus virescens</i>	BIRD	Animalia
<i>Lichmera indistincta</i>	BIRD	Animalia
<i>Lichmera indistincta</i> subsp. <i>indistincta</i>	BIRD	Animalia
<i>Malacorhynchus membranaceus</i>	BIRD	Animalia
<i>Malurus lamberti</i>	BIRD	Animalia
<i>Malurus lamberti assimilis</i>	BIRD	Animalia
<i>Malurus lamberti</i> subsp. <i>assimilis</i>	BIRD	Animalia
<i>Malurus lamberti</i> subsp. <i>bernieri</i>	BIRD	VU
<i>Malurus leucopterus</i>	BIRD	Animalia
<i>Manorina flavigula</i>	BIRD	Animalia
<i>Megalurus cruralis</i>	BIRD	Animalia
<i>Melanodryas cucullata</i>	BIRD	Animalia
<i>Melopsittacus undulatus</i>	BIRD	Animalia
<i>Merops ornatus</i>	BIRD	Animalia
<i>Microcarbo melanoleucos</i>	BIRD	Animalia
<i>Milvus migrans</i>	BIRD	Animalia
<i>Mirafra javanica</i>	BIRD	Animalia
<i>Neochmia ruficauda</i>	BIRD	Animalia
<i>Ninox boobook</i>	BIRD	Animalia
<i>Ninox boobook boobook</i>	BIRD	Animalia
<i>Ninox novaeseelandiae</i>	BIRD	Animalia
<i>Ninox novaeseelandiae</i> subsp. <i>boobook</i>	BIRD	Animalia
<i>Nycticorax caledonicus</i>	BIRD	Animalia
<i>Nymphicus hollandicus</i>	BIRD	Animalia
<i>Ocyphaps lophotes</i>	BIRD	Animalia
<i>Oreoica gutturalis</i>	BIRD	Animalia
<i>Pachycephala rufiventris</i>	BIRD	Animalia
<i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i>	BIRD	Animalia
<i>Pardalotus rubricatus</i>	BIRD	Animalia
<i>Pardalotus striatus</i> subsp. <i>murchisoni</i>	BIRD	Animalia
<i>Petrochelidon ariel</i>	BIRD	Animalia
<i>Petrochelidon nigricans</i>	BIRD	Animalia
<i>Petroica cucullata</i>	BIRD	Animalia
<i>Petroica goodenovii</i>	BIRD	Animalia
<i>Phaps chalcoptera</i>	BIRD	Animalia
<i>Platycercus zonarius</i>	BIRD	Animalia
<i>Platycercus zonarius</i> subsp. <i>zonarius</i>	BIRD	Animalia
<i>Podargus strigoides</i>	BIRD	Animalia
<i>Poliocephalus poliocephalus</i>	BIRD	Animalia
<i>Pomatostomus superciliosus</i>	BIRD	Animalia
<i>Pomatostomus temporalis</i>	BIRD	Animalia
<i>Pomatostomus temporalis</i> subsp. <i>rubeculus</i>	BIRD	Animalia
<i>Porphyrio porphyrio</i>	BIRD	Animalia

<i>Psophodes occidentalis</i>	BIRD		Animalia
<i>Ptilonorhynchus guttatus</i>	BIRD		Animalia
<i>Ptilonorhynchus maculatus guttatus</i>	BIRD		Animalia
<i>Ptilotula keartlandi</i>	BIRD		Animalia
<i>Ptilotula penicillata</i>	BIRD		Animalia
<i>Purnella albifrons</i>	BIRD		Animalia
<i>Pyrrholaemus brunneus</i>	BIRD		Animalia
<i>Recurvirostra novaehollandiae</i>	BIRD		Animalia
<i>Rhipidura albiscapa</i>	BIRD		Animalia
<i>Rhipidura fuliginosa</i>	BIRD		Animalia
<i>Rhipidura leucophrys</i>	BIRD		Animalia
<i>Rhipidura leucophrys</i> subsp. <i>leucophrys</i>	BIRD		Animalia
<i>Smicrornis brevirostris</i>	BIRD		Animalia
<i>Stipiturus ruficeps</i>	BIRD		Animalia
<i>Tachybaptus novaehollandiae</i>	BIRD		Animalia
<i>Tachybaptus novaehollandiae novaehollandiae</i>	BIRD		Animalia
<i>Tachybaptus ruficollis tricolor</i>	BIRD		Animalia
<i>Taeniopygia guttata</i>	BIRD		Animalia
<i>Taeniopygia guttata</i> subsp. <i>castanotis</i>	BIRD		Animalia
<i>Threskiornis molucca</i>	BIRD		Animalia
<i>Threskiornis spinicollis</i>	BIRD		Animalia
<i>Todiramphus pyrrhopygius</i>	BIRD		Animalia
<i>Todiramphus sanctus</i>	BIRD		Animalia
<i>Tringa glareola</i>	BIRD	MI	Animalia
<i>Turnix velox</i>	BIRD		Animalia
<i>Abutilon amplum</i>	DICOT		Plantae
<i>Abutilon cryptopetalum</i>	DICOT		Plantae
<i>Abutilon fraseri</i>	DICOT		Plantae
<i>Abutilon fraseri</i> subsp. <i>fraseri</i>	DICOT		Plantae
<i>Abutilon lepidum</i>	DICOT		Plantae
<i>Abutilon otocarpum</i>	DICOT		Plantae
<i>Abutilon oxycarpum</i> subsp. <i>Prostrate</i> (A.A. Mitchell PRP 1266)	DICOT		Plantae
<i>Abutilon</i> sp. (3) Channar Survey)	DICOT		Plantae
<i>Abutilon</i> sp. (4) Channar Survey)	DICOT		Plantae
<i>Abutilon</i> sp. (5) Channar Survey)	DICOT		Plantae
<i>Abutilon</i> sp. (6) aff. <i>lepidium</i> B)	DICOT		Plantae
<i>Abutilon</i> sp. (6) Channar Survey)	DICOT		Plantae
<i>Abutilon</i> sp. 1 (Channar Survey)	DICOT		Plantae
<i>Abutilon</i> sp. 5 (= aff. <i>lepidium</i> A)	DICOT		Plantae
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)	DICOT		Plantae
<i>Acacia ampliceps</i>	DICOT		Plantae
<i>Acacia ampliceps</i> x <i>sclerosperma</i> subsp. <i>sclerosperma</i>	DICOT		Plantae
<i>Acacia aneura</i>	DICOT		Plantae
<i>Acacia aptaneura</i>	DICOT		Plantae
<i>Acacia atkinsiana</i>	DICOT		Plantae

<i>Acacia ayersiana</i>	DICOT		Plantae
<i>Acacia ayersiana hybrid</i>	DICOT		Plantae
<i>Acacia ayersiana x incurvaneura</i>	DICOT		Plantae
<i>Acacia bivenosa</i>	DICOT		Plantae
<i>Acacia bivenosa x sclerosperma subsp. sclerosperma</i>	DICOT		Plantae
<i>Acacia citrinoviridis</i>	DICOT		Plantae
<i>Acacia coriacea subsp. pendens</i>	DICOT		Plantae
<i>Acacia cuspidifolia</i>	DICOT		Plantae
<i>Acacia fuscanaura</i>	DICOT		Plantae
<i>Acacia hamersleyensis</i>	DICOT		Plantae
<i>Acacia incurvaneura</i>	DICOT		Plantae
<i>Acacia maitlandii</i>	DICOT		Plantae
<i>Acacia marramamba</i>	DICOT		Plantae
<i>Acacia pruinocarpa</i>	DICOT		Plantae
<i>Acacia pyrifolia var. morrisonii</i>	DICOT		Plantae
<i>Acacia pyrifolia var. pyrifolia</i>	DICOT		Plantae
<i>Acacia rhodophloia</i>	DICOT		Plantae
<i>Acacia rhodophloia x sibirica</i>	DICOT		Plantae
<i>Acacia sclerosperma subsp. sclerosperma</i>	DICOT		Plantae
<i>Acacia sibirica</i>	DICOT		Plantae
<i>Acacia spondylophylla</i>	DICOT		Plantae
<i>Acacia synchronica</i>	DICOT		Plantae
<i>Acacia tetanophylla</i>	DICOT		Plantae
<i>Acacia tetragonophylla</i>	DICOT		Plantae
<i>Acacia thoma</i>	DICOT		Plantae
<i>Acacia wanyu</i>	DICOT		Plantae
<i>Acacia xiphophylla</i>	DICOT		Plantae
<i>Adriana tomentosa var. tomentosa</i>	DICOT		Plantae
<i>Aerva javanica</i>	DICOT		Plantae
<i>Aluta quadrata</i>	DICOT	EN	Plantae
<i>Amaranthus cuspidifolius</i>	DICOT		Plantae
<i>Amaranthus undulatus</i>	DICOT		Plantae
<i>Ammannia multiflora</i>	DICOT		Plantae
<i>Amyema fitzgeraldii</i>	DICOT		Plantae
<i>Amyema gibberula var. gibberula</i>	DICOT		Plantae
<i>Amyema sanguinea var. sanguinea</i>	DICOT		Plantae
<i>Amyema sp. Fortescue (M.E. Trudgen 5358)</i>	DICOT		Plantae
<i>Androcalva luteiflora</i>	DICOT		Plantae
<i>Angianthus tomentosus</i>	DICOT		Plantae
<i>Apowollastonia hamersleyensis</i>	DICOT		Plantae
<i>Argemone ochroleuca subsp. ochroleuca</i>	DICOT		Plantae
<i>Astrotricha hamptonii</i>	DICOT		Plantae
<i>Atriplex amnicola</i>	DICOT		Plantae
<i>Atriplex codonocarpa</i>	DICOT		Plantae
<i>Atriplex quadrivalvata</i>	DICOT		Plantae

<i>Boerhavia coccinea</i>	DICOT	Plantae
<i>Boerhavia</i> sp.	DICOT	Plantae
<i>Bonamia pilbarensis</i>	DICOT	Plantae
<i>Calandrinia holtumii</i>	DICOT	Plantae
<i>Calandrinia schistorhiza</i>	DICOT	Plantae
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	DICOT	Plantae
<i>Calocephalus knappii</i>	DICOT	Plantae
<i>Calocephalus multiflorus</i>	DICOT	Plantae
<i>Calotis multicaulis</i>	DICOT	Plantae
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	DICOT	Plantae
<i>Carissa lanceolata</i>	DICOT	Plantae
<i>Chrysocephalum gilesii</i>	DICOT	Plantae
<i>Cleome oxalidea</i>	DICOT	Plantae
<i>Cleome viscosa</i>	DICOT	Plantae
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	DICOT	Plantae
<i>Commicarpus australis</i>	DICOT	Plantae
<i>Convolvulus clementii</i>	DICOT	Plantae
<i>Corchorus crozophorifolius</i>	DICOT	Plantae
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	DICOT	Plantae
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	DICOT	Plantae
<i>Corchorus tridens</i>	DICOT	Plantae
<i>Corymbia candida</i>	DICOT	Plantae
<i>Corymbia ferriticola</i>	DICOT	Plantae
<i>Corymbia hamersleyana</i>	DICOT	Plantae
<i>Corymbia opaca</i>	DICOT	Plantae
<i>Crotalaria cunninghamii</i> subsp. <i>sturtii</i>	DICOT	Plantae
<i>Crotalaria medicaginea</i>	DICOT	Plantae
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	DICOT	Plantae
<i>Cryptandra monticola</i>	DICOT	Plantae
<i>Cucumis variabilis</i>	DICOT	Plantae
<i>Cullen leucanthum</i>	DICOT	Plantae
<i>Cullen leucochaites</i>	DICOT	Plantae
<i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>	DICOT	Plantae
<i>Dicladantha forrestii</i>	DICOT	Plantae
<i>Diplopeltis sturtii</i> var. <i>sturtii</i>	DICOT	Plantae
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>	DICOT	Plantae
<i>Dissocarpus paradoxus</i>	DICOT	Plantae
<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>	DICOT	Plantae
<i>Dodonaea pachyneura</i>	DICOT	Plantae
<i>Dodonaea petiolaris</i>	DICOT	Plantae
<i>Dodonaea viscosa</i>	DICOT	Plantae
<i>Duperreya commixta</i>	DICOT	Plantae
<i>Dysphania kalpari</i>	DICOT	Plantae
<i>Dysphania plantaginella</i>	DICOT	Plantae
<i>Dysphania rhadinostachya</i>	DICOT	Plantae

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	DICOT		Plantae
<i>Enchylaena tomentosa</i>	DICOT		Plantae
<i>Eremophea spinosa</i>	DICOT		Plantae
<i>Eremophila accrescens</i>	DICOT		Plantae
<i>Eremophila canaliculata</i>	DICOT		Plantae
<i>Eremophila coacta</i>	DICOT	P3	Plantae
<i>Eremophila cryptothrix</i>	DICOT		Plantae
<i>Eremophila cuneifolia</i>	DICOT		Plantae
<i>Eremophila exilifolia</i>	DICOT		Plantae
<i>Eremophila forrestii</i>	DICOT		Plantae
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	DICOT		Plantae
<i>Eremophila forrestii</i> subsp. <i>hastieana</i>	DICOT		Plantae
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	DICOT		Plantae
<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	DICOT		Plantae
<i>Eremophila lachnocalyx</i>	DICOT		Plantae
<i>Eremophila latrobei</i>	DICOT		Plantae
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	DICOT		Plantae
<i>Eremophila latrobei</i> subsp. <i>glabra</i>	DICOT		Plantae
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	DICOT		Plantae
<i>Eremophila longifolia</i>	DICOT		Plantae
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	DICOT	P4	Plantae
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	DICOT		Plantae
<i>Eremophila petrophila</i> subsp. <i>petrophila</i>	DICOT		Plantae
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	DICOT		Plantae
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>	DICOT		Plantae
<i>Eremophila reticulata</i>	DICOT		Plantae
<i>Eremophila</i> sp.	DICOT		Plantae
<i>Eremophila</i> sp. Hamersley Range (K. Walker KW 136)	DICOT	P3	Plantae
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	DICOT	P4	Plantae
<i>Erodium cygnorum</i>	DICOT		Plantae
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusata</i>	DICOT		Plantae
<i>Eucalyptus gamophylla</i>	DICOT		Plantae
<i>Eucalyptus kingsmillii</i>	DICOT		Plantae
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	DICOT		Plantae
<i>Eucalyptus repullulans</i>	DICOT		Plantae
<i>Euphorbia australis</i>	DICOT		Plantae
<i>Euphorbia australis</i> var. <i>hispidula</i>	DICOT		Plantae
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	DICOT		Plantae
<i>Euphorbia boophthona</i>	DICOT		Plantae
<i>Euphorbia careyi</i>	DICOT		Plantae
<i>Euphorbia coghlanii</i>	DICOT		Plantae
<i>Euphorbia</i> sp.	DICOT		Plantae
<i>Euphorbia tannensis</i>	DICOT		Plantae
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	DICOT		Plantae
<i>Euphorbia trigonosperma</i>	DICOT		Plantae

<i>Evolvulus alsinoides</i>	DICOT		Plantae
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	DICOT		Plantae
<i>Ficus brachypoda</i>	DICOT		Plantae
<i>Flaveria trinervia</i>	DICOT		Plantae
<i>Frankenia hispidula</i>	DICOT		Plantae
<i>Frankenia magnifica</i>	DICOT		Plantae
Genus C sp.11	DICOT		Plantae
<i>Glycine tabacina</i>	DICOT		Plantae
<i>Gnephosis arachnoidea</i>	DICOT		Plantae
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>	DICOT		Plantae
<i>Gomphrena canescens</i>	DICOT		Plantae
<i>Gomphrena cunninghamii</i>	DICOT		Plantae
<i>Gomphrena kanisii</i>	DICOT		Plantae
<i>Goodenia cusackiana</i>	DICOT		Plantae
<i>Goodenia forrestii</i>	DICOT		Plantae
<i>Goodenia microptera</i>	DICOT		Plantae
<i>Goodenia muelleriana</i>	DICOT		Plantae
<i>Goodenia pascua</i>	DICOT		Plantae
<i>Goodenia scaevolina</i>	DICOT		Plantae
<i>Goodenia</i> sp.	DICOT		Plantae
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	DICOT	P3	Plantae
<i>Goodenia stobbsiana</i>	DICOT		Plantae
<i>Goodenia tenuiloba</i>	DICOT		Plantae
<i>Gossypium robinsonii</i>	DICOT		Plantae
<i>Grevillea berryana</i>	DICOT		Plantae
<i>Grevillea saxicola</i>	DICOT	P3	Plantae
<i>Grevillea striata</i>	DICOT		Plantae
<i>Hakea lorea</i> subsp. <i>lorea</i>	DICOT		Plantae
<i>Hakea lorea</i> subsp. <i>suberea</i>	DICOT		Plantae
<i>Harnieria kempeana</i>	DICOT		Plantae
<i>Heliotropium chrysocarpum</i>	DICOT		Plantae
<i>Heliotropium conocarpum</i>	DICOT		Plantae
<i>Heliotropium crispatum</i>	DICOT		Plantae
<i>Heliotropium heteranthum</i>	DICOT		Plantae
<i>Heliotropium inexplicitum</i>	DICOT		Plantae
<i>Heliotropium ovalifolium</i>	DICOT		Plantae
<i>Heliotropium pachyphyllum</i>	DICOT		Plantae
<i>Heliotropium tenuifolium</i>	DICOT		Plantae
<i>Hibiscus burtonii</i>	DICOT		Plantae
<i>Hibiscus campanulatus</i>	DICOT	P1	Plantae
<i>Hibiscus coatesii</i>	DICOT		Plantae
<i>Hibiscus goldsworthii</i>	DICOT		Plantae
<i>Hibiscus</i> sp.	DICOT		Plantae
<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)	DICOT		Plantae
<i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	DICOT	P2	Plantae

<i>Hibiscus sturtii</i>	DICOT	Plantae
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	DICOT	Plantae
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>	DICOT	Plantae
<i>Hybanthus aurantiacus</i>	DICOT	Plantae
<i>Indigofera colutea</i>	DICOT	Plantae
<i>Indigofera decipiens</i>	DICOT	Plantae
<i>Indigofera fractiflexa</i>	DICOT	Plantae
<i>Indigofera monophylla</i>	DICOT	Plantae
<i>Indigofera rugosa</i>	DICOT	Plantae
<i>Ipomoea muelleri</i>	DICOT	Plantae
<i>Ixiochlamys cuneifolia</i>	DICOT	Plantae
<i>Jasminum didymum</i>	DICOT	Plantae
<i>Jasminum didymum</i> subsp. <i>lineare</i>	DICOT	Plantae
<i>Lawrenzia densiflora</i>	DICOT	Plantae
<i>Lawrenzia glomerata</i>	DICOT	Plantae
<i>Lawrenzia</i> sp. Mulein Station (Setter 317)	DICOT	Plantae
<i>Lepidium muelleri-ferdinandii</i>	DICOT	Plantae
<i>Lepidium oxytrichum</i>	DICOT	Plantae
<i>Lepidium pedicellosum</i>	DICOT	Plantae
<i>Lepidium phlebopetalum</i>	DICOT	Plantae
<i>Lepidium platypetalum</i>	DICOT	Plantae
<i>Lobelia arnhemiaca</i>	DICOT	Plantae
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	DICOT	Plantae
<i>Lotus cruentus</i>	DICOT	Plantae
<i>Lysiana casuarinae</i>	DICOT	Plantae
<i>Maireana eriosphaera</i>	DICOT	Plantae
<i>Maireana georgei</i>	DICOT	Plantae
<i>Maireana lanosa</i>	DICOT	Plantae
<i>Maireana melanocoma</i>	DICOT	Plantae
<i>Maireana planifolia</i>	DICOT	Plantae
<i>Maireana planifolia</i> x <i>villosa</i>	DICOT	Plantae
<i>Maireana pyramidata</i>	DICOT	Plantae
<i>Maireana suaedifolia</i>	DICOT	Plantae
<i>Maireana thesioides</i>	DICOT	Plantae
<i>Maireana tomentosa</i>	DICOT	Plantae
<i>Maireana tomentosa</i> subsp. <i>tomentosa</i>	DICOT	Plantae
<i>Maireana villosa</i>	DICOT	Plantae
<i>Malvastrum americanum</i>	DICOT	Plantae
<i>Marsdenia australis</i>	DICOT	Plantae
<i>Melaleuca bracteata</i>	DICOT	Plantae
<i>Melaleuca glomerata</i>	DICOT	Plantae
<i>Melaleuca linophylla</i>	DICOT	Plantae
<i>Melhania oblongifolia</i>	DICOT	Plantae
<i>Neptunia dimorphantha</i>	DICOT	Plantae
<i>Nicotiana benthamiana</i>	DICOT	Plantae

<i>Nicotiana karijini</i>	DICOT	Plantae
<i>Nicotiana occidentalis</i>	DICOT	Plantae
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	DICOT	Plantae
<i>Notoleptopus decaisnei</i>	DICOT	Plantae
<i>Oldenlandia crouchiana</i>	DICOT	Plantae
<i>Olearia mucronata</i>	DICOT	P3 Plantae
<i>Olearia xerophila</i>	DICOT	Plantae
<i>Operculina aequisepala</i>	DICOT	Plantae
<i>Petalostylis labicheoides</i>	DICOT	Plantae
<i>Phyllanthus maderaspatensis</i>	DICOT	Plantae
<i>Pilbara trudgenii</i>	DICOT	P3 Plantae
<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	DICOT	Plantae
<i>Pittosporum</i> sp.	DICOT	Plantae
<i>Pluchea dentex</i>	DICOT	Plantae
<i>Pluchea rubelliflora</i>	DICOT	Plantae
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	DICOT	Plantae
<i>Polycarpaea longiflora</i>	DICOT	Plantae
<i>Polygala glaucifolia</i>	DICOT	Plantae
<i>Polygala longifolia</i>	DICOT	Plantae
<i>Polymeria ambigua</i>	DICOT	Plantae
<i>Portulaca intraterranea</i>	DICOT	Plantae
<i>Portulaca oleracea</i>	DICOT	Plantae
<i>Prostanthera albiflora</i>	DICOT	Plantae
<i>Pseudognaphalium luteoalbum</i>	DICOT	Plantae
<i>Psyrax latifolia</i>	DICOT	Plantae
<i>Psyrax suaveolens</i>	DICOT	Plantae
<i>Pterocaulon sphacelatum</i>	DICOT	Plantae
<i>Ptilotus aevoides</i>	DICOT	Plantae
<i>Ptilotus astrolasius</i>	DICOT	Plantae
<i>Ptilotus auriculifolius</i>	DICOT	Plantae
<i>Ptilotus calostachyus</i>	DICOT	Plantae
<i>Ptilotus carinatus</i>	DICOT	Plantae
<i>Ptilotus clementii</i>	DICOT	Plantae
<i>Ptilotus drummondii</i>	DICOT	Plantae
<i>Ptilotus exaltatus</i>	DICOT	Plantae
<i>Ptilotus gaudichaudii</i>	DICOT	Plantae
<i>Ptilotus gomphrenoides</i>	DICOT	Plantae
<i>Ptilotus helipteroides</i>	DICOT	Plantae
<i>Ptilotus macrocephalus</i>	DICOT	Plantae
<i>Ptilotus mollis</i>	DICOT	P4 Plantae
<i>Ptilotus nobilis</i>	DICOT	Plantae
<i>Ptilotus obovatus</i>	DICOT	Plantae
<i>Ptilotus polystachyus</i>	DICOT	Plantae
<i>Ptilotus schwartzii</i>	DICOT	Plantae
<i>Ptilotus trichocephalus</i>	DICOT	P4 Plantae

<i>Rhagodia eremaea</i>	DICOT	Plantae
<i>Rhodanthe floribunda</i>	DICOT	Plantae
<i>Rhodanthe margarethae</i>	DICOT	Plantae
<i>Rhodanthe maryonii</i>	DICOT	Plantae
<i>Rhynchosia australis</i>	DICOT	Plantae
<i>Rhynchosia minima</i>	DICOT	Plantae
<i>Roebuckiella cuneata</i>	DICOT	Plantae
<i>Roepera kochii</i>	DICOT	Plantae
<i>Rumex vesicarius</i>	DICOT	Plantae
<i>Salsola australis</i>	DICOT	Plantae
<i>Samolus sp.</i>	DICOT	Plantae
<i>Santalum lanceolatum</i>	DICOT	Plantae
<i>Sauropus crassifolius</i>	DICOT	Plantae
<i>Scaevola acacioides</i>	DICOT	Plantae
<i>Scaevola spinescens</i>	DICOT	Plantae
<i>Schenkia clementii</i>	DICOT	Plantae
<i>Schoenia ayersii</i>	DICOT	Plantae
<i>Sclerolaena bicornis</i>	DICOT	Plantae
<i>Sclerolaena cornishiana</i>	DICOT	Plantae
<i>Sclerolaena costata</i>	DICOT	Plantae
<i>Sclerolaena cuneata</i>	DICOT	Plantae
<i>Sclerolaena densiflora</i>	DICOT	Plantae
<i>Sclerolaena eriacantha</i>	DICOT	Plantae
<i>Sclerolaena lanicuspis</i>	DICOT	Plantae
<i>Senecio magnificus</i>	DICOT	Plantae
<i>Senna artemisioides</i>	DICOT	Plantae
<i>Senna artemisioides</i> subsp. <i>artemisioides</i>	DICOT	Plantae
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	DICOT	Plantae
<i>Senna artemisioides</i> subsp. <i>helmsii</i> x <i>artemisioides</i> subsp. <i>oligophylla</i>	DICOT	Plantae
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	DICOT	Plantae
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>	DICOT	Plantae
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	DICOT	Plantae
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	DICOT	Plantae
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	DICOT	Plantae
<i>Senna notabilis</i>	DICOT	Plantae
<i>Senna sp.</i>	DICOT	Plantae
<i>Senna sp.</i> Karijini (M.E. Trudgen 10392)	DICOT	Plantae
<i>Senna sp.</i> Meekatharra (E. Bailey 1-26)	DICOT	Plantae
<i>Senna stricta</i>	DICOT	Plantae
<i>Seringia elliptica</i>	DICOT	Plantae
<i>Seringia nephrosperma</i>	DICOT	Plantae
<i>Sesbania cannabina</i>	DICOT	Plantae
<i>Sesbania formosa</i>	DICOT	Plantae
<i>Sida brownii</i>	DICOT	Plantae
<i>Sida calyxhymenia</i>	DICOT	Plantae

<i>Sida echinocarpa</i>	DICOT	Plantae
<i>Sida fibulifera</i>	DICOT	Plantae
<i>Sida laevis</i>	DICOT	Plantae
<i>Sida platycalyx</i>	DICOT	Plantae
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	DICOT	4 Plantae
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	DICOT	Plantae
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)	DICOT	Plantae
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	DICOT	P3 Plantae
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	DICOT	Plantae
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	DICOT	Plantae
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	DICOT	Plantae
<i>Sida spinosa</i>	DICOT	Plantae
<i>Sisymbrium orientale</i>	DICOT	Plantae
<i>Solanum ashbyae</i>	DICOT	Plantae
<i>Solanum gabrielae</i>	DICOT	Plantae
<i>Solanum horridum</i>	DICOT	Plantae
<i>Solanum lasiophyllum</i>	DICOT	Plantae
<i>Solanum nigrum</i>	DICOT	Plantae
<i>Solanum octonum</i>	DICOT	Plantae
<i>Solanum phlomoides</i>	DICOT	Plantae
<i>Solanum piceum</i>	DICOT	Plantae
<i>Solanum</i> sp.	DICOT	Animalia
<i>Solanum sturtianum</i>	DICOT	Plantae
<i>Sonchus oleraceus</i>	DICOT	Plantae
<i>Stackhousia intermedia</i>	DICOT	Plantae
<i>Stackhousia muricata</i>	DICOT	Plantae
<i>Stemodia grossa</i>	DICOT	Plantae
<i>Stenopetalum anfractum</i>	DICOT	Plantae
<i>Streptoglossa adscendens</i>	DICOT	Plantae
<i>Streptoglossa decurrens</i>	DICOT	Plantae
<i>Streptoglossa liatroides</i>	DICOT	Plantae
<i>Streptoglossa</i> sp.	DICOT	Plantae
<i>Stylobasium spathulatum</i>	DICOT	Plantae
<i>Swainsona forrestii</i>	DICOT	Plantae
<i>Swainsona incei</i>	DICOT	Plantae
<i>Swainsona leeana</i>	DICOT	Plantae
<i>Swainsona maccullochiana</i>	DICOT	Plantae
<i>Swainsona thompsoniana</i>	DICOT	P3 Plantae
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	DICOT	Plantae
<i>Taplinia saxatilis</i>	DICOT	Plantae
<i>Taraxacum khatoonae</i>	DICOT	Plantae
<i>Tecticornia disarticulata</i>	DICOT	Plantae
<i>Tecticornia</i> sp.	DICOT	Plantae
<i>Tephrosia densa</i>	DICOT	Plantae
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	DICOT	Plantae

<i>Tephrosia</i> sp. clay soils (S. van Leeuwen et al. PBS 0273)	DICOT	Plantae
<i>Tephrosia</i> sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)	DICOT	Plantae
<i>Thespesia</i> sp.	DICOT	Plantae
<i>Trachymene pilbarensis</i>	DICOT	Plantae
<i>Trianthema glossostigmum</i>	DICOT	Plantae
<i>Trianthema oxycalyptum</i>	DICOT	Plantae
<i>Trianthema pilosum</i>	DICOT	Plantae
<i>Trianthema triquetrum</i>	DICOT	Plantae
<i>Tribulus astrocarpus</i>	DICOT	Plantae
<i>Tribulus hirsutus</i>	DICOT	Plantae
<i>Tribulus occidentalis</i>	DICOT	Plantae
<i>Tribulus suberosus</i>	DICOT	Plantae
<i>Trichodesma zeylanicum</i>	DICOT	Plantae
<i>Trigastrotheca molluginea</i>	DICOT	Plantae
<i>Triumfetta chaetocarpa</i>	DICOT	Plantae
<i>Triumfetta clementii</i>	DICOT	Plantae
<i>Vachellia farnesiana</i>	DICOT	Plantae
<i>Ventilago viminalis</i>	DICOT	Plantae
<i>Vigna lanceolata</i>	DICOT	Plantae
<i>Vincetoxicum flexuosum</i>	DICOT	Plantae
<i>Vincetoxicum lineare</i>	DICOT	Plantae
<i>Wahlenbergia tumidifructa</i>	DICOT	Plantae
<i>Waltheria indica</i>	DICOT	Plantae
<i>Waltheria virgata</i>	DICOT	Plantae
<i>Zaleya galericulata</i> subsp. <i>galericulata</i>	DICOT	Plantae
<i>Zygophyllum eichleri</i>	DICOT	Plantae
<i>Zygophyllum iodocarpum</i>	DICOT	Plantae
<i>Cheilanthes brownii</i>	FERN	Plantae
<i>Cheilanthes lasiophylla</i>	FERN	Plantae
<i>Cheilanthes tenuifolia</i>	FERN	Plantae
<i>Marsilea hirsuta</i>	FERN	Plantae
<i>Leiopotherapon unicolor</i>	FISH	Animalia
<i>Melanotaenia australis</i>	FISH	Animalia
<i>Neosilurus hyrtlui</i>	FISH	Animalia
<i>Abnitocrella halsei</i>	INVERT	Animalia
<i>Acariformes</i> sp.	INVERT	Animalia
<i>Aeolosoma</i> sp. 1 (PSS)	INVERT	Animalia
<i>Aeolosoma</i> sp. 4 (cf <i>travancorensis</i>) (PSS)	INVERT	Animalia
<i>amphipod</i> sp. 2 (PSS)	INVERT	Animalia
<i>Amphipoda</i> sp.	INVERT	Animalia
<i>Anochetus armstrongi</i> McAreavey	INVERT	Animalia
<i>ant</i> sp.	INVERT	Animalia
<i>Apocyclops dengizicus</i>	INVERT	Animalia
<i>Areacandona 'scanlonii'</i> (PSS)	INVERT	Animalia
<i>Areacandona</i> sp.	INVERT	Animalia

<i>Areacandona</i> sp. 5' (PSS)	INVERT	Animalia
<i>Arrenuridae</i> sp.	INVERT	Animalia
<i>Arrenurus</i> sp. S3 (PSS)	INVERT	Animalia
<i>Arrenurus</i> sp. S4 (PSS)	INVERT	Animalia
<i>Asadipus</i> sp.4	INVERT	Animalia
<i>Atopobathynella</i> sp. A	INVERT	Animalia
<i>Australutica</i> sp.2	INVERT	Animalia
<i>Bdelloidea</i> sp.	INVERT	Animalia
beetle sp.	INVERT	Animalia
<i>Bogidiellidae</i> sp.	INVERT	Animalia
<i>Bolborhachium inclinatum</i>	INVERT	Animalia
<i>Boreosaragus</i> sp1	INVERT	Animalia
<i>Bothriembryon 'pilbara'</i>	INVERT	Animalia
<i>Brises</i> sp1	INVERT	Animalia
<i>Buddelundia</i> sp.	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 10 (= sp. B25)	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 13 (= sp. B27)	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 14 (= sp. B22)	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 16 (= sp. B24)	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 48 (= sp. B21)	INVERT	Animalia
<i>Buddelundia</i> sp. nov. 50 (= sp. B20)	INVERT	Animalia
<i>Calosoma oceanicum</i>	INVERT	Animalia
<i>Calosoma schayeri</i>	INVERT	Animalia
<i>Camponotus discors</i> Forel	INVERT	Animalia
<i>Camponotus novaehollandiae</i> Mayr	INVERT	Animalia
<i>Camponotus wiederkehri</i> Forel	INVERT	Animalia
<i>Candonid Genus 2</i> sp. 1 (PSS)	INVERT	Animalia
<i>Candonid Genus 5</i> sp. 1	INVERT	Animalia
<i>Carenum pulchrum</i>	INVERT	Animalia
<i>Chlaenius australis</i>	INVERT	Animalia
<i>Cryptoerithrus harveyi</i>	INVERT	Animalia
<i>Cryptoerithrus</i> sp.6	INVERT	Animalia
<i>Deminutiocandona</i> cf. 'quasimica' (PSS)	INVERT	Animalia
<i>Deminutiocandona</i> sp. 1' (PSS)	INVERT	Animalia
<i>Deminutiocandona 'stomachosa'</i> (PSS)	INVERT	Animalia
<i>Diacyclops cockingi</i>	INVERT	Animalia
<i>Diacyclops humphreysi humphreysi</i>	INVERT	Animalia
<i>Diacyclops sobeprolatus</i>	INVERT	Animalia
earthworm sp.	INVERT	Animalia
<i>Euasteron</i> sp.1	INVERT	Animalia
fly sp.	INVERT	Animalia
<i>Gamasomorpha</i> sp.1	INVERT	Animalia
<i>Gamasomorpha</i> sp.2	INVERT	Animalia
<i>Gangus</i> sp. 2	INVERT	Animalia
<i>Gnathaphanus aridus</i>	INVERT	Animalia

<i>Gomphodella cf. sp. 5 (PSS)</i>	INVERT	Animalia
<i>Gomphodella sp. 5 (PSS)</i>	INVERT	Animalia
<i>Grymeus sp.7</i>	INVERT	Animalia
<i>Habronestes sp.8</i>	INVERT	Animalia
<i>Halacaridae sp. 1 (PSS)</i>	INVERT	Animalia
<i>Halacaridae sp. S3 (PSS)</i>	INVERT	Animalia
<i>Helea sp3</i>	INVERT	Animalia
<i>Heteropoda hermitis</i>	INVERT	Animalia
<i>Hypharpax sp2</i>	INVERT	Animalia
<i>Indolpium sp. B08 (=Phoenix sp. 1)</i>	INVERT	Animalia
<i>Iridomyrmex chasei complex sp. JDM 1157</i>	INVERT	Animalia
<i>Iridomyrmex chasei concolor</i> Forel	INVERT	Animalia
<i>Iridomyrmex hartmeyeri</i> Forel	INVERT	Animalia
<i>Iridomyrmex hartmeyeri gp sp. JDM 327</i>	INVERT	Animalia
<i>Iridomyrmex sp. JDM 133</i>	INVERT	Animalia
<i>Iridomyrmex sp. JDM 319</i>	INVERT	Animalia
<i>Iridomyrmex sp. JDM 843</i>	INVERT	Animalia
<i>Karaops martamarta</i>	INVERT	Animalia
<i>'Leicacandona' 'carinata' (PSS)</i>	INVERT	Animalia
<i>Lepanus sp nov. nr. penelopae</i>	INVERT	Animalia
<i>Loxandrus micantior</i>	INVERT	Animalia
<i>Lychas annulatus</i>	INVERT	Animalia
<i>Lychas bituberculatus</i>	INVERT	Animalia
<i>Lychas 'bituberculatus' ms</i>	INVERT	Animalia
<i>Lychas 'hairy tail group'</i>	INVERT	Animalia
<i>Lychas mjobergi</i>	INVERT	Animalia
<i>Lychas sp.</i>	INVERT	Animalia
<i>Lychas sp. 2</i>	INVERT	Animalia
<i>Lychas sp. 8</i>	INVERT	Animalia
<i>Lycosa sp.1</i>	INVERT	Animalia
<i>Melitidae sp. 1 (PSS)</i>	INVERT	Animalia
<i>Melophorus bagoti</i> Lubbock	INVERT	Animalia
<i>Melophorus ludius sulla</i> Forel	INVERT	Animalia
<i>Melophorus sp. JDM 176</i>	INVERT	Animalia
<i>Melophorus turneri</i> Forel	INVERT	Animalia
<i>Meranoplus cf. dimidiatus</i> F. Smith	INVERT	Animalia
<i>Meranoplus sp. JDM 865</i>	INVERT	Animalia
<i>Meranoplus taurus</i> Schiödz̄ ½īz̄ ½īz̄ ½dl	INVERT	Animalia
<i>Mesocyclops brooksi</i>	INVERT	Animalia
<i>Mesocyclops sp.</i>	INVERT	Animalia
<i>Metistete sp1</i>	INVERT	Animalia
<i>Microcyclops varicans</i>	INVERT	Animalia
<i>Minasteron minusculum</i>	INVERT	Animalia
<i>Monomorium disetigerum</i> Heterick	INVERT	Animalia
<i>Monomorium laeve</i> Mayr	INVERT	Animalia

<i>Monomorium rothsteini</i> Forel	INVERT	Animalia
<i>Myrmopopaea</i> sp.18	INVERT	Animalia
<i>Myrmopopaea</i> sp.19	INVERT	Animalia
<i>Nedsia nr hurlberti</i>	INVERT	Animalia
<i>Nedsia nr</i> sp. 24 (PSS)	INVERT	Animalia
<i>Nedsia</i> sp.	INVERT	Animalia
<i>Nedsia</i> sp. 24 (PSS)	INVERT	Animalia
<i>Nematoda</i> sp. 10 (PSS)	INVERT	Animalia
<i>No invertebrates</i>	INVERT	Animalia
<i>Nocticola</i> sp.	INVERT	Animalia
<i>Onthophagus consentaneus</i>	INVERT	Animalia
<i>Onthophagus mjobergi</i>	INVERT	Animalia
<i>Onthophagus pugnacior</i>	INVERT	Animalia
<i>Opopaea</i> sp.17	INVERT	Animalia
<i>Opopaea</i> sp.21	INVERT	Animalia
<i>Opopaea</i> sp.4	INVERT	Animalia
<i>Oribatida</i> group 1 (PSS)	INVERT	Animalia
<i>Origocandona inanitas</i>	INVERT	Animalia
<i>Ostracoda</i> (unident.)	INVERT	Animalia
<i>Paramelitidae</i> sp.	INVERT	Animalia
<i>Paramelitidae</i> sp. 2 (PSS)	INVERT	Animalia
<i>Parastenocarididae</i> sp.	INVERT	Animalia
<i>Parastenocaris jane</i>	INVERT	Animalia
<i>Paratrechina braueri glabrior</i> (Forel)	INVERT	Animalia
<i>Pheidole deserticola</i> Forel	INVERT	Animalia
<i>Phorticosomus gularis</i>	INVERT	Animalia
<i>Phorticosomus</i> sp1	INVERT	Animalia
<i>Phreodrilid</i> with dissimilar ventral chaetae	INVERT	Animalia
<i>Phreodrilid</i> with similar ventral chaetae	INVERT	Animalia
<i>Phreodrilidae</i> sp.	INVERT	Animalia
<i>Pilbaracandona</i> 'sp. 3' (PSS)	INVERT	Animalia
<i>Pilbaracandona</i> 'sp. 4' (PSS)	INVERT	Animalia
<i>Pilbarus millsii</i>	INVERT	Animalia
<i>Planorbidae</i> sp.	INVERT	Animalia
<i>planthopper</i> sp.	INVERT	Animalia
<i>Pristina longiseta</i>	INVERT	Animalia
<i>Pygolabis paraburdoo</i>	INVERT	Animalia
<i>Pygolabis</i> sp.	INVERT	Animalia
<i>Recifella</i> sp P1 (nr umala) (PSW)	INVERT	Animalia
<i>Rhagada</i> 'small banded'	INVERT	Animalia
' <i>Rockleanitocrella</i> ' sp. 1 (PSS)	INVERT	Animalia
<i>Rotifera</i> sp.	INVERT	Animalia
<i>Schizopera roberiverensis</i>	INVERT	Animalia
<i>spider</i> sp.	INVERT	Animalia
<i>springtail</i> sp.	INVERT	Animalia

<i>Synothele</i> sp.5	INVERT	Animalia
<i>Tetramorium spininode</i> Bolton	INVERT	Animalia
<i>Tetramorium striolatum</i> gp. sp. JDM 142	INVERT	Animalia
<i>Tetramorium striolatum</i> Viehmeyer	INVERT	Animalia
<i>Thereuopoda lesueurii</i>	INVERT	Animalia
<i>Tiramideopsis lictus</i>	INVERT	Animalia
<i>Tiramideopsis</i> sp.	INVERT	Animalia
<i>Trichocyclus nigropunctatus</i>	INVERT	Animalia
<i>Trichocyclus warianga</i>	INVERT	Animalia
<i>Trombidioidea</i> sp. C (PSS)	INVERT	Animalia
white ant sp.	INVERT	Animalia
<i>Yilgarnia</i> sp.3	INVERT	Animalia
<i>Collema coccophorum</i>	LICHEN	Fungi
<i>Xanthoparmelia reptans</i>	LICHEN	Fungi
<i>Austronomus australis</i>	MAMMAL	Animalia
<i>Bos taurus</i>	MAMMAL	Animalia
<i>Canis dingo</i>	MAMMAL	Animalia
<i>Canis lupus</i>	MAMMAL	Animalia
<i>Chaerephon jobensis</i>	MAMMAL	Animalia
<i>Chalinolobus gouldii</i>	MAMMAL	Animalia
<i>Dasykaluta rosamondae</i>	MAMMAL	Animalia
<i>Dasyurus hallucatus</i>	MAMMAL EN	Animalia
<i>Felis catus</i>	MAMMAL	Animalia
<i>Macroderma gigas</i>	MAMMAL VU	Animalia
<i>Macropus rufus</i>	MAMMAL	Animalia
<i>Mus musculus</i>	MAMMAL	Animalia
<i>Ningai timealeyi</i>	MAMMAL	Animalia
<i>Nyctophilus geoffroyi</i>	MAMMAL	Animalia
<i>Osphranter robustus</i>	MAMMAL	Animalia
<i>Osphranter robustus erubescens</i>	MAMMAL	Animalia
<i>Osphranter rufus</i>	MAMMAL	Animalia
<i>Ozimops lumsdenae</i>	MAMMAL	Animalia
<i>Petrogale rothschildi</i>	MAMMAL	Animalia
<i>Planigale ingrami</i>	MAMMAL	Animalia
<i>Planigale species 1'</i>	MAMMAL	Animalia
<i>Pseudantechinus woolleyae</i>	MAMMAL	Animalia
<i>Pseudomys chapmani</i>	MAMMAL P4	Animalia
<i>Pseudomys desertor</i>	MAMMAL	Animalia
<i>Pseudomys hermannsburgensis</i>	MAMMAL	Animalia
<i>Pseudomys hermannsbergensis</i>	MAMMAL	Animalia
<i>Rhinonictes aurantia</i>	MAMMAL P4	Animalia
<i>Rhinonictes aurantia</i> (Pilbara)	MAMMAL VU	Animalia
<i>Rhinonictes aurantius</i>	MAMMAL	Animalia
<i>Saccolaimus flaviventris</i>	MAMMAL	Animalia
<i>Scotorepens greyii</i>	MAMMAL	Animalia

<i>Sminthopsis longicaudata</i>	MAMMAL	P4	Animalia
<i>Sminthopsis macroura</i>	MAMMAL		Animalia
<i>Taphozous georgianus</i>	MAMMAL		Animalia
<i>Taphozous hilli</i>	MAMMAL		Animalia
<i>Vespadelus finlaysoni</i>	MAMMAL		Animalia
<i>Zyzomys argurus</i>	MAMMAL		Animalia
<i>Amphipogon sericeus</i>	MONOCOT		Plantae
<i>Aristida burbidgeae</i>	MONOCOT		Plantae
<i>Aristida contorta</i>	MONOCOT		Plantae
<i>Asphodelus fistulosus</i>	MONOCOT		Plantae
<i>Astrebla pectinata</i>	MONOCOT		Plantae
<i>Brachyachne prostrata</i>	MONOCOT		Plantae
<i>Bulbostylis barbata</i>	MONOCOT		Plantae
<i>Cenchrus ciliaris</i>	MONOCOT		Plantae
<i>Chloris virgata</i>	MONOCOT		Plantae
<i>Cymbopogon ambiguus</i>	MONOCOT		Plantae
<i>Cynodon prostratus</i>	MONOCOT		Plantae
<i>Cyperus bifax</i>	MONOCOT		Plantae
<i>Cyperus cunninghamii</i>	MONOCOT		Plantae
<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>	MONOCOT		Plantae
<i>Cyperus involucratus</i>	MONOCOT		Plantae
<i>Cyperus vaginatus</i>	MONOCOT		Plantae
<i>Dactyloctenium radulans</i>	MONOCOT		Plantae
<i>Digitaria ciliaris</i>	MONOCOT		Plantae
<i>Diplachne fusca</i> subsp. <i>fusca</i>	MONOCOT		Plantae
<i>Enneapogon caeruleus</i>	MONOCOT		Plantae
<i>Enneapogon lindleyanus</i>	MONOCOT		Plantae
<i>Enneapogon pallidus</i>	MONOCOT		Plantae
<i>Enneapogon polyphyllus</i>	MONOCOT		Plantae
<i>Enteropogon ramosus</i>	MONOCOT		Plantae
<i>Eragrostis dielsii</i>	MONOCOT		Plantae
<i>Eragrostis eriopoda</i>	MONOCOT		Plantae
<i>Eragrostis setifolia</i>	MONOCOT		Plantae
<i>Eragrostis</i> sp.	MONOCOT		Plantae
<i>Eragrostis xerophila</i>	MONOCOT		Plantae
<i>Eriachne aristidea</i>	MONOCOT		Plantae
<i>Eriachne mucronata</i>	MONOCOT		Plantae
<i>Eriachne pulchella</i>	MONOCOT		Plantae
<i>Eriachne tenuiculmis</i>	MONOCOT		Plantae
<i>Iseilema dolichotrichum</i>	MONOCOT		Plantae
<i>Iseilema vaginiflorum</i>	MONOCOT		Plantae
<i>Panicum decompositum</i>	MONOCOT		Plantae
<i>Paraneurachne muelleri</i>	MONOCOT		Plantae
<i>Paspalidium basicladum</i>	MONOCOT		Plantae
<i>Paspalidium clementii</i>	MONOCOT		Plantae

<i>Paspalidium constrictum</i>	MONOCOT	Plantae
<i>Paspalidium rarum</i>	MONOCOT	Plantae
<i>Potamogeton tepperi</i>	MONOCOT	Plantae
<i>Schoenoplectus subulatus</i>	MONOCOT	Plantae
<i>Sporobolus australasicus</i>	MONOCOT	Plantae
<i>Themeda</i> sp.	MONOCOT	Plantae
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	MONOCOT P3	Plantae
<i>Themeda triandra</i>	MONOCOT	Plantae
<i>Triodia angusta</i>	MONOCOT	Plantae
<i>Triodia brizoides</i>	MONOCOT	Plantae
<i>Triodia epactia</i>	MONOCOT	Plantae
<i>Triodia wiseana</i>	MONOCOT	Plantae
<i>Triraphis mollis</i>	MONOCOT	Plantae
<i>Typha domingensis</i>	MONOCOT	Plantae
<i>Amphibolurus longirostris</i>	REPTILE	Animalia
<i>Anilius grypys</i>	REPTILE	Animalia
<i>Antaresia perthensis</i>	REPTILE	Animalia
<i>Antaresia stimsoni</i>	REPTILE	Animalia
<i>Brachyurophis approximans</i>	REPTILE	Animalia
<i>Carlia triacantha</i>	REPTILE	Animalia
<i>Cryptoblepharus ustulatus</i>	REPTILE	Animalia
<i>Ctenophorus caudicinctus</i>	REPTILE	Animalia
<i>Ctenophorus caudicinctus</i> subsp. <i>caudicinctus</i>	REPTILE	Animalia
<i>Ctenophorus isolepis</i>	REPTILE	Animalia
<i>Ctenophorus isolepis</i> subsp. <i>isolepis</i>	REPTILE	Animalia
<i>Ctenophorus nuchalis</i>	REPTILE	Animalia
<i>Ctenophorus reticulatus</i>	REPTILE	Animalia
<i>Ctenotus duricola</i>	REPTILE	Animalia
<i>Ctenotus duricola/piankai</i>	REPTILE	Animalia
<i>Ctenotus hanloni</i>	REPTILE	Animalia
<i>Ctenotus helenae</i>	REPTILE	Animalia
<i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i>	REPTILE	Animalia
<i>Ctenotus rubicundus</i>	REPTILE	Animalia
<i>Ctenotus rutilans</i>	REPTILE	Animalia
<i>Ctenotus saxatilis</i>	REPTILE	Animalia
<i>Ctenotus serventyi</i>	REPTILE	Animalia
<i>Ctenotus uber</i>	REPTILE	Animalia
<i>Ctenotus uber</i> subsp. <i>uber</i>	REPTILE	Animalia
<i>Cyclodomorphus melanops</i> subsp. <i>elongatus</i>	REPTILE	Animalia
<i>Delma elegans</i>	REPTILE	Animalia
<i>Delma nasuta</i>	REPTILE	Animalia
<i>Delma pax</i>	REPTILE	Animalia
<i>Demansia rufescens</i>	REPTILE	Animalia
<i>Diplodactylus conspicillatus</i>	REPTILE	Animalia
<i>Diplodactylus savagei</i>	REPTILE	Animalia

<i>Furina ornata</i>	REPTILE		Animalia
<i>Gehyra punctata</i>	REPTILE		Animalia
<i>Gehyra purpurascens</i>	REPTILE		Animalia
<i>Gehyra variegata</i>	REPTILE		Animalia
<i>Gehyra variegata/purpurascens</i>	REPTILE		Animalia
<i>Heteronotia binoei</i>	REPTILE		Animalia
<i>Heteronotia spelea</i>	REPTILE		Animalia
<i>Lerista bipes</i>	REPTILE		Animalia
<i>Lerista clara</i>	REPTILE		Animalia
<i>Lerista flammicauda</i>	REPTILE		Animalia
<i>Lerista neander</i>	REPTILE		Animalia
<i>Lerista rolfei</i>	REPTILE		Animalia
<i>Lerista verhmensis</i>	REPTILE		Animalia
<i>Lialis burtonis</i>	REPTILE		Animalia
<i>Liasis olivaceus subsp. barroni</i>	REPTILE	VU	Animalia
<i>Lucasium stenodactylum</i>	REPTILE		Animalia
<i>Lucasium wombeyi</i>	REPTILE		Animalia
<i>Lucasium 'woodwardi'</i>	REPTILE		Animalia
<i>Menetia greyii</i>	REPTILE		Animalia
<i>Menetia surda</i>	REPTILE		Animalia
<i>Menetia surda subsp. surda</i>	REPTILE		Animalia
<i>Morethia ruficauda</i>	REPTILE		Animalia
<i>Morethia ruficauda subsp. exquisita</i>	REPTILE		Animalia
<i>Nephrurus levis subsp. pilbarensis</i>	REPTILE		Animalia
<i>Nephrurus wheeleri</i>	REPTILE		Animalia
<i>Nephrurus wheeleri subsp. cinctus</i>	REPTILE		Animalia
<i>Notoscincus ornatus</i>	REPTILE		Animalia
<i>Notoscincus ornatus subsp. ornatus</i>	REPTILE		Animalia
<i>Oedura fimbria</i>	REPTILE		Animalia
<i>Oedura marmorata</i>	REPTILE		Animalia
<i>Pogona minor subsp. minima</i>	REPTILE	VU	Animalia
<i>Pseudechis australis</i>	REPTILE		Animalia
<i>Pseudonaja mengdeni</i>	REPTILE		Animalia
<i>Pseudonaja modesta</i>	REPTILE		Animalia
<i>Pseudonaja nuchalis</i>	REPTILE		Animalia
<i>Ramphotyphlops ammodytes</i>	REPTILE		Animalia
<i>Ramphotyphlops grypus</i>	REPTILE		Animalia
<i>Simoselaps bertholdi</i>	REPTILE		Animalia
<i>Strophurus strophurus</i>	REPTILE		Animalia
<i>Suta fasciata</i>	REPTILE		Animalia
<i>Tympanocryptis cephalo</i>	REPTILE		Animalia
<i>Varanus acanthurus</i>	REPTILE		Animalia
<i>Varanus breviceuda</i>	REPTILE		Animalia
<i>Varanus bushi</i>	REPTILE		Animalia
<i>Varanus caudolineatus</i>	REPTILE		Animalia

<i>Varanus eremius</i>	REPTILE	Animalia
<i>Varanus giganteus</i>	REPTILE	Animalia
<i>Varanus tristis</i>	REPTILE	Animalia
<i>Varanus tristis tristis</i>	REPTILE	Animalia
<i>Vermicella snelli</i>	REPTILE	Animalia



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Jun-2023

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Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	9
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species

[[Resource Information](#)]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name

Threatened Category

Presence Text

BIRD

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat may occur within area

[Erythrotriorchis radiatus](#)

Red Goshawk [942]

Endangered

Species or species habitat may occur within area

[Falco hypoleucos](#)

Grey Falcon [929]

Vulnerable

Species or species habitat likely to occur within area

[Polytelis alexandrae](#)

Princess Parrot, Alexandra's Parrot [758]

Vulnerable

Species or species habitat may occur within area

[Rostratula australis](#)

Australian Painted Snipe [77037]

Endangered

Species or species habitat may occur within area

MAMMAL

[Dasyurus hallucatus](#)

Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]

Endangered

Species or species habitat likely to occur within area

[Macroderma gigas](#)

Ghost Bat [174]

Vulnerable

Species or species habitat likely to occur within area

[Rhinonicteris aurantia \(Pilbara form\)](#)

Pilbara Leaf-nosed Bat [82790]

Vulnerable

Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
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REPTILE

[Liasis olivaceus barroni](#)

Olive Python (Pilbara subspecies)
[66699]

Vulnerable

Species or species
habitat likely to occur
within area

Listed Migratory Species

[\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
-----------------	---------------------	---------------

Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species
habitat likely to occur
within area

Migratory Terrestrial Species

[Hirundo rustica](#)

Barn Swallow [662]

Species or species
habitat may occur
within area

[Motacilla cinerea](#)

Grey Wagtail [642]

Species or species
habitat may occur
within area

[Motacilla flava](#)

Yellow Wagtail [644]

Species or species
habitat may occur
within area

Migratory Wetlands Species

[Actitis hypoleucos](#)

Common Sandpiper [59309]

Species or species
habitat may occur
within area

[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]

Species or species
habitat may occur
within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species
habitat may occur
within area

[Calidris melanotos](#)

Pectoral Sandpiper [858]

Species or species
habitat may occur
within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel [882]

Species or species
habitat may occur
within area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	
Commonwealth Land - [51015]	WA

Listed Marine Species

[\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans		
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Turee Syncline Iron Ore Project	2012/6391	Controlled Action	Post-Approval
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
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- [-University of New England](#)
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- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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Appendix 2: Likelihood of occurrence criteria for flora and fauna species

Likelihood of occurrence criteria for flora and fauna species:

- Likelihood: Previously recorded
 - The species has previously been recorded within study area from DEC database search results and/or from previous surveys of the study area, and/or the species has been confirmed through a current vouchered specimen at WA Herbarium.
- Likelihood: Likely
 - The species has not previously been recorded from within the study area. However:
 - The species has been recorded in proximity (<10 km) to the study area and occurs in similar habitat to that which occurs within the study area.
 - Core habitat and suitable landforms for the species occurs within the study area either year-round or seasonally. In relation to fauna species, this could be that a host plant is seasonally present on site, or habitat features such as caves are present that may be used during particular times during its life cycle e.g. for breeding. In relation to both flora and fauna species, it may be there are seasonal wetlands present.
 - There is a medium to high probability that a species uses the study area.
- Likelihood: Potential
 - The species has not previously been recorded from within the study area. However:
 - Targeted surveys may locate the species based on records occurring in proximity to the study area (10-20 km) and suitable habitat occurring in the study area.
 - The study area has been assessed as having potentially suitable habitat through habitat modelling.
 - The species is known to be cryptic and may not have been detected despite extensive surveys.
 - The species is highly mobile and has an extensive foraging range so may not have been detected during previous surveys.
 - The species has been recorded in the study area by a previous consultant survey or there is historic evidence of species occurrence within the study area. However:
 - Doubt remains over taxonomic identification, or the majority of habitat does not appear suitable (although presence cannot be ruled out due to factors such as species ecology or distribution).
 - Coordinates are doubtful.
- Likelihood: Unlikely
 - The species has been recorded locally through DBCA database searches. However, it has not been recorded within the study area and:
 - It is unlikely to occur due to the site lacking critical habitat, having at best marginally suitable habitat, and/or being severely degraded.
 - It is unlikely to occur due to few historic record/s and no other current collections in the local area.

- The species has been recorded within the bioregion based on literature review but has not been recorded locally or within the study area through DBCA database searches.
- The species has not been recorded in the study area despite adequate survey efforts, such as a standardised methodology or targeted searching within potentially suitable habitat.

Appendix 3: Vegetation structural classification and condition rating scale

Vegetation structural classification[^]

Stratum	70 - 100%	30 – 70%	10 – 30%	2 – 10%	< 2%
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Shrubs over 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs under 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Grasses, Sedges, Herbs	Closed tussock grassland / sedgeland / herbland	Tussock grassland / sedgeland / herbland	Open tussock grassland / sedgeland / herbland	Very open tussock grassland / sedgeland / herbland	Scattered tussock grasses / sedges / herbs

[^]Based on Muir (1977) and Aplin's (1979) modification of the vegetation classification system of Specht (1970).

Vegetation condition scale rating for use on Pilbara surveys[^]

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

[^]Based on Trudgen (1998) as presented in EPA Technical Guidance (EPA 2016a).



Appendix 4: Field site – Relevé

SITE ID	EASTING	NORTHING	DATE	SITE TYPE	SITE DIMENSIONS	LANDFORM	SOIL TYPE	SOIL COLOUR	TIME SINCE LAST FIRE	VEG DESC UPPER STRATUM	VEG DESC MIDDLE STRATUM	VEG DESC LOWER STRATUM	VEG COND	DISTURBANCE TYPES
R01	569105	7435273	30/03/2023	Relevé	50x50m	Plain	Clay/sand	Red/brown	>10 years ago	<i>Acacia citrinoviridis</i> tall sparse shrubland	<i>Acacia tetragonophylla</i> and <i>Eremophilla cuneifolia</i> mid sparse shrubland	* <i>Cenchrus setiger</i> and * <i>Cenchrus ciliaris</i> tussock grassland	Poor	Weeds, tracks, cattle, litter, previous clearing, infrastructure (powerlines and water bore)

Appendix 5: Field survey flora results

FAMILY	GENUS	SPECIES	INFRA RANK	INFRA NAME	FULL NAME	VERNACULAR NATURALISE	COVER	HEIGHT
Aizoaceae	<i>Trianthema</i>	<i>triquetrum</i>			<i>Trianthema triquetrum</i>	Red Spinach	0.1	0.1
Amaranthaceae	<i>Aerva</i>	<i>javanica</i>			<i>Aerva javanica</i>	Kapok Bush *	0.1	0.4
Amaranthaceae	<i>Ptilotus</i>	<i>exaltatus</i>			<i>Ptilotus exaltatus</i>	Tall Mulla Mulla	0.1	0.1
Caryophyllaceae	<i>Polycarpaea</i>	<i>longiflora</i>			<i>Polycarpaea longiflora</i>	-	0.1	0.2
Chenopodiaceae	<i>Enchyleana</i>	<i>tomentosa</i>			<i>Enchyleana tomentosa</i>	Ballier Saltbush	0.1	0.25
Chenopodiaceae	<i>Maireana</i>	sp.			<i>Maireana sp. (indet.)</i>	-	0.1	0.3
Chenopodiaceae	<i>Salsola</i>	<i>australis</i>			<i>Salsola australis</i>	-	0.1	0.2
Cleomaceae	<i>Arivela</i>	<i>viscosa</i>			<i>Arivela viscosa</i>	-	0.1	0.15
Euphorbiaceae	<i>Euphorbia</i>	<i>australis</i>	var.	<i>subtomentosa</i>	<i>Euphorbia australis var. subtomentosa</i>	-	0.1	0.15
Fabaceae	<i>Acacia</i>	<i>citrinoviridis</i>			<i>Acacia citrinoviridis</i>	-	6	5
Fabaceae	<i>Acacia</i>	<i>synchronicia</i>			<i>Acacia synchronicia</i>	-	0.1	3.5
Fabaceae	<i>Acacia</i>	<i>tetragonophylla</i>			<i>Acacia tetragonophylla</i>	Kurara	1	2
Fabaceae	<i>Indigofera</i>	<i>monophylla</i>			<i>Indigofera monophylla</i>	-	0.1	0.3
Fabaceae	<i>Senna</i>	<i>artemisioides</i>	subsp.	<i>oligophylla</i>	<i>Senna artemisioides subsp. oligophylla</i>	-	0.1	0.3
Fabaceae	<i>Tephrosia</i>	NW Eremaean (S. van Leeuwen et al. PBS 0356)			<i>Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)</i>	-	0.1	0.25
Fabaceae	<i>Tephrosia</i>	<i>rosea</i>	var.	Fortescue creeks (M.I.H. Brooker 2186)	<i>Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)</i>	-	0.1	0.45

FAMILY	GENUS	SPECIES	INFRA RANK	INFRA NAME	FULL NAME	VERNACULAR NATURALISE	COVER	HEIGHT
Goodeniaceae	<i>Goodenia</i>	<i>forrestii</i>			<i>Goodenia forrestii</i>	-	0.1	0.15
Malvaceae	? <i>Malvaceae</i>	<i>americanum</i>			<i>Malvastrum americanum</i>	Spiked Malvastru *	0.1	0.5
Malvaceae	<i>Corchorus</i>	<i>crozophorifolius</i>			<i>Corchorus crozophorifolius</i>	-	0.1	1.5
Nyctaginaceae	<i>Boerhavia</i>	? <i>coccinea</i>			<i>Boerhavia ? coccinea</i>	-	0.1	0.1
Poaceae	<i>Aristida</i>	<i>contorta</i>			<i>Aristida contorta</i>	Bunched Kerosene Grass	0.1	0.2
Poaceae	<i>Cenchrus</i>	<i>ciliaris</i>			<i>Cenchrus ciliaris</i>	Buffel Grass *	10	0.4
Poaceae	<i>Cenchrus</i>	<i>setiger</i>			<i>Cenchrus setiger</i>	Birdwood Grass *	30	0.5
Poaceae	<i>Cynodon</i>	<i>dactylon</i>			<i>Cynodon dactylon</i>	Couch *	0.1	CR
Poaceae		<i>Dactyloctenium radulans</i>			<i>Dactyloctenium radulans</i>	Button Grass	0.1	0.1
Poaceae	<i>Enneapogon</i>	<i>caerulescens</i>			<i>Enneapogon caerulescens</i>	Limestone Grass	0.1	0.2
Poaceae	<i>Sporobolus</i>	<i>australasicus</i>			<i>Sporobolus australasicus</i>	Fairy Grass	0.1	0.15
Portulacaceae	<i>Portulaca</i>	sp.			<i>Portulaca sp. (indet.)</i>	-	0.1	0.15
Proteaceae	<i>Grevillia</i>	<i>berryana</i>			<i>Grevillea berryana</i>	-	0.1	6
Scrophulariaceae	<i>Eremophila</i>	<i>cuneifolia</i>			<i>Eremophila cuneifolia</i>	Pinyuru	2	2
Scrophulariaceae	<i>Eremophila</i>	<i>forrestii</i>			<i>Eremophila forrestii</i>	Wilcox Bush	0.1	1
Solanaceae	<i>Solanum</i>	<i>horridum</i>			<i>Solanum horridum</i>	-	0.1	0.15
Zygophyllaceae	<i>Tribulus</i>	<i>suberosus</i>			<i>Tribulus suberosus</i>	-	0.1	0.15
Zygophyllaceae	<i>Tribulus</i>	<i>terrestris</i>			<i>Tribulus terrestris</i>	Caltrop	0.1	0.1