

Native Vegetation Clearing Permit – Supporting Report

Flora, Vegetation and Fauna Habitat Assessment at
Hope Downs 1

24 October 2023



Rio Tinto, on behalf of Hamersley HMS

152-158 St Georges Terrace

Perth WA 6000

Restrictions on use

This report has been prepared by Rio Tinto, on behalf of Hamersley HMS. Neither the report nor its contents may be referred to without the express approval of Rio Tinto, unless the report has been released for referral and assessment of proposals.

Document Status

Rev	Author	Reviewer/s	Date	Approved for issue	
				Distributed to	Date
1	B. Duncan	A. Michael	23/10/2023	N/A	-
2	B. Duncan	B. Duncan	24/10/2023	External	24/10/2023

Executive Summary

Rio Tinto, on behalf of Hamersley HMS, is proposing to undertake a hydrogeology drilling program as part of the Hope Downs 1 Partial Closure program. The works also comprise drilling exploratory monitoring and abstraction/injection bores with the intent of conducting a Mine Aquifer Recharge trial program. All discharge will be completed under a discharge management plan.

The proposed program consists of approximately 28 monitoring bores, four Vibrating Wire Piezometers and five production bores up to 200 m in depth and up to 5 km of new track using blade down grading. Access will be along existing tracks where possible to minimise new disturbance, however these tracks may require maintenance.

To support these works, a Native Vegetation Clearing Permit is required. Therefore, the area where the hydrogeology drilling program is planned to occur (hereafter known as the study area) was subject to a reconnaissance flora, vegetation and fauna habitat assessment. The study area comprises 143.6 ha.

The study area was surveyed by Rio Tinto botanists Julijanna Hantzis, Bridget Duncan, Daenia Dundon and Candice Le Roux on the 1st to 5th May, 2023.

Three vegetation types were identified across two major landforms within the study area. Two vegetation types were described from undulating plains or low hills, and one vegetation type from drainage lines. The majority of vegetation within the study area was rated as being in Excellent condition. Only 0.1 ha of the study area was ranked as being Completely Degraded, in the form of previously cleared tracks.

None of the vegetation types occurring within the study area are listed as Threatened Ecological Communities under either the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or under Western Australian listings. None of the vegetation types occurring within the study area are listed as Priority Ecological Communities.

A total of 94 taxa from 50 genera representing 25 families were recorded during the current survey. The dominant plant groups are consistent with other surveys of the broader locality.

No species of Threatened Flora were recorded during the survey or were expected to occur within the study area. Two Priority flora taxa were recorded within the study area, *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3). The Proposal is unlikely to affect the conservation significance of the two Priority flora species recorded during the survey, due to their broad distributions across the Pilbara, their population extending outside the Proposal boundaries, and the small scale of the Proposal.

A further two Priority flora species were considered likely to occur within the study area, and two have the potential to occur based on desktop and field observations. The survey occurred outside the flowering period for these species, and therefore it is possible that they were missed during the survey. It is unlikely the Proposal will negatively impact on the conservation status of any of these species on either a local or bioregional scale.

Two broad fauna habitat types were described from the study area: 'Low Hills and Slopes'; 'Minor Drainage'. Both fauna habitats are not considered to be restricted at a local or regional level.

Secondary evidence of *Pseudomys chapmani* (Western pebble-mound mouse) (P4) was recorded during the survey. A total of 22 mounds were recorded.

A further three species were considered to have the 'potential' to occur within the study area based on desktop and field observations. These species are: *Dasyurus hallucatus* (Northern Quoll); *Macroderma gigas* (Ghost Bat); *Rhinoicteris aurantia* (Pilbara Leaf-nosed Bat). The Proposal is unlikely to impact the conservation status of any of these species on either a local or bioregional scale due to the lack of core habitat within the study area, such as denning or roosting habitat, or permanent water pools.

The Proposal was assessed against the 10 clearing principles as defined in Schedule 5 (Principles for Clearing Native Vegetation) of the *Environmental Protection Act 1986*. A specialist assessment against the 10 Clearing Principles determined that:

- Principles (c), (d), (e) and (h) are not at variance; and
- Principles (a), (b), (f), (g), (i) and (j) are not likely to be at variance.

Contents page

1.	Introduction	11
1.1	Project background and study area location	11
1.2	Scope of survey	11
1.3	Limitations	13
1.4	Climate	14
1.5	Geology and soils	16
1.6	Surface hydrology and groundwater	16
1.7	Land systems	16
1.8	Vegetation	18
1.8.1	IBRA bioregions and subregions	18
1.8.2	Beard's regional vegetation mapping	18
1.8.3	Pre-European vegetation extent	18
1.9	Conservation areas and environmentally sensitive areas	19
1.10	Priority ecological communities	19
2.	Methodology	21
2.1	Literature review	21
2.1.1	Flora and vegetation	21
2.1.2	Fauna and fauna habitat	21
2.2	Database searches	30
2.3	Likelihood of occurrence assessment	30
2.3.1	Flora	30
2.3.2	Fauna	30
2.4	Flora and vegetation field survey	30
2.5	Vegetation, descriptions, condition assessment and mapping	33
2.6	Flora identification	33
2.7	Fauna habitat assessment	33
2.8	Opportunistic fauna records	33
2.9	Other vegetation of significance	33
2.10	Environmentally significant areas	34
3.	Results	35
3.1	Desktop assessment	35
3.1.1	Flora diversity	35
3.1.2	Conservation significant flora likelihood	35
3.1.3	Fauna diversity	39
3.1.4	Conservation significant fauna likelihood	39
3.2	Vegetation of the study area	44
3.2.1	Detailed vegetation descriptions	45

3.3	Vegetation condition	49
3.4	Vegetation of conservation significance	51
3.5	Vegetation of other significance	51
3.6	Native flora recorded during the survey	51
3.7	Conservation listed flora recorded during the survey	51
3.8	Flora of other significance	53
3.9	Potential conservation listed flora occurring in the study area	55
3.10	Introduced flora occurring within the study area	57
3.11	Fauna habitats of the study area	57
3.12	Fauna habitats of significance	62
3.13	Other habitats of significance	62
3.14	Conservation listed fauna recorded during survey	62
3.15	Potential conservation listed fauna occurring in the study area	64
4.	Statement addressing the 10 Clearing Principles	65
4.1	Principle (a) Comprises high level of biological diversity	65
4.2	Principle (b) Potential impact to any significant habitat for fauna indigenous to Western Australia	67
4.3	Principle (c) Potential impact to any rare flora	67
4.4	Principle (d) Presence of any threatened ecological communities	67
4.5	Principle (e) Significance as a remnant of native vegetation in the area that has been extensively cleared	67
4.6	Principle (f) Impact on any watercourse and / or wetlands	68
4.7	Principle (g) Potential to cause appreciable land degradation	68
4.8	Principle (h) Potential to impact on the environmental values of adjacent or nearby conservation areas	68
4.9	Principle (i) Potential deterioration in the quality of surface or underground water	69
4.10	Principle (j) Potential of clearing to cause, or exacerbate, the incidence or intensity of flooding	69
5.	Conclusions	70
6.	References	71
7.	Appendices	74

Tables

Table 1-1: Constraints and limitations of the current study.....	13
Table 1-2: Representation of the Oakover Land System in the Pilbara bioregion.....	16
Table 1-3: Beard's mapping unit occurring within the study area, its current and pre-European extent within the Pilbara bioregion and its extent across the study area.....	18
Table 2-1: Summary of previous flora and vegetation reports utilised for the desktop assessment.	25
Table 2-2: Summary of previous fauna habitat reports utilised for the desktop assessment	28
Table 3-1: Summary of vascular flora taxa returned by NatureMap search.....	35
Table 3-2: Pre-field likelihood of occurrence assessment and potential presence via habitat preference and proximity of previous records for conservation significant flora considered to have the potential to occur or higher.....	36
Table 3-3: Summary of terrestrial vertebrate fauna species returned by NatureMap search.....	39
Table 3-4: Pre-field likelihood of occurrence assessment and potential presence via habitat preference and proximity of previous records for conservation significant fauna considered to have the potential to occur or higher.....	40
Table 3-5: Vegetation types of the study area	44
Table 3-6: Vegetation condition of the study area	49
Table 3-7: Revised likelihood of occurrence of conservation listed flora taxa considered to have 'potential' to occur or higher.....	56
Table 3-8: List of habitat types within the study area including microhabitats and extent.....	58

Figures

Figure 1-1: Study area location 12

Figure 1-2: Climate and rainfall statistics for Newman Aero (Station 7176) and Hope Downs 1, 12 months prior to the survey..... 15

Figure 1-3: Geology within the study area 17

Figure 1-4: Conservation areas in proximity to the study area 20

Figure 2-1: Previous flora and vegetation surveys in the vicinity of the study area..... 23

Figure 2-2: Previous fauna surveys in the vicinity of the study area 24

Figure 2-3: Survey effort 32

Figure 3-1: Rio Tinto records for conservation listed flora within 20 km of the study area 38

Figure 3-2: Rio Tinto records for conservation listed fauna within 20 km of the study area 43

Figure 3-3: Vegetation types 48

Figure 3-4: Vegetation condition 50

Figure 3-5: Conservation significant flora recorded 54

Figure 3-6: Fauna habitats 61

Figure 3-7: Conservation significant fauna recorded 63

Plates

Plate 1: Representative photo of vegetation type V1 (R03).....	45
Plate 2: Representative photo of vegetation type V3 (R07).....	46
Plate 3: Representative photo of vegetation type V2 (R08).....	47
Plate 4: <i>Acacia subtiliformis</i> (P3) recorded within the study area. From left to right: close-up of branch with phyllodes and scars where phyllodes have fallen; habitat; branching habit.	52
Plate 5: <i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) (P3) recorded within the study area. From left to right: spatulate leaves; yellow flowers with brown centre; remnant raceme.	53
Plate 6: Representative photo of fauna habitat 'Low Hills and Slopes' (R02).....	60
Plate 7: Representative photo of fauna habitat 'Minor Drainage' (R04).....	60

Appendices

Appendix 1:	Results of NatureMap and EPBC Protected Matters database searches	75
Appendix 2:	GPS coordinates of relevé locations established within the study area	102
Appendix 3:	Flora site sheets	103
Appendix 4:	Vegetation structural classification and condition rating scale	114
Appendix 5:	Likelihood of occurrence criteria for flora and fauna species	115
Appendix 6:	Likelihood of occurrence assessment of conservation significant flora species	117
Appendix 7:	Likelihood of occurrence assessment of conservation significant fauna species	119
Appendix 8:	Flora species recorded within the study area	122
Appendix 9:	Conservation listed flora recorded during the survey	124
Appendix 10:	Introduced (weed) species recorded during the survey	125
Appendix 11:	Conservation listed fauna recorded during the survey	126
Appendix 12:	Rio Tinto internal operational controls for environmental management	127

1. Introduction

1.1 Project background and study area location

Rio Tinto, on behalf of Hamersley HMS (the Proponent), is proposing to undertake a hydrological drilling program at Hope Downs 1, which incorporates 10.2 ha of clearing (the Proposal). The Proposal consists of 28 monitoring bores, four VWP (Vibrating Wire Piezometers), five production bores up to 200 m in depth, and up to 5 km of new track using blade down grading. Access will be mainly along existing tracks where possible to minimise new disturbance, however these tracks may require maintenance.

Approval for clearing of native vegetation associated with the Proposal is required via a Native Vegetation Clearing Permit (NVCP) under Section 51A of *the Environmental Protection Act 1986* (EP Act). Vegetation, flora and fauna assessments at Hope Downs 1 (the study area) were required to address the 10 Clearing Principles as part of the NVCP application process.

The study area covers 143.6 ha, which consists of 140.7 ha of native vegetation and 2.9 ha of previously disturbed areas, and is located approximately 70 km northwest of Newman, within the Pilbara region of Western Australia (WA) (Figure 1-1).

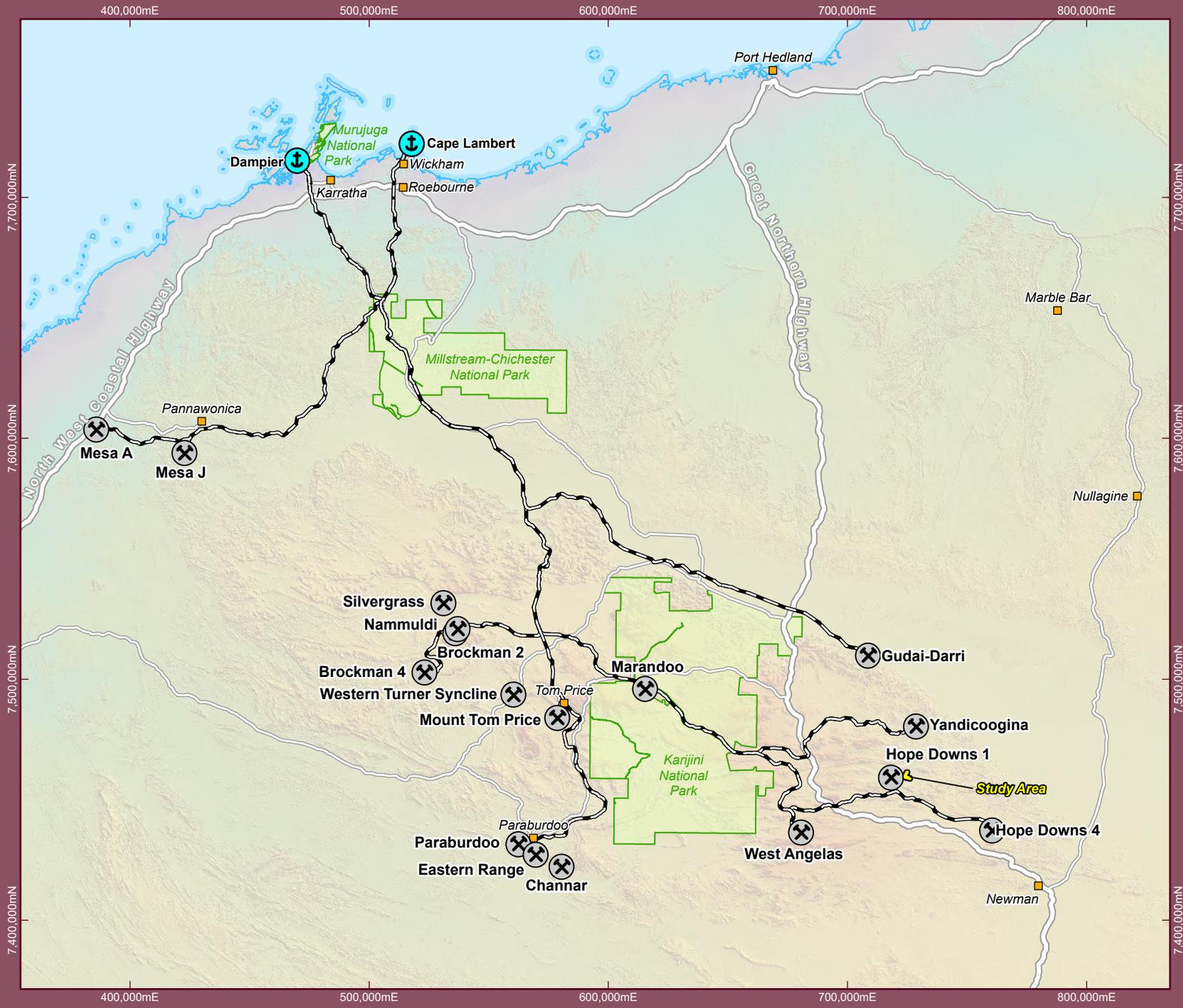
1.2 Scope of survey

This report describes the methodology employed for the flora, vegetation and fauna habitat assessment of the study area, and documents the results of the survey. In particular, this report identifies vegetation, flora and fauna habitats of conservation significance relevant to the study area.

This report is intended as a supporting document for an NVCP application by Rio Tinto and has been prepared on the basis of a review of existing information for the study area, combined with a site field survey.

This report includes a description of the:

- Local environment of the study area including flora, vegetation, fauna habitats, geology, landforms, and hydrology;
- Methods employed during the field survey;
- Locations and populations of conservation listed flora, including photographs and mapping;
- Vegetation types occurring in the study area, an assessment on their condition and conservation significance for the locality and subregion, including mapping;
- Fauna habitats present, assessment of their significance for the locality and subregion, including mapping; and
- Potential impacts of the Proposal on the local environment through application of the 10 clearing principles, as outlined in Schedule 5 of the EP Act.



Legend

- Study Area
- ⊕ Port
- ⊗ Rio Tinto Mine
- Town
- National Park
- Rio Tinto Railway
- Highway
- Major Road

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 Date: September 2023
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 1-1: Study Area Location



1.3 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	<p>The Pilbara bioregion has been relatively well surveyed, with increasing biological survey work occurring due to the resource expansion in the region. Numerous flora and fauna surveys have been conducted in the wider region and many in the Greater Hope Downs locality. Therefore, a suitable number of survey reports were available for contextual information.</p> <p>Two of the reports cited in the desktop assessment (Biota Environmental Sciences, 2011; Mattiske Consulting Pty Ltd, 2009) were completed prior to the EPA flora and fauna technical guidance documents were released (Environmental Protection Authority, 2016; Environmental Protection Authority, 2020), therefore there may be limitations with the survey methodology used during these surveys. However, due to more recent surveys being incorporated in the desktop assessment, this was not considered a limitation to this report.</p> <p>Sources of information were not considered a limitation in this assessment.</p>
Scope of works	<p>The survey requirements of a targeted terrestrial flora, vegetation and fauna survey for a NVCP application were met. No quadrat sampling or fauna trapping was undertaken, however, relevés were undertaken to record the vegetation types in addition to foot traverses of the study area.</p>
Completeness of survey	<p>The study area was fully surveyed to the satisfaction of an equivalent Level 1.5 survey, which is appropriate to support a NVCP application. No additional surveys were deemed necessary for the purpose of this assessment. Fungi and non-vascular flora (algae, mosses and liverworts) were not sampled.</p>
Intensity of survey	<p>The study area was surveyed by relevés, and targeted traverses on foot. Habitats with potential to support conservation listed species were searched. All vegetation and fauna habitat types were inspected.</p>
Timing, weather, season, cycle	<p>The survey was conducted in May 2023, which is within the primary survey period as per EPA Guidance (Environmental Protection Authority, 2016). Conditions encountered during the survey were regarded as average conditions, with rainfall in the preceding three months being lower than the long-term average. Despite some specimens being sterile or dead, numerous annual species were recorded, therefore the survey timing was not considered a limitation.</p>
Disturbances	<p>The study area has been recently disturbed by fires, with the fire age ranging between 5 and 10 years old. Relevés were placed in pockets of remaining vegetation, and numerous annual species were recorded, therefore the fire age was not considered a limitation to the results of this assessment.</p>

Constraint	Limitation
Resources	<p>The biologists undertaking the surveys and subsequent reports as part of the studies were suitably qualified to identify flora and fauna. Julijanna Hantzis (field survey and report review) has five years of experience as a botanist in Western Australia, with significant experience working in the Pilbara. Bridget Duncan (field survey and report writing) has three years of experience as a botanist in Western Australia, with significant experience working in the Pilbara. Daenia Dundon (field survey) has two years of experience as a botanist in Western Australia, with significant experience working in the Pilbara. Fauna habitat mapping was reviewed by Zoologist Madi Roberts, who has six years' experience working as a zoologist in the Pilbara region. Steven Dillon, from the Western Australian Herbarium, completed the plant specimen identifications.</p> <p>There were no resource limitations noted in reports cited in the desktop assessment.</p>
Accessibility / remoteness	<p>The study area was accessed by vehicle and on foot. The study area was adequately traversed on foot. No parts of the study area were inaccessible. Accessibility/remoteness was not considered a limitation to this survey.</p>

1.4 Climate

The closest Bureau of Meteorology (BoM) weather station to the study area is Newman Aero (Station 7176), located approximately 70 km southeast of the study area. The Newman Aero weather station recorded 382.8 mm of rainfall in the 12 months prior to the survey (May 2022 to April 2023), which is 59.0 mm above the long-term average of 323.8 mm (Figure 1-2) (BoM, 2023). In the three months prior to the survey (February 2023 to April 2023), 171.4 mm of rainfall was recorded, which is 119.2 mm above the long-term average of 52.2 mm for the same time period.

The Hope Downs 1 weather station recorded a total of 380.4 mm of rainfall in the 12 months prior to the survey (May 2022 to April 2023), which is comparable to the 382.8 mm of rainfall recorded at Newman in the same time period. In the three months prior to the survey (February 2023 to April 2023), 114.8 mm of rainfall was recorded, which is 56.6 mm below the rainfall recorded at Newman for the same time period.

Seasonal conditions prior to the survey were considered average, however many plant species were sterile at the time of the survey. Most of the sterile specimens were herbaceous annual species.

Hamersley HMS PTmited

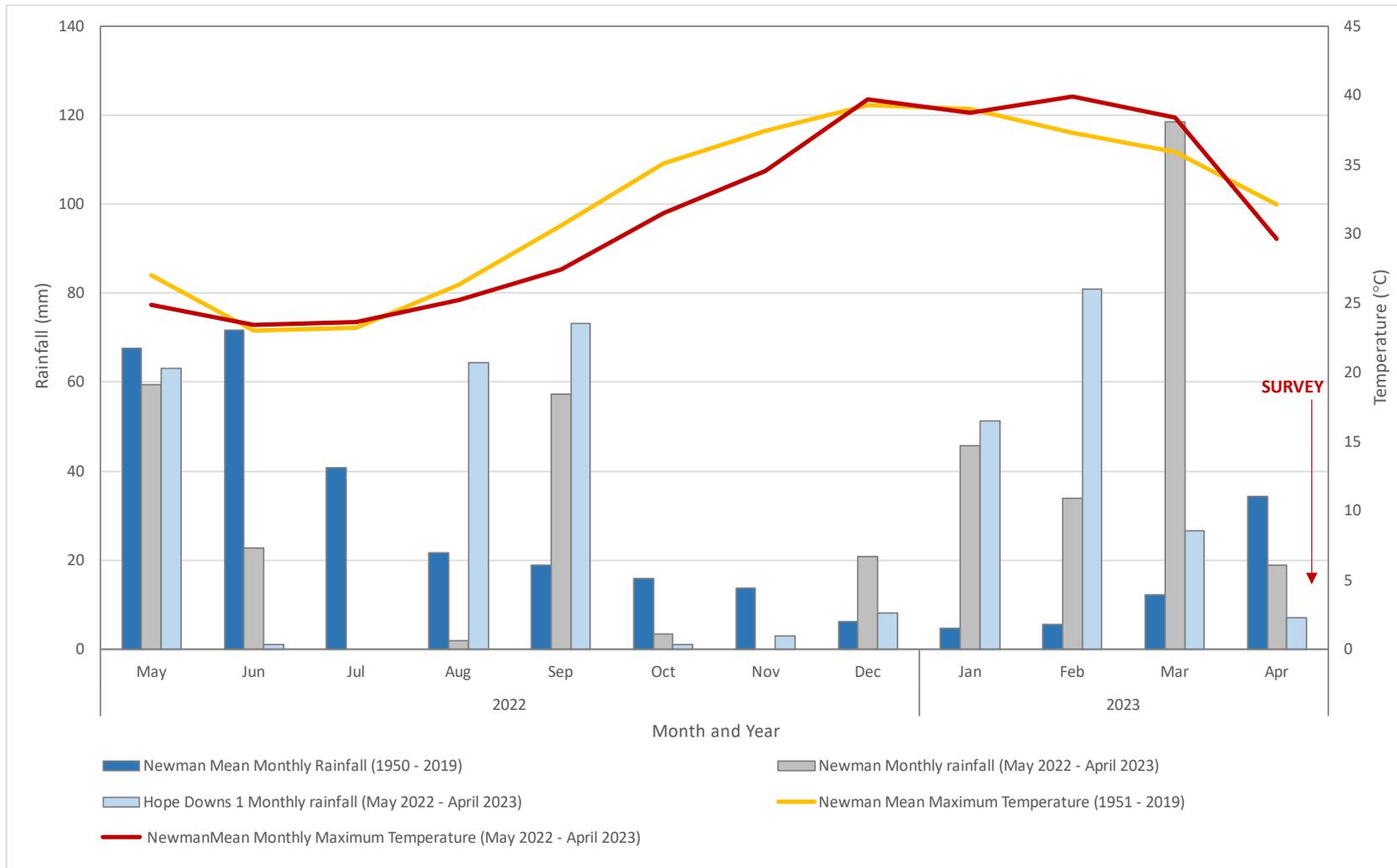


Figure 1-2: Climate and rainfall statistics for Newman Aero (Station 7176) and Hope Downs 1, 12 months prior to the survey

1.5 Geology and soils

The study area was comprised of two major geological units based on 1:250,000 scale map sheet series (Figure 1-3) (Geoscience Australia, 2006). These geological units were:

- Czk: Calcrete-sheet carbonate; found along major drainage lines.
- Czc: Colluvium-partly consolidated quartz and rock fragments in silt and sand matrix; old valley-fill deposits.

1.6 Surface hydrology and groundwater

The study area lies within the Port Hedland / East Pilbara groundwater subarea of the Pilbara (Department of Water and Environmental Regulation, 2022).

The study area does not overlap any major stream. The closest major stream is Weeli Wolli Creek, located less than 1.0 km north of the study area. Three minor ephemeral drainage lines, likely to flow after significant rainfall, are located within the study area.

1.7 Land systems

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.

The study area is located within the Oakover Land System, which is described as breakaways, mesas, plateaux and stony plains of calcrete supporting hard spinifex shrubby grasslands. The Oakover Land System is not generally prone to degradation or susceptible to soil erosion (Van Vreeswyk, Payne, Leighton, & Hennig, 2004). The land system and its extent within the study area are presented below (Table 1-2).

Table 1-2: Representation of the Oakover Land System in the Pilbara bioregion

Land System (Map code)	Total area (ha) in Pilbara bioregion	Area (ha) in study area	Proportion (%) of study area	Study area proportion (%) of land system extent
Oakover (285Ok)	4949.3	143.6	100.00	2.9

1.8 Vegetation

1.8.1 IBRA bioregions and subregions

The Interim Biogeographic Regionalisation of Australia (IBRA7) recognises 89 bioregions (Department of Agriculture, Water and the Environment, 2022). 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 subregion and is described by Kendrick (2001) as:

- *'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 300 mm 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'.*

1.8.2 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 Agriculture and Food WA (DAFWA) has compiled a list of vegetation extent and types across WA (Shepherd, Beeston, & Hopkins, 2002). The study area falls within one vegetation association: Hamersley 18 (80100053) - Low woodland; mulga (*Acacia aneura*).

Given the broad nature of Beard's mapping; this vegetation association is only broadly applicable to the vegetation types occurring in the study area.

1.8.3 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, Beeston, & Hopkins, 2002).

Table 1-3 presents the pre-European and current extent of the one Beard mapping unit across its range, as well as the extent in the study area.

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

Beard's mapping unit (Shepherd vegetation association)	Pre-European extent (ha) [^]	Current extent (ha) [^]	Extent (ha) within study area / (Proportion of current extent)
80100053 (Hamersley 18)	580,512.26	575,807.88	143.6 (0.02%)

[^]Government of Western Australia (2016)

1.9 Conservation areas and environmentally sensitive areas

The study area does not intersect any conservation areas.

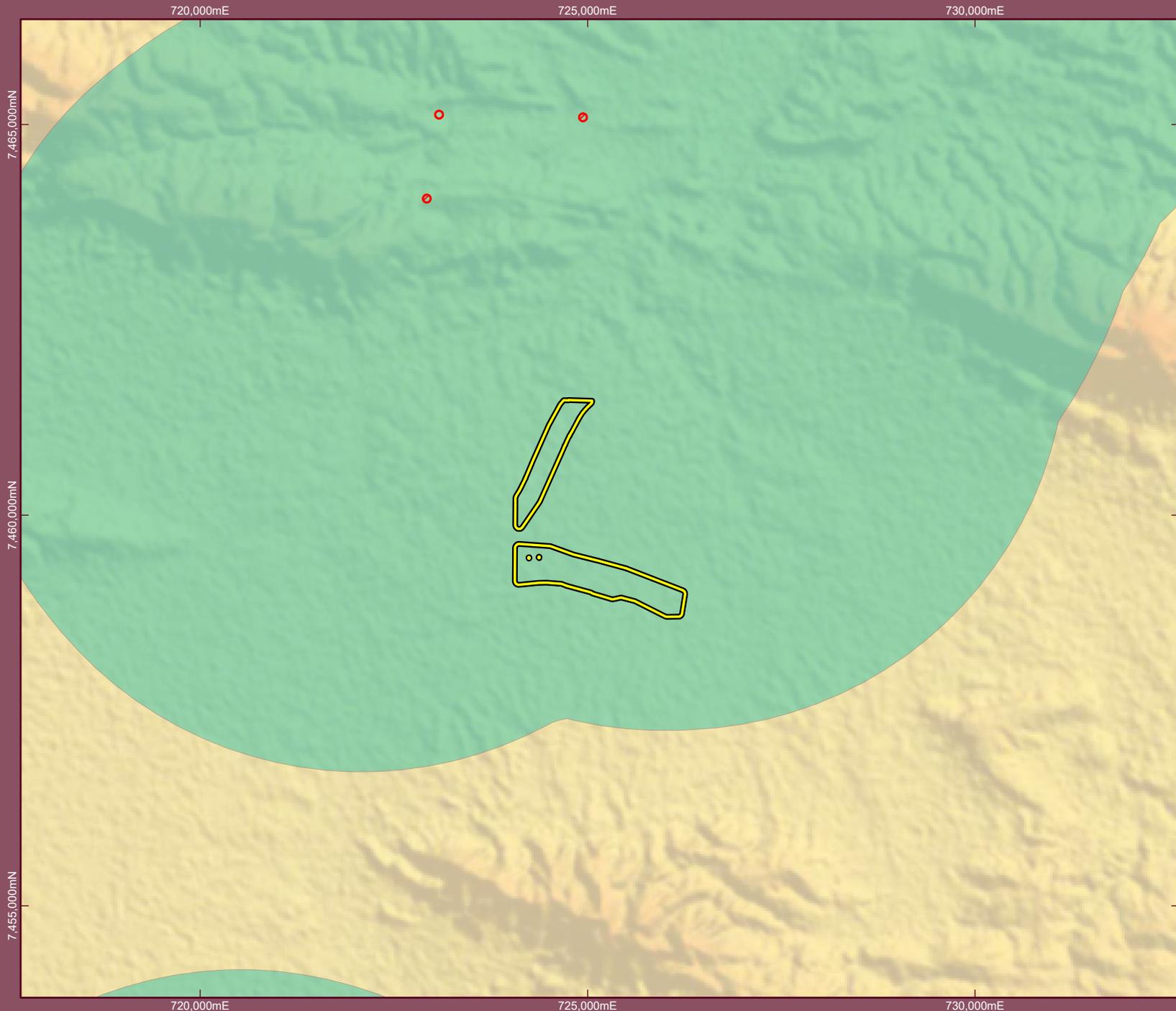
Environmentally Sensitive Areas (ESAs) are defined in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* under section 51B of the WA State EP Act. ESAs include areas declared as: World Heritage; included on the Register of the National Estate; defined wetlands; vegetation containing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

No TECs have been recorded within 20 km of the study area. The Proposal is not expected to impact the environmental values of any TECs. The study area does not intersect any mapped ESAs.

1.10 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 Department of Parks and Wildlife (Parks and Wildlife), and are ranked as Priorities 1, 2 and 3 (1 being the highest).

The study area is located within the buffer of the Weeli Wolli Spring Community (Priority 1) PEC (Figure 1-4). The Proposal is not expected to impact the environmental values of this PEC as it does not intersect the Weeli Wolli creekline.



Legend

 Study Area

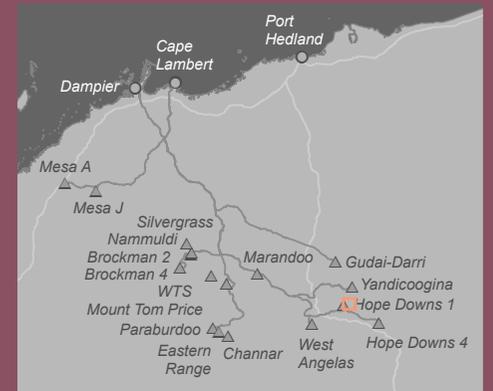
 Environmentally Sensitive Areas

TEC and PEC Buffers

 Weeli Wolli Spring Community

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 1-4: Conservation Areas in Proximity to the Study Area



2. Methodology

2.1 Literature review

Early systematic flora survey work in the Pilbara bioregion was undertaken by Burbidge (1959) and Beard (1975). These surveys involved the mapping of broad floristic formations and vegetation associations across the bioregion. More recently, DAFWA conducted a regional inventory of flora, vegetation, vegetation condition, and land resources of the bioregion (van Vreeswyk *et al.* 2004). In addition, Parks and Wildlife undertook a comprehensive regional survey of the Pilbara (DEC 2011) which included counting, sampling, documenting, and mapping the way plant communities are distributed in relation to soil, climate, landforms and geology within the Pilbara.

Over recent decades there has been an expansion of resource development projects occurring within the Pilbara. As a result, there has been an increase in site-specific ecological surveys to fulfil the statutory requirements of the EP Act, the State *Biodiversity Conservation Act 2016 (BC Act)*, and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

Numerous flora, vegetation and fauna surveys have previously been conducted within and surrounding the study area (Figure 2-1 and Figure 2-2). The findings of these surveys, in addition to the database searches, form the desktop study to determine conservation significant species that are known to, or may occur within the study area, as well as the flora, vegetation types, ecosystems and fauna habitats.

2.1.1 Flora and vegetation

Three previous flora and vegetation survey reports have been utilised as part of this flora and vegetation desktop assessment:

- Flora and Vegetation of the Hope Downs 1 Area (Mattiske Consulting Pty Ltd, 2009).
- Hope Downs 2 Proposal Flora and Vegetation Survey (Astron Environmental Services, 2019).
- Hope Downs Development Envelope Vegetation Mapping (Astron Environmental Services, 2020).

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 types and ecosystems. A summary of the findings of each report primarily used in the desktop review is presented in Table 2-1.

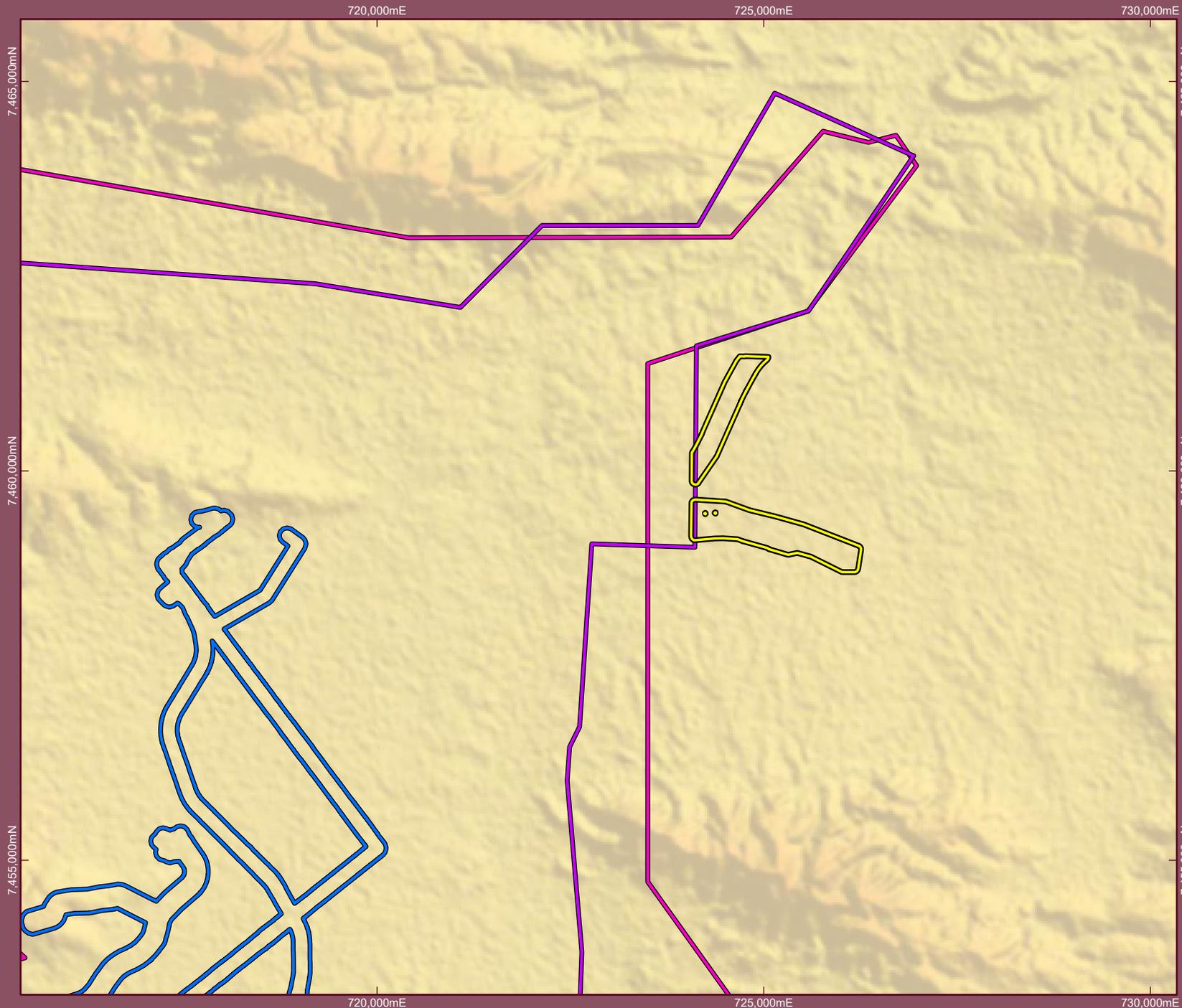
A review of additional published and unpublished reports of relevance to the area was also conducted prior to completing the survey and report. These reports comprised mostly regional scale reports such as the Department of Agriculture Land Systems mapping (Van Vreeswyk, Payne, Leighton, & Hennig, 2004).

2.1.2 Fauna and fauna habitat

Four previous fauna survey reports were utilised as part of the fauna desktop assessment:

- Hope Downs 1 Development Envelope Fauna Habitat Mapping (Astron Environmental Services, 2020).
- Hope Downs 2 Proposal Fauna Survey March 2019 (Astron Environmental Services, 2019).
- Hope Downs 2 Proposal Matters of National Environmental Significance Fauna Assessment (Astron Environmental Services, 2019).
- Hope Downs Project Life of Mine Targeted Fauna Survey (Biota Environmental Sciences, 2011).

The reports were reviewed as part of the literature review to determine conservation significant species that may occur within the study area and fauna habitats. A summary of the findings is presented in Table 2-2.

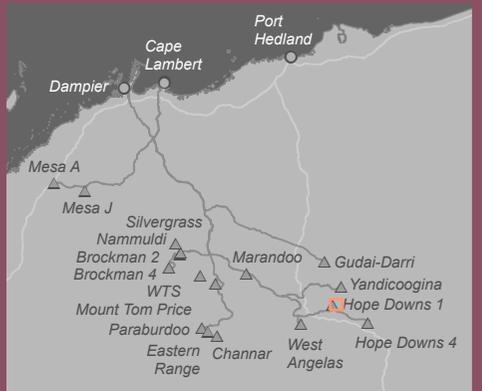


Legend

- Study Area
- Biological Assessment**
- Mattiske Consulting Pty Ltd (2009)
- Astron Environmental Services (2019)
- Astron Environmental Services (2020)

Drawn: J.Wesson
Plan: RTIO-1019645v1
Date: September 2023

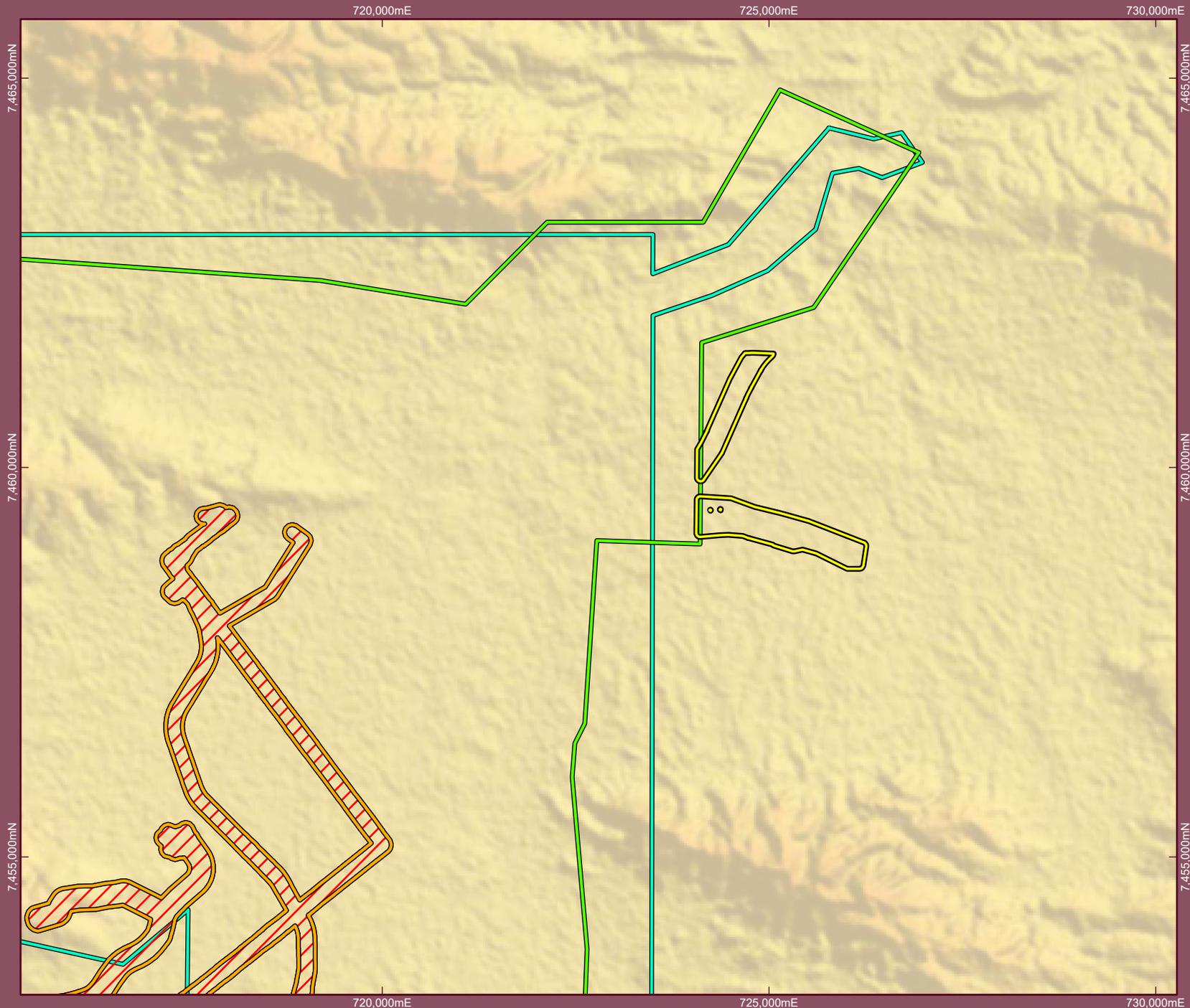
Checked by: A.Coulson
Proj: GDA 1994 MGA Zone 50
GIS: Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 2-1: Previous Flora and Vegetation Surveys in the Vicinity of the Study Area





Legend

- Study Area
- Biological Assessment**
- Astron Environmental Services (2019)
- Astron Environmental Services (2019)
- Astron Environmental Services (2019)
- Biota Environmental Sciences (2011)

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 2-2: Previous Fauna Surveys in the Vicinity of the Study Area



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

Report and level of survey	Size (ha)	Number of taxa	Conservation listed flora	Weeds	Vegetation of significance
Flora and Vegetation of the Hope Downs 1 Area (Mattiske Consulting Pty Ltd, 2009) Single-phase detailed flora and vegetation survey	13,682.9	217 taxa 47 families 117 genera	No Threatened flora taxa were recorded. Seven Priority flora taxa were recorded: <ul style="list-style-type: none"> • <i>Acacia bromilowiana</i> (P4) (previously listed as P3) • <i>Acacia subtiliformis</i> (P3) • <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) • <i>Eremophila magnifica</i> subsp. <i>velutina</i> (P3) • <i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) (P3) (previously listed as P1) • <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3) (previously listed as P2) • <i>Stylidium weeliwollii</i> (P3) (previously listed as P2). 	Ten introduced flora taxa : <ul style="list-style-type: none"> • <i>*Aerva javanica</i> • <i>*Argemone ochroleuca</i> • <i>*Bidens bipinnata</i> • <i>*Cenchrus ciliaris</i> • <i>*Datura leichhardtii</i> • <i>*Lactuca serriola</i> • <i>*Malvastrum americanum</i> • <i>*Phoenix dactylifera</i> • <i>*Sonchus</i> sp. • <i>*Vachellia farnesiana</i>. 	No Threatened Ecological Communities were recorded. One vegetation type (C4) was analogous to the Weeli Wolli Spring Community (Priority 1) PEC. Similarities include the stands of <i>Eucalyptus camaldulensis</i> , <i>Eucalyptus victrix</i> and <i>Melaleuca argentea</i> associated with localised pools. Thirteen vegetation types supported Priority flora taxa.

Report and level of survey	Size (ha)	Number of taxa	Conservation listed flora	Weeds	Vegetation of significance
Hope Downs 2 Proposal Flora and Vegetation Survey (Astron Environmental Services, 2019) Multiple-phase detailed flora and vegetation survey	10,817.7	411 taxa 52 families 161 genera	No Threatened flora taxa were recorded. Eleven Priority flora taxa were recorded: <ul style="list-style-type: none"> • <i>Acacia bromilowiana</i> (P4) • <i>Aristida lazaridis</i> (P2) • <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) • <i>Eremophila naaykensis</i> (P3) (previously known as <i>Eremophila</i> sp. Hamersley Range (K. Walker KW 136)) • <i>Eremophila</i> sp. West Angelas (S. van Leeuwen 4068) (P2) (previously listed as P1) • <i>Grevillea saxicola</i> (P3) • <i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708) (P2) • <i>Lepidium catapycnon</i> (P4) • <i>Ptilotus mollis</i> (P4) • <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) • <i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739) (P3). 	Seventeen introduced flora taxa: <ul style="list-style-type: none"> • <i>*Bidens bipinnata</i> • <i>*Brassica tournefortii</i> • <i>*Cenchrus ciliaris</i> • <i>*Cenchrus setiger</i> • <i>*Chloris virgata</i> • <i>*Cynodon dactylon</i> • <i>*Datura leichhardtii</i> subsp. <i>leichhardtii</i> • <i>*Erigeron bonariensis</i> • <i>*Flaveria trinervia</i> • <i>*Lactuca serriola</i> • <i>*Malvastrum americanum</i> • <i>*Rumex vesicarius</i> • <i>*Setaria verticillata</i> • <i>*Sigesbeckia orientalis</i> • <i>*Solanum nigrum</i> • <i>*Sonchus oleraceus</i> • <i>*Vachellia farnesiana</i>. 	No Threatened Ecological Communities were recorded. One vegetation type (P2) may be locally restricted. Four vegetation types were considered to have local conservation significance due to their likelihood to act as refugia habitat (H2, D3), having restricted occurrence within the study area (H2, P2, D3) and/or association with conservation significant flora taxa (H2, P2, D3, D4).

Report and level of survey	Size (ha)	Number of taxa	Conservation listed flora	Weeds	Vegetation of significance
Hope Downs Development Envelope Vegetation Mapping (Astron Environmental Services, 2020) Desktop assessment and reconnaissance field survey	36,943.6	Not part of the assessment	No Threatened flora taxa were recorded. Seven Priority flora taxa were recorded: <ul style="list-style-type: none"> <i>Acacia subtiliformis</i> (P3) <i>Aristida lazaridis</i> (P2) <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) <i>Grevillea saxicola</i> (P3) <i>Lepidium catapycnon</i> (P4) <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3) 	Sixteen introduced flora taxa: <ul style="list-style-type: none"> *<i>Bidens bipinnata</i> *<i>Cenchrus ciliaris</i> *<i>Cenchrus setiger</i> *<i>Cynodon dactylon</i> *<i>Erigeron bonariensis</i> *<i>Euphorbia hirta</i> *<i>Flaveria trinervia</i> *<i>Lactuca serriola</i> *<i>Malvastrum americanum</i> *<i>Melinis repens</i> *<i>Setaria verticillata</i> *<i>Sigesbeckia orientalis</i> *<i>Solanum nigrum</i> *<i>Sonchus oleraceus</i> *<i>Tridax procumbens</i> *<i>Vachellia farnesiana</i>. 	No Threatened Ecological Communities were recorded. One vegetation type (D6) is inferred to be associated with the Weeli Wolli Spring Community (Priority 1) PEC based on the presence of <i>Melaleuca argentea</i> , <i>Eucalyptus camaldulensis</i> subsp. <i>obtusata</i> and <i>Eucalyptus victrix</i> , and the assemblage of sedgeland and herbland understorey taxa.

Table 2-2: Summary of previous fauna habitat reports utilised for the desktop assessment

Report and level of survey	Size (ha)	Number of taxa	Conservation listed fauna	Fauna habitat (value to MNES species)
Hope Downs 1 Development Envelope Fauna Habitat Mapping (Astron Environmental Services, 2020) Desktop assessment	36,943.6	Not part of the assessment.	Not part of the assessment.	Nine broad fauna habitat types were recorded: <ul style="list-style-type: none"> • Major Drainage (high) • Minor Drainage (low) • Gorge/Gully (high) • Breakaway (high) • Rocky Hill (moderate) • Low Hill and Slopes (low) • Alluvial Plain (low) • Mulga Woodland (low) • Stony Plain (low).
Hope Downs 2 Proposal Fauna Survey March 2019 (Astron Environmental Services, 2019) Multiple-phase detailed fauna survey	10,817.7	174 fauna species including: <ul style="list-style-type: none"> • Two amphibians • 55 reptiles • 84 birds • 33 mammals (including seven introduced mammal species). 	Seven species of conservation significance were recorded: <ul style="list-style-type: none"> • Northern Quoll (<i>Dasyurus hallucatus</i>) (EN, EN) • Pilbara Leaf-nosed Bat (<i>Rhinioncteris aurantia</i>) (VU, VU) • Ghost Bat (<i>Macroderma gigas</i>) (VU, VU) • Oriental Plover (<i>Charadrius veredus</i>) (MI, MI) • <i>Lerista macropisthopus remota</i> (P2) • Letter-winged Kite (<i>Elanus scriptus</i>) (P4) • Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>) (P4). 	Eight broad fauna habitat types were recorded: <ul style="list-style-type: none"> • Minor Drainage (low) • Gorge/Gully (high) • Breakaway (high) • Rocky Hill (moderate) • Low Hill and Slopes • Alluvial Plain (low) • Mulga Woodland (low) • Stony Plain (low).

Report and level of survey	Size (ha)	Number of taxa	Conservation listed fauna	Fauna habitat (value to MNES species)
Hope Downs 2 Proposal Matters of National Environmental Significance Fauna Assessment (Astron Environmental Services, 2019) Desktop assessment and Targeted MNES survey	10,817.7	Not part of the assessment.	Four species of conservation significance were recorded: <ul style="list-style-type: none"> Northern Quoll (<i>Dasyurus hallucatus</i>) (EN, EN) Pilbara Leaf-nosed Bat (<i>Rhinonicteris aurantia</i>) (VU, VU) Ghost Bat (<i>Macroderma gigas</i>) (VU, VU) Oriental Plover (<i>Charadrius veredus</i>) (MI, MI). 	Eight broad fauna habitat types were recorded: <ul style="list-style-type: none"> Minor Drainage (low) Gorge/Gully (high) Breakaway (high) Rocky Hill (moderate) Low Hill and Slopes Alluvial Plain (low) Mulga Woodland (low) Stony Plain (low).
Hope Downs Project Life of Mine Targeted Fauna Survey (Biota Environmental Sciences, 2011) Targeted Northern Quoll survey	11,422.8	Not part of the assessment.	One male Northern Quoll (<i>Dasyurus hallucatus</i>) (EN, EN) was captured.	Not part of the assessment.

2.2 Database searches

A desktop assessment was undertaken in April 2023, in order to identify known or potential environmental constraints within or pertaining to the study area and surrounds.

The Parks and Wildlife and WA Museum's (WAM) NatureMap database was searched for Threatened and Priority flora and fauna that have the potential to utilise the habitats present within the study area. The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) administered EPBC Act Protected Matters Search Tool (PMST) was also searched for Matters of National Environmental Significance (MNES) listed under the EPBC Act including Threatened flora and fauna and TECs (Department of Climate Change, Energy, the Environment and Water, 2022).

Spatial data for conservation significant flora and fauna held and maintained by Rio Tinto was also searched as part of the desktop study. Any ESA, Reserves and/or conservation areas within or surrounding the study area were also identified using relevant GIS layers held by Rio Tinto. A buffer of 20 km was applied to the study area for NatureMap, PMST and Rio Tinto database searches. Results of NatureMap and Protected Matters searches undertaken are presented in Appendix 1.

2.3 Likelihood of occurrence assessment

2.3.1 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 3.8). This list was then updated following the field survey to better reflect the habitats observed.

2.3.2 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 3.14). This list was then updated following the field survey to better reflect the habitats. Marine fauna taxa were excluded from the likelihood assessment as the study area does not contain marine habitat and is therefore not able to support these species.

2.4 Flora and vegetation field survey

The study area was surveyed by Rio Tinto botanists Julijanna Hantzis, Bridget Duncan, Daenia Dundon and Candice Le Roux on the 1st to 5th May 2023.

The study area was assessed in accordance with the relevant Factor Guidelines (EPA 2016a and 2016b) and Technical Guidance (EPA 2016c and 2016d). Targeted searches were undertaken in habitats with potential to support species of conservation significance, identified by the database search.

Relevé (unpegged) survey sites, typically 50 x 50 m in size (to represent an approximate 2,500 m²) were established in representative areas of all vegetation types within the study area. A botanical relevé is described as a vegetation sample that describes the structure and floristics, and associated physical attributes, flora and opportunistic fauna sightings. A total of 11 relevés were surveyed in representative vegetation types. The locations of each relevé from the study area and tracklogs are presented in Figure 2-3 and Appendix 2. Detailed site sheets for each relevé are presented in Appendix 3.

At each relevé site, a location was recorded with a handheld GPS and photographs were taken. Data was collected on the flora species present, including: percentage cover; average height of each vegetation stratum; site slope; aspect; topography; soil texture and colour; and landform type and habitat features.

Recent orthorectified aerial photography covering the study area was reviewed whilst in the field to determine boundaries of vegetation communities. The location of each site where a vegetation record was taken was determined based on interpretation of aerial photography and a visit to the site for ground truthing. Determination of boundaries between vegetation types was also undertaken using aerial photography and ground truthing whilst in the field. The mapping data gathered in the field was used to prepare a draft map of vegetation, utilising rectified 1:5,000 scale colour digital aerial photography as the background. The vegetation boundaries were digitised on-screen using ArcGIS Pro 3.0.3.

Locations of flora of conservation significance, flora of special interest, unknown flora, weeds and other observations including opportunistic fauna sightings were recorded using a hand-held GPS (WGS 84 datum). Where populations of conservation significant flora were encountered; estimates of density or numbers of individuals, habitats and associated flora were recorded. Density or numbers of individuals of introduced flora species were also recorded.



Legend

- Field Sites
- Study Area
- GPS Tracklog

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 2-3: Survey Effort



2.5 **Vegetation, descriptions, condition assessment and mapping**

Vegetation descriptions for the study area were based on Specht (1970) with modification by Aplin (1979) (Appendix 4). Descriptions were taken at relevés and during traverses where changes in the vegetation structure were observed. A photograph of each vegetation type, and a location using a hand-held GPS (WGS84 datum) was taken. Assessment of the overall condition of each vegetation type was made based on Trudgen (1988) (Appendix 4).

The mapping notes gathered in the field were used to prepare a draft map of vegetation, utilising rectified colour digital air photography as the background. The vegetation boundaries were digitised on-screen using ArcGIS Pro 3.0.3.

The resulting polygons were attributed with the relevant information including the vegetation type, description and condition. Point locations of each relevé recorded were also uploaded into ArcGIS Pro, together with photographs which were used to assist with the finalising of vegetation boundaries.

2.6 **Flora identification**

An interim species list was compiled in the field covering common species identified with confidence by the botanists. Voucher samples of unknown and Priority flora were taken and pressed and dried in the field. Each sample was assigned a unique reference identification sample number.

Flora samples collected in the field were identified using relevant taxonomic publications and compared to collections at the Western Australian Herbarium (WAH). Sample identifications were conducted by Parks and Wildlife taxonomist Steven Dillon (WAH). Voucher quality specimens will be lodged with the Western Australian Herbarium in the future. Nomenclature was cross-checked using the Parks and Wildlife's FloraBase (WAH 2018) website and updated where required.

2.7 **Fauna habitat assessment**

Broad fauna habitats were identified and mapped based on landforms and vegetation type identified during the current survey. Habitats were then assessed for their potential to support species of conservation significance, taking into account relevant State and Commonwealth Guidelines to support identification of 'potential' habitat. Supporting evidence such as sightings, the presence of microhabitats including caves, water holes, tree hollows and burrows were recorded throughout the study area. Representative traverses were also completed throughout all habitats present within the study area.

Fauna habitats were assessed and mapped as per Factor Guideline (Environmental Protection Authority, 2016) and Technical Guidance (Environmental Protection Authority, 2020) for terrestrial fauna.

2.8 **Opportunistic fauna records**

Opportunistic fauna sightings were recorded whilst traversing the study area with a focus on conservation significant species and supporting evidence (i.e. scats). A location of each opportunistic fauna record was taken in the field using a hand-held GPS (WGS84 datum).

Potential fauna assemblages were based on the desktop review of previous surveys in the area and database searches.

2.9 **Other vegetation of significance**

Vegetation not legally protected or classified as part of regulatory ratings may still be regarded as being of significance. Vegetation that may fall under this category includes (but is not limited to) vegetation supporting elevated floristic diversity, habitats supporting numerous conservation listed species, ecosystems at risk (Kendrick, 2001), novel floristic associations, groundwater dependent ecosystems, uncommon vegetation and associations on novel landforms.

Vegetation types or biological features assigned a significance classification are, for the purpose of this document, considered to be of elevated significance when compared to all other identified associations or features that are common or widespread and therefore well represented.

2.10 Environmentally significant areas

Rio Tinto manages all work, including clearing, through the Approvals Coordination System which ensures biological and heritage surveys are completed and all government regulatory approvals are in place prior to the commencement of works.

Environmentally significant features are uploaded into Rio Tinto's database (GIS system) which includes a description highlighting the significance of these areas. Small populations or individuals are protected as buffered point locations, while larger spatial populations and significant habitat are protected as 'significant areas'. The GIS system is used as part of the Approvals Coordination System when reviewing the Proposal, thereby ensuring appropriate management conditions are in place.

3. Results

3.1 Desktop assessment

3.1.1 Flora diversity

Table 3-1 presents a summary of flora taxa returned by the NatureMap database searches.

Table 3-1: Summary of vascular flora taxa returned by NatureMap search

Flora group	Number of potential species
Families	55
Genera	178
Species	456
Conservation listed	22
Weeds	11

3.1.2 Conservation significant flora likelihood

Thirty-one conservation listed flora taxa were returned by the database search (Figure 3-1, Appendix 1):

- No Threatened flora taxa.
- No Priority 1 flora taxa.
- Six Priority 2 flora taxa.
- Nineteen Priority 3 flora taxa.
- Six Priority 4 flora taxa.

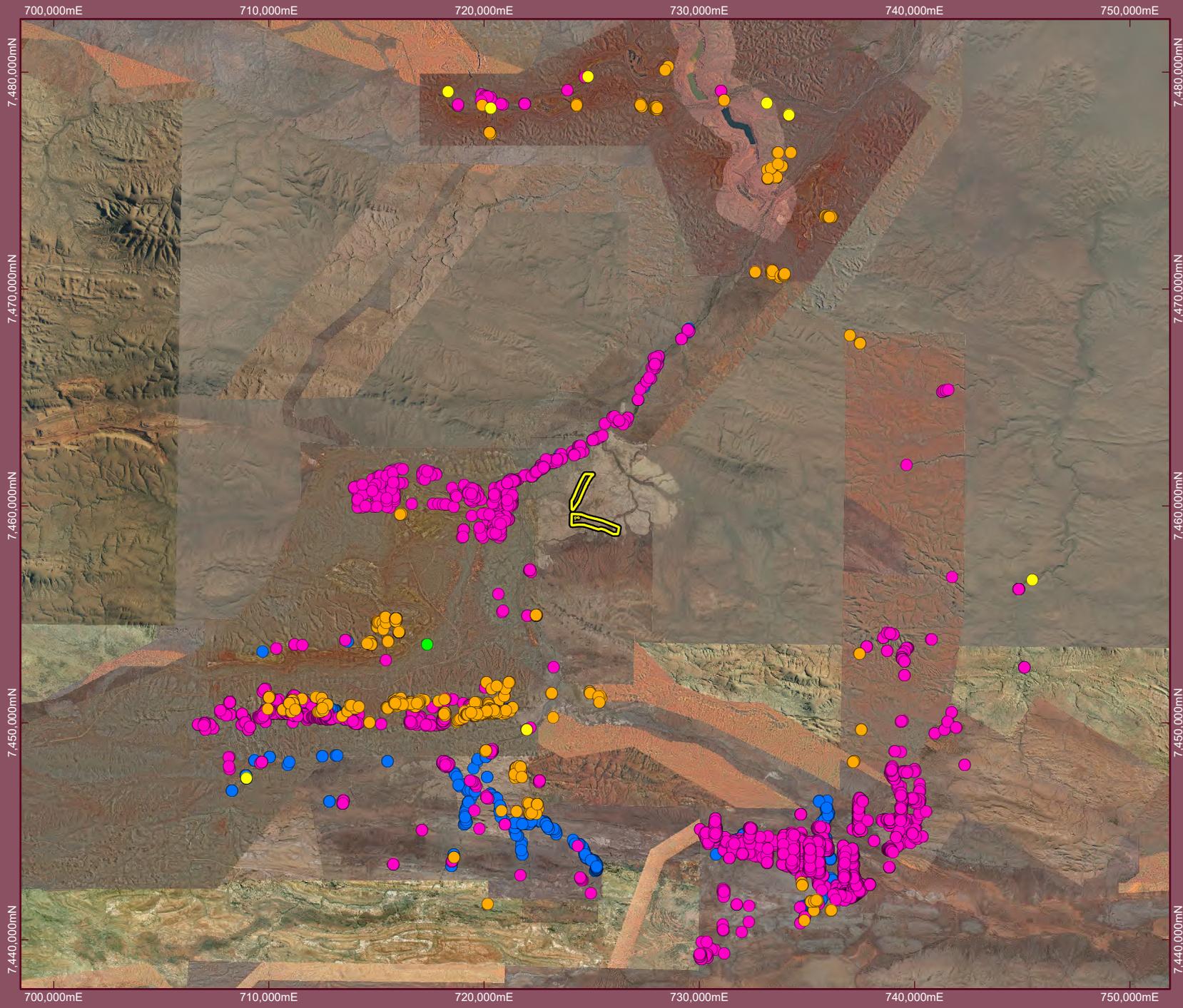
None of the flora taxa identified by the database searches were previously recorded in the study area. Six taxa were considered 'likely' to occur, five had the 'potential' to occur, and 20 species were considered 'unlikely' to occur based on the criteria used to assess the pre-field likelihood of occurrence (Appendix 5). Table 3-2 lists the conservation significant flora taxa with the 'potential' to occur within the study area or higher classification. The flora likelihood in its entirety is presented in Appendix 6.

Table 3-2: Pre-field likelihood of occurrence assessment and potential presence via habitat preference and proximity of previous records for conservation significant flora considered to have the potential to occur or higher

Species	Status	NM	RT	Distance to nearest record (km)	Habitat	Flowering time	Likelihood of occurrence and discussion (pre-field)
<i>Acacia subtiliformis</i>	P3	X	X	2.8	On rocky calcrete plateau.	Jun - Aug	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.
<i>Aristida lazaridis</i>	P2	X	X	11.0	Sand or loam.	Apr	Potential This taxon was recorded within 15 km of the study area and its preferred habitat may occur within the study area.
<i>Cladium procerum</i>	P2	X	X	5.8	Perennial pools.	Nov	Potential This taxon was recorded within 15 km of the study area and its preferred habitat may occur within the study area.
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4		X	8.9	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	Jan or Mar or Jun or Aug - Sep	Potential This taxon was recorded within 15 km of the study area and its preferred habitat may occur within the study area.
<i>Fimbristylis sieberiana</i>	P3	X	X	2.7	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	May - Jun	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	X	X	1.6	Red-brown clay soil, calcrete pebbles. Low undulating plain, swampy plains.	Aug - Sep	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.

Species	Status	NM	RT	Distance to nearest record (km)	Habitat	Flowering time	Likelihood of occurrence and discussion (pre-field)
<i>Indigofera gilesii</i>	P3	X	X	12.7	Pebbly loam. Amongst boulders & outcrops, hills.	May or Aug	Potential This taxon was recorded within 15 km of the study area and its preferred habitat may occur within the study area.
<i>Isotropis parviflora</i>	P3	X	X	14.3	Valley slope of ironstone plateau.	Feb - Mar or May	Potential This taxon was recorded within 15 km of the study area and its preferred habitat may occur within the study area.
<i>Lepidium catapycnon</i>	P4	X	X	4.5	Stony hill slopes, open woodland in hilly areas, more frequently on south facing slopes, hill hummock grasslands, and road verges.	Oct - Jan	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3	X	X	1.1	Ironstone soils. Near creeks, rocky hills.	Apr - May	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.
<i>Stylidium weeliwoilli</i>	P3	X	X	1.1	Gritty sand soil, sandy clay. Edge of watercourses.	Aug - Sep	Likely This taxon was recorded within 5 km of the study area and its preferred habitat may occur within the study area.

NM – NatureMap; **RT** –Rio Tinto Priority Flora Database; **EPBC** – EPBC Act Protected Matters Search Tool.



Legend

Study Area

Conservation Listed Flora

- P1
- P2
- P3
- P4
- PSI

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 Date: September 2023
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

3.1.3 Fauna diversity

Table 3-3 presents a summary of terrestrial vertebrate fauna taxa returned by the NatureMap database searches.

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

Fauna group	Number of potential species
Amphibians	8
Reptiles	132
Avifauna	180
Mammals	53
Conservation listed	11
Total	373

3.1.4 Conservation significant fauna likelihood

Twenty conservation listed fauna species were returned by the database search (Figure 3-2, Appendix 1), 11 from NatureMap and an additional nine from the Rio Tinto database or PMST searches:

- Two Critically Endangered fauna taxa.
- Two Endangered fauna taxa.
- Eight Vulnerable fauna taxa.
- Three Migratory fauna taxa.
- One Priority 1 fauna taxon.
- One Priority 2 fauna taxon.
- One Priority 3 fauna taxon.
- One Priority 4 fauna taxon.
- One Other Specially Protected fauna taxon.

None of the fauna taxa identified by the database searches have previously been recorded within the study area.

None of the taxa were considered ‘likely’ to occur within the study area, six taxa were considered to have ‘potential’ to occur within the study area and 14 taxa were considered ‘unlikely’ to occur, based on the criteria used to assess the pre-field likelihood of occurrence (Appendix 5). The species considered to have ‘potential’ to occur or higher classification within the study area are presented in Table 3-4. The likelihood assessment in its entirety is presented in Appendix 7.

Table 3-4: Pre-field likelihood of occurrence assessment and potential presence via habitat preference and proximity of previous records for conservation significant fauna considered to have the potential to occur or higher

Scientific Name	Common Name	Conservation Code		Source			Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)
		State	Federal	NM	RTIO	PMST			
Birds									
<i>Aphelocephala leucopsis</i>	Southern Whiteface	-	VU	-	-	X	7.1	Southern Whitefaces live in a wide range of sparsely treed woodlands and shrublands where there is an understorey of grasses or shrubs or both, usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands and plains (BirdLife International, 2023).	Potential
Mammals									
<i>Dasyurus hallucatus</i>	Northern Quoll	EN	EN	X	X	X	11.6	The Northern Quoll occupies 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 (Threatened Species Scientific Committee, 2005). In the Pilbara region, the species appears to prefer the Rocklea, Macroy and Robe land systems (Biota Environmental Sciences, 2008). 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 Environmental Sciences, 2008).	Potential

Scientific Name	Common Name	Conservation Code		NMI	Source		Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)
		State	Federal		RTIO	PMST			
<i>Macroderma gigas</i>	Ghost Bat	VU	VU	X	X	X	12	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, 2021).	Potential
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse, Ngadji	P4	0	X	X		10.7	The Western Pebble-mound Mouse is found on stony hillsides with hummock grassland (Menkhorst & Knight, 2021). This species favors 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.	Potential
<i>Rhinonictoris aurantia</i> (Pilbara form)	Pilbara Leaf-nosed Bat	VU	VU	X	X	X	14.5	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 Pilbara (Van Dyck & Strahan, 2008). During the dry season, the PLNB roosts in deep, warm, humid caves or mines and forages nearby, while during the wet season, it is more widespread and may not require caves for roosting (Menkhorst & Knight, 2021). The PLNB forages low in open habitats, including grasslands and along roads.	Potential

Scientific Name	Common Name	Conservation Code		NM	Source		Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)
		State	Federal		RTIO	PMST			
Reptiles									
<i>Liasis olivaceus barroni</i>	Pilbara Olive Python	VU	VU	X	X	X	12.8	The Pilbara Olive Python is found in arid to subhumid areas of northern Australia, it is often encountered along watercourses, especially those associated with rocky areas (Wilson & Swan, 2017). The preferred habitat of this taxon includes escarpments, gorges and water holes in the ranges of the Pilbara region (Wilson & Swan, 2017). Individuals are usually recorded in close proximity to water and rock outcrops that attract suitably sized prey species (Pearson, 1993). Males have been recorded travelling up to 4 km to locate mates during the breeding season (Tutt, Mitchell, Brace, & Pearson, 2002).	Potential

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.



Legend

Study Area

Tier 1 Fauna

- Apus pacificus
- Charadrius veredus
- Dasyurus hallucatus
- Falco peregrinus
- Liasis olivaceus barroni
- Macroderma gigas
- Rhinonictes aurantia

Tier 2 Fauna

- P1
- P4
- FSI

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: October 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s); (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 3-2: Rio Tinto records for conservation listed fauna within 20 km of the study area



3.2 Vegetation of the study area

Three vegetation types were identified across two major landforms over the study area. The vegetation types are summarised in Table 3-5 and are described in detail on the following pages, accompanied by vegetation mapping (Figure 3-3).

Two vegetation types were described from undulating plains or low hills, and one vegetation type from drainage lines. The most widespread vegetation type was V1 (117.1 ha covering 81.5% of the study area). The least widespread vegetation type was V3 (7.6 ha covering 5.3% of the study area). Cleared areas representing access tracks and exploration tracks were also mapped.

Table 3-5: Vegetation types of the study area

Vegetation Type	Vegetation description	Extent (ha) within study area	Proportion (%) within study area
Vegetation of undulating plains and low hills			
V1	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Acacia bivenosa</i> and <i>Acacia subtiliformis</i> mid sparse shrubland over <i>Triodia wiseana</i> open hummock grassland.	117.1	81.5
V3	<i>Acacia</i> spp. low open woodland over <i>Triodia vanleeuwenii</i> and <i>Triodia wiseana</i> open hummock grassland	7.6	5.3
Total		124.7	86.8
Vegetation of drainage lines			
V2	<i>Eucalyptus xerothermica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Petalostylis labicheoides</i> tall sparse shrubland over <i>Acacia</i> spp. mid sparse shrubland over <i>Triodia wiseana</i> and <i>Triodia longiceps</i> open hummock grassland over <i>Themeda triandra</i> isolated tussock grasses.	16.0	11.1
Total		16.0	11.1
Other			
CL	Previously cleared areas (e.g. tracks)	2.9	2.0
Total		2.9	2.0
Grand Total		143.6	100.0

3.2.1 Detailed vegetation descriptions

Vegetation of undulating plains and low hills

V1 EsAbTw	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Acacia bivenosa</i> and <i>Acacia subtiliformis</i> mid sparse shrubland over <i>Triodia wiseana</i> open hummock grassland.
Soil	This vegetation type was recorded from orange and brown clay loam with calcrete rock cover.
Distribution	This vegetation type was recorded throughout the study area. It was recorded from 117.1 ha (81.5%).
Associated species	<p><u>Trees</u>: None</p> <p><u>Tall shrubs</u>: <i>Petalostylis labicheoides</i></p> <p><u>Shrubs</u>: <i>Acacia bivenosa</i></p> <p><u>Low shrubs</u>: <i>Acacia pyrifolia</i> var. <i>pyrifolia</i>, <i>Androcalva luteiflora</i>, <i>Codonocarpus cotinifolius</i>, <i>Euploca</i> sp. (PSI), <i>Halgania cyanea</i> var. Allambi Stn (B.W. Strong 676), <i>Indigofera ?monophylla</i>, <i>Scaevola ambylanthera</i> var. <i>ambylanthera</i></p> <p><u>Grasses</u>: None</p> <p><u>Herbs</u>: <i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) (P3)</p>
Conservation listed flora	<p><i>Acacia subtiliformis</i> (Priority 3) was recorded as a scattered to sparse understorey species (0.1 - 5% cover) at all relevés sampled for this vegetation type, except for R06. Similarly, <i>Euploca</i> sp. (PSI) was recorded at all relevés, except for R06.</p> <p><i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) (P3) was recorded at R01, R02, R05, and R09.</p>
Weeds	None recorded.
Condition	Very Good to Excellent
Sampling sites	Relevés: R01, R02, R03, R05, R06, R09
Fire and disturbance	This vegetation type has been affected by recent fires, with fire scars being noticeable on aerial imagery. Minor disturbance from a nearby drill pad was recorded at R06.
Photo	Plate 1



Plate 1: Representative photo of vegetation type V1 (R03)

V3 *Acacia* spp. low open woodland over *Triodia vanleeuwenii* and *Triodia wiseana* open hummock grassland

AsppTv

Landform and soils	This vegetation type was recorded from red brown clay loam with ironstone, basalt, calcrete and quartz rock cover. This vegetation type was recorded from undulating plains and low hills, from the Oakover Land System.
Distribution	This vegetation type was restricted within the study area, however, it does extend south of the study area. This vegetation type comprised 7.6 ha (5.3%).
Associated species	<p><u>Trees</u>: None</p> <p><u>Tall shrubs</u>: <i>Hakea</i> ssp.</p> <p><u>Shrubs</u>: <i>Acacia ancistrocarpa</i>, <i>Acacia tenuissima</i></p> <p><u>Low shrubs</u>: <i>Solanum lasiophyllum</i></p> <p><u>Grasses</u>: None</p> <p><u>Herbs</u>: None</p>
Conservation listed flora	None recorded.
Weeds	None recorded.
Condition	Very Good to Excellent
Sampling sites	Relevés: R07, R10
Fire and disturbance	Previous clearing was recorded nearby R10.
Photo	Plate 2



Plate 2: Representative photo of vegetation type V3 (R07)

Vegetation of drainage lines

V2 ExpITw	<i>Eucalyptus xerothermica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Petalostylis labicheoides</i> tall sparse shrubland over <i>Acacia</i> spp. mid sparse shrubland over <i>Triodia wiseana</i> and <i>Triodia longiceps</i> open hummock grassland over <i>Themeda triandra</i> isolated tussock grasses
Landform and soils	This vegetation type was recorded from brown sandy clay loam with calcrete, ironstone and basalt rocks. This vegetation type was recorded from drainage lines, from the Oakover Land System.
Distribution	This vegetation type was recorded throughout the study area. It was recorded from 16.0 ha (11.1%)
Associated species	<u>Trees</u> : None <u>Tall shrubs</u> : <i>Petalostylis labicheoides</i> <u>Shrubs</u> : <i>Acacia ancistrocarpa</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia tenuissima</i> , <i>Androcalva luteiflora</i> , <i>Jasminum didymum</i> subsp. <i>lineare</i> , <i>Stylobasium spathulatum</i> <u>Low shrubs</u> : <i>Acacia bivenosa</i> , <i>Corchorus lasiocarpus</i> , <i>Indigofera ?monophylla</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> <u>Grasses</u> : <i>Eriachne tenuiculmis</i> , <i>Paraneurachne muelleri</i> <u>Herbs</u> : <i>Polymeria ?mollis</i>
Conservation listed flora	<i>Acacia subtiliformis</i> (P3), <i>Euploca</i> sp. (PSI) and <i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) (P3) were recorded at R04.
Weeds	None recorded.
Condition	Very Good
Sampling sites	Relevés: R04, R08, R11
Fire and disturbance	Cattle tracks and previous clearing were recorded in this vegetation type.
Photo	Plate 3



Plate 3: Representative photo of vegetation type V2 (R08)

724,000mE

725,000mE

726,000mE

727,000mE

7,461,000mN

7,460,000mN

7,459,000mN

7,461,000mN

7,460,000mN

7,459,000mN



724,000mE

725,000mE

726,000mE

727,000mE

Legend

Study Area

Vegetation Type

Cleared

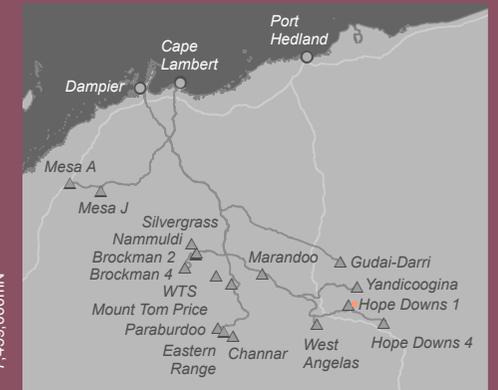
V1

V2

V3

Drawn: J.Wesson
Plan: RTIO-1019645v1
Date: September 2023

Checked by: A.Coulson
Proj: GDA 1994 MGA Zone 50
GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 3-3: Vegetation Types

0 150 300 450 600



metres

Scale: 1:20,000 @A4



3.3 Vegetation condition

The majority of vegetation within the study area was rated as being in Excellent condition (Trudgen 1988). Only 2.9 ha of the study area was considered Completely Degraded, in the form of previously cleared tracks. A single record of *Cenchrus ciliaris*, comprising 20 individuals, was noted within the study area on the side of a previously cleared access track.

Figure 3-4 presents the condition mapping for the study area, whilst Table 3-6 presents the extent of condition of vegetation mapped within the study area.

Table 3-6: Vegetation condition of the study area

Condition	Area (ha)	Proportion (%) of study area
Excellent	124.3	86.6
Very Good	16.4	11.4
Completely Degraded	2.9	2.0
Total	143.6	100.0



Legend

Study Area

Vegetation Condition

Completely Degraded

Very Good

Excellent

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 3-4: Vegetation Condition



3.4 Vegetation of conservation significance

None of the vegetation types occurring within the study area correspond to any ecosystems listed as Threatened under the EPBC Act and none are consistent with ecosystems listed as TECs by the Department of Biodiversity, Conservation and Attractions (DBCA) (2018).

None of the vegetation types occurring within the study area are representative of listed PECs by DBCA (2022).

3.5 Vegetation of other significance

Vegetation type V2 may be representative of an Ecosystems at Risk; major ephemeral water courses. The ecosystem is at risk due to trampling by cattle and other feral animals such as donkeys and horses, and due to invasion by buffel grass and ruby dock (Kendrick, 2001). Buffel grass, *Cenchrus ciliaris*, was recorded opportunistically in the vicinity of this vegetation type, and cattle tracks were also recorded.

Vegetation types V1 and V2 are considered of conservation significance as they support populations of Priority flora *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3). Additionally, these vegetation types support populations of *Euploca* sp. (PSI), which may be an undescribed entity (Section 3.7).

Although all vegetation types extend outside the study area, the calcrete landform may be considered restricted in the landscape. The extent of this landform is easily identifiable on aerial imagery.

3.6 Native flora recorded during the survey

A total of 94 taxa from 50 genera representing 25 families were recorded during the current survey (Appendix 8).

The most speciose families were Fabaceae (21 taxa), Poaceae (17 taxa), and Malvaceae (11 taxa). The most speciose genera were *Acacia* (12 taxa), *Ptilotus* and *Eucalyptus* (5 taxa each). The dominant plant groups are consistent with other surveys of the broader locality.

3.7 Conservation listed flora recorded during the survey

No Threatened flora species were recorded during the survey.

A total of two Priority flora taxa were recorded within the study area, *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3) (Figure 3-5, Appendix 9). These taxa are discussed in detail below:

- ***Acacia subtiliformis* (P3)**

Acacia subtiliformis is a spindly, slender, erect shrub to 3.5 m high that flowers in June with yellow inflorescence (Western Australian Herbarium, 2022) (Plate 4). This taxon has green phyllodes with slightly viscid new growth, is resinous and aromatic. *Acacia subtiliformis* occurs in low, undulating country on calcareous rises adjacent to drainage lines, and is associated with *Eucalyptus* mallees, *Melaleuca* and *Petalostylis* shrubs over scattered hard spinifex (Rio Tinto and Western Australian Herbarium, 2015).

The WAH has 24 specimens of this taxon, which are restricted to the Fortescue and Hamersley subregions (Western Australian Herbarium, 2022). The Rio Tinto database has records of 191,525 individuals with a range of approximately 118 km within the Pilbara region. *Acacia subtiliformis* was not previously recorded within the study area, with the closest record being 2.8 km west of the study area.

A total of 9722 individuals were recorded from 133 records, representing 5.07% of the records of this species within the Rio Tinto database for the Pilbara region. *Acacia subtiliformis* was recorded throughout the study area, where it represented one of the dominant species of vegetation type V1. As this vegetation type was the most widespread within the study area, and it extends outside the surveyed boundaries, it can be inferred that the *Acacia subtiliformis* population is larger than the number of individuals recorded. Additionally, *Acacia subtiliformis* was recorded within vegetation type V2, and two individuals were recorded on a previously cleared area.

Due to this species' recorded broad occurrence across the Hamersley Ranges, the small scale of the Proposal and the number of records existing, the Proposal is unlikely to impact on the local or regional significance of this species.



Plate 4: *Acacia subtiliformis* (P3) recorded within the study area. From left to right: close-up of branch with phyllodes and scars where phyllodes have fallen; habitat; branching habit.

- ***Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3)**

Goodenia sp. East Pilbara (A.A. Mitchell PRP 727) is an erect rosetted herb to 0.2 m high, that flowers either annually or biannually (Western Australian Herbarium, 2022; Rio Tinto and Western Australian Herbarium, 2015) (Plate 5). This taxon has spatulate leaves, and its flowers are yellow with brown centres and occur in racemes. *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) grows in low undulating plains or swampy plains on major river systems dominated by *Eucalyptus victrix*.

The WAH has 53 specimens of this taxon, which span across the Augustus, Chichester, Fortescue and Hamersley subregions (Western Australian Herbarium, 2022). The Rio Tinto database has records of 73,174 individuals with a range of approximately 324 km within the Pilbara region. *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) was not previously recorded within the study area, with the closest record being 1.0 km north of the study area within Weeli Wolli Creek.

A total of 308 individuals from 71 records of *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) were recorded within the study area, representing 0.42% of the records of this species within the Rio Tinto database for the Pilbara region. This taxon was growing mostly in association with vegetation types

V1 and V2, on calcrete low hills or drainage lines. Two records, for a total of 14 individuals, were recorded on previously cleared areas.

Given this species' broad distribution, the small scale of the Proposal and the large number of regional records, the conservation significance of this species is unlikely to be impacted.



Plate 5: *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3) recorded within the study area. From left to right: spatulate leaves; yellow flowers with brown centre; remnant raceme.

3.8 Flora of other significance

One taxon recorded in the study area, *Euploca* sp., did not match any currently known entity and thus considered to represent novel, undescribed flora taxa. This taxon has some affinities to *E. argyrea* (P1) due to especially dense, appressed indumentum of hairs of one size class but differs in having broader leaves. It also has affinities to the highly variable *E. glandulifera*, however glandular hairs only seem to be present on the sepals. This taxon needs to be recollected with mature fruits, and it is suspected to be an undescribed entity (S. Dillon, pers. comm. 13/06/2023).

A total of six records of this taxon were noted in the study area, within vegetation types V1 and V2. Three specimens were collected and submitted to the WAH for identification. Population size was not estimated, therefore it is assumed that at least six individuals occur within the study area.

It is possible that this taxon will be given a phrase name and described as new species in the future. Protection of this taxon is assumed at Priority 1 level as a precautionary approach.



Legend

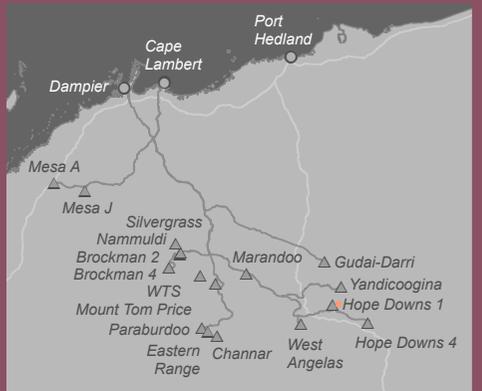
Study Area

Conservation Significant Flora

- Acacia subtiliformis* (P3)
- Euploca* sp. (PSI)
- Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3)

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 3-5: Conservation Significant Flora Recorded



3.9 Potential conservation listed flora occurring in the study area

Following the survey, the likelihood of occurrence assessment was revised considering the presence of suitable habitat, survey timing and conditions (Appendix 6). Of the 31 conservation significant flora taxa identified by the database searches, two were recorded (Section 3.6), two are considered likely to occur within the study area, and two have the potential to occur. The remaining 27 conservation significant flora taxa are considered unlikely to occur. Table 3-7 lists the conservation significant flora taxa whose revised likelihood of occurrence is 'potential' or higher classification.

Table 3-7: Revised likelihood of occurrence of conservation listed flora taxa considered to have 'potential' to occur or higher.

Species	Status	Likelihood of occurrence (post-field)
<i>Acacia subtiliformis</i>	P3	Recorded This taxon was recorded throughout the study area.
<i>Aristida lazaridis</i>	P2	Potential Suitable habitat occurs within the study area. The survey occurred the month following the flowering period for this taxon (April), therefore it is possible that it would have been missed during the survey.
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	Recorded This taxon was recorded throughout the study area.
<i>Lepidium catapycnon</i>	P4	Likely The study area contains suitable habitat for this taxon (stony hill slopes, open woodlands in hilly areas, hill hummock grasslands, and road verges). Additionally, the survey was undertaken outside of this taxon's flowering time (Oct – Jan), so it is possible that it would have been missed during the survey.
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3	Potential The study area contains suitable habitat for this taxon (near creeks, rocky hills). The survey occurred the month following the flowering period for this taxon (April), therefore it is possible that it would have been missed during the survey.
<i>Stylidium weeliwoolli</i>	P3	Likely The study area contains suitable habitat for this taxon (sandy soils on the edge of watercourses) Additionally, the survey was undertaken outside of this taxon's flowering time (Aug - Sep), so it is possible that it would have been missed during the survey.

3.10 Introduced flora occurring within the study area

One introduced (weed) species was recorded from the study area, **Cenchrus ciliaris*, which is not listed as a Declared Pest (Department of Primary Industries and Regional Development, 2022) and is not a Weed of National Significance (Department of Agriculture, Water and the Environment, 2021) (Appendix 10).

Strict weed hygiene protocols should be implemented during clearing of vegetation and subsequent earthworks to minimise the introduction and spread of weeds to or from the study area.

3.11 Fauna habitats of the study area

Two broad fauna habitat types were described from the study area. The fauna habitat types recorded are described below, accompanied by mapping of the habitat types (Table 3-8, Figure 3-6).

'Low Hills and Slopes' were the most widespread fauna habitat across the study area (124.7 ha, 86.8%), whilst 'Minor Drainage' were the least widespread fauna habitat recorded from the study area (16.0 ha, 11.1%). The remaining 2.0% constituted 'Disturbed' areas, such as access tracks and pads (2.9 ha).

Table 3-8: List of habitat types within the study area including microhabitats and extent

Habitat	Fauna habitat description	Significant microhabitat	Extent (ha) within study area	Proportion (%) within study area
Low Hills and Slopes	<p>Low undulating hills and extensive foot slopes with a gradual gradient. Low hills have rounded summits without plateaus. This habitat does not contain cliff faces or outcropping. (Plate 6). Microhabitats generally include high <i>Triodia</i> cover, exposed bedrock, and small rock piles.</p> <p>The undisturbed areas were in very good to excellent condition, however the vegetation is regrowing following a recent fire, and <i>Triodia</i> hummocks are smaller in size.</p> <p>This habitat was associated with vegetation consisting of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Acacia bivenosa</i> and <i>Acacia subtiliformis</i> mid sparse shrubland over <i>Triodia wiseana</i> and <i>Triodia vanleeuwenii</i> open hummock grassland. Soils consisted of orange and brown clay loam with calcrete, ironstone, basalt, calcrete and quartz rock cover.</p> <p>This habitat is considered of high value for the Western Pebble-mound Mouse where active mounds are present. Within the habitat type, 22 Western Pebble-mound Mouse mounds were recorded, 18 of which were active. The habitat is considered of moderate value for other species of conservation significance.</p>	<p><i>Triodia</i> was recorded, however its cover percentage was not high, and hummocks were small in size due to recent fires.</p>	124.7	86.8

Habitat	Fauna habitat description	Significant microhabitat	Extent (ha) within study area	Proportion (%) within study area
Minor Drainage	<p>Small drainage channels less than 10m in width. Often with thick <i>Acacia</i> growth along banks. Does not include the minor drainage depressions that flow from high ground features. This habitat is less likely to support surface water for long after rains (Plate 7). Microhabitats within this habitat type include occasional mature Eucalypts/Corymbias, leaf litter, hollow logs/tree hollows. The drainage channels support fauna dispersal, are subject to seasonal inundation, and support richer floristic diversity than surrounds.</p> <p>The undisturbed areas were in very good condition.</p> <p>This habitat was associated with vegetation consisting of <i>Eucalyptus xerothermica</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Petalostylis labicheoides</i> tall sparse shrubland over <i>Acacia</i> spp. mid sparse shrubland over <i>Triodia wiseana</i> and <i>Triodia longiceps</i> open hummock grassland over <i>Themeda triandra</i> isolated tussock grasses. Soils consisted of brown sandy clay loam with calcrete, ironstone and basalt rocks.</p> <p>Minor Drainage habitat is considered to have a moderate fauna habitat value and may provide suitable foraging habitat for conservation significant fauna species such as the Grey Falcon (VU), Peregrine Falcon (OS), Ghost Bat (VU), Pilbara Leaf-nosed Bat (VU) and Western Pebble-mound Mouse (P4). This habitat may also provide nesting opportunities for the Grey Falcon (VU) and Peregrine Falcon (OS) and dispersal habitat for the Northern Quoll (EN).</p>	<p>No large Eucalypts/Corymbia, hollow logs or tree hollows were recorded.</p> <p>Seasonally inundated.</p> <p>Supports fauna dispersal.</p>	16.0	11.1
Disturbed	<p>Areas where the natural vegetation and microhabitats have been disturbed (tracks, pads etc.). This habitat 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 recorded	2.9	2.0
Total			143.6	100.0



Plate 6: Representative photo of fauna habitat 'Low Hills and Slopes' (R02)



Plate 7: Representative photo of fauna habitat 'Minor Drainage' (R04)

724,000mE

725,000mE

726,000mE

727,000mE

7,461,000mN

7,460,000mN

7,459,000mN

7,461,000mN

7,460,000mN

7,459,000mN



724,000mE

725,000mE

726,000mE

727,000mE

Legend

Study Area

Habitat Type

Disturbed

Low Hills and Slopes

Minor Drainage

Drawn: J.Wesson
Plan: RTIO-1019645v1
Date: September 2023

Checked by: A.Coulson
Proj: GDA 1994 MGA Zone 50
GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.



3.12 Fauna habitats of significance

None of the fauna habitats occurring within the study area correspond to any ecosystems listed as Threatened under the EPBC Act and none are consistent with ecosystems listed as TECs (Department of Biodiversity, Conservation and Attractions, 2018).

None of the fauna habitats occurring within the study area are representative of listed PECs (Department of Biodiversity, Conservation and Attractions, 2023).

3.13 Other habitats of significance

Low Hills and Slopes habitat is considered to be high value habitat if active Western Pebble-mound Mouse mounds are present. Eighteen active Western Pebble-mound Mouse mounds were found during the survey (out of 22 total mounds recorded). However, this habitat is common in the surrounding area and throughout the Pilbara.

3.14 Conservation listed fauna recorded during survey

Evidence of a fauna species of conservation significance was recorded within the study area.

- ***Pseudomys chapmani* (Western Pebble-mound Mouse) – Priority 4**

The Western Pebble-mound Mouse is endemic to the Pilbara region of Western Australia and occurs west to the McKay Range and south to the Collier Range (Menkhorst & Knight, 2021). The species is patchily distributed on gentle colluvial slopes of rocky, hummock grasslands with little or no soil and a sparse shrub layer. Where suitable habitat is present, this species can be common.

A total of 22 Western Pebble-mound Mouse mounds were recorded, of which 18 were assessed as active, one recently inactive, and three inactive mounds. Locations of Western Pebble-mound Mouse mounds recorded are shown in Figure 3-7 and listed in Appendix 11.



Legend

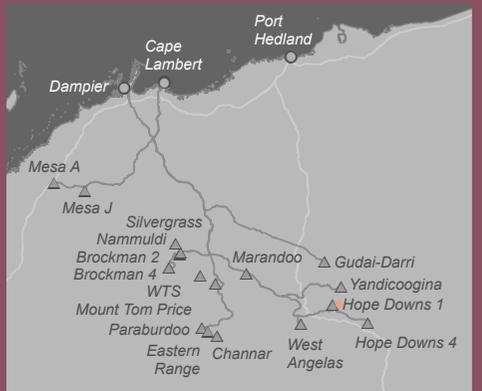
- Study Area

Conservation Significant Fauna

- *Pseudomys chapmani* (P4)

Drawn: J.Wesson
 Plan: RTIO-1019645v1
 Date: September 2023

Checked by: A.Coulson
 Proj: GDA 1994 MGA Zone 50
 GIS.Team@riotinto.com



Disclaimer: Copyright in this document is owned by or is licensed to the relevant Rio Tinto Group member(s) and may contain confidential information of the relevant Rio Tinto Group member(s). This document has been prepared to the appropriate level of accuracy as required for its purposes. Reproduction, distribution or disclosure of this document in whole or in part by any means is strictly prohibited without the express written approval of the relevant Rio Tinto Group member(s). Any unauthorised use or disclosure of this document may result in loss or damage to the relevant Rio Tinto Group member(s). Further this document may not be referred to, quoted or relied upon for any purpose whatsoever without the written approval of the relevant Rio Tinto Group member(s). To the maximum extent permitted by law, the relevant Rio Tinto Group member(s): (a) will not be liable to a third party for any loss, damage, liability or claim arising out of or incidental to a third party using or relying on the content contained in this document, whether such use was authorised or not; and (b) disclaims all risk, representations and warranties (express or implied), and the third party assumes all risk and releases and indemnifies and agrees to keep indemnified the relevant Rio Tinto Group member(s) from any loss, damage, claim or liability arising directly or indirectly from the use or reliance on this document.

Figure 3-7: Conservation Significant Fauna Recorded



3.15 Potential conservation listed fauna occurring in the study area

Following the survey, sixteen of the 20 conservation listed species identified by the database searches were deemed unlikely to occur within the study area, due to the study area not supporting likely habitat (Appendix 7). One species was recorded within the study area (Section 3.14), and a further three have the 'potential' to occur within the habitats available in the study area; these are discussed below:

- ***Dasyurus hallucatus* (Northern Quoll) – Endangered**

The Northern Quoll typically inhabits and is more abundant in dissected rocky escarpments, however, they will utilise a range of habitats and den sites from rock crevices, tree hollows and goanna burrows, to the roofs of buildings (Van Dyck & Strahan, 2008). It is important to note that much of the ecological information for the Northern Quoll comes from studies in the Top End of the Northern Territory (Oakwood, 2002). Much of their ecology is likely to be similar in the Pilbara; however, differences in genetic structure and some demographic parameters have been observed (Howe, Spencer, & Schmitt, 2009).

The Northern Quoll has a relatively large home-range size of up to 150 ha for males (35 ha for females). Movements between den sites on consecutive nights can be up to 1.85 km for males (Oakwood, 2002). In the Northern Territory, mating occurs in late May to June and all males die after the mating season and females rear the young alone (Oakwood, 2002).

The Northern Quoll has been recorded 11.6 km west of the study area. This species may opportunistically utilise the minor drainage habitat to cross the study area when males disperse. No denning habitat is found in the study area. Therefore, it is unlikely the Proposal will impact the conservation status of this species.

- ***Macroderma gigas* (Ghost Bat) – Vulnerable**

The Ghost Bat is Australia's largest microbat and 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, 2021).

The Ghost Bat has not been recorded within close proximity to the study area, with the closest record being 12 km east of the study area. This species may opportunistically use the study area for foraging, however no roosting habitat is present within the study area. Therefore, it is considered unlikely the Proposal will negatively impact on the conservation status of this species on either a local or bioregional scale.

- ***Rhinonictes aurantia* (Pilbara Leaf-nosed Bat) – Vulnerable**

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 Pilbara (Van Dyck & Strahan, 2008). 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 (Churchill, 1998).

This species has been recorded 14.5 km southwest of the study area. Whilst the PLNB may potentially forage within the study area, the conservation status of the PLNB is unlikely to be negatively impacted by the Proposal, due to the lack of permanent water pools and no roosting habitat in the study area.

4. Statement addressing the 10 clearing principles

Rio Tinto, on behalf of Hamersley HMS (the Proponent), is proposing to undertake a hydrological drilling program at Hope Downs 1 (the Proposal). The study area covers approximately 143.6 ha of previously disturbed ground and intact native vegetation and is located approximately 70 km northwest of Newman, within the Pilbara region of Western Australia.

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

- Principles (c), (d), (e) and (h) are not at variance; and
- Principles (a), (b), (f), (g), (i) and (j) are not likely to be at variance.

4.1 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 (Government of Western Australia, 2018) and is a secondary centre of endemism and species richness for *Acacia*, *Triodia*, *Corymbia* and *Sida* in Western Australia (Maslin, 2001; Kendrick, 2001; Maslin & van Leeuwen, 2008). The Hamersley subregion 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 subregion of the Pilbara bioregion. The Hamersley subregion 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 subregion include rare features such as gorges, centres of endemism including calcrete deposits, refugia and the *Themeda* grasslands TEC (Kendrick, 2001). The buffer boundary for the '*Themeda* grasslands on cracking clays (Hamersley Station, Pilbara)' TEC is located approximately 50 km northeast of the study area, and due to the separation, will not be impacted by the Proposal.

Three vegetation types were described from the study area, of which two vegetation types were described from undulating plains or low hills, and one vegetation type from drainage lines. Two vegetation types, V1 and V2, are considered of conservation significance as they support populations of Priority flora *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3). Additionally, these vegetation types support populations of *Euploca* sp. (PSI), which may be an undescribed entity. One vegetation type, V2, may be representative of an Ecosystems at Risk, major ephemeral water courses (Kendrick, 2001). Although all vegetation types extend outside the study area, the calcrete landform may be considered restricted in the landscape.

None of the vegetation types occurring within the study area are listed as TECs under either the EPBC Act or under the State listing maintained by DBCA. None of the vegetation types represent PECs under the State listing maintained by DBCA.

The buffer boundary for the 'Weeli Wollie Spring Community' PEC (P1) intersects the study area. This community is characterised by riparian woodland and forest associations with sedges and herbfields in the understorey fringing pools and associated water bodies along the main channels of Weeli Wollie Creek (Department of Biodiversity, Conservation and Attractions, 2023). The spring and creekline are also noted for their relatively high diversity of stygofauna and microbat assemblage. Within the study

area, no sedges were recorded; additionally, the creeklines were ephemeral and did not support permanent pools with extensive herbfields. As the Proposal does not intersect the main channels of Weeli Wollie Creek, and the absence of sedges and herbfields, the 'Weeli Wollie Spring Community' PEC will not be impacted by the Proposal.

A total of 94 taxa from 50 genera representing 25 families were recorded during the current survey. The most speciose families were Fabaceae (21 taxa), Poaceae (17 taxa), and Malvaceae (11 taxa). The most speciose genera were *Acacia* (12 taxa), *Ptilotus* and *Eucalyptus* (5 taxa each). The dominant plant groups are consistent with other surveys of the broader locality.

No Threatened flora species were recorded during the survey. Two Priority flora taxa were recorded within the study area, *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3). Both these species grew in association with vegetation types extending outside the study area boundary, therefore it is unlikely that the Proposal will negatively impact on the conservation status of these species at either a local or regional scale.

Following the survey, two additional conservation significant flora identified by the database searches are considered likely to occur within the study area, and another two have the potential to occur:

- *Aristida lazaridis* (P2) – Potential: the study area contains suitable habitat for this taxon, which could have been missed during the survey due to its flowering period having already occurred.
- *Lepidium catapycnon* (P4) – Likely: the study area contains suitable habitat for this taxon, which could have been missed during the survey due to its flowering period occurring five months following the survey.
- *Rostellularia adscendens* var. *latifolia* (P3) – Potential: the study area contains suitable habitat for this taxon, which could have been missed during the survey due to its flowering period having already occurred.
- *Stylidium weeliwollie* (P3) – Likely: the study area contains suitable habitat for this taxon, which could have been missed during the survey due to its flowering period occurring three months following the survey.

The survey was conducted in May 2023, which is within the primary survey period as per EPA Guidance (Environmental Protection Authority, 2016). Conditions encountered during the survey were regarded as average, with rainfall in the preceding three months being lower than the long-term average. Despite some specimens being sterile or dead, numerous annual species were recorded.

Two broad fauna habitat types were described from the study area: 'Low Hills and Slopes' and 'Minor Drainage'. Low Hills and Slopes habitat is considered high value habitat where active Western Pebble-mound Mouse mounds were recorded. However, this habitat is common in the surrounding area and throughout the Pilbara. This habitat is considered of moderate value for other species of conservation significance. Both fauna habitats are not considered to be restricted at a local or regional level.

One fauna species of conservation significance, the Western Pebble-mound Mouse (P4), was recorded within the study area, for which 22 mounds were recorded. The species is patchily distributed on gentle colluvial slopes of rocky, hummock grasslands with little or no soil and a sparse shrub layer. Where suitable habitat is present, this species can be common.

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

4.2 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.

Secondary evidence in the form of 22 mounds of the Priority 4 species *Pseudomys chapmani* (Western Pebble-mound Mouse) was recorded within the study area, of which 18 were considered active, one recently inactive (i.e. a mound that had slightly lost their dome formation), and three inactive mounds. This species can be common where suitable habitat is present.

No conservation significant fauna species were considered 'Likely' to occur within the habitats available in the study area. Three conservation significant fauna species were considered to have the 'potential' to occur within the study area: *Dasyurus hallucatus* (Northern Quoll); *Macroderma gigas* (Ghost Bat); *Rhinonictis aurantia* (Pilbara Leaf-nosed Bat). The Proposal is unlikely to impact the conservation status of these three species due to the lack of core habitat within the study area, such as denning or roosting habitat, or permanent water pools.

Due to the small size of the study area, it is considered unlikely the Proposal will negatively impact on the conservation status of any of these species, on either a local or regional scale.

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

4.3 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 Threatened flora species were recorded, and none were identified by the database searches within 20 km of the study area.

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

4.4 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).

No TEC is known to occur within 50 km of the study area, and none were recorded within the study area.

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

4.5 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 falls within one vegetation association: Hamersley 18 (80100053) - Low woodland; mulga (*Acacia aneura*).

The current extent of the Hamersley 18 (80100053) vegetation association (Beard, 1975) within the Pilbara bioregion has been estimated to be over 99% of its pre-European extent remaining and is

considered to be of 'least concern'. As such, the vegetation types within the study area would not represent remnant stands of extensively cleared vegetation, and are well represented within the region.

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

4.6 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.

The closest Groundwater Dependent Ecosystem (GDE) is located 1.0 km north of the study area, which is represented by Weeli Wolli Springs.

Minor ephemeral creeklines that flow after significant rainfall events transect the study area, and are not considered to be significant watercourses or wetlands. These flowlines are not holding persistent vegetation that indicate the presence of groundwater dependent vegetation. Additionally, the study area is not considered an inflow dependent ecosystem (claypans, ephemeral wetlands/lakes, floodplains).

One vegetation type, V2, was mapped within the minor creeklines of the study area, which were dry at the time of the survey. Within this vegetation type, a few flora taxa that are associated with, and indicative of, GDE, were identified. These include:

- Low level (soil moisture availability or surface water availability is sub-perennial to ephemeral) species: *Eucalyptus xerothermica*, *Atalaya hemiglauca*, *Stylobasium spathulatum* (although not common or abundant).
- Moderate level (soil moisture availability or surface water availability is sub-perennial) species: *Dodonaea lanceolata* (although not abundant).

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

4.7 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 is located within the Oakover Land System, which is described as breakaways, mesas, plateaux and stony plains of calcrete supporting hard spinifex shrubby grasslands. The Oakover Land System is not generally prone to degradation or susceptible to soil erosion (Van Vreeswyk, Payne, Leighton, & Hennig, 2004).

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 not likely to be at variance to this principle.

4.8 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.

The study area does not intersect any mapped Environmentally Sensitive Areas or conservation areas.

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

4.9 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. Given the small scale of Proposal, there is no reason to expect that the Proposal would affect groundwater quality in the region.

The Proposal does not lie over a Public Drinking Water Source.

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

4.10 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. Several minor ephemeral drainage lines but no major streams are present within the Proposal.

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 not likely to be at variance to this principle.

5. Conclusions

Rio Tinto's Proposal is to clear native vegetation to undertake a hydrological drilling program at Hope Downs 1. The study area covers approximately 143.6 ha of previously disturbed ground (2.9 ha, 2.0%) and intact native vegetation (140.7 ha, 98%).

The landforms, vegetation, and fauna habitats are well represented within the broader Hamersley subregion. Three vegetation types were identified across the study area. Two vegetation types were described from undulating plains or low hills, and one vegetation type from drainage lines.

The study area does not contain any TECs or PECs and is not within any ESAs. The vegetation types identified within the study area are considered to be of low conservation value and are widely distributed both locally and throughout the Hamersley subregion.

A total of 94 taxa from 50 genera representing 25 families were recorded during the current survey. The dominant plant groups are consistent with other surveys of the broader locality.

No species of Threatened flora were recorded by the study, or were expected to occur within the study area.

A total of two Priority flora taxa were recorded within the study area, *Acacia subtiliformis* (P3) and *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3).

One introduced (weed) species was recorded from the study area, **Cenchrus ciliaris*, which is not listed as a Declared Pest or Weed of National Significance.

Two broad fauna habitat types were described from the study area: 'Low Hills and Slopes' and 'Minor Drainage'. Both fauna habitats are not considered to be restricted at a local or regional level.

One fauna species of conservation significance, the Western Pebble-mound Mouse (P4), was recorded within the study area, for which 22 mounds were recorded. Where suitable habitat is present, this species can be common.

The manner in which the clearing of native vegetation is regulated, undertaken and rehabilitated is under various internal Rio Tinto operational controls, which are presented in Appendix 12 and will be followed during the course of the Proposal.

A specialist assessment against the 10 Clearing Principles determined that:

- Principles (c), (d), (e) and (h) are not at variance; and
- Principles (a), (b), (f), (g), (i) and (j) are not likely to be at variance.

6. References

- Astron Environmental Services. (2019). *Hope Downs 2 Proposal Fauna Survey March 2019*. Prepared for Rio Tinto.
- Astron Environmental Services. (2019). *Hope Downs 2 Proposal Flora and Vegetation Survey*. Prepared for Rio Tinto.
- Astron Environmental Services. (2019). *Hope Downs 2 Proposal Matters of National Environmental Significance Fauna Assessment*. Prepared for Rio Tinto.
- Astron Environmental Services. (2020). *Hope Downs 1 Development Envelope Fauna Habitat Mapping*. Prepared for Rio Tinto.
- Astron Environmental Services. (2020). *Hope Downs Development Envelope Vegetation Mapping*. Prepared for Rio Tinto.
- Beard, J. S. (1975). *Vegetation Survey of Western Australia, Pilbara. 1:1 000 000 Vegetation Series. Explanatory Notes to Sheet 5*. Nedlands, Western Australia: University of Western Australia Press.
- Biota Environmental Sciences. (2008). *Hope Downs Northern Quoll Position Paper*. Prepared for Rio Tinto Iron Ore on behalf of Hammersley HMS.
- Biota Environmental Sciences. (2011). *Hope Downs Project Life of Mine Targeted Fauna Survey*. Prepared for Rio Tinto Iron Ore.
- BirdLife International. (2023). Retrieved from BirdLife: <http://datazone.birdlife.org>
- BoM. (2023). *Climate Data Online*. Retrieved from <http://www.bom.gov.au/climate/data/>
- Christian, C. S., & Stewart, G. A. (1953). General report on survey of Katherine-Darwin region, 1946. *Land Research Series No. 1*.
- Churchill, S. (1998). *Australian Bats*. Pullman, WA: Reed Natural History Australia.
- Department of Agriculture, Water and the Environment. (2021). *Weeds Australia*. Retrieved from Centre for Invasive Species Solutions: <https://weeds.org.au/>
- Department of Agriculture, Water and the Environment. (2022). *Australia's bioregions (IBRA)*. Retrieved from <http://www.environment.gov.au/land/nrs/science/ibra>
- Department of Biodiversity, Conservation and Attractions. (2017, May 26). *Night Parrot*. Retrieved from Parks and Wildlife Service: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/night-parrot>
- Department of Biodiversity, Conservation and Attractions. (2018). *List of Threatened Ecological Communities Endorsed by the Western Australian Minister for Environment*.
- Department of Biodiversity, Conservation and Attractions. (2022). *Priority Ecological Communities for Western Australia Version 33*. Species and Communities Program.
- Department of Biodiversity, Conservation and Attractions. (2023). *Priority Ecological Communities for Western Australia Version 35*. Species and Communities Program.
- Department of Climate Change, Energy, the Environment and Water. (2022). *Protected Matters Search Tool: Interactive Map*. Retrieved from <https://pmst.awe.gov.au/>
- Department of Climate Change, Energy, the Environment and Water. (2023). Retrieved from Species Profile and Threats Database: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- Department of Climate Change, Energy, the Environment and Water. (2023). *Apus pacificus - Fork-tailed Swift*. Retrieved from Species Profile and Threats Database: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=678

- Department of Primary Industries and Regional Development. (2022). *Western Australian Organism List*. Retrieved from Agriculture and Food: <https://www.agric.wa.gov.au/organisms>
- Department of Water and Environmental Regulation. (2022). *WRIMS - Groundwater subareas (DWER-083) dataset*.
- Environmental Protection Authority. (2016, December). *Environmental Factor Guideline - Terrestrial Fauna*. Perth, Western Australia.
- Environmental Protection Authority. (2016, December). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Perth, Western Australia: The Government of Western Australia.
- Environmental Protection Authority. (2020, July). *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment*. Perth, Western Australia.
- Geoscience Australia. (2006). *GEODATA TOPO 250K Series 3*. Symonston, ACT Australia: Ausgeo News.
- Government of Western Australia. (2018). *Pilbara Conservation Strategy*.
- Howe, R. A., Spencer, P. B., & Schmitt, L. H. (2009). Island populations have high conservation value for northern Australia's top marsupial predator ahead of a threatening process. *Journal of Zoology*, 1-12.
- Kendrick, P. (2001). *Pilbara 3 (PIL3 - Hamersley subregion), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Department of Conservation and Land Management.
- Marchant, S., Higgins, P. J., & Considine, M. (1993). *Handbook of Australian, New Zealand & Antarctic birds. Volume 2, Raptors to lapwings*. Melbourne, Australia: Oxford University Press.
- Maslin, B. R. (2001). *WATTLE: Acacias of Australia*. Canberra: CSIRO Publishing.
- Maslin, B. R., & van Leeuwen, S. (2008). New taxa of Acacia (Leguminosae: Mimosoideae) and notes on other species from the Pilbara and adjacent desert regions of Western Australia. *Nuytsia*, 18, 139-188.
- Mattiske Consulting Pty Ltd. (2009). *Flora and Vegetation of the Hope Downs 1 Area*. Prepared for Pilbara Iron.
- Menkhorst, P., & Knight, F. (2021). *A field guide to the mammals of Australia*. South Melbourne, Australia: Oxford University Press.
- Menkhorst, P., Rogers, D., Clarke, R., Davies, J., & Marsack, P. (2017). *The Australian Bird Guide*. Australia: CSIRO.
- Oakwood, M. (2002). Spatial and social organization of a carnivorous marsupial *Dasyurus hallucatus* (Marsupialia: Dasyuridae). *Journal of Zoology*, 237-248.
- Pearson, D. J. (1993). Distribution, status and conservation of pythons in Western Australia. In D. Lunney, & D. Ayers, *Herpetology in Australia: a Diverse Discipline* (pp. 383-395). Sydney: Royal Zoological Society of NSW.
- Pizzey, G., & Knight, F. (2012). *The Field Guide to the Birds of Australia*. Australia: HarperCollins Publishers.
- Rio Tinto and Western Australian Herbarium. (2015). *Rare and Priority Plants of the Pilbara*. Perth, Western Australia: LucidMobile.
- Shepherd, D. P., Beeston, G. R., & Hopkins, A. J. (2002). *Native vegetation in Western Australia - extent, type and status*. Western Australia: Department of Agriculture.
- Threatened Species Scientific Committee. (2005). *Commonwealth Listing Advice on Northern Quoll (Dasyurus hallucatus)*. Retrieved from Department of Climate Change, Energy, the Environment and Water:

<https://www.dcceew.gov.au/environment/biodiversity/threatened/assessments/dasyurus-hallucatus-2005>

- Tutt, M., Mitchell, S., Brace, P., & Pearson, D. (2002). *Conserving Pilbara olive pythons on the Burrup. Threatened Species Network community grants annual report, Project WA04/100*. Karratha: Nickol Bay Naturalists' Club.
- Van Dyck, S., & Strahan, R. (2008). *The Mammals of Australia*. Sydney, Australia: New Holland Publishers.
- Van Vreeswyk, A. M., Payne, A. L., Leighton, K. A., & Hennig, P. (2004). *An inventory and condition survey of the Pilbara region, Western Australia*. Department of Agriculture.
- Western Australian Herbarium. (2022). Retrieved from Florabase - the Western Australian Flora: <https://florabase.dpaw.wa.gov.au/>
- Wilson, S., & Swan, G. (2017). *A complete guide to reptiles of Australia*. Sydney, Australia: New Holland Publishers.

7. Appendices

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Acanthagenys rufogularis</i>	BIRD		Animalia
<i>Acanthiza apicalis</i>	BIRD		Animalia
<i>Acanthiza chrysorrhoa</i>	BIRD		Animalia
<i>Acanthiza robustirostris</i>	BIRD		Animalia
<i>Acanthiza uropygialis</i>	BIRD		Animalia
<i>Acanthophis wellsi</i>	REPTILE		Animalia
<i>Accipiter cirrocephalus</i>	BIRD		Animalia
<i>Accipiter fasciatus</i>	BIRD		Animalia
<i>Acrocephalus australis</i>	BIRD		Animalia
<i>Aegotheles cristatus</i>	BIRD		Animalia
<i>Amphibolurus longirostris</i>	REPTILE		Animalia
<i>Amytornis striatus</i>	BIRD		Animalia
<i>Amytornis striatus subsp. whitei</i>	BIRD		Animalia
<i>Anas superciliosa</i>	BIRD		Animalia
<i>Anhinga melanogaster</i>	BIRD		Animalia
<i>Anhinga melanogaster subsp. novaehollandiae</i>	BIRD		Animalia
<i>Anhinga novaehollandiae</i>	BIRD		Animalia
<i>Anilios ganei</i>	REPTILE	P1	Animalia
<i>Antaresia perthensis</i>	REPTILE		Animalia
<i>Antaresia stimsoni</i>	REPTILE		Animalia
<i>Antaresia stimsoni subsp. orientalis</i>	REPTILE		Animalia
<i>Anthus australis</i>	BIRD		Animalia
<i>Aphelocephala leucopsis</i>	BIRD		Animalia
<i>Apus pacificus</i>	BIRD	MI	Animalia
<i>Aquila audax</i>	BIRD		Animalia
<i>Aquila morphnoides</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 subsp. melanops</i>	BIRD		Animalia
<i>Artamus cyanopterus</i>	BIRD		Animalia
<i>Artamus minor</i>	BIRD		Animalia
<i>Artamus personatus</i>	BIRD		Animalia
<i>Aspidites melanocephalus</i>	REPTILE		Animalia
<i>Austronomus australis</i>	MAMMAL		Animalia
<i>Barnardius zonarius</i>	BIRD		Animalia
<i>Bos taurus</i>	MAMMAL		Animalia
<i>Brachyurophis approximans</i>	REPTILE		Animalia
<i>Cacatua roseicapilla</i>	BIRD		Animalia
<i>Cacatua roseicapilla subsp. assimilis</i>	BIRD		Animalia
<i>Cacatua roseicapilla subsp. roseicapilla</i>	BIRD		Animalia
<i>Cacatua sanguinea</i>	BIRD		Animalia
<i>Cacatua sanguinea subsp. sanguinea</i>	BIRD		Animalia
<i>Cacomantis pallidus</i>	BIRD		Animalia
<i>Caimanops amphiboluroides</i>	REPTILE		Animalia
<i>Camelus dromedarius</i>	MAMMAL		Animalia
<i>Canis dingo</i>	MAMMAL		Animalia
<i>Canis familiaris dingo</i>	MAMMAL		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Canis lupus subsp. dingo</i>	MAMMAL		Animalia
<i>Carlia munda</i>	REPTILE		Animalia
<i>Carlia triacantha</i>	REPTILE		Animalia
<i>Certhionyx niger</i>	BIRD		Animalia
<i>Certhionyx variegatus</i>	BIRD		Animalia
<i>Chaerephon jobensis</i>	MAMMAL		Animalia
<i>Chalinolobus gouldii</i>	MAMMAL		Animalia
<i>Chalinolobus morio</i>	MAMMAL		Animalia
<i>Charadrius melanops</i>	BIRD		Animalia
<i>Cheramoeca leucosternus</i>	BIRD		Animalia
<i>Chrysococcyx basalis</i>	BIRD		Animalia
<i>Cincloramphus cruralis</i>	BIRD		Animalia
<i>Cincloramphus mathewsi</i>	BIRD		Animalia
<i>Cinclosoma castaneothorax</i>	BIRD		Animalia
<i>Circus assimilis</i>	BIRD		Animalia
<i>Colluricincla harmonica</i>	BIRD		Animalia
<i>Colluricincla harmonica subsp. rufiventris</i>	BIRD		Animalia
<i>Coracina maxima</i>	BIRD		Animalia
<i>Coracina novaehollandiae</i>	BIRD		Animalia
<i>Coracina novaehollandiae subsp. subpallida</i>	BIRD		Animalia
<i>Corvus bennetti</i>	BIRD		Animalia
<i>Corvus coronoides</i>	BIRD		Animalia
<i>Corvus orru</i>	BIRD		Animalia
<i>Corvus orru subsp. ceciliae</i>	BIRD		Animalia
<i>Coturnix ypsilophora</i>	BIRD		Animalia
<i>Cracticus nigrogularis</i>	BIRD		Animalia
<i>Cracticus tibicen</i>	BIRD		Animalia
<i>Cracticus tibicen subsp. dorsalis</i>	BIRD		Animalia
<i>Cracticus tibicen subsp. tibicen</i>	BIRD		Animalia
<i>Cracticus torquatus</i>	BIRD		Animalia
<i>Crenadactylus ocellatus</i>	REPTILE		Animalia
<i>Crenadactylus ocellatus subsp. horni</i>	REPTILE		Animalia
<i>Crenadactylus ocellatus subsp. rostralis</i>	REPTILE		Animalia
<i>Cryptoblepharus buchananii</i>	REPTILE		Animalia
<i>Cryptoblepharus plagiocephalus</i>	REPTILE		Animalia
<i>Cryptoblepharus ustulatus</i>	REPTILE		Animalia
<i>Ctenophorus caudicinctus</i>	REPTILE		Animalia
<i>Ctenophorus caudicinctus subsp. caudicinctus</i>	REPTILE		Animalia
<i>Ctenophorus isolepis</i>	REPTILE		Animalia
<i>Ctenophorus isolepis subsp. citrinus</i>	REPTILE		Animalia
<i>Ctenophorus isolepis subsp. isolepis</i>	REPTILE		Animalia
<i>Ctenophorus nuchalis</i>	REPTILE		Animalia
<i>Ctenotus ariadnae</i>	REPTILE		Animalia
<i>Ctenotus duricola</i>	REPTILE		Animalia
<i>Ctenotus grandis</i>	REPTILE		Animalia
<i>Ctenotus grandis subsp. grandis</i>	REPTILE		Animalia
<i>Ctenotus hanloni</i>	REPTILE		Animalia
<i>Ctenotus helenae</i>	REPTILE		Animalia
<i>Ctenotus inornatus</i>	REPTILE		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Ctenotus pantherinus</i>	REPTILE		Animalia
<i>Ctenotus pantherinus subsp. acripes</i>	REPTILE		Animalia
<i>Ctenotus pantherinus subsp. ocellifer</i>	REPTILE		Animalia
<i>Ctenotus rubicundus</i>	REPTILE		Animalia
<i>Ctenotus rutilans</i>	REPTILE		Animalia
<i>Ctenotus saxatilis</i>	REPTILE		Animalia
<i>Ctenotus schomburgkii</i>	REPTILE		Animalia
<i>Ctenotus serventyi</i>	REPTILE		Animalia
<i>Cuculus pallidus</i>	BIRD		Animalia
<i>Cyclodomorphus melanops</i>	REPTILE		Animalia
<i>Cyclodomorphus melanops subsp. elongatus</i>	REPTILE		Animalia
<i>Cyclodomorphus melanops subsp. melanops</i>	REPTILE		Animalia
<i>Cyclorana maini</i>	AMPHI		Animalia
<i>Cyclorana platycephala</i>	AMPHI		Animalia
<i>Dacelo leachii</i>	BIRD		Animalia
<i>Dacelo leachii subsp. leachii</i>	BIRD		Animalia
<i>Dasykaluta rosamondae</i>	MAMMAL		Animalia
<i>Dasyurus hallucatus</i>	MAMMAL	EN	Animalia
<i>Delma elegans</i>	REPTILE		Animalia
<i>Delma haroldi</i>	REPTILE		Animalia
<i>Delma nasuta</i>	REPTILE		Animalia
<i>Delma pax</i>	REPTILE		Animalia
<i>Delma tincta</i>	REPTILE		Animalia
<i>Demansia psammophis</i>	REPTILE		Animalia
<i>Demansia psammophis subsp. cupreiceps</i>	REPTILE		Animalia
<i>Demansia rufescens</i>	REPTILE		Animalia
<i>Dicaeum hirundinaceum</i>	BIRD		Animalia
<i>Diplodactylus conspicillatus</i>	REPTILE		Animalia
<i>Diplodactylus pulcher</i>	REPTILE		Animalia
<i>Diplodactylus savagei</i>	REPTILE		Animalia
<i>Dromaius novaehollandiae</i>	BIRD		Animalia
<i>Egernia cygnitos</i>	REPTILE		Animalia
<i>Egernia depressa</i>	REPTILE		Animalia
<i>Egernia formosa</i>	REPTILE		Animalia
<i>Egretta novaehollandiae</i>	BIRD		Animalia
<i>Elanus caeruleus subsp. axillaris</i>	BIRD		Animalia
<i>Elsayornis melanops</i>	BIRD		Animalia
<i>Emblema pictum</i>	BIRD		Animalia
<i>Eolophus roseicapillus</i>	BIRD		Animalia
<i>Epthianura tricolor</i>	BIRD		Animalia
<i>Eremiascincus fasciolatus</i>	REPTILE		Animalia
<i>Eremiascincus isolepis</i>	REPTILE		Animalia
<i>Eremiascincus pallidus</i>	REPTILE		Animalia
<i>Eremiascincus richardsonii</i>	REPTILE		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 berigora subsp. berigora</i>	BIRD		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Falco cenchroides</i>	BIRD		Animalia
<i>Falco longipennis</i>	BIRD		Animalia
<i>Falco longipennis subsp. longipennis</i>	BIRD		Animalia
<i>Falco peregrinus</i>	BIRD	OS	Animalia
<i>Felis catus</i>	MAMMAL		Animalia
<i>Furina ornata</i>	REPTILE		Animalia
<i>Gallirallus philippensis</i>	BIRD		Animalia
<i>Gavicalis virescens</i>	BIRD		Animalia
<i>Gehyra 'fenestra'</i>	REPTILE		Animalia
<i>Gehyra montium</i>	REPTILE		Animalia
<i>Gehyra pilbara</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>Geopelia cuneata</i>	BIRD		Animalia
<i>Geopelia striata</i>	BIRD		Animalia
<i>Geopelia striata subsp. placida</i>	BIRD		Animalia
<i>Geophaps plumifera</i>	BIRD		Animalia
<i>Gerygone (fusca) mungi</i>	BIRD		Animalia
<i>Gerygone fusca</i>	BIRD		Animalia
<i>Gerygone fusca subsp. fusca</i>	BIRD		Animalia
<i>Gerygone fusca subsp. mungi</i>	BIRD		Animalia
<i>Grallina cyanoleuca</i>	BIRD		Animalia
<i>Haliastur sphenurus</i>	BIRD		Animalia
<i>Hamirostra isura</i>	BIRD		Animalia
<i>Hamirostra melanosternon</i>	BIRD		Animalia
<i>Heteronotia binoei</i>	REPTILE		Animalia
<i>Heteronotia sp.</i>	REPTILE		Animalia
<i>Heteronotia sp. B</i>	REPTILE		Animalia
<i>Heteronotia spelea</i>	REPTILE		Animalia
<i>Hieraaetus morphnoides</i>	BIRD		Animalia
<i>Hirundo nigricans</i>	BIRD		Animalia
<i>Hirundo nigricans subsp. nigricans</i>	BIRD		Animalia
<i>Lacustroica whitei</i>	BIRD		Animalia
<i>Lalage tricolor</i>	BIRD		Animalia
<i>Lerista bipes</i>	REPTILE		Animalia
<i>Lerista labialis</i>	REPTILE		Animalia
<i>Lerista macropisthopus subsp. fusciceps</i>	REPTILE		Animalia
<i>Lerista muelleri</i>	REPTILE		Animalia
<i>Lerista neander</i>	REPTILE		Animalia
<i>Lerista zietzi</i>	REPTILE		Animalia
<i>Lialis burtonis</i>	REPTILE		Animalia
<i>Liasis olivaceus subsp. barroni</i>	REPTILE	VU	Animalia
<i>Lichenostomus keartlandi</i>	BIRD		Animalia
<i>Lichenostomus penicillatus</i>	BIRD		Animalia
<i>Lichenostomus virescens</i>	BIRD		Animalia
<i>Lichmera indistincta</i>	BIRD		Animalia
<i>Lichmera indistincta subsp. indistincta</i>	BIRD		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Litoria rubella</i>	AMPHI		Animalia
<i>Lophognathus longirostris</i>	REPTILE		Animalia
<i>Lucasium stenodactylum</i>	REPTILE		Animalia
<i>Lucasium wombeyi</i>	REPTILE		Animalia
<i>Lucasium 'woodwardi'</i>	REPTILE		Animalia
<i>Macroderma gigas</i>	MAMMAL	VU	Animalia
<i>Macronectes giganteus</i>	BIRD	MI	Animalia
<i>Macropus robustus</i>	MAMMAL		Animalia
<i>Macropus robustus subsp. erubescens</i>	MAMMAL		Animalia
<i>Macropus rufus</i>	MAMMAL		Animalia
<i>Malurus lamberti</i>	BIRD		Animalia
<i>Malurus lamberti assimilis</i>	BIRD		Animalia
<i>Malurus lamberti subsp. assimilis</i>	BIRD		Animalia
<i>Malurus leucopterus</i>	BIRD		Animalia
<i>Malurus leucopterus subsp. leuconotus</i>	BIRD		Animalia
<i>Manorina flavigula</i>	BIRD		Animalia
<i>Melanodryas cucullata</i>	BIRD		Animalia
<i>Melithreptus gularis</i>	BIRD		Animalia
<i>Melopsittacus undulatus</i>	BIRD		Animalia
<i>Menetia greyii</i>	REPTILE		Animalia
<i>Menetia surda</i>	REPTILE		Animalia
<i>Menetia surda subsp. surda</i>	REPTILE		Animalia
<i>Merops ornatus</i>	BIRD		Animalia
<i>Milvus migrans</i>	BIRD		Animalia
<i>Milvus migrans subsp. affinis</i>	BIRD		Animalia
<i>Mirafra javanica</i>	BIRD		Animalia
<i>Morethia ruficauda</i>	REPTILE		Animalia
<i>Morethia ruficauda subsp. exquisita</i>	REPTILE		Animalia
<i>Mormopterus beccarii</i>	MAMMAL		Animalia
<i>Mormopterus loriae</i>	MAMMAL		Animalia
<i>Mus musculus</i>	MAMMAL		Animalia
<i>Neobatrachus sutor</i>	AMPHI		Animalia
<i>Neochmia ruficauda</i>	BIRD		Animalia
<i>Neochmia ruficauda subsp. subclaescens</i>	BIRD		Animalia
<i>Neophema bourkii</i>	BIRD		Animalia
<i>Neopsephotus bourkii</i>	BIRD		Animalia
<i>Nephrurus milii</i>	REPTILE		Animalia
<i>Nephrurus wheeleri</i>	REPTILE		Animalia
<i>Nephrurus wheeleri subsp. cinctus</i>	REPTILE		Animalia
<i>Ningau ridei</i>	MAMMAL		Animalia
<i>Ningau timealeyi</i>	MAMMAL		Animalia
<i>Ninox boobook boobook</i>	BIRD		Animalia
<i>Ninox connivens</i>	BIRD		Animalia
<i>Ninox connivens subsp. connivens</i>	BIRD	P3	Animalia
<i>Ninox novaeseelandiae</i>	BIRD		Animalia
<i>Nyctophilus bifax subsp. daedalus</i>	MAMMAL		Animalia
<i>Nyctophilus daedalus</i>	MAMMAL		Animalia
<i>Nyctophilus geoffroyi</i>	MAMMAL		Animalia
<i>Nymphicus hollandicus</i>	BIRD		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Ocyphaps lophotes</i>	BIRD		Animalia
<i>Oedura fimbria</i>	REPTILE		Animalia
<i>Oedura marmorata</i>	REPTILE		Animalia
<i>Oreoica gutturalis</i>	BIRD		Animalia
<i>Oreoica gutturalis subsp. pallescens</i>	BIRD		Animalia
<i>Oryctolagus cuniculus</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>Pachycephala rufiventris</i>	BIRD		Animalia
<i>Pachycephala rufiventris subsp. rufiventris</i>	BIRD		Animalia
<i>Parasuta monachus</i>	REPTILE		Animalia
<i>Pardalotus rubricatus</i>	BIRD		Animalia
<i>Pardalotus striatus</i>	BIRD		Animalia
<i>Pardalotus striatus subsp. murchisoni</i>	BIRD		Animalia
<i>Pardalotus striatus subsp. uropygialis</i>	BIRD		Animalia
<i>Pardalotus striatus subsp. westraliensis</i>	BIRD		Animalia
<i>Petrochelidon ariel</i>	BIRD		Animalia
<i>Petrochelidon nigricans</i>	BIRD		Animalia
<i>Petrogale rothschildi</i>	MAMMAL		Animalia
<i>Petroica cucullata</i>	BIRD		Animalia
<i>Petroica goodenovii</i>	BIRD		Animalia
<i>Phalacrocorax sulcirostris</i>	BIRD		Animalia
<i>Phaps chalcoptera</i>	BIRD		Animalia
<i>Phylidonyris albifrons</i>	BIRD		Animalia
<i>Planigale ingrami</i>	MAMMAL		Animalia
<i>Planigale sp.</i>	MAMMAL		Animalia
<i>Planigale Sp.1 (WAM)</i>	MAMMAL		Animalia
<i>Platycercus varius</i>	BIRD		Animalia
<i>Platycercus zonarius</i>	BIRD		Animalia
<i>Platycercus zonarius subsp. zonarius</i>	BIRD		Animalia
<i>Podargus strigoides</i>	BIRD		Animalia
<i>Pogona minor</i>	REPTILE		Animalia
<i>Pogona minor subsp. minor</i>	REPTILE		Animalia
<i>Pogona minor subsp. mitchelli</i>	REPTILE		Animalia
<i>Pomatostomus superciliosus</i>	BIRD		Animalia
<i>Pomatostomus temporalis</i>	BIRD		Animalia
<i>Pomatostomus temporalis subsp. rubeculus</i>	BIRD		Animalia
<i>Porphyrio porphyrio</i>	BIRD		Animalia
<i>Porzana tabuensis</i>	BIRD		Animalia
<i>Proablepharus reginae</i>	REPTILE		Animalia
<i>Pseudantechinus sp.</i>	MAMMAL		Animalia
<i>Pseudantechinus woolleyae</i>	MAMMAL		Animalia
<i>Pseudechis australis</i>	REPTILE		Animalia
<i>Pseudomys chapmani</i>	MAMMAL	P4	Animalia
<i>Pseudomys desertor</i>	MAMMAL		Animalia
<i>Pseudomys hermannsburgensis</i>	MAMMAL		Animalia
<i>Pseudonaja mengdeni</i>	REPTILE		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Pseudonaja modesta</i>	REPTILE		Animalia
<i>Pseudonaja nuchalis</i>	REPTILE		Animalia
<i>Pseudophryne douglasi</i>	AMPHI		Animalia
<i>Psophodes occidentalis</i>	BIRD		Animalia
<i>Ptilonorhynchus guttatus</i>	BIRD		Animalia
<i>Ptilonorhynchus maculatus</i>	BIRD		Animalia
<i>Ptilonorhynchus maculatus guttatus</i>	BIRD		Animalia
<i>Ptilonorhynchus maculatus subsp. guttatus</i>	BIRD		Animalia
<i>Ptilotula keartlandi</i>	BIRD		Animalia
<i>Ptilotula penicillatus</i>	BIRD		Animalia
<i>Purnella albifrons</i>	BIRD		Animalia
<i>Pygopus nigriceps</i>	REPTILE		Animalia
<i>Pygopus nigriceps nigriceps</i>	REPTILE		Animalia
<i>Pyrrholaemus brunneus</i>	BIRD		Animalia
<i>Ramphotyphlops ammodytes</i>	REPTILE		Animalia
<i>Ramphotyphlops ganei</i>	REPTILE		Animalia
<i>Ramphotyphlops grypus</i>	REPTILE		Animalia
<i>Ramphotyphlops hamatus</i>	REPTILE		Animalia
<i>Rhinonictis aurantia</i>	MAMMAL	P4	Animalia
<i>Rhinonictis aurantia (Pilbara)</i>	MAMMAL	VU	Animalia
<i>Rhipidura (fuliginosa) albicauda</i>	BIRD		Animalia
<i>Rhipidura albicauda</i>	BIRD		Animalia
<i>Rhipidura albiscapa</i>	BIRD		Animalia
<i>Rhipidura fuliginosa</i>	BIRD		Animalia
<i>Rhipidura fuliginosa subsp. alisteri</i>	BIRD		Animalia
<i>Rhipidura leucophrys</i>	BIRD		Animalia
<i>Rhipidura leucophrys subsp. leucophrys</i>	BIRD		Animalia
<i>Rhynchoedura ornata</i>	REPTILE		Animalia
<i>Saccolaimus flaviventris</i>	MAMMAL		Animalia
<i>Scotorepens greyii</i>	MAMMAL		Animalia
<i>Smicrornis brevirostris</i>	BIRD		Animalia
<i>Sminthopsis macroura</i>	MAMMAL		Animalia
<i>Sminthopsis ooldea</i>	MAMMAL		Animalia
<i>Sminthopsis youngsoni</i>	MAMMAL		Animalia
<i>Stipiturus ruficeps</i>	BIRD		Animalia
<i>Strophurus elderi</i>	REPTILE		Animalia
<i>Strophurus jeanae</i>	REPTILE		Animalia
<i>Strophurus wellingtonae</i>	REPTILE		Animalia
<i>Sugomel niger</i>	BIRD		Animalia
<i>Suta fasciata</i>	REPTILE		Animalia
<i>Suta punctata</i>	REPTILE		Animalia
<i>Tachyglossus aculeatus</i>	MAMMAL		Animalia
<i>Tachyglossus aculeatus acanthion</i>	MAMMAL		Animalia
<i>Tadarida australis</i>	MAMMAL		Animalia
<i>Taeniopygia guttata</i>	BIRD		Animalia
<i>Taeniopygia guttata subsp. castanotis</i>	BIRD		Animalia
<i>Taphozous georgianus</i>	MAMMAL		Animalia
<i>Taphozous hilli</i>	MAMMAL		Animalia
<i>Threskiornis spinicollis</i>	BIRD		Animalia

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Tiliqua multifasciata</i>	REPTILE		Animalia
<i>Todiramphus pyrrhopygia</i>	BIRD		Animalia
<i>Todiramphus pyrrhopygius</i>	BIRD		Animalia
<i>Todiramphus sanctus</i>	BIRD		Animalia
<i>Todiramphus sanctus vagans</i>	BIRD		Animalia
<i>Turnix velox</i>	BIRD		Animalia
<i>Tympanocryptis cephalus</i>	REPTILE		Animalia
<i>Tyto alba</i>	BIRD		Animalia
<i>Underwoodisaurus milii</i>	REPTILE		Animalia
<i>Underwoodisaurus seorsus</i>	REPTILE	P2	Animalia
<i>Uperoleia russelli</i>	AMPHI		Animalia
<i>Uperoleia saxatalis</i>	AMPHI		Animalia
<i>Uperoleia saxatilis</i>	AMPHI		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 gilleni</i>	REPTILE		Animalia
<i>Varanus gouldii</i>	REPTILE		Animalia
<i>Varanus hamersleyensis</i>	REPTILE		Animalia
<i>Varanus panoptes</i>	REPTILE		Animalia
<i>Varanus panoptes subsp. rubidus</i>	REPTILE		Animalia
<i>Varanus pilbarensis</i>	REPTILE		Animalia
<i>Varanus tristis</i>	REPTILE		Animalia
<i>Varanus tristis subsp. tristis</i>	REPTILE		Animalia
<i>Vespadelus finlaysoni</i>	MAMMAL		Animalia
<i>Zyzomys argurus</i>	MAMMAL		Animalia
<i>Zyzomys sp.</i>	MAMMAL		Animalia
<i>Abutilon lepidum</i>	DICOT		Plantae
<i>Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)</i>	DICOT		Plantae
<i>Abutilon sp. Pilbara (W.R. Barker 2025)</i>	DICOT		Plantae
<i>Acacia adoxa var. adoxa</i>	DICOT		Plantae
<i>Acacia adsurgens</i>	DICOT		Plantae
<i>Acacia ampliceps</i>	DICOT		Plantae
<i>Acacia ancistrocarpa</i>	DICOT		Plantae
<i>Acacia aneura hybrid</i>	DICOT		Plantae
<i>Acacia aptaneura</i>	DICOT		Plantae
<i>Acacia aptaneura x pteraneura</i>	DICOT		Plantae
<i>Acacia arida</i>	DICOT		Plantae
<i>Acacia arida x hilliana</i>	DICOT		Plantae
<i>Acacia atkinsiana</i>	DICOT		Plantae
<i>Acacia ayersiana</i>	DICOT		Plantae
<i>Acacia ayersiana hybrid</i>	DICOT		Plantae
<i>Acacia bivenosa</i>	DICOT		Plantae
<i>Acacia bromilowiana</i>	DICOT	P4	Plantae
<i>Acacia catenulata</i>	DICOT		Plantae
<i>Acacia catenulata subsp. occidentalis</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Acacia citrinoviridis</i>	DICOT		Plantae
<i>Acacia coriacea</i>	DICOT		Plantae
<i>Acacia coriacea subsp. pendens</i>	DICOT		Plantae
<i>Acacia dictyophleba</i>	DICOT		Plantae
<i>Acacia elachantha</i>	DICOT		Plantae
<i>Acacia hamersleyensis</i>	DICOT		Plantae
<i>Acacia inaequilatera</i>	DICOT		Plantae
<i>Acacia incurvaneura</i>	DICOT		Plantae
<i>Acacia maitlandii</i>	DICOT		Plantae
<i>Acacia marramamba</i>	DICOT		Plantae
<i>Acacia monticola</i>	DICOT		Plantae
<i>Acacia pachyacra</i>	DICOT		Plantae
<i>Acacia paraneura</i>	DICOT		Plantae
<i>Acacia pruinocarpa</i>	DICOT		Plantae
<i>Acacia pteraneura</i>	DICOT		Plantae
<i>Acacia pyrifolia</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 sclerosperma subsp. sclerosperma</i>	DICOT		Plantae
<i>Acacia sibirica</i>	DICOT		Plantae
<i>Acacia sp. Juliflorae Pilbara Region</i>	DICOT		Plantae
<i>Acacia spondylophylla</i>	DICOT		Plantae
<i>Acacia stowardii</i>	DICOT		Plantae
<i>Acacia subtiliformis</i>	DICOT	P3	Plantae
<i>Acacia synchronicia</i>	DICOT		Plantae
<i>Acacia tenuissima</i>	DICOT		Plantae
<i>Acacia tetragonophylla</i>	DICOT		Plantae
<i>Acacia tumida</i>	DICOT		Plantae
<i>Acacia tumida var. pilbarensis</i>	DICOT		Plantae
<i>Acrachne racemosa</i>	MONOCOT		Plantae
<i>Adriana tomentosa var. hookeri</i>	DICOT		Plantae
<i>Adriana tomentosa var. tomentosa</i>	DICOT		Plantae
<i>Aerva javanica</i>	DICOT		Plantae
<i>Alectryon oleifolius</i>	DICOT		Plantae
<i>Alternanthera denticulata</i>	DICOT		Plantae
<i>Alternanthera nana</i>	DICOT		Plantae
<i>Alternanthera nodiflora</i>	DICOT		Plantae
<i>Ammannia baccifera</i>	DICOT		Plantae
<i>Amphipogon sericeus</i>	MONOCOT		Plantae
<i>Amyema gibberula var. gibberula</i>	DICOT		Plantae
<i>Amyema hilliana</i>	DICOT		Plantae
<i>Amyema preissii</i>	DICOT		Plantae
<i>Amyema sanguinea var. pulchra</i>	DICOT		Plantae
<i>Amyema sanguinea var. sanguinea</i>	DICOT		Plantae
<i>Androcalva luteiflora</i>	DICOT		Plantae
<i>Anthobolus leptomerioides</i>	DICOT		Plantae
<i>Argemone ochroleuca</i>	DICOT		Plantae
<i>Aristida contorta</i>	MONOCOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Aristida holathera</i> var. <i>holathera</i>	MONOCOT		Plantae
<i>Aristida lazaridis</i>	MONOCOT	P2	Plantae
<i>Astrotricha hamptonii</i>	DICOT		Plantae
<i>Atalaya hemiglauca</i>	DICOT		Plantae
<i>Bidens bipinnata</i>	DICOT		Plantae
<i>Boerhavia coccinea</i>	DICOT		Plantae
<i>Bonamia erecta</i>	DICOT		Plantae
<i>Bonamia pilbarensis</i>	DICOT		Plantae
<i>Bothriochloa ewartiana</i>	MONOCOT		Plantae
<i>Brachychiton acuminatus</i>	DICOT		Plantae
<i>Brachyscome ciliaris</i>	DICOT		Plantae
<i>Brunonia australis</i>	DICOT		Plantae
<i>Bulbostylis barbata</i>	MONOCOT		Plantae
<i>Calandrinia Ptychosperma</i>	DICOT		Plantae
<i>Calandrinia reticulata</i>	DICOT		Plantae
<i>Calocephalus francisii</i>	DICOT		Plantae
<i>Calocephalus multiflorus</i>	DICOT		Plantae
<i>Calotis multicaulis</i>	DICOT		Plantae
<i>Calotis plumulifera</i>	DICOT		Plantae
<i>Calytrix carinata</i>	DICOT		Plantae
<i>Capparis lasiantha</i>	DICOT		Plantae
<i>Capparis spinosa</i>	DICOT		Plantae
<i>Cassytha filiformis</i>	DICOT		Plantae
<i>Cenchrus ciliaris</i>	MONOCOT		Plantae
<i>Cenchrus setiger</i>	MONOCOT		Plantae
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	DICOT		Plantae
<i>Cheilanthes austrotenuifolia</i>	FERN		Plantae
<i>Cheilanthes contigua</i>	FERN		Plantae
<i>Cheilanthes lasiophylla</i>	FERN		Plantae
<i>Cheilanthes sieberi</i>	FERN		Plantae
<i>Cheilanthes sieberi</i> subsp. <i>pseudovellea</i>	FERN		Plantae
<i>Chenopodium melanocarpum</i>	DICOT		Plantae
<i>Chloris pectinata</i>	MONOCOT		Plantae
<i>Chrysocephalum apiculatum</i> subsp. <i>pilbarensis</i>	DICOT		Plantae
<i>Chrysopogon fallax</i>	MONOCOT		Plantae
<i>Cleome viscosa</i>	DICOT		Plantae
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	DICOT		Plantae
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	DICOT		Plantae
<i>Codonocarpus cotinifolius</i>	DICOT		Plantae
<i>Commelina ensifolia</i>	MONOCOT		Plantae
<i>Corchorus crozophorifolius</i>	DICOT		Plantae
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	DICOT		Plantae
<i>Corchorus</i> sp.	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>Crotalaria medicaginea</i>	DICOT		Plantae
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Crotalaria novae-hollandiae</i>	DICOT		Plantae
<i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>	DICOT		Plantae
<i>Cucumis variabilis</i>	DICOT		Plantae
<i>Cullen leucochaites</i>	DICOT		Plantae
<i>Cullen martinii</i>	DICOT		Plantae
<i>Cullen pogonocarpum</i>	DICOT		Plantae
<i>Cymbopogon ambiguus</i>	MONOCOT		Plantae
<i>Cymbopogon obtectus</i>	MONOCOT		Plantae
<i>Cynanchum floribundum</i>	DICOT		Plantae
<i>Cyperus bulbosus</i>	MONOCOT		Plantae
<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>	MONOCOT		Plantae
<i>Cyperus iria</i>	MONOCOT		Plantae
<i>Cyperus ixiocarpus</i>	MONOCOT		Plantae
<i>Cyperus vaginatus</i>	MONOCOT		Plantae
<i>Dactyloctenium radulans</i>	MONOCOT		Plantae
<i>Dampiera candicans</i>	DICOT		Plantae
<i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>	DICOT		Plantae
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	MONOCOT		Plantae
<i>Dicladanthera forrestii</i>	DICOT		Plantae
<i>Dicrastylis cordifolia</i>	DICOT		Plantae
<i>Digitaria brownii</i>	MONOCOT		Plantae
<i>Diplatia grandibractea</i>	DICOT		Plantae
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>	DICOT		Plantae
<i>Dodonaea coriacea</i>	DICOT		Plantae
<i>Dodonaea lanceolata</i>	DICOT		Plantae
<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>	DICOT		Plantae
<i>Dodonaea pachyneura</i>	DICOT		Plantae
<i>Dodonaea viscosa</i>	DICOT		Plantae
<i>Duperreya commixta</i>	DICOT		Plantae
<i>Dysphania kalpari</i>	DICOT		Plantae
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	DICOT		Plantae
<i>Dysphania melanocarpa</i> forma <i>melanocarpa</i>	DICOT		Plantae
<i>Dysphania rhadinostachya</i>	DICOT		Plantae
<i>Eleocharis geniculata</i>	MONOCOT		Plantae
<i>Enchylaena tomentosa</i>	DICOT		Plantae
<i>Enneapogon caeruleus</i>	MONOCOT		Plantae
<i>Enneapogon lindleyanus</i>	MONOCOT		Plantae
<i>Enneapogon polyphyllus</i>	MONOCOT		Plantae
<i>Enneapogon robustissimus</i>	MONOCOT		Plantae
<i>Enteropogon ramosus</i>	MONOCOT		Plantae
<i>Eragrostis cumingii</i>	MONOCOT		Plantae
<i>Eragrostis eriopoda</i>	MONOCOT		Plantae
<i>Eragrostis pergracilis</i>	MONOCOT		Plantae
<i>Eragrostis tenellula</i>	MONOCOT		Plantae
<i>Eremophila cuneifolia</i>	DICOT		Plantae
<i>Eremophila exilifolia</i>	DICOT		Plantae
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	DICOT		Plantae
<i>Eremophila fraseri</i>	DICOT		Plantae
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Eremophila jucunda</i>	DICOT		Plantae
<i>Eremophila jucunda subsp. pulcherrima</i>	DICOT		Plantae
<i>Eremophila lanceolata</i>	DICOT		Plantae
<i>Eremophila latrobei</i>	DICOT		Plantae
<i>Eremophila longifolia</i>	DICOT		Plantae
<i>Eremophila magnifica subsp. magnifica</i>	DICOT	P4	Plantae
<i>Eremophila oppositifolia subsp. angustifolia</i>	DICOT		Plantae
<i>Eremophila platycalyx subsp. Neds Creek (N.H. Speck 1228)</i>	DICOT		Plantae
<i>Eremophila sp. Hamersley Range (K. Walker KW 136)</i>	DICOT	P3	Plantae
<i>Eriachne aristidea</i>	MONOCOT		Plantae
<i>Eriachne benthamii</i>	MONOCOT		Plantae
<i>Eriachne helmsii</i>	MONOCOT		Plantae
<i>Eriachne lanata</i>	MONOCOT		Plantae
<i>Eriachne mucronata</i>	MONOCOT		Plantae
<i>Eriachne pulchella</i>	MONOCOT		Plantae
<i>Eriachne pulchella subsp. pulchella</i>	MONOCOT		Plantae
<i>Eriachne tenuiculmis</i>	MONOCOT		Plantae
<i>Eucalyptus camaldulensis</i>	DICOT		Plantae
<i>Eucalyptus camaldulensis subsp. obtusa</i>	DICOT		Plantae
<i>Eucalyptus camaldulensis subsp. refulgens</i>	DICOT		Plantae
<i>Eucalyptus gamophylla</i>	DICOT		Plantae
<i>Eucalyptus hamersleyana</i>	DICOT		Plantae
<i>Eucalyptus kingsmillii</i>	DICOT		Plantae
<i>Eucalyptus leucophloia</i>	DICOT		Plantae
<i>Eucalyptus leucophloia subsp. leucophloia</i>	DICOT		Plantae
<i>Eucalyptus pilbarensis</i>	DICOT		Plantae
<i>Eucalyptus repullulans</i>	DICOT		Plantae
<i>Eucalyptus socialis subsp. eucentrica</i>	DICOT		Plantae
<i>Eucalyptus trivalvis</i>	DICOT		Plantae
<i>Eucalyptus victrix</i>	DICOT		Plantae
<i>Eucalyptus xerothermica</i>	DICOT		Plantae
<i>Eulalia aurea</i>	MONOCOT		Plantae
<i>Eulalia fulva</i>	MONOCOT		Plantae
<i>Euphorbia australis</i>	DICOT		Plantae
<i>Euphorbia biconvexa</i>	DICOT		Plantae
<i>Euphorbia boophthona</i>	DICOT		Plantae
<i>Euphorbia coghlanii</i>	DICOT		Plantae
<i>Euphorbia trigonosperma</i>	DICOT		Plantae
<i>Euphorbia vaccaria</i>	DICOT		Plantae
<i>Euphorbia vaccaria var. eruroides</i>	DICOT		Plantae
<i>Evolvulus alsinoides</i>	DICOT		Plantae
<i>Evolvulus alsinoides var. villosicalyx</i>	DICOT		Plantae
<i>Exocarpos sparteus</i>	DICOT		Plantae
<i>Ficus brachypoda</i>	DICOT		Plantae
<i>Ficus platypoda</i>	DICOT		Plantae
<i>Fimbristylis cardiocarpa</i>	MONOCOT		Plantae
<i>Fimbristylis microcarya</i>	MONOCOT		Plantae
<i>Fimbristylis sieberiana</i>	MONOCOT	P3	Plantae
<i>Flaveria trinervia</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Gastrolobium grandiflorum</i>	DICOT		Plantae
<i>Glycine canescens</i>	DICOT		Plantae
<i>Gompholobium oreophilum</i>	DICOT		Plantae
<i>Gompholobium polyzygum</i>	DICOT		Plantae
<i>Gomphrena canescens subsp. canescens</i>	DICOT		Plantae
<i>Gomphrena cunninghamii</i>	DICOT		Plantae
<i>Goodenia cusackiana</i>	DICOT		Plantae
<i>Goodenia microptera</i>	DICOT		Plantae
<i>Goodenia muelleriana</i>	DICOT		Plantae
<i>Goodenia nuda</i>	DICOT	P4	Plantae
<i>Goodenia omearana</i>	DICOT		Plantae
<i>Goodenia pasqua</i>	DICOT		Plantae
<i>Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)</i>	DICOT	P3	Plantae
<i>Goodenia stellata</i>	DICOT		Plantae
<i>Goodenia stobbsiana</i>	DICOT		Plantae
<i>Goodenia trichophylla</i>	DICOT		Plantae
<i>Goodenia triodiophila</i>	DICOT		Plantae
<i>Gossypium australe</i>	DICOT		Plantae
<i>Gossypium robinsonii</i>	DICOT		Plantae
<i>Gossypium robinsonii x sturtianum</i>	DICOT		Plantae
<i>Gossypium sturtianum</i>	DICOT		Plantae
<i>Gossypium sturtianum var. sturtianum</i>	DICOT		Plantae
<i>Grevillea pyramidalis</i>	DICOT		Plantae
<i>Grevillea pyramidalis subsp. leucadendron</i>	DICOT		Plantae
<i>Grevillea saxicola</i>	DICOT	P3	Plantae
<i>Grevillea wickhamii</i>	DICOT		Plantae
<i>Grevillea wickhamii subsp. hispidula</i>	DICOT		Plantae
<i>Gymnanthera cunninghamii</i>	DICOT	P3	Plantae
<i>Hakea chordophylla</i>	DICOT		Plantae
<i>Hakea lorea</i>	DICOT		Plantae
<i>Halgania cyanea var. Allambi Stn (B.W. Strong 676)</i>	DICOT		Plantae
<i>Haloragis gossei</i>	DICOT		Plantae
<i>Haloragis gossei var. gossei</i>	DICOT		Plantae
<i>Heliotropium chrysocarpum</i>	DICOT		Plantae
<i>Heliotropium cunninghamii</i>	DICOT		Plantae
<i>Heliotropium glabellum</i>	DICOT		Plantae
<i>Heliotropium heteranthum</i>	DICOT		Plantae
<i>Heliotropium inexplicitum</i>	DICOT		Plantae
<i>Heliotropium pachyphyllum</i>	DICOT		Plantae
<i>Heliotropium skeleton</i>	DICOT		Plantae
<i>Hibbertia glaberrima</i>	DICOT		Plantae
<i>Hibiscus burtonii</i>	DICOT		Plantae
<i>Hibiscus coatesii</i>	DICOT		Plantae
<i>Hibiscus leptocladus</i>	DICOT		Plantae
<i>Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)</i>	DICOT	P2	Plantae
<i>Hibiscus sp. Mt Robinson (G. Byrne 3537)</i>	DICOT		Plantae
<i>Hibiscus sturtii var. campylochlamys</i>	DICOT		Plantae
<i>Hibiscus sturtii var. platychlamys</i>	DICOT		Plantae
<i>Hybanthus aurantiacus</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Indigofera fractiflexa</i> subsp. <i>fractiflexa</i>	DICOT		Plantae
<i>Indigofera gilesii</i>	DICOT	P3	Plantae
<i>Indigofera hirsuta</i>	DICOT		Plantae
<i>Indigofera linifolia</i>	DICOT		Plantae
<i>Indigofera monophylla</i>	DICOT		Plantae
<i>Indigofera rugosa</i>	DICOT		Plantae
<i>Indigofera trita</i>	DICOT		Plantae
<i>Ipomoea muelleri</i>	DICOT		Plantae
<i>Ipomoea plebeia</i>	DICOT		Plantae
<i>Isotropis atropurpurea</i>	DICOT		Plantae
<i>Isotropis parviflora</i>	DICOT	P2	Plantae
<i>Isotropis</i> sp. Arid zone (G. Byrne 2775)	DICOT		Plantae
<i>Jasminum didymum</i>	DICOT		Plantae
<i>Jasminum didymum</i> subsp. <i>lineare</i>	DICOT		Plantae
<i>Lamarchea sulcata</i>	DICOT		Plantae
<i>Lepidium catapycnon</i>	DICOT	P4	Plantae
<i>Lepidium muelleri-ferdinandii</i>	DICOT		Plantae
<i>Lobelia arnhemiaca</i>	DICOT		Plantae
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	DICOT		Plantae
<i>Maireana carnososa</i>	DICOT		Plantae
<i>Maireana georgei</i>	DICOT		Plantae
<i>Maireana melanocoma</i>	DICOT		Plantae
<i>Maireana planifolia</i>	DICOT		Plantae
<i>Malvastrum americanum</i>	DICOT		Plantae
<i>Melaleuca argentea</i>	DICOT		Plantae
<i>Melaleuca glomerata</i>	DICOT		Plantae
<i>Melhaniania oblongifolia</i>	DICOT		Plantae
<i>Melhaniania</i> sp.	DICOT		Plantae
<i>Melinis repens</i>	MONOCOT		Plantae
<i>Mirbelia viminalis</i>	DICOT		Plantae
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	DICOT		Plantae
<i>Notoleptopus decaisnei</i> var. <i>Orbicularis</i> (A.B. Craig 428)	DICOT		Plantae
<i>Oldenlandia crouchiana</i>	DICOT		Plantae
<i>Olearia fluvialis</i>	DICOT		Plantae
<i>Pandorea pandorana</i>	DICOT		Plantae
<i>Panicum laevinode</i>	MONOCOT		Plantae
<i>Paraneurachne muelleri</i>	MONOCOT		Plantae
<i>Paspalidium basicladum</i>	MONOCOT		Plantae
<i>Paspalidium clementii</i>	MONOCOT		Plantae
<i>Paspalidium gracile</i>	MONOCOT		Plantae
<i>Paspalidium rarum</i>	MONOCOT		Plantae
<i>Pentalepis trichodesmoides</i> subsp. <i>trichodesmoides</i>	DICOT		Plantae
<i>Peripleura arida</i>	DICOT		Plantae
<i>Perotis rara</i>	MONOCOT		Plantae
<i>Petalostylis labicheoides</i>	DICOT		Plantae
<i>Phyllanthus baccatus</i>	DICOT		Plantae
<i>Phyllanthus maderaspatensis</i>	DICOT		Plantae
<i>Plectranthus scutellarioides</i>	DICOT		Plantae
<i>Pluchea dentex</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Plumbago zeylanica</i>	DICOT		Plantae
<i>Podolepis eremaea</i>	DICOT		Plantae
<i>Polycarpaea corymbosa</i>	DICOT		Plantae
<i>Polycarpaea holtzei</i>	DICOT		Plantae
<i>Polycarpaea involucrata</i>	DICOT		Plantae
<i>Polycarpaea longiflora</i>	DICOT		Plantae
<i>Polycarpaea sp.</i>	DICOT		Plantae
<i>Polygala glaucifolia</i>	DICOT		Plantae
<i>Polymeria ambigua</i>	DICOT		Plantae
<i>Polymeria lanata</i>	DICOT		Plantae
<i>Portulaca oleracea</i>	DICOT		Plantae
<i>Prostanthera albiflora</i>	DICOT		Plantae
<i>Pseudognaphalium luteoalbum</i>	DICOT		Plantae
<i>Psydrax latifolia</i>	DICOT		Plantae
<i>Pterocaulon sphacelatum</i>	DICOT		Plantae
<i>Pterocaulon sphaeranthoides</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 clementii</i>	DICOT		Plantae
<i>Ptilotus exaltatus</i>	DICOT		Plantae
<i>Ptilotus fusiformis</i>	DICOT		Plantae
<i>Ptilotus gaudichaudii</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 rotundifolius</i>	DICOT		Plantae
<i>Rhagodia eremaea</i>	DICOT		Plantae
<i>Rhagodia sp.</i>	DICOT		Plantae
<i>Rhagodia sp. Hamersley (M. Trudgen 17794)</i>	DICOT	P3	Plantae
<i>Rhodanthe floribunda</i>	DICOT		Plantae
<i>Rhodanthe margarethae</i>	DICOT		Plantae
<i>Rhynchosia australis</i>	DICOT		Plantae
<i>Rhynchosia minima</i>	DICOT		Plantae
<i>Roebuckiella similis</i>	DICOT		Plantae
<i>Rostellularia adscendens</i>	DICOT		Plantae
<i>Rostellularia adscendens var. latifolia</i>	DICOT	P3	Plantae
<i>Salsola australis</i>	DICOT		Plantae
<i>Santalum acuminatum</i>	DICOT		Plantae
<i>Santalum lanceolatum</i>	DICOT		Plantae
<i>Scaevola acacioides</i>	DICOT		Plantae
<i>Scaevola amblyanthera</i>	DICOT		Plantae
<i>Scaevola amblyanthera var. amblyanthera</i>	DICOT		Plantae
<i>Scaevola parvifolia subsp. pilbarae</i>	DICOT		Plantae
<i>Schenkia australis</i>	DICOT		Plantae
<i>Schizachyrium fragile</i>	MONOCOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Schoenoplectus subulatus</i>	MONOCOT		Plantae
<i>Sclerolaena cornishiana</i>	DICOT		Plantae
<i>Senecio magnificus</i>	DICOT		Plantae
<i>Senna artemisioides</i>	DICOT		Plantae
<i>Senna artemisioides subsp. helmsii</i>	DICOT		Plantae
<i>Senna artemisioides subsp. oligophylla</i>	DICOT		Plantae
<i>Senna glutinosa subsp. chatelainiana</i>	DICOT		Plantae
<i>Senna glutinosa subsp. glutinosa</i>	DICOT		Plantae
<i>Senna glutinosa subsp. pruinosa</i>	DICOT		Plantae
<i>Senna glutinosa subsp. x luerssenii</i>	DICOT		Plantae
<i>Senna notabilis</i>	DICOT		Plantae
<i>Senna pleurocarpa var. angustifolia</i>	DICOT		Plantae
<i>Senna sericea</i>	DICOT		Plantae
<i>Senna sp. Meekatharra (E. Bailey 1-26)</i>	DICOT		Plantae
<i>Senna stricta</i>	DICOT		Plantae
<i>Senna venusta</i>	DICOT		Plantae
<i>Seringia elliptica</i>	DICOT		Plantae
<i>Seringia nephrosperma</i>	DICOT		Plantae
<i>Sesbania cannabina</i>	DICOT		Plantae
<i>Setaria dielsii</i>	MONOCOT		Plantae
<i>Setaria surgens</i>	MONOCOT		Plantae
<i>Setaria verticillata</i>	MONOCOT		Plantae
<i>Sida arenicola</i>	DICOT		Plantae
<i>Sida calyxhymenia</i>	DICOT		Plantae
<i>Sida cardiophylla</i>	DICOT		Plantae
<i>Sida echinocarpa</i>	DICOT		Plantae
<i>Sida fibulifera</i>	DICOT		Plantae
<i>Sida rohlenae</i>	DICOT		Plantae
<i>Sida sp.</i>	DICOT		Plantae
<i>Sida sp. Articulation below (A.A. Mitchell PRP 1605)</i>	DICOT		Plantae
<i>Sida sp. dark green fruits (S. van Leeuwen 2260)</i>	DICOT		Plantae
<i>Sida sp. Excedentifolia (J.L. Egan 1925)</i>	DICOT		Plantae
<i>Sida sp. L (A.M. Ashby 4202)</i>	DICOT		Plantae
<i>Sida sp. Pilbara (A.A. Mitchell PRP 1543)</i>	DICOT		Plantae
<i>Sida sp. Shovelanna Hill (S. van Leeuwen 3842)</i>	DICOT		Plantae
<i>Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)</i>	DICOT		Plantae
<i>Sigesbeckia orientalis</i>	DICOT		Plantae
<i>Solanum centrale</i>	DICOT		Plantae
<i>Solanum chippendalei</i>	DICOT		Plantae
<i>Solanum elatius</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 phlomoides</i>	DICOT		Plantae
<i>Sonchus oleraceus</i>	DICOT		Plantae
<i>Sporobolus australasicus</i>	MONOCOT		Plantae
<i>Stackhousia muricata subsp. annual (W.R. Barker 2172)</i>	DICOT		Plantae
<i>Stemodia grossa</i>	DICOT		Plantae

NatureMap Database Search Results

TAXON	CLASS	CONS	KINGDOM
<i>Streptoglossa decurrens</i>	DICOT		Plantae
<i>Stylidium weeliwoffi</i>	DICOT	P3	Plantae
<i>Stylobasium spathulatum</i>	DICOT		Plantae
<i>Swainsona decurrens</i>	DICOT		Plantae
<i>Swainsona formosa</i>	DICOT		Plantae
<i>Synostemon rhytidospermus</i>	DICOT		Plantae
<i>Tephrosia oxalidea</i>	DICOT		Plantae
<i>Tephrosia rosea</i> var. <i>Fortescue creeks</i> (M.I.H. Brooker 2186)	DICOT		Plantae
<i>Tephrosia</i> sp. Bungaroo Creek (M.E. Trudgen 11601)	DICOT		Plantae
<i>Tephrosia</i> sp. Newman (A.A. Mitchell PRP 29)	DICOT		Plantae
<i>Tephrosia</i> sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)	DICOT		Plantae
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	MONOCOT	P3	Plantae
<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	MONOCOT		Plantae
<i>Themeda triandra</i>	MONOCOT		Plantae
<i>Trachymene oleracea</i>	DICOT		Plantae
<i>Tragus australianus</i>	MONOCOT		Plantae
<i>Trianthema glossostigmum</i>	DICOT		Plantae
<i>Tribulus hirsutus</i>	DICOT		Plantae
<i>Tribulus macrocarpus</i>	DICOT		Plantae
<i>Tribulus suberosus</i>	DICOT		Plantae
<i>Trichodesma zeylanicum</i>	DICOT		Plantae
<i>Tricoryne</i> sp. Hamersley Range (S. van Leeuwen 915)	MONOCOT		Plantae
<i>Trigastrotheca molluginea</i>	DICOT		Plantae
<i>Triodia biflora</i>	MONOCOT		Plantae
<i>Triodia brizoides</i>	MONOCOT		Plantae
<i>Triodia longiceps</i>	MONOCOT		Plantae
<i>Triodia pungens</i>	MONOCOT		Plantae
<i>Triodia schinzii</i>	MONOCOT		Plantae
<i>Triodia</i> sp.	MONOCOT		Plantae
<i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739)	MONOCOT	P3	Plantae
<i>Triodia vanleeuwenii</i>	MONOCOT		Plantae
<i>Triodia wiseana</i>	MONOCOT		Plantae
<i>Triraphis mollis</i>	MONOCOT		Plantae
<i>Triumfetta leptacantha</i>	DICOT		Plantae
<i>Triumfetta maconochieana</i>	DICOT		Plantae
<i>Vachellia farnesiana</i>	DICOT		Plantae
<i>Velleia connata</i>	DICOT		Plantae
<i>Vigna lanceolata</i>	DICOT		Plantae
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	DICOT		Plantae
<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	DICOT		Plantae
<i>Vincetoxicum lineare</i>	DICOT		Plantae
<i>Wahlenbergia tumidifruca</i>	DICOT		Plantae
<i>Waltheria indica</i>	DICOT		Plantae
<i>Waltheria virgata</i>	DICOT		Plantae
<i>Yakirra australiensis</i>	MONOCOT		Plantae



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: 26-Apr-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

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:	12
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:	None
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:	11
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	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhinonicteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat known to occur within area	In feature area

REPTILE

Liasis olivaceus barroni Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat known to occur within area	In feature area
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Migratory Terrestrial Species

Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Controlled action					
Baralaba Train Load Out and Rail Loop	2012/6548	Controlled Action	Post-Approval	In buffer area only	
Iron ore mine, Hope Downs 2 Proposal	2021/9035	Controlled Action	Assessment Approach	In buffer area only	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Jinidi Iron Ore Mine	2012/6299	Controlled Action	Post-Approval	In feature area
Koodaideri Iron Ore Mine & Infrastructure Project, WA	2012/6422	Controlled Action	Post-Approval	In buffer area only
Phil's Creek Iron Ore Project	2009/5107	Controlled Action	Post-Approval	In buffer area only
Yandicoogina Junction South West and Oxbow Iron Ore Project	2011/5815	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Development of the Hope Downs 4 Iron Ore Mine and Associated Infrastructure	2008/4636	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Iron Valley Iron Ore Project	2012/6458	Not Controlled Action	Completed	In buffer area only
Stage B of Pilbara Iron Ore and Infrastructure Project	2004/1897	Not Controlled Action	Completed	In buffer area only
Yandicoogina Pocket and Billiard South, Iron ore mine, WA	2014/7343	Not Controlled Action	Completed	In buffer area only

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](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-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.

Please feel free to provide feedback via the [Contact us](#) page.

[© Commonwealth of Australia](#)

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

Canberra ACT 2601 Australia

+61 2 6274 1111

Appendix 2: GPS coordinates of relevé locations established within the study area

Site ID	Easting	Northing	Zone	Date
R01	724767.03020000000	7461261.41900000000	50	2/05/2023
R02	724572.67270000000	7460979.42750000000	50	2/05/2023
R03	724091.97880000000	7460208.17250000000	50	2/05/2023
R04	724517.49440000000	7460707.73080000000	50	2/05/2023
R06	724289.61370000000	7459230.73350000000	50	2/05/2023
R08	725864.98990000000	7459103.78020000000	50	3/05/2023
R10	725789.02900000000	7459146.27820000000	50	3/05/2023
R11	725478.72690000000	7458999.52910000000	50	3/05/2023
R09	724848.19430000000	7459413.49640000000	50	3/05/2023
R07	725782.64640000000	7458937.36650000000	50	3/05/2023
R05	726110.60090000000	7458790.82690000000	50	2/05/2023

FLORA SITE SHEET

Project Name HD1 NVCP AR-22-17678
Site: R10
Location MGA 50 725789 mE 7459146 mN

Date: 3/05/2023
Type: Releve

Landform: Stony rise
Slope: Very gentle
Rock Type: Iron stone quartz basalt
Soil Type: Clay loam
Soil Colour: Red brown

No photo available

Vegetation: *Acacia inaequilatera* low open woodland over *Triodia vanleeuwenii* open hummock grassland

Condition: 1
Fire Age: 2-5 Years ago
Disturbance Type: Previous track clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
<i>Acacia ancistrocarpa</i>	0.5	0.1	
<i>Acacia inaequilatera</i>	3	1	
<i>Acacia sibirica</i>	0.7	0.1	
<i>Acacia tenuissima</i>	0.65	0.1	
<i>Duperreya commixta</i>	0.3	0.1	
<i>Enneapogon polyphyllus</i>	0.2	0.1	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.3	0.1	
<i>Hakea chordophylla</i>	2	0.1	
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	0.3	0.1	
<i>Ptilotus</i> sp.	0.4	0.1	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.3	0.1	
<i>Solanum lasiophyllum</i>	0.4	0.1	
<i>Triodia vanleeuwenii</i>	0.2	11	
<i>Triodia wiseana</i>	0.15	0.1	

Appendix 4: 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 Alpin'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 2016c).

Appendix 5: 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 (<5 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 (5-15 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 DEC 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 DEC 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.
- **Likelihood: Not applicable**

- The species is not known to occur within the IBRA bioregion based on current literature and distribution.
- The study area lacks important habitat for a species that has highly selective habitat requirements.
- The species has been historically recorded within study area or locally; however, it is considered locally extinct due to significant habitat changes such as land clearing and/or introduced predators.

Table: Assessment of the likelihood of occurrence of conservation significant flora identified by the desktop assessment in the vicinity of the study area

Distance to Nearest Record from the Survey Area is based on a distance analysis undertaken against Rio Tinto Database. CR = Listed as Critically Endangered under the EPBC Act, EN = Listed as Endangered under the EPBC Act, VU = Listed as Vulnerable under the EPBC Act. T = Listed as Threatened under the BC Act, P = Listed as Priority by DBCA.

Taxa	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Habitat and discussion (post-field)	Post-Survey Likelihood of Occurrence
	DBCAs	EPBC	NatureMap	PMST	RTIO							
<i>Acacia bramiowiana</i>	P4		X		X	8	Jul - Aug	Red skeletal stony loam, orange-brown pebbly, gravel loam, laterite, banded ironstone, basalt. Rocky hills, breakaways, scree slopes, gorges, creek beds.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Acacia subtiliformis</i>	P3		X		X	2.8	Jun - Aug	On rocky calcrete plateau.	Potential	Likely	This taxon was recorded throughout the study area.	Recorded
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P3		X		X	15.5	Mar - May or Jul or Sep	Hardpan plains, cracking clay flats. Dolerite outcropping. Red light clay.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Aristida lazaridis</i>	P2		X		X	11	Apr	Sand or loam.	Potential	Potential	Suitable habitat occurs within the study area. The survey occurred the month following the flowering period for this taxon (April), therefore it is possible that it would have been missed during the survey.	Potential
<i>Cladium procerum</i>	P2		X		X	5.8	Nov	Perennial pools.	Potential	Potential	No suitable habitat recorded within the study area.	Unlikely
<i>Dolichocarpa</i> sp. <i>Hammersley Station</i> (A.A. Mitchell PRP 1479)	P3				X	18.1	Mar - May or Jul	Flat crabhole plains, cracking clay, gilgai self-mulching plains, gentle slopes, flow lines. Red-brown cracking clay/loam. Basalt and ironstone rocks and pebbles, pisolitic gravel.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	P4		X		X	9.3	Jul - Sep	Skeletal soils over ironstone. Rocky scree.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	P3				X	9.9	Jul - Sep	Skeletal soils over ironstone. Summits.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Eremophila naaykensis</i>	P3		X		X	11.4	Aug - Sep	Hillslopes, scree slopes, ironstone outcrops. Brown-red soil, silty loam.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Eremophila</i> sp. <i>West Angelas</i> (S. van Leeuwen 4068)	P2				X	8.9	Aug - Oct	High in landscape, summit of hills and hillslopes, outcrops, ironstone ranges. Brown silty loam.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4				X	8.9	Jan or Mar or Jun or Aug - Sep	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	Potential	Potential	No suitable habitat recorded within the study area.	Unlikely
<i>Fimbristylis sieberiana</i>	P3		X		X	2.7	May - Jun	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	Potential	Likely	No suitable habitat recorded within the study area.	Unlikely
<i>Goodenia lyrata</i>	P3				X	10.7	Aug	Red sandy loam. Near claypan.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Goodenia</i> sp. <i>East Pilbara</i> (A.A. Mitchell PRP 727)	P3		X		X	1.6	Aug - Sep	Red-brown clay soil, calcrete pebbles. Low undulating plain, swampy plains.	Potential	Likely	This taxon was recorded throughout the study area.	Recorded
<i>Grevillea saxicola</i>	P3		X		X	8.4	Feb - Mar	Hillslopes, incised gully systems, steep cliffs. Loamy soils.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Gymnanthera cunninghamii</i>	P3		X		X	16.3	Apr or Dec	Sandy soils.	Potential	Unlikely	The study area contains suitable habitat for this taxon (sandy soils), however it has not been recorded within 15 km of the study area.	Unlikely
<i>Hibiscus</i> sp. <i>Gurinbiddy Range</i> (M.E. Trudgen MET 15708)	P2		X		X	11.7	May - Jul	Rocky slopes, gullies, breakaways, scree slopes, creeks. Gravelly, red brown loam.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Indigofera gilesii</i>	P3		X		X	12.7	May or Aug	Pebbly loam. Amongst boulders & outcrops, hills.	Potential	Potential	The study area contains suitable habitat for this taxon (pebbly loam, hills). The survey occurred during this taxon's flowering time (May or Aug), therefore it is unlikely that it would have been missed during the survey.	Unlikely
<i>Ipomoea racemigera</i>	P2				X	19.1	Apr	On sandy soils along watercourses.	Potential	Unlikely	The study area contains suitable habitat for this taxon (sandy soils along watercourses), however it has not been recorded within 15 km of the study area.	Unlikely
<i>Isotropis parviflora</i>	P3		X		X	14.3	Feb - Mar or May	Valley slope of ironstone plateau.	Potential	Potential	The study area contains suitable habitat for this taxon (slopes of ironstone plateaus). The survey occurred during this taxon's flowering time (Feb - Mar or May), therefore it is unlikely that it would have been missed during the survey.	Unlikely

Taxa	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Habitat and discussion (post-field)	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	RTIO							
<i>Lepidium catapycnon</i>	P4		X		X	4.5	Oct - Jan	Stony hill slopes, open woodland in hilly areas, more frequently on south facing slopes, hill hummock grasslands, and road verges.	Potential	Likely	The study area contains suitable habitat for this taxon (stony hill slopes, open woodlands in hilly areas, hill hummock grasslands, and road verges). Additionally, the survey was undertaken outside of this taxon's flowering time (Oct – Jan), so it is possible that it would have been missed during the survey.	Likely
<i>Oxalis sp. Pilbara (M.E. Trudgen 12725)</i>	P2				X	11.4	May	Shaded gullies, below cliffs, drainages, creeklines. Red-brown clayey loam, rocky loam among boulders.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Ptilotus mollis</i>	P4		X		X	9.7	May or Sep	Stony hills and screes.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Rhagodia sp. Hamersley (M. Trudgen 17794)</i>	P3		X		X	15.5	Mar - May or Sep or Nov	Red sandy loam over gravelly ironstone. Plains.	Potential	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Rhynchosia bungarensis</i>	P4				X	11.2	May - Dec	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Rostellularia adscendens var. latifolia</i>	P3		X		X	1.1	Apr - May	Ironstone soils. Near creeks, rocky hills.	Potential	Likely	The study area contains suitable habitat for this taxon (near creeks, rocky hills). The survey occurred the month following the flowering period for this taxon (April), therefore it is possible that it would have been missed during	Potential
<i>Sida sp. Barlee Range (S. van Leeuwen 1642)</i>	P3		X		X	12.5	Jul - Aug	Skeletal red soils pockets. Steep slope.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Streptoglossa sp. Cracking clays (S. van Leeuwen et al. PBS 7353)</i>	P3				X	18.1	Jun or Sep	Cracking clays, plains, floodplains. Red-brown sandy clay. Ironstone.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Stylidium weeliwollii</i>	P3		X		X	1.1	Aug - Sep	Gritty sand soil, sandy clay. Edge of watercourses.	Potential	Likely	The study area contains suitable habitat for this taxon (sandy soils on the edge of watercourses) Additionally, the survey was undertaken outside of this taxon's flowering time (Aug - Sep), so it is possible that it would have	Likely
<i>Themeda sp. Hamersley Station (M.E. Trudgen 11431)</i>	P3		X		X	18.7	Aug	Red clay. Clay pan, grass plain.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely
<i>Triodia sp. Mt Ella (M.E. Trudgen 12739)</i>	P3		X		X	9.4	Feb or May or Jul or Sep	Light orange-brown, pebbly loam. Amongst rocks & outcrops, gully slopes.	No	Unlikely	No suitable habitat recorded within the study area.	Unlikely

Table: Assessment of the likelihood of occurrence of conservation significant fauna Identified by the desktop assessment in the vicinity of the study area

Family	Scientific Name	Common Name	Conservation Code					Source			Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)	Habitat and discussion (post-field)	Likelihood of Occurrence (post-field)
			State	Federal	NM	RTIO	PMST								
Birds															
Pardalotidae	<i>Aphelocephala leucopsis</i>	Southern Whiteface	0	VU				X		7.1	Southern Whitefaces live in a wide range of sparsely treed woodlands and shrublands where there is an understorey of grasses or shrubs or both, usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands and plains (BirdLife International, 2023).	Potential	Whilst this species has been recorded within 20km, the study area does not contain suitable habitat for occurrence.	Unlikely	
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	MI	MI	X	X				19.1	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 (Department of Climate Change, Energy, the Environment and Water, 2023).	Unlikely	Whilst this species has been recorded within 20km, the study area does not contain suitable habitat for occurrence.	Unlikely	
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR & MI				X		81.2	The Curlew Sandpiper prefers habitats such as tidal mudflats, saltmarsh, salt fields, fresh, brackish or saline wetlands and sewerage ponds (Pizzey & Knight, 2012). 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 (BirdLife International, 2023).	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely	
Charadriidae	<i>Charadrius veredus</i>	Oriental Plover	MI	MI			X			19.8	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 (Department of Climate Change, Energy, the Environment and Water, 2023). 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 (Menkhorst et al., 2017).	Unlikely	Whilst this species has been recorded within 20km, the study area does not contain suitable habitat for occurrence.	Unlikely	
Accipitridae	<i>Erythrotriorchis radiatus</i>	Red Goshawk	VU	VU				X		696.8	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. 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 (Department of Climate Change, Energy, the Environment and Water, 2023).	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely	
Falconidae	<i>Falco hypoleucos</i>	Grey Falcon	VU	0				X		25.1	The 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).	Unlikely	The study area does not contain suitable habitat for occurrence. This species may overfly study area.	Unlikely	
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon	OS	0	X	X				11.5	The Peregrine Falcon occupies most environments with suitable nest sites: cliff faces are preferred, including man-made ones, and it commonly uses stick nests built by other species (Menkhorst et al., 2017).	Unlikely	The study area does not contain suitable habitat for occurrence. This species may overfly study area.	Unlikely	
Procellariidae	<i>Macronectes giganteus</i>	Southern Giant Petrel	MI	EN & MI	X					550.1	The Southern Giant Petrel is a seabird found in the southern oceans. Its habitat is primarily marine, over open seas and inshore waters favouring the edges of the continental shelf and pack ice (Morcombe 2021). Routinely ashore to feed and rest (Menkhorst et al., 2017). It has been found to gather at carrion, offal and sewage outlets. Breeding does not occur on Australia.	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely	

Family	Scientific Name	Common Name	Conservation Code			Source			Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)	Habitat and discussion (post-field)	Likelihood of Occurrence (post-field)
			State	Federal	NM	RTIO	PMST						
Strigidae	<i>Ninox connivens connivens</i>	Barking owl	P3	0	X				5	<p>Barking Owls are found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat (BirdLife International, 2023).</p> <p>They are usually found in habitats that are dominated by eucalyptus species, particularly red gum, and, in the tropics, paperbark species. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey. Roost sites are often located near waterways or wetlands.</p>	Unlikely	Whilst the species, <i>Ninox connivens</i> , was recorded within 20km, it is only the southwest subpopulation which is listed as a priority species, and not the species as it occurs outside the south west of Western Australia. The subspecies <i>Ninox connivens connivens</i> southwest population is unlikely to occur within the study area.	Unlikely
Psittaculidae	<i>Pezoporus occidentalis</i>	Night Parrot	CR	EN				X	343.3	<p>The 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 (Triodia) 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. Triodia 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. Sclerolaena has been shown to be a source of food and moisture (Department of Biodiversity, Conservation and Attractions, 2017).</p>	Unlikely	Although this species is cryptic, the small-sized study area does not contain suitable habitat for occurrence.	Unlikely
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	EN	EN					54.9	<p>The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and canegrass (BirdLife International, 2023). The Australian Painted Snipe can use modified habitats, such as low-lying woodlands converted to grazing pasture, sewage farms, dams, bores and irrigation schemes (Marchant & Higgins, 1993), however they do not necessarily breed in such habitats.</p>	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely
Mammals													
Dasyuridae	<i>Dasyurus hallucatus</i>	Northern Quoll	EN	EN	X	X	X		11.6	<p>The Northern Quoll occupies 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 (Threatened Species Scientific Committee, 2005). In the Pilbara region, the species appears to prefer the Rocklea, Macroy and Robe land systems (Biota Environmental Services, 2008). 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 Environmental Services, 2008).</p>	Potential	This species may opportunistically utilise the minor drainage habitat to cross the study area when males disperse. No denning habitat is found in the study area.	Potential
Megadermatidae	<i>Macroderma gigas</i>	Ghost Bat	VU	VU	X	X	X		12	<p>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, 2021).</p>	Potential	This species may opportunistically use the study area for foraging, however no roosting habitat is present within the study area.	Potential

Family	Scientific Name	Common Name	Conservation Code		Source					Distance to Nearest Record	Habitat and discussion (pre-field)	Likelihood of Occurrence (pre-field)	Habitat and discussion (post-field)	Likelihood of Occurrence (post-field)
			State	Federal	NM	RTIO	PMST							
Thylacomyidae	<i>Macrotis lagotis</i>	Bilby, Dalgyte, Ninu	VU	VU					X	76.7	The Bilby inhabits a variety of habitats including acacia shrublands and hummock grassland, stony downs country of cracking clays, desert sandplains and dune fields sometimes containing laterite (Menkhorst & Knight, 2021; Van Dyck & Strahan, 2008).	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely
Muridae	<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse, Ngadji	P4	0	X	X				10.7	The Western Pebble-mound Mouse is found on stony hillsides with hummock grassland (Menkhorst & Knight, 2021). This species favors 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.	Potential	Secondary evidence of its presence has been recorded within the study area.	Recorded
Rhinycteridae	<i>Rhinycteris aurantia</i> (Pilbara form)	Pilbara Leaf-nosed Bat	VU	VU	X	X	X			14.5	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 Pilbara (Van Dyck & Strahan, 2008). During the dry season, the PLNB roosts in deep, warm, humid caves or mines and forages nearby, while during the wet season, it is more widespread and may not require caves for roosting (Menkhorst & Knight, 2021). The PLNB forages low in open habitats, including grasslands and along roads.	Potential	Whilst this species has been recorded within 20 km of the study area, there is no roosting habitat in the study area and the habitat represents limited foraging potential.	Potential
Reptiles														
Typhlopidae	<i>Anilius ganei</i>	Gane's Blind Snake (Pilbara)	P1	0	X	X				18.1	The Gane's Blind Snake inhabits hill crests and slopes, outcroppings, gullies. This taxon is associated with rocky and stony habitats (Wilson and Swan, 2017).	Unlikely	Whilst this species has been recorded within 20 km of the study area, the study area does not contain suitable habitat for occurrence.	Unlikely
Pythonidae	<i>Liasis olivaceus barroni</i>	Pilbara Olive Python	VU	VU	X	X	X			12.8	The Pilbara Olive Python is found in arid to subhumid areas of northern Australia, it is often encountered along watercourses, especially those associated with rocky areas (Wilson & Swan, 2017). The preferred habitat of this taxon includes escarpments, gorges and water holes in the ranges of the Pilbara region (Wilson & Swan, 2017). Individuals are usually recorded in close proximity to water and rock outcrops that attract suitably sized prey species (Pearson, 1993). Males have been recorded travelling up to 4 km to locate mates during the breeding season (Tutt, Mitchell, Brace, & Pearson, 2002).	Potential	Whilst this species has been recorded within 20 km of the study area, the habitat in the study area has limited sheltering and foraging capacity with no permanent or semi-permanent water.	Unlikely
Scincidae	<i>Liopholis kintorei</i>	Great Desert Skink	VU	VU				X		638.1	The Great Desert Skins is found in arid sandflats and clay-based or loamy soils with spinifex (Wilson and Swan, 2017).	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely
Carphodactylidae	<i>Underwoodisaurus seorsus</i>	Pilbara Barking Gecko	P2	0	X					29.6	The Pilbara Barking Gecko is known from an isolated population in West Angelas and Paddlesack Range in the central Hamersley Range (Wilson & Swan, 2017).	Unlikely	The study area does not contain suitable habitat for occurrence.	Unlikely

Appendix 5: Flora species recorded within the study area

FAMILY	GENUS	FULL NAME
Malvaceae	Abutilon	<i>Abutilon cunninghamii</i>
Malvaceae	Abutilon	<i>Abutilon</i> sp.
Fabaceae	Acacia	<i>Acacia ancistrocarpa</i>
Fabaceae	Acacia	<i>Acacia aptaneura</i>
Fabaceae	Acacia	<i>Acacia bivenosa</i>
Fabaceae	Acacia	<i>Acacia citrinoviridis</i>
Fabaceae	Acacia	<i>Acacia dictyophleba</i>
Fabaceae	Acacia	<i>Acacia inaequilatera</i>
Fabaceae	Acacia	<i>Acacia pruinocarpa</i>
Fabaceae	Acacia	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>
Fabaceae	Acacia	<i>Acacia sibirica</i>
Fabaceae	Acacia	<i>Acacia subtiliformis</i>
Fabaceae	Acacia	<i>Acacia tenuissima</i>
Fabaceae	Acacia	<i>Acacia tumida</i> var. <i>pilbarensis</i>
Violaceae	Afrohybanthus	<i>Afrohybanthus aurantiacus</i>
Malvaceae	Androcalva	<i>Androcalva luteiflora</i>
Poaceae	Aristida	<i>Aristida</i> ? <i>pruinosa</i>
Poaceae	Aristida	<i>Aristida contorta</i>
Sapindaceae	Atalaya	<i>Atalaya hemiglauca</i>
Nyctaginaceae	Boerhavia	<i>Boerhavia coccinea</i>
Capparaceae	Capparis	<i>Capparis lasiantha</i>
Poaceae	Cenchrus	<i>Cenchrus ciliaris</i>
Poaceae	Chrysopogon	<i>Chrysopogon fallax</i>
Gyrostemonaceae	Codonocarpus	<i>Codonocarpus cotinifolius</i>
Malvaceae	Corchorus	<i>Corchorus lasiocarpus</i>
Malvaceae	Corchorus	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>
Malvaceae	Corchorus	<i>Corchorus</i> sp.
Myrtaceae	Corymbia	<i>Corymbia</i> ? <i>hamersleyana</i>
Myrtaceae	Corymbia	<i>Corymbia hamersleyana</i>
Fabaceae	Crotalaria	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>
Poaceae	Cymbopogon	<i>Cymbopogon ambiguus</i>
Sapindaceae	Dodonaea	<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>
Convolvulaceae	Duperreya	<i>Duperreya commixta</i>
Poaceae	Enneapogon	<i>Enneapogon caeruleus</i>
Poaceae	Enneapogon	<i>Enneapogon polyphyllus</i>
Poaceae	Enneapogon	<i>Enneapogon robustissimus</i>
Poaceae	Eragrostis	<i>Eragrostis desertorum</i>
Scrophulariaceae	Eremophila	<i>Eremophila forrestii</i>
Scrophulariaceae	Eremophila	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
Scrophulariaceae	Eremophila	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>
Scrophulariaceae	Eremophila	<i>Eremophila longifolia</i>
Poaceae	Eriachne	<i>Eriachne mucronata</i>
Poaceae	Eriachne	<i>Eriachne tenuiculmis</i>
Myrtaceae	Eucalyptus	<i>Eucalyptus</i> ? <i>socialis</i> subsp. <i>eucentrica</i>
Myrtaceae	Eucalyptus	<i>Eucalyptus gamophylla</i>
Myrtaceae	Eucalyptus	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>
Myrtaceae	Eucalyptus	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>
Myrtaceae	Eucalyptus	<i>Eucalyptus xerothermica</i>
Euphorbiaceae	Euphorbia	<i>Euphorbia biconvexa</i>

Appendix 5: Flora species recorded within the study area

Euphorbiaceae	Euphorbia	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>
Boraginaceae	Euploca	<i>Euploca</i> sp.
Convolvulaceae	Evolvulus	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>
Goodeniaceae	Goodenia	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)
Goodeniaceae	Goodenia	<i>Goodenia stobbsiana</i>
Malvaceae	Gossypium	<i>Gossypium australe</i>
Malvaceae	Gossypium	<i>Gossypium robinsonii</i>
Malvaceae	Gossypium	<i>Gossypium sturtianum</i> var. <i>sturtianum</i>
Proteaceae	Hakea	<i>Hakea chordophylla</i>
Proteaceae	Hakea	<i>Hakea lorea</i> subsp. <i>lorea</i>
Boraginaceae	Halgania	<i>Halgania cyanea</i> var. Allambi Stn (B.W. Strong 676)
Malvaceae	Hibiscus	<i>Hibiscus coatesii</i>
Malvaceae	Hibiscus	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>
Fabaceae	Indigofera	<i>Indigofera</i> ? <i>georgei</i>
Fabaceae	Indigofera	<i>Indigofera</i> ? <i>monophylla</i>
Fabaceae	Isotropis	<i>Isotropis iophyta</i>
Oleaceae	Jasminum	<i>Jasminum didymum</i> subsp. <i>lineare</i>
Fabaceae	Mirbelia	<i>Mirbelia viminalis</i>
Phyllanthaceae	Nellica	<i>Nellica maderaspatensis</i>
Poaceae	Paraneurachne	<i>Paraneurachne muelleri</i>
Fabaceae	Petalostylis	<i>Petalostylis labicheoides</i>
Poaceae		<i>Poaceae</i> sp.
Convolvulaceae	Polymeria	<i>Polymeria</i> ? <i>mollis</i>
Asteraceae	Pterocaulon	<i>Pterocaulon</i> ? <i>sphacelatum</i>
Amaranthaceae	Ptilotus	<i>Ptilotus astrolasius</i>
Amaranthaceae	Ptilotus	<i>Ptilotus calostachyus</i>
Amaranthaceae	Ptilotus	<i>Ptilotus clementii</i>
Amaranthaceae	Ptilotus	<i>Ptilotus obovatus</i>
Amaranthaceae	Ptilotus	<i>Ptilotus</i> sp.
Fabaceae	Rhynchosia	<i>Rhynchosia minima</i>
Chenopodiaceae	Salsola	<i>Salsola australis</i>
Santalaceae	Santalum	<i>Santalum lanceolatum</i>
Goodeniaceae	Scaevola	<i>Scaevola ambylanthera</i> var. <i>ambylanthera</i>
Goodeniaceae	Scaevola	<i>Scaevola parviflora</i> subsp. <i>pilbarae</i>
Fabaceae	Senna	<i>Senna artemisioides</i> subsp. <i>helmsii</i> × <i>oligophylla</i>
Fabaceae	Senna	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>
Solanaceae	Solanum	<i>Solanum chippendalei</i>
Solanaceae	Solanum	<i>Solanum lasiophyllum</i>
Surianaceae	Stylobasium	<i>Stylobasium spathulatum</i>
Poaceae	Themeda	<i>Themeda triandra</i>
Hemerocallidaceae	Tricoryne	<i>Tricoryne</i> sp. Hamersley Range (S. van Leeuwen 915)
Poaceae	Triodia	<i>Triodia angusta</i>
Poaceae	Triodia	<i>Triodia longiceps</i>
Poaceae	Triodia	<i>Triodia vanleeuwenii</i>
Poaceae	Triodia	<i>Triodia wiseana</i>
Apocynaceae	Vincetoxicum	<i>Vincetoxicum lineare</i>

Appendix 9: Conservation listed flora recorded during the survey

Family	Taxon	WA Listing	Easting	Northing	Zone	Date	Number of Individuals
Fabaceae	<i>Acacia subtiliformis</i>	P3	724442	7460778	50	2/05/2023	100
	<i>Acacia subtiliformis</i>	P3	724789	7459233	50	3/05/2023	1
	<i>Acacia subtiliformis</i>	P3	724769	7461261	50	2/05/2023	50
	<i>Acacia subtiliformis</i>	P3	724572	7460978	50	2/05/2023	100
	<i>Acacia subtiliformis</i>	P3	724092	7460210	50	2/05/2023	80
	<i>Acacia subtiliformis</i>	P3	724508	7460708	50	2/05/2023	20
	<i>Acacia subtiliformis</i>	P3	726114	7458740	50	2/05/2023	1
	<i>Acacia subtiliformis</i>	P3	724896	7459397	50	3/05/2023	1
Boraginaceae	<i>Euploca</i> sp.	PSI	724776	7461272	50	2/05/2023	0
	<i>Euploca</i> sp.	PSI	724574	7460973	50	2/05/2023	0
	<i>Euploca</i> sp.	PSI	724149	7460245	50	2/05/2023	0
	<i>Euploca</i> sp.	PSI	724507	7460711	50	2/05/2023	0
	<i>Euploca</i> sp.	PSI	726110	7458790	50	2/05/2023	0
	<i>Euploca</i> sp.	PSI	724889	7459377	50	3/05/2023	0
Goodeniaceae	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724443	7460777	50	2/05/2023	26
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724656	7461050	50	2/05/2023	4
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724355	7460032	50	1/05/2023	13
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724767	7461261	50	2/05/2023	20
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724573	7460971	50	2/05/2023	2
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724418	7460723	50	2/05/2023	1
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	726111	7458791	50	2/05/2023	30
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	724886	7459362	50	3/05/2023	2

Appendix 10: Introduced (weed) species recorded during the survey

Species	Easting (mE)	Northing (mN)	Zone	Date	Number of Individuals
* <i>Cenchrus ciliaris</i>	725908	7458959	50	03/05/2023	20

Appendix 11: Conservation listed fauna recorded during the survey

Taxon	WA Listing	Abundance	Notes	Easting	Northing	Zone	Date
<i>Pseudomys chapmani</i>	P4	1	Active mound	725462	7459064	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724490	7460630	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724508	7460761	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724237	7459422	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724435	7460531	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Recently inactive mound	724338	7459177	50	2/05/2023
<i>Pseudomys chapmani</i>	P4	1	Inactive mound	725791	7459171	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724438	7460760	50	2/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725571	7459152	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725709	7459208	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725030	7459415	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Inactive mound	725310	7459292	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725366	7459288	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725504	7459192	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	725475	7459128	50	3/05/2023
<i>Pseudomys chapmani</i>	P4	1	Inactive mound	724558	7460656	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724559	7460667	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724668	7460879	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724352	7460741	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724295	7459568	50	4/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	724085	7459903	50	2/05/2023
<i>Pseudomys chapmani</i>	P4	1	Active mound	726126	7458745	50	3/05/2023

Appendix 12: Rio Tinto internal operational controls for environmental management**Operational Controls for Environmental Management**

The manner in which the clearing of native vegetation is regulated, undertaken and rehabilitated is under various internal Rio Tinto operational controls. These operational controls are discussed below.

Rio Tinto Operational Controls

Rio Tinto Iron Ore is part of the Rio Tinto group of companies and is obliged through its integrated Health Safety Environment and Quality Management System (HSEQ), to comply with five global environmental standards. RTIO has developed and implemented numerous management plans and work practices to control environmental issues relating to mining and exploration. A number of these work practices are of direct relevance in managing and controlling land clearing activities, and include:

- Approvals Permit Guidelines and Procedure;
- HSEQ Ground Disturbance, Re-entering a Rehabilitated Area and Track maintenance Standard Work Practice;
- HSEQ Iron Ore (WA) – Equipment Hygiene Inspection Work Practice;
- HSEQ Operational Control Procedure 6: Drilling; and
- HSEQ Closure, Rehabilitation and Monitoring Standard Work Practice.