360 environmental | Part of SLR

North Star Junction Renewable Energy Infrastructure Project

Vertebrate Fauna Assessment

Prepared for

Fortescue Metals Group Ltd

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people planet professional

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Disclaimer

Executive Summary

Fortescue Metals Group Ltd commissioned 360 Environmental Pty Ltd part of SLR consulting to undertake a detailed vertebrate fauna survey for renewable energy infrastructure at North Star Junction. The North Star Junction Survey Area (the Survey Area) covers approximately 4,757 hectares and is located approximately 80 kilometers south of Port Hedland in the Pilbara bioregion of Western Australia.

The purpose of the survey was to identify key vertebrate fauna values within the Survey Area and to support the Environmental Impact Assessment process for the renewable energy infrastructure at North Star Junction. This report presents the results of the vertebrate fauna survey undertaken to support the above objectives.

The single-phase detailed and targeted vertebrate fauna survey was undertaken by suitably experienced and qualified personnel from the 15 – 27 March 2022 and used a variety of detection methods including cage traps, camera traps, opportunistic observations, active searches, and autonomous recording units (bat and bird detectors). The survey timing was considered suitable for all vertebrate fauna taxa.

Fauna habitat mapping was undertaken based on a combination of aerial imagery and field observations. Six fauna habitats were mapped. The Drainage Line/River/Creek (major and minor) habitats are of high value to significant fauna and overall fauna assemblages, largely due to their role as an ecological linkage. The Granite Outcrops contain important refuge and shelter opportunities for fauna, however, the majority of the Granite Outcrops habitat has been recently burnt, therefore its value may be limited until further regeneration of vegetation occurs. All fauna habitats identified within the Survey Area are typical of the Pilbara bioregion and consistent with habitats identified by previous studies in the region, and all identified fauna habitats extend outside the Survey Area to form larger ecosystems.

The inventory of fauna taxa recorded during the field survey is typical for the Pilbara bioregion and consistent with the database search results and studies conducted in the region.

Four significant fauna taxa were recorded during the fauna survey:

- Northern Quoll (*Dasyurus hallucatus*) – listed as Endangered under the BC Act and EPBC Act: Based on camera trapping evidence, it is possible that a low-density population uses habitats within the Survey Area, primarily Drainage Line/River/Creek (major and minor) and Hills/Ranges/Plateaux for dispersal and foraging. Granite Outcrops may be used for denning.
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) – listed as Vulnerable under the BC Act and EPBC Act: Low numbers of calls were recorded during the survey, and no suitable roosting habitat was observed within the Survey Area, therefore it is likely that all habitats within the Survey Area are used by foraging individuals.

- Pilbara Grasswren (*Amytornis whitei whitei*) – listed as Priority 4 (as *A. striatus striatus*): Likely to use all habitat types within the Survey Area, however, will likely favour unburnt areas where tall, dense spinifex is present.
- Western Pebble-mound Mouse (*Pseudomys chapmani*) – listed as Priority 4: Twenty mounds were observed within Plain (stony/gibber) habitat, including one currently active mound, three recently active mounds and 16 old, inactive mounds.

One additional significant fauna taxon has been recorded within the Survey Area prior to the current survey, the Bilby (*Macrotis lagotis*) – listed as Vulnerable under the BC Act and EPBC Act. The taxon is likely to use the Plain (sand) habitat within the Survey Area.

Four significant fauna taxa were identified as having a high likelihood of occurrence within the Survey Area based on nearby records and suitable habitat:

- Ghost Bat (*Macroderma gigas*) – listed as Vulnerable under the BC Act and EPBC Act: The taxon may use all habitats for foraging, however no roosting habitat was recorded within the Survey Area
- Pilbara Olive Python (*Liasis olivaceous barroni*) – listed as Vulnerable under the BC Act and EPBC Act: This taxon was recorded 300 m outside the Survey Area boundary towards the northeast of the Survey Area and the species is most likely to use Drainage Line/River/Creek (major and minor) habitats within the Survey Area
- Brush-tailed Mulgara (*Dasycercus blythi*) – listed as Priority 4: The species is most likely to use Plain (sand) dominated by hummock grasslands and shrublands on sandy soils within the Survey Area
- Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) – listed as Priority 4: This taxon is likely to use unburnt areas within the Survey Area where tall, dense spinifex is present.

Seven significant fauna taxa were assessed as having a medium likelihood of occurrence within the Survey Area, and five significant fauna taxa were assessed as having a low likelihood of occurrence within the Survey Area.

Four introduced mammal species were recorded within the Survey Area, European Cattle (**Bos primigenius taurus*), Dog/Dingo (**Canis familiaris*), Horse (**Equus ferus caballus*), and Cat (**Felis catus*).

Abbreviations

Abbreviations used through the report are described below in Table 1.

Table 1: Abbreviations

Abbreviation	Description
360 Environmental	360 Environmental Pty Ltd
ARU	Autonomous Recording Unit
BC Act	*Biodiversity Conservation Act 2016*
°C	Degree Celsius
CD	Conservation Dependent Fauna
CR	Critically Endangered
DAWE	Department of Agriculture, Water, and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DoE	Department of Environment
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection Biodiversity and Conservation Act 1999*
ESA	Environmentally Sensitive Area
Fortescue	Fortescue Metals Group Limited
GIS	Geographic Information System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
km	Kilometres
m	Metres
mm	Millimetres
MA	Marine
MI	Migratory
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected Fauna
P	Priority
PMST	Protected Matters Search Tool
SLR	SLR Consulting Pty Ltd

Abbreviation	Description
SRE	Short Range Endemic
Survey Area	The North Star Junction Survey Area
T	Threatened
VU	Vulnerable
WA	Western Australia
WAM	Western Australian Museum

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1 Introduction

1.1 The Project

Fortescue Metals Group Ltd (Fortescue) commissioned 360 Environmental Pty Ltd (360 Environmental) part of SLR Consulting (SLR) to undertake a detailed vertebrate fauna survey for development of renewable energy infrastructure at North Star Junction (the Project).

The Project Survey Area (the Survey Area) covers 4,757.86 ha and is located approximately 80 km south of Port Hedland in the Pilbara bioregion of Western Australia (Figure 1). The Survey Area comprises nine tenements, which have been abbreviated for the report (Table 2).

Table 2: Summary of the Survey Area Polygons

Tenement	Abbreviation	Area (ha)
L45–615	L45–615	1466.83
L45–616	L45–616	294.12
L45–617	L45–617	403.15
L45–624	L45–624	2319.66
Middle Option A	MO–A	81.66
Middle Option B	MO–B	5.86
Nyamal Access Corridor Part A	NAC–A	71.39
Nyamal Access Corridor Part B	NAC–B	4.15
Zane’s Lane Tenure	Zane's Lane	111.04

1.2 Objectives and Scope

The purpose of the survey was to identify key vertebrate fauna values within the Survey Area and to support the Environmental Impact Assessment (EIA) process for the North Star Junction renewable energy infrastructure project.

The scope of works was to:

- Undertake a desktop assessment, including relevant database searches and a literature review to compile and summarise existing records of vertebrate fauna in the vicinity of the Survey Area
- Undertake a single-phase detailed terrestrial vertebrate fauna survey using fauna detection methods including pitfall traps, funnel traps, camera traps, and autonomous recording units (ARUs)
- Produce a vertebrate fauna technical report
- Supply a geospatial data package prepared in accordance with Fortescue and IBSA requirements.

This report presents the outcomes of the vertebrate fauna survey undertaken to support the objectives outlined above.

2 Background

2.1 Protection of Fauna

Western Australian (WA) fauna is formally protected by the following legislative measures:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (Commonwealth of Australia, 1999)
- *Biodiversity Conservation Act 2016* (WA) (BC Act) (Government of Western Australia, 2016)
- *Environmental Protection Act 1986* (WA) (EP Act) (Government of Western Australia, 1986).

In addition to these legislative measures, the WA Department of Biodiversity, Conservation and Attractions (DBCA) priority fauna list provides a non-legislative list of possibly threatened, rare but not threatened or near threatened taxa.

In addition to these protection mechanisms, the EIA process is supported by various guidance documents published by the Environmental Protection Authority (EPA), DBCA and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) (formerly the Department of Agriculture Water and Environment (DAWE)).

Western Australia

- Guidelines for Surveys to Detect the Presence of Bilbies and Assess the Importance of Habitat in Western Australia (Department of Biodiversity Conservation and Attractions, 2017b)
- Interim Guideline for Preliminary Surveys of Night Parrot (*Pezoporus occidentalis*) in Western Australia (Department of Parks and Wildlife, 2017)
- Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2020).

Commonwealth

- EPBC Act Referral Guideline for the Endangered Northern Quoll, *Dasyurus hallucatus*. (Department of Sustainability Environment Water Population and Communities, 2011a)
- Matters of National Environmental Significance – Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2013)
- Survey Guidelines for Australia's Threatened Bats: Guidelines for detecting bats listed as threatened under the EPBC Act (Department of the Environment Water Heritage and the Arts, 2010a)

- Survey Guidelines for Australia's Threatened Birds: Guidelines for detecting birds listed as threatened under the EPBC Act (Department of the Environment Water Heritage and the Arts, 2010b)
- Survey Guidelines for Australia's Threatened Reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act (Department of Sustainability Environment Water Population and Communities, 2011c)
- Survey Guidelines for Australia's Threatened Mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (Department of Sustainability Environment Water Population and Communities, 2011b).

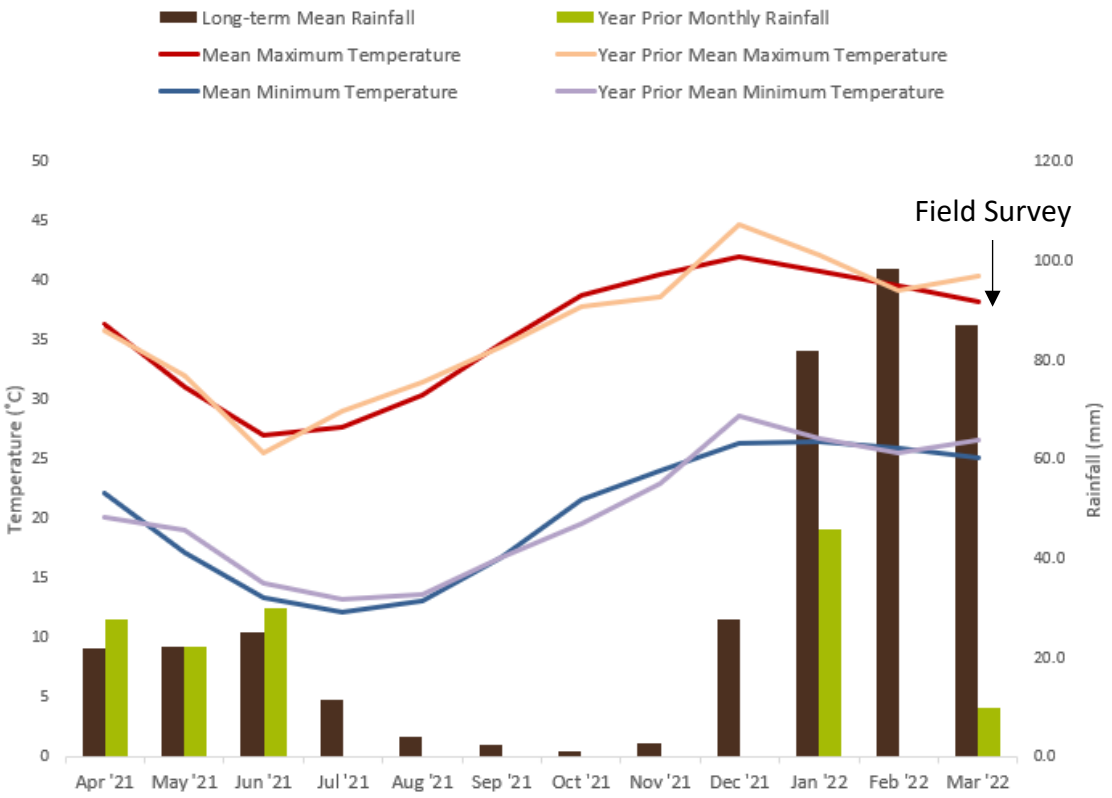
2.2 Climate

The closest long-term Bureau of Meteorology weather station to the Survey Area with a complete temperature dataset is Marble Bar (Station 004106), located approximately 82 km north of the Survey Area. The closest Bureau of Meteorology weather station with a complete rainfall dataset is Indee (Station 004016), located approximately 40 km southwest of the Survey Area.

Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30-year interval (Bureau of Meteorology, 2007), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate (Bureau of Meteorology, 2007).

The long-term mean minimum temperature for Marble Bar ranges from 12.2˚C (July) to 26.5˚C (January) and the long-term mean maximum temperature ranges from 27.1˚C (June) to 42˚C (March) (Graph 1) (Bureau of Meteorology, 2022).

The Indee Weather Station recorded 135.5 mm of rainfall in the 12 months prior to the survey (March 2021 to February 2022), which is 251.7 mm below the long-term average of 387.2 mm (Bureau of Meteorology, 2022). In the three months prior to the survey (December 2021 to February 2022), 45.8 mm of rainfall was recorded, which is 162.6 mm below the long-term average of 208.4 mm for the same time period (Bureau of Meteorology, 2022).



Graph 1: Climate Summary prior to the Survey. The single-phase terrestrial vertebrate survey was undertaken in March 2022. Temperature data from Port Headland Airport. Rainfall data from Indee.

2.3 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical, and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (Department of the Environment and Energy, 2016). The Survey Area occurs within the Pilbara bioregion and the Chichester (PIL01) subregion (Figure 2).

The Chichester (PIL01) subregion comprises the northern section of the Pilbara Craton and is characterised by undulating Archaean granite and basalt plains include significant areas of basaltic ranges. The subregion is represented by plains supporting a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, and ranges supporting *Eucalyptus leucophloia* tree steppes. The climate is Semi-desert-tropical and receives 300 mm of rainfall annually, with drainage occurring to the north via numerous rivers (e.g. De Grey, Oakover, Nullagine, Shaw, Yule, Sherlock) (Kendrick and McKenzie, 2001).

2.4 Soil Landscapes and Land Systems

Soil landscapes and land system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:250,000 (Department of Primary Industries and Regional Development, 2018). The Survey Area occurs within nine land systems (Figure 2, Table 3).

Table 3: Land Systems within the Survey Area

Land System		Area (Ha)	Description (Department of Primary Industries and Regional Development, 2018)
Name	Code		
Boolaloo System	283Bo	26.78	Granite hills, domes, tor fields and sandy plains supporting spinifex grasslands with scattered shrubs.
Boolgeeda System	280Bg	1952.04	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.
Capricorn System	280Cp	47.20	Rugged sandstone hills, ridges, stony footslopes and interfluves supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs.
Macroy System	280Mc	126.48	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands.
Macroy System	283Mc	979.76	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands.
Platform System	280Pl	51.335	Dissected slopes and raised plains supporting shrubby hard spinifex grasslands.
River System	283Ri	15.55	Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex.
Robe System	280Ro	89.19	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.
Uaroo System	283Ua	1317.87	Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered acacia shrubs.

2.5 Hydrography

Hydrographic features intersecting and in the vicinity of the Survey Area are described in Table 4 and shown in Figure 2 (Department of Water and Environmental Regulation, 2018).

Table 4: Hydrographical Features in the Vicinity of the Survey Area

Hydrographical Feature	Description
Turner River	A minor river originating 32 km southeast of Survey Area. Turner River flows in a northwest direction, intersecting the middle of the Survey Area before reaching the ocean at Port Hedland
Minor Tributary	A minor tributary originating 7 km east of the Survey Area and flowing in a north-westerly direction. After intersecting with the northern point of the Survey Area, the minor tributary travels 24 km where it connects with Turner River.
Significant Stream	A significant stream originating 22 km east of the Survey Area traveling in a north-east direction. After intersecting at the middle of the Survey Area, the significant stream connects with Turner River.
Major Tributary	A major tributary originating 12 km south of the Survey Area and heading in a northerly direction. The major tributary nearly intersects the northwest section of the Survey Area then continues up another 11 km where it connects with Turner River.

2.6 Broad Vegetation Associations

Mapping of pre-European vegetation in Western Australia was completed on a broad scale (1:1,000,000) by Beard (1976). These vegetation associations were later refined by Shepherd et al. (2002) resulting in 819 associations.

Four broad vegetation system associations are mapped over the Survey Area (Table 5; Figure 4).

Table 5. Broad Vegetation Systems within the Survey Area (Government of Western Australia, 2019)

Broad Vegetation System	Area (Ha)	Description
George Ranges 82	186.36	Low tree-steppe: Hummock grassland with scattered bloodwoods and snappy gum. *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*.
Abydos Plain – Chichester 93	4561.63	Shrub-steppe: Hummock grassland with scattered shrubs or mallee. *Triodia* spp. *Acacia* spp., *Grevillea* spp. *Eucalyptus* spp.
Abydos Plain – Chichester 619	9.10	Woodland other: Wheatbelt; York gum, salmon gum etc., *Eucalyptus loxophleba*, *E. salmonophloia*. Goldfields; gimlet, redwood etc., *E. salubris*, *E. oleosa*. Riverine; rivergum, *E. camaldulensis*. Tropical; messmate, woolybutt, *E. tetrodonta, E. miniata*.
Abydos Plain – Chichester 626	0.17	Sparse shrub-steppe: Hummock grassland with sparse shrubs. *Triodia* spp. *Acacia* spp.

2.7 Environmentally Sensitive and Conservation Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs) or Significant wetlands. The Survey Area does not intersect any ESAs (Department of Water and Environmental Regulation, 2020). The nearest ESA is Mungaroona Range Nature Reserve, located 52 km southwest of the Survey Area (Figure 5).

Conservation Areas consist of areas protected for the purpose of conservation, including but not limited to National Parks, Nature Reserves, Conservation Parks, and Regional Parks. The Survey Area does not intersect any Conservation Areas. The nearest Conservation Area is Mungaroona Range Nature Reserve, which is located 52 km southwest of the Survey Area and is vested under the Conservation Commission of Western Australia (Department of Biodiversity Conservation and Attractions, 2021) (Figure 5).

3 Methods

The biological survey documented by this report was undertaken in accordance with relevant EPA and DCCEEW guidelines (see section 2.1).

3.1 Literature Review

Background information on the Survey Area and surrounds was compiled prior to the field survey (see Section 2). Historical vegetation mapping (Beard, 1976; Shepherd, Beeston and Hopkins, 2002), land systems mapping (Department of Primary Industries and Regional Development, 2018), and the IBRA classification system (Kendrick and McKenzie, 2001) were consulted to provide broad contextual knowledge of the vegetation units and habitat likely to be encountered within the Survey Area.

The literature review considered a selection of biological reports detailing assessments within a 100 km radius of the Survey Area sourced from the EPA Consultation Hub, the Index of Biodiversity Surveys for Assessments (IBSA) website, internet search engine, or provided directly by Fortescue (Figure 6):

- Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage a Rail Corridor (Biota Environmental Sciences, 2004), 5 km west of the Survey Area
- North Star Project Level 2 Terrestrial Vertebrate Fauna Assessment (ecologia Environment, 2012), overlaps the Survey Area
- Pilbara Ghost Bat Review (Biologic and Bat Call WA, 2014), overlaps the Survey Area
- Pilbara Leaf-nosed Bat Research Plan 12-month Monitoring Report (GHD, 2022), overlaps the Survey Area
- Proposed Gas Pipeline Targeted Threatened Fauna Survey (Outback Ecology, 2013), overlaps the Survey Area
- Reconnaissance Flora and Vegetation Survey and Fauna Survey for The Croydon Gold Project (Phoenix Environmental Sciences, 2021), 65 km west of the Survey Area
- Targeted Fauna Assessment of The Rail Duplication (Bamford Consulting Ecologists, 2010), 5 km west of the Survey Area
- Warrawoona Gold Project Targeted Vertebrate Fauna Survey (Biologic, 2018), 100 km east of the Survey Area
- Wodgina Gas Pipeline Targeted Fauna Survey (360 Environmental Pty Ltd, 2018), 7 km west of the Survey Area
- Wodgina Project Level 1 Fauna Survey, Targeted Conservation Significant Fauna Survey and Desktop Assessment (Stantec Australia Pty Ltd, 2018), 30 km southwest of the Survey Area.

3.2 Database Searches

Database searches were undertaken to compile a list of potential flora and fauna and identify potential significant flora, fauna, and ecological communities within or surrounding the Survey Area (Table 6). In addition, an EPBC Protected Matters Search (PMST) was undertaken to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (Department of Agriculture Water and the Environment, 2022).

Table 6: Database Searches of the Survey Area

Database Name	Date Received	Search Target	Buffer around the Survey Area
DBCA Threatened and Priority Fauna database search (Department of Biodiversity Conservation and Attractions, 2022c)	22 February 2022	Threatened and priority fauna	40 km radial search buffer around a central Survey Area point
NatureMap (Department of Biodiversity Conservation and Attractions, 2022b)	16 February 2022	Threatened and priority fauna, and inventory of potential fauna	40 km radial search buffer around a central Survey Area point
Protected Matters Search Tool (Department of Agriculture Water and the Environment, 2022)	8 February 2022	Commonwealth listed threatened fauna	100 km radial search buffer around a central Survey Area point

3.3 Likelihood of Occurrence

Significant fauna species identified from the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area, both prior to and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in .

Only species either recorded within the Survey Area or considered as having a high or medium likelihood of occurrence are discussed in detail. Species classified as having a low likelihood of occurrence based on the above criteria are not discussed unless a justification for this classification is required.

Taxa listed as Marine only under the EPBC Act were not included as significant taxa because species listed as Marine only do not constitute MNES. Some marine species were only returned by PMST which searches by modelled distribution, not actual records, and were therefore excluded from the likelihood of occurrence assessment due to lack of suitable habitat. Erroneous records (i.e. records of extinct or locally extinct taxa, or records that occur obviously outside a taxon's known distribution) have also been excluded from consideration.

Table 7: Likelihood of Occurrence Criteria

Rank	Criteria
Recorded	The species was recorded during the current survey.
Previously Recorded	The species has been previously recorded in the Survey Area.
High (Likely to occur)	There are existing records of the species in close proximity to the Survey Area in the last 15 years and: • The species is strongly linked to a specific habitat, which is present in the Survey Area; or • The species has more general habitat preferences, and suitable habitat is present.
Medium (May occur)	There is suitable habitat in the Survey Area, but the species is recorded infrequently in the locality; or There are existing records of the species from the locality, however: • The species is strongly linked to a specific habitat, of which only a small amount is present in the Survey Area; or • The species has more general habitat preferences, but only some suitable habitat is present.
Low (Unlikely to occur)	The species is linked to a strongly specific habitat, which is absent from the Survey Area; or Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or There is some suitable habitat in the Survey Area, however the species is very infrequently recorded in the locality.

3.4 Survey Timing

The vertebrate fauna survey was undertaken across a single field trip to collect data from the Survey Area (Table 8). Survey effort is demonstrated in Figure 7 and discussed in the following sections.

Table 8: Field Trip

Scope	Date	Personnel	Person Field Days
Detailed terrestrial vertebrate fauna survey	15 - 27 March 2022	Dr Michael Lohr Evan Webb Lachlan Crossley Lewis Berry	52

3.5 Field Personnel

Field personnel and their roles for the field trip are detailed in Table 9. The survey was led by Principal Zoologist Dr Michael Lohr and Senior Zoologist Evan Webb. The team has a combined total of over 20 years' experience conducting surveys of similar scope throughout Western Australia.

Table 9: Field Personnel

Personnel	Role
Dr Michael Lohr	Principal Zoologist, fauna technical lead
Evan Webb	Senior Zoologist, fauna technical lead
Lachlan Crossley	Ecologist
Lewis Berry	Ecologist

3.6 Licence and Authorisation

The fauna fieldwork was completed under Fauna Taking (Biological Assessment) License – Regulation 27 (BA270000606) and an authorisation to take or disturb threatened species under Section 40 of the BC Act (TFA 2022 –0015) (Appendix A).

3.7 Daily Survey Conditions

Survey conditions for the detailed fauna survey are presented in Table 10. Daily temperature is from is Port Hedland Airport (Station 004032) and Marble Bar (Station 004106), and rainfall data is from the Indee (Station 004016) (Bureau of Meteorology, 2022). This information is important for potential detection of species diversity during a survey. A severe thunderstorm passed through the Survey Area on 18th April 2022, however, this is not reflected in the rainfall data as the thunderstorm was localised and was not recorded at Indee.

Table 10: Detailed Fauna Survey Weather Conditions

Date	Temperature (°C)				Rainfall (mm)
	Min		Max		
	Port Hedland	Marble Bar	Port Hedland	Marble Bar	Indee
15/03/2022	27.8	30.4	39.4	43.9	0.0
16/03/2022	28.1	27.3	42.3	43.8	0.0
17/03/2022	25.7	27.2	43.7	43.1	0.0
18/03/2022	28.5	28.7	36.2	41.4	0.0
19/03/2022	26.4	27.1	39.6	40.0	0.0
20/03/2022	23.0	24.0	39.2	41.6	0.8
21/03/2022	26.3	26.6	39.0	41.4	0.0
22/03/2022	26.1	28.0	39.9	42.6	0.0

Date	Temperature (°C)				Rainfall (mm)
	Min		Max		
	Port Hedland	Marble Bar	Port Hedland	Marble Bar	Indee
23/03/2022	31.0	29.6	42.8	41.9	0.0
24/03/2022	29.7	29.6	37.9	40.4	0.0
25/03/2022	26.5	27.5	38.4	40.1	0.0
26/03/2022	25.2	24.4	37.4	40.6	0.0
27/03/2022	27.0	26.3	37.5	39.2	0.0

3.8 Fauna Habitat Assessment

Fauna habitat assessments were undertaken throughout the Survey Area to identify fauna habitat values. Habitat assessment locations are shown in Figure 7. The following information was collected at each site using Fulcrum, a mobile data collection app:

- Site photo
- Landform
- Soil type and colour
- Rock types, surface stone cover, and size classes
- Key habitat and microhabitat features including leaf litter, logs, burrows, rocky outcrops, rock crevices, hollows, water sources
- Habitat quality, fire history, and evidence of disturbance
- General description of vegetation structure.

Fauna habitat mapping was based on a combination of field observations, fauna habitat assessment data, and vegetation mapping undertaken by 360 Environmental. Fauna habitats were mapped and named in accordance with the most up to date Fortescue Environmental data template and described in accordance with the Terrestrial Vertebrate Fauna Assessment Guidelines (Fortescue Metals Group, 2014).

3.9 Trap Sites

Seven trap sites were installed in the Survey Area within areas of suitable and representative habitat. Each trap site consisted of two individual replicate trap lines spaced roughly 50 m apart to account for the possibility that fauna assemblages can be distributed unevenly within a given habitat. Individual trap lines were roughly 30 m long and comprised a 30 cm tall flywire drift fence passing over five pitfall traps (20 L buckets and 150 mm PVC pipes) with six funnel traps attached to the drift fence in pairs. Elliot traps were not deployed at trap sites due to concerns regarding animal welfare in extreme heat. A diagram of the trap site layout is provided in .

Site selection was based on a review of available literature and aerial imagery, which indicated that four fauna habitats occurred within the Survey Area. Two trap sites (i.e. four replicate trap lines) were intended to be installed in each habitat type, however two additional fauna habitats were identified during the field survey and access problems restricted the survey to seven trap sites. Trap site locations are shown in Figure 7 and Table 11 shows the total trapping effort for each trap site and habitat type.

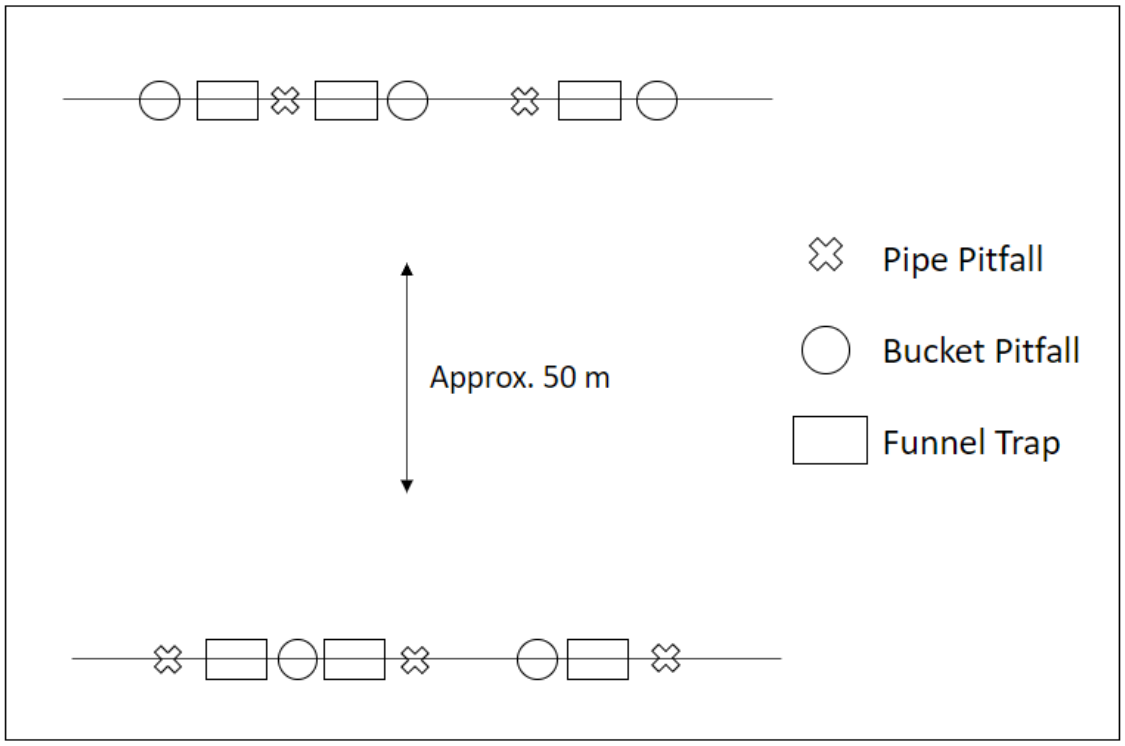


Plate 1. Trap Site Layout

Table 11: Trap Site Trapping Effort

Habitat	Trap site	Number of nights open	Total pitfall trap nights	Total funnel trap nights
Plain (sand)	NS-TS01	7	70	84
Plain (stony/gibber)	NS-TS02	7	70	84
Drainage Line/River/Creek (major)	NS-TS03	7	70	84
Drainage Line/River/Creek (minor)	NS-TS04	7	70	84
Plain (stony/gibber)	NS-TS05	7	70	84
Drainage Line/River/Creek (major)	NS-TS06	7	70	84
Granite Outcrop	NS-TS07	7	70	84
Total	**7 sites**	**49**	**490**	**588**

3.10 Camera Traps

Forty motion sensitive camera traps were deployed to target Northern Quolls. Site selection was based on preferred Northern Quoll habitat. Cameras were deployed in lines of 10 cameras spaced approximately 50 m apart and were baited with universal bait (rolled oats, peanut butter, and sardines). Table 12 shows the total trapping effort for camera traps, and locations are shown in Figure 7.

Table 12: Camera Trapping Effort

Fauna habitat	Nearest trap site	Number of camera traps	Number of trap nights per camera	Total camera trap nights
Drainage Line/River/Creek (major)	NS-TS03	10	5	50
Drainage Line/River/Creek (minor)	NS-TS04	10	5	50
Drainage Line/River/Creek (major/minor)	NS-TS06	10	5	50
Granite Outcrop	NS-TS07	10	6	60
Total				**210**

3.11 Acoustic Bat Surveys

Song Meter SM4BAT ultrasonic autonomous recording units (ARUs) were used to target bats with a particular focus on two significant taxa, the Pilbara Leaf-nosed Bat and Ghost Bat. Ultrasonic ARUs were placed in locations that contained habitats likely to be used by bats, and they were active for more than four consecutive nights at each location. The ARU recordings were analyzed by Robert Bullen from Bat Call WA. Non-significant bat species were simply recorded as present or absent at each location, whereas the abundance of the significant bat calls was noted for those species. Table 13 outlines the total trapping effort for ultrasonic ARUs and locations are shown in Figure 7.

3.12 Acoustic Night Parrot Surveys

Song Meter SM4 autonomous recording units (ARUs) were used to target Night Parrot (*Pezoporus occidentalis*). The units were deployed near habitat features that may be used by the Night Parrot, such as large spinifex hummocks. They were deployed for a minimum of 5 nights and up to 10 nights at each location. The ARU recordings were analyses by Robert Bullen from Bat Call WA. Table 13 outlines the total trapping effort for acoustic ARUs and locations are shown in Figure 7.

Table 13: ARU Trapping Effort for Bats and Night Parrots

Fauna habitat	Nearest trap site	Audible ARU trap nights	Ultrasonic ARU trap nights
Drainage Line/River/Creek (major)	NS-TS03	-	7
Hills/Ranges/Plateaux	NS-BAT01	-	5
Granite Outcrop	NS-TS07	-	7
Drainage Line/River/Creek (major)	NS-TS06	-	8
Drainage Line/River/Creek (minor)	NS-TS08	-	10
Plain (sand)	NS-TS04	-	7
Plain (sand)	NS-TS02	7	-
Plain (stony/gibber)	NS-TS05	7	-
Total		**14**	**44**

3.13 Bilby Search Plots

Five targeted Bilby searches were undertaken. Searches consisted of four personnel walking an approximately 1.5 km transect spaced approximately 20 m apart (i.e. approximately 6 km total per transect). Searches involved looking for evidence of Bilbies such as burrows, diggings, scats, and tracks. Table 14 shows the total survey effort for Bilby searches. Tracks are shown in Figure 7.

Table 14: Targeted Bilby search effort

Habitat Assessments	Fauna Habitats	Approximate transect length (km)	
		Distance per person	Total distance covered
NS-HAB02	Plain (stony/gibber)	1.5	6
NS-HAB04, NS-HAB05, NS-HAB06	Plain (stony/gibber), Hills/Ranges/Plateux	1.5	6
NS-HAB09, NS-HAB10, NS-HAB11	Plain (stony/gibber), Plain (sand)	1.5	6
NS-HAB12, NS-HAB13	Plain (stony/gibber), Plain (sand)	1.5	6
NS-HAB14, NS-HAB15, NS-HAB16	Plain (stony/gibber), Plain (sand)	2	8
Total			**32 km**

3.14 Opportunistic Observations

Opportunistic observations of fauna were recorded throughout the Survey Area, including primary evidence (direct sightings, calls) and secondary evidence (tracks, scats, diggings, remains).

3.15 Active Searches

Timed active searches were undertaken at each trap site a minimum duration of one person hour. These searches included raking leaf litter, peeling bark, splitting dead wood, and flipping rocks in search of evidence of fauna. Additional untimed active searches were undertaken opportunistically in microhabitats likely to contain fauna.

3.16 Bird Surveys

Unbounded bird surveys were undertaken in conjunction with active searches at each at each trap site for a minimum duration of one person hour.

3.17 Spotlighting

Two nights of spotlighting were undertaken from both vehicle and on foot and comprised approximately eight person hours per night. Tracks are shown in Figure 7.

3.18 Identification and Taxonomy

Terrestrial vertebrate fauna taxa were identified in the field and released on site. Data captured by ARUs was analysed by bat specialist Robert Bullen from Bat Call WA.

Where there was doubt on a species name (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. Taxonomy and nomenclature in this report follows the WA Museum Checklist 2022 (Western Australian Museum, 2022) where relevant.

3.19 Statistical Analysis

Species accumulation curves for vertebrate fauna groups were plotted using the open-source software R (R Core Team, 2021) to demonstrate the adequacy of survey effort at sampling locations within the Survey Area. The treatments comprised Sobs (Mao Tao), to reflect the observed number of species (based on the total number of species recorded), and richness estimators (Chao, Jacknife 1, Jacknife 2 and Bootstrap) to predict the total number of fauna taxa that could potentially be recorded (Clarke and Gorley, 2006). Species accumulation curves were calculated using presence/absence at fauna trap sites only, and therefore may underrepresent the completeness of the overall fauna survey.

Richness estimators attempt to estimate the number of variants (i.e. taxa) that aren't observed within the collected data, which is then used to estimate the overall richness of a sample. This information is derived from the number of observed singletons and doubletons within the data,

and thus data with a high number of singletons (i.e. when capture rates are low but capture diversity is not) will produce higher richness estimates than data with the same number of taxa but fewer singletons (Gotelli and Colwell, 2010).

4 Results

4.1 Limitations

Limitations and constraints of the vertebrate fauna survey are detailed below in Table 15.

Table 15: Limitations and Constraints Associated with the Survey

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
Availability of data and information	No	All data required to complete the scope of works including regional and local contextual information was available.
Competency and experience	No	The fauna field survey was undertaken by a team with extensive experience in undertaking similar scopes within the bioregion. Principal Zoologist Dr Michael Lohr – 10+ years' experience Senior Zoologist Evan Webb – 5+ years' experience Ecologist Lachlan Crossley – 3 years' experience Ecologist Lewis Berry – 1 year experience ARU data (ultrasonic and audible) analysis was undertaken by Robert Bullen from Bat Call WA.
Survey scope	Partial	A single-phase detailed terrestrial vertebrate fauna survey was undertaken. The relevant EPA guidance (2020) recommends two complementary survey phases for detailed surveys.
Access	Partial	Access across the Survey Area was largely limited to areas accessible by vehicle; time constraints due to daily trap checks meant that walking was not always practicable. A localised thunderstorm on 18/03/2022 flooded tracks that were required to access the southernmost portion of the Survey Area (L45 –617), therefore it was not possible to install a trap site in this portion of the Survey Area.
Adequacy of survey intensity	Partial	The Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2020) recommends two trap sites per habitat type. Trap site selection was based on a review of available literature and aerial imagery undertaken prior to the field survey. While two trap sites were intended to be installed in each habitat type, additional fauna habitats were identified during the field survey. There was not enough time to install two trap sites in every habitat type. Survey effort for trap sites is provided in Section 3.9.
Timing, weather, season	Yes	The recommended primary survey periods for the Eremaean Climatic Region as per the Technical Guidance - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2020) are: • Reptiles – September to April • Mammals – no preferred time • Amphibians and birds – immediately after rain events.

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
		Additionally, targeted Northern Quoll surveys should be undertaken between April and September (inclusive) (Department of the Environment, 2016). The field survey was undertaken in March 2022, which is within the recommended timing for reptiles and mammals. No major rainfall events occurred prior to the survey. Rainfall data from Indee Weather Station indicates that rainfall in the three months prior to the survey was well below the long-term average, which is likely to have resulted in low fauna activity within the Survey Area and therefore may have impacted the outcomes of the survey. A localised rainfall event occurred during the survey which may have increased fauna activity, particularly of amphibians and birds. Temperatures were high throughout the field survey, which may have reduced fauna activity during the daytime.
Life forms sampled	No	The Survey Area was traversed by vehicle and on foot and representative sites of all fauna habitat was sampled. All fauna species encountered within the Survey Area were recorded. All vertebrate fauna taxa recorded during the survey were able to be identified with a level of confidence. No specimens were collected.
Disturbances (fire, flood etc.)	No	Areas of disturbance associated with cattle grazing and trampling, cleared tracks and drill pads, infrastructure, weeds, fire scars, and railway tracks were present within the Survey Area. Flooded tracks contributed to access problems; it was not possible to install a trap site in L45-617.
Problems with data and analysis	No	Species accumulation curves are useful in demonstrating survey adequacy at survey sites, but do not necessarily reflect survey adequacy across the entire Survey Area. This is due to the sampling approach, which consisted of clustered sampling locations, and the broad, highly variable landscape within the Survey Area. However, given the availability of existing data and information, and the purpose of the report which is to identify fauna values to inform the EIA process rather than to provide an exhaustive inventory of fauna taxa within the Survey Area, this is not considered a major limitation on the survey. Targeted survey effort for significant fauna was concentrated in preferred habitats for significant fauna, as opposed to consistent survey effort throughout the Survey Area. This may introduce a bias towards recording significant taxa in preferred habitat only and underrepresent the use of non – preferred habitat, however this is not considered a limitation on the survey outcomes.

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
Completeness	Partial	As stated above, two trap sites were not installed in each habitat type as recommended by the Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2020). Two additional fauna habitats that were not identified from aerial imagery prior to the survey were identified in the field. Therefore, due to time and access constraints two fauna habitats had two trap sites installed, three fauna habitats had one trap site installed and one fauna habitat had no trap sites installed. Fauna habitats in which two trap sites were installed, Plain (stony/gibber) and Drainage Line/River/Creek (major), made up 75.43% and 1.82% of the Survey Area, respectively. Fauna habitats in which one trap site was installed, Plain (sand), Granite Outcrop, and Drainage Line/River/Creek (minor), made up 17.37%, 2.92% and 0.25% of the Survey Area, respectively. The fauna habitat in which no trap sites were installed, Hills/Ranges/Plateaux, made up 1.41% of the Survey Area. To account for the lack of trap sites, NS-TS05 and NS-TS06 were installed in fauna habitat adjacent to areas of Hills/Ranges/Plateaux and NS-BAT01 was installed in this habitat.

4.2 Desktop Assessment

The desktop assessment identified 334 terrestrial vertebrate fauna taxa recorded within the vicinity of the Survey Area, of which 46 are significant. The inventory of fauna taxa identified during the desktop assessment is presented in Appendix B and summarised below:

- 157 birds, of which 19 are significant
- 49 mammals, of which 12 are significant
- 118 reptiles, of which four are significant
- 10 amphibians, none of which are significant.

Key findings of the literature review are summarized below in Table 16. Database search results are presented in Figure 6 and Appendix C.

Table 16: Literature review summary

Report	Project Area	Survey Timing	Survey Type	Significant Fauna Recorded	Fauna Habitats
Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage a Rail Corridor (Biota Environmental Sciences, 2004)	5 km west of the Survey Area	March 2004	Basic fauna survey	• Crest-tailed Mulgara (*Dasycercus cristicauda*) (has since been revised to Brush –tailed Mulgara (*Dasycercus blythi*)) • Peregrine Falcon (*Falco peregrinus*) • Australian Bustard (*Ardeotis australis*) (conservation status has since been downgraded) • Short-tailed Mouse (*Leggadina lakedownensis*).	Five fauna habitats were identified: • Fortescue Marshes • Linear sand dunes • Cracking clay • Granite rockpiles • Major drainage systems • Mangroves.

Report	Project Area	Survey Timing	Survey Type	Significant Fauna Recorded	Fauna Habitats
North Star Project Level 2 Terrestrial Vertebrate Fauna Assessment (ecologia Environment, 2012)	Overlaps the Survey Area	October 2011	Detailed terrestrial vertebrate fauna assessment	• Northern Quoll (*Dasyurus hallucatus*) • Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) • Ghost Bat (*Macroderma gigas*) • Long-tailed Dunnart (*Sminthopsis longicaudata*) • Western Pebble-mound Mouse (*Pseudomys chapmani*) • Fork-tailed Swift (*Apus pacificus*) • Grey Falcon (*Falco hypoleucos*) • Australian Bustard (*Ardeotis australis*) • Bush Stone-curlew (*Burhinus grallarius*) (conservation status has since been downgraded) • Rainbow Bee Eater (*Merops ornatus*) • Pilbara Olive Python (*Liasis olivaceus barroni*).	Seven fauna habitats were identified: • Rocky spinifex hills • Rocky plains with spinifex • Rocky ridges/breakaway/gorges • Sandy plains with spinifex and scattered granites • Acacia shrubland on hard soil • Creek lines • Granite outcrops.
Pilbara Ghost Bat Review (Biologic and Bat Call WA, 2014)	Overlaps the Survey Area	May 2014	Targeted Ghost Bat survey	• Ghost Bat (*Macroderma gigas*).	One fauna habitat was identified: • Cave formation.
Pilbara Leaf-nosed Bat Research Plan: 12-month monitoring Report (GHD, 2022)	Overlaps Survey Area	January/March 2022	Pilbara Leaf-nosed Bat monitoring	• Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantia* Pilbara form).	One fauna habitat was identified: • Cave system.

Report	Project Area	Survey Timing	Survey Type	Significant Fauna Recorded	Fauna Habitats
Proposed Gas Pipeline Targeted Threatened Fauna Survey (Outback Ecology, 2013)	Overlaps the Survey Area	June 2013	Targeted threatened fauna survey	• Northern Quoll (*Dasyurus hallucatus*) • Bush Stone-curlew (*Burhinus grallarius*) (conservation status has since been downgraded).	Three fauna habitats were identified: • Plain (sand) • Plain (stony) • Plain (Boulders) • Woodland • Drainage line (major) • Drainage line (minor) • Breakaway • Hills.
Reconnaissance Flora and Vegetation Survey and Fauna Survey for The Croydon Gold Project (Phoenix Environmental Sciences, 2021)	65 km west of the Survey Area	September 2020	Reconnaissance survey for flora and basic terrestrial fauna	• Northern Quoll (*Dasyurus hallucatus*) • Pilbara Olive Python (*Liasis olivaceus barroni*) • Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*).	Two fauna habitats were identified: • *Triodia* Grassland • Creekline open woodland.

Report	Project Area	Survey Timing	Survey Type	Significant Fauna Recorded	Fauna Habitats
Targeted Fauna Assessment of The Rail Duplication (Bamford Consulting Ecologists, 2010)	5 km west of the Survey Area	November 2010	Targeted vertebrate fauna assessment	• Bilby (*Macrotis lagotis*) • Western Pebble-mound Mouse (*Pseudomys chapmani*) • Brush-tailed Mulgara (*Dasycercus blythi*) • Australian Bustard (*Ardeotis australis*) • Rainbow Bee-eater (*Merops ornatus*).	Six fauna habitats were identified: • Granite outcrops • Spinifex grasslands • Low trees • Clayey plains • Acacia • Open riparian.
Warrawoona Gold Project Targeted Vertebrate Fauna Survey (Biologic, 2018)	100 km east of the Survey Area	July 2018	Basic vertebrate fauna survey	• Northern Quoll (*Dasyurus hallucatus*).	Seven fauna habitats were identified: • Rocky Breakaway • Claypan • Stony Plain • Hillcrest/Hillslope • Rounded Hills • Major Drainage Line • Minor Drainage Line.
Wodgina Gas Pipeline Targeted Fauna Survey (360 Environmental Pty Ltd, 2018)	7 km west of the Survey Area	June 2018	Targeted fauna survey	• Bilby (*Macrotis lagotis*) • Brush-tailed Mulgara (*Dasycercus blythi*) • Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantia* Pilbara form).	Two fauna habitats were identified: • Grassland (foot slopes) • Grassland (flat plain) • Low woodland / shrubland • Low lying habitat • Major drainage.

Report	Project Area	Survey Timing	Survey Type	Significant Fauna Recorded	Fauna Habitats
Wodgina Project Level 1 Fauna Survey, Targeted Conservation Significant Fauna Survey and Desktop Assessment (Stantec Australia Pty Ltd, 2018)	30 km southwest of the Survey Area	July 2018	Basic fauna survey	• Northern Quoll (*Dasyurus hallucatus*) • Ghost Bat (*Macroderma gigas*) • Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantia* Pilbara form) • Ghost Bat (*Macroderma gigas*) • Western Pebble-mound Mouse (*Pseudomys chapmani*) • Bilby (*Macrotis lagotis*) • Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) • Brush-tailed Mulgara (*Dasycercus blythi*) • Fork-tailed Swift (*Apus pacificus*) • Long-tailed Dunnart (*Sminthopsis longicaudata*).	Three fauna habitats were identified: • Ironstone ridge top • Rocky ridge and gorge • Rocky foothills • Stony rise • Spinifex stony plain • Shrubland over spinifex • Spinifex sandplain • Drainage line • Low vegetation with ephemeral areas.

4.3 Fauna Habitat

Six broad fauna habitats (excluding cleared areas) were identified and mapped within the Survey Area. Habitat condition varied throughout the Survey Area, with disturbances including recent and historical clearing for infrastructure, cattle tracks, and scats, and weeds. The Survey Area had evidence of recent burning (estimated to be within a year) in a number of areas, which are summarized in Table 17.

A description, extent within the Survey Area, and a representative photo is provided for each fauna habitat in Table 18. Small discrepancies in fauna habitat extents (i.e., not adding up to the exact area extent of the Survey Area) are due to rounding. Fauna habitat mapping is displayed in Figure 9 and site sheets for each habitat assessment are shown in Appendix D.

Table 17: Summary of Burn Extent

Polygon	Burn summary
L45 –615	Unburnt
L45 –616	Heavily burnt
L45 –617	Heavily burnt
L45 –624	Mostly unburnt, small patchy burns
MO –A	Patchy burns on plains
MO –B	Unburnt
NAC –A	Patchy burns on plains
NAC –B	Cleared infrastructure
Zane's Lane	Patchy burns

Table 18: Fauna Habitat Type Descriptions within the Survey Area

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Plain (stony/gibber)	3,588.7 ha, 75.43%	Stony plain, usually with a sparse overstorey of mixed shrubs dominated by *Acacia* spp. over *Triodia* hummock grassland. *Triodia* hummocks found within this habitat type provide an important source of shelter, refuge, and nesting opportunities for small fauna taxa including birds, mammals, and reptiles. The significant Western Pebble-mound Mouse - P4 (DBCA) was recorded within this habitat, however, it is more typically found in stony slopes rather than plains. Bilbies - VU (BC Act); VU (EPBC Act) may also use this habitat.	
Plain (sand)	826.6 ha, 17.37%	*Triodia* hummock grassland on primarily red sand and sandy loam plain with a sparse overstorey of mixed shrubs dominated by *Acacia* spp. and scattered *Corymbia* sp. Abundant *Triodia* hummocks found within this habitat type provide an important source of shelter, refuge, and nesting opportunities for small fauna taxa including birds, mammals, and reptiles. The sandy substrate is suitable for digging and burrowing. This is considered primary habitat for Brush-tailed Mulgara - P4 (DBCA) and Bilby - VU (BC Act); VU (EPBC Act).	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Granite Outcrops	139.3 ha, 2.92%	This habitat consists primarily of small to large granite outcrops over thin soils over periodic shallow bedrock. Vegetation consists of open *Acacia* shrublands over *Triodia* hummock grasslands. Microhabitats within the granite outcrops include small and large crevices, overhangs. Northern Quolls - EN (BC Act); EN (EPBC Act) were recorded in this habitat. The majority of this habitat type had recently been burnt.	
Hills/Ranges/Plateaux	67.3 ha, 1.41%	Rocky ironstone hills and slopes with rocky outcropping and thin soils over shallow bedrock. Vegetation consists of open *Acacia* shrublands over *Triodia* hummock grasslands. Microhabitats include *Triodia* hummocks which provide shelter for a variety of species and rocky outcrops which contain abundant crevices for small fauna species. Small breakaways containing shallow overhangs were occasionally observed. Habitat had been recently burnt in many areas and was heavily impacted by vehicle tracks and drill pads in some areas. This is the preferred habitat of the Western Pebble-mound Mouse - P4 (DBCA).	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Drainage Line/River/Creek (Major)	86.6 ha, 1.82%	Areas of drainage often consisting of multiple braided channels or broad individual channels. Dense overstorey vegetation made up primarily of *Eucalyptus* sp. and *Corymbia* sp., and occasionally *Melaleuca* sp. Ground cover is typically *Triodia* hummock grassland or tussock grassland on substrates ranging from sand to sandy clay, with an assortment of river stones. Often contains permanent or semi-permanent pooling of water, which is critical habitat for the Pilbara Olive Python - VU (BC Act); VU (EPBC Act). Large, hollow-bearing eucalypts were abundant within this habitat. The overstorey vegetation provides valuable nesting and foraging habitat for birds and may be used by significant taxa such as the Grey Falcon - VU (BC Act); VU (EPBC Act) and Peregrine Falcon - OS (DBCA). Northern Quolls - EN (BC Act); EN (EPBC Act) are likely to use this habitat for foraging and dispersal. Key microhabitats include woody debris, leaf litter, peeling bark, and hollow logs.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Drainage Line/River/Creek (minor)	12.13 ha, 0.25%	Areas of drainage consisting of narrow individual channels or, in some cases, lacking surface channelling altogether. Dense overstorey vegetation made up primarily of tall *Acacia* spp., with *Eucalyptus* sp. and *Corymbia* sp. Ground cover is typically *Triodia* hummock grassland or tussock grassland on substrates ranging from sand to sandy clay, with an assortment of river stones. Most minor drainage lines lack permanent or semi-permanent pooling of water. Large, hollow-bearing eucalypts were occasionally observed within this habitat. The overstorey vegetation provides valuable nesting and foraging habitat for birds and may be used by significant taxa such as the Grey Falcon - VU (BC Act); VU (EPBC Act) and Peregrine Falcon - OS (DBCA). Northern Quolls - EN (BC Act); EN (EPBC Act) are likely to use this habitat for foraging and dispersal. Key microhabitats include woody debris, leaf litter, peeling bark, hollow trees and logs, and hummock grasslands which provide refuge, shelter, and foraging opportunities for a wide variety of fauna taxa.	
Cleared	36.5 ha, 0.76%	Areas that have been cleared and do not contain vegetation. These areas generally do not contain suitable habitat of value to fauna taxa.	

4.4 Fauna Assemblage

The terrestrial vertebrate fauna survey recorded a total of 109 fauna species from 44 families, summarized in Table 19. A full list of fauna species recorded during the field survey is provided in Appendix E.

Table 19: Overview of Vertebrate Fauna Species Recorded

Fauna group	Number of species	Number of families
Birds	37	21
Mammals	16	10
Reptiles	53	10
Amphibians	3	2
Total	**109**	**43**

Birds

A total of 37 bird species from 21 families were recorded throughout the Survey Area. The most recorded species was the Zebra Finch (*Taeniopygia guttata*) followed by the Spinifex Pigeon (*Geophaps plumifera*) and the Budgerigar (*Melopsittacus undulatus*). The most diverse avifauna family was Meliphagidae (Honeyeaters) with four species recorded.

Mammals

A total of seven native non-volant (non-flying) mammal species from seven families were recorded within the Survey Area. The most recorded native mammal species were the Western Pebble-mound Mouse (*Pseudomys chapmani*) (P4) and Pilbara Ningaui (*Ningaui timealeyi*). The most speciose mammalian family was Muridae with four species.

Four introduced mammal species were recorded in the Survey Area, European Cattle (**Bos primigenius taurus*), Dog/Dingo (**Canis familiaris*), Horse (**Equus ferus caballus*), and Cat (**Felis catus*).

A total of five volant mammal species (bats) from three families were recorded within the Survey Area. A fourth family was recorded, Emballonuridae, however *Taphozous* spp. was not able to be identified to species level and has therefore been omitted from the fauna inventory. The most diverse bat family was Vespertilionidae (common or simple nosed bats) with three species recorded.

Reptiles

A total of 53 reptile species from 10 families were recorded throughout the Survey Area. The most diverse reptile families were Scincidae (18 taxa) and Varanidae (eight taxa).

Amphibians

Three amphibian species were recorded during the field survey which were the Pilbara Toadlet (*Uperoleia saxatilis*), Little Red Treefrog (*Litoria rubella*) and the Sheep Frog (*Cyclorana maini*). All amphibian taxa were recorded after the localised thunderstorm on 18 April 2022.

4.5 Significant Fauna

Four significant species (Threatened or Priority) were recorded within the Survey Area during the field trip:

- Northern Quoll (*Dasyurus hallucatus*) – EN (BC Act); EN (EPBC Act): One individual was observed at night during spotlighting at site NS-TS07 within the Plain (stony/gibber) habitat. Two individuals were detected by camera trap, one at site NS-TS07 and one at site NS-TS06 (Plate 2). It was not possible to confirm whether the individual detected by camera trap at NS-TS07 was the same individual that was observed during spotlighting.
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) – VU (BC Act); VU (EPBC Act): Low numbers of singular calls were recorded at site NS-TS06. The maximum number of calls recorded in one night was five. Calls occurred in small numbers between 20:28 and 04:19 indicating that NS-TS06 was not near a roost.
- Pilbara Grasswren (*Amytornis whitei whitei*) – P4 (listed as *A. striatus striatus*) (DBCA): Calls were heard near site NS-TS01 within the Plain (sand) habitat.
- Western Pebble-mound Mouse (*Pseudomys chapmani*) – P4 (DBCA): Twenty mounds were observed during the field survey. One mound near NS-HAB02 was observed to be currently active, with clear evidence of current use such as a well-maintained entrance hole (Plate 3). Seven mounds had clear undulating and conical structures, indicating they have been recently maintained and had been recently active. The remaining twelve mounds were old and inactive. Most mounds were recorded in Plain (stony/gibber) habitat.

One significant fauna taxon has been recorded within the Survey Area prior to the current survey, the Bilby (*Macrotis lagotis*) – VU (BC Act); VU (EPBC Act), which was recorded within Plain (stony/gibber) habitat during a fauna survey in 2001 (Department of Biodiversity Conservation and Attractions, 2022c).

Four significant taxa, one of which was recorded just outside the survey boundary during the field survey, were identified as having a high likelihood of occurrence within the Survey Area based on previous nearby records and habitats within the Survey Area:

- Ghost Bat (*Macroderma gigas*) – VU (BC Act); VU (EPBC Act)
- Pilbara Olive Python (*Liasis olivaceous barroni*) – VU (BC Act); VU (EPBC Act): One individual was observed next to a pool of water 300 m east the Survey Area near NS-TS03 (Plate 4)
- Brush-tailed Mulgara (*Dasycercus blythi*) – P4 (DBCA)
- Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) – P4 (DBCA).

Seven significant taxa were identified as having a medium likelihood of occurrence within the Survey Area:

- Grey Falcon (*Falco hypoleucos*) – VU (BC Act); VU (EPBC Act)
- Common Sandpiper (*Actitis hypoleucos)* – MI (BC Act); MI, MA (EPBC Act)
- Pacific Swift (Fork-tailed Swift) (*Apus pacificus*) – MI (BC Act); MI, MA (EPBC Act)
- Peregrine Falcon (*Falco peregrinus*) – OS (DBCA)
- Gane's Blind Snake (*Anilios ganei*) – P1 (DBCA)
- Pin-striped Finesnout Ctenotus (*Ctenotus nigrilineatus*) – P1 (DBCA)
- Long-tailed Dunnart (*Sminthopsis longicauda*) – P4 (DBCA)
- Common Brush-tailed Possum (*Trichosurus vulpecula*) – locally significant.

A further five significant taxa were assessed as having a low likelihood of occurrence within the Survey Area. Further detail regarding recorded and potential significant fauna is provided below in Table 20.

Plate 2: Northern Quoll captured on a remote sensing camera at site NS-TS06 within the Survey Area.

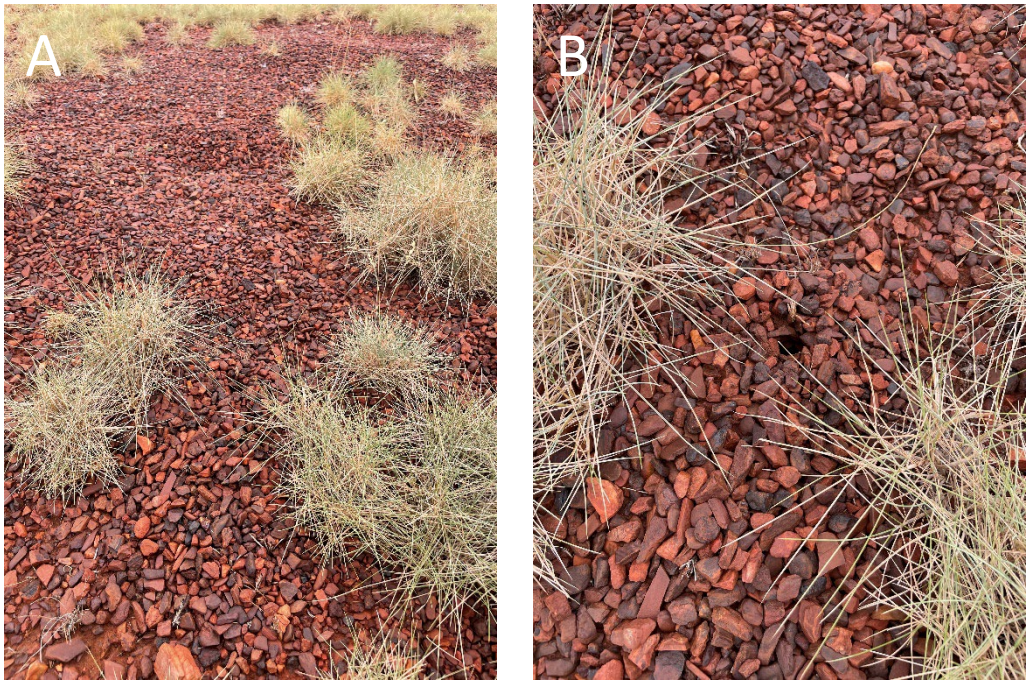


Plate 3: Active Western Pebble-mound Mouse mound (L45-624; -21.1915298, 118.8586515) A) overall mound and B) close up of entrance.

Plate 4: Pilbara Olive Python observed 300 m east of the Survey Area, near site NS-TS03.

Table 20: Likelihood of significant fauna species

Conservation Status: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999. CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
BIRDS						
Apodidae	*Apus pacificus*	Pacific Swift (Fork-tailed Swift)	MI	MI, MA	Medium	The DBCA database shows one record 4.2 km west of the Survey Area in 2014. May use habitats in Survey Area for hunting (low to very high airspace over varied habitat) (Morcombe, 2003).
Charadriidae	*Charadrius veredus*	Oriental Plover	MI	MI, MA	Low	The DBCA database shows one record 13 km north of the Survey Area in 2001. Suitable habitat is present in the Survey Area (grasslands, thinly vegetated plains) (Menkhorst et al., 2017).
Falconidae	*Falco hypoleucos*	Grey Falcon	VU	VU	Medium	The DBCA database shows five records, including one 2.2 km northwest of the Survey Area in 2014 and one 6.2 km southeast of the Survey Area in 2012. May use habitats in Survey Area for hunting (open plains with treed watercourses in arid inland) (Menkhorst et al., 2017).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Falconidae	*Falco peregrinus*	Peregrine Falcon	OS	-	Medium	The DBCA database records show four records, including one 8.1 km west of the Survey Area in 2013 and one 11.5 km west of the Survey Area in 2013. The taxon has the potential to use all habitats in the Survey Area for hunting and may use drainage lines for nesting (often nests in stick nests built by other birds) (Menkhorst et al., 2017).
Maluridae	*Amytornis whitei whitei*	Pilbara Grasswren	P4	-	Recorded	This taxon was recorded during this field survey. It occupies habitats within the Survey Area that contains spinifex, often preferring areas of tall dense spinifex hummocks. Underwent recent taxonomic revision and is listed under is former name of Striated Grasswren (*A. striatus striatus*) by DBCA. DBCA has advised that *A. whitei whitei* should still be treated as Priority 4 pending further updates to the DBCA Threatened and Priority Fauna List (Amy Mutton pers. comm. 2022).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Psittaculidae	*Pezoporus occidentalis*	Night Parrot	CR	EN	Low	No nearby records identified from the database searches or literature, however cannot be ruled out due to cryptic nature and lack of certainty surrounding current distribution. Appears to be associated with spinifex, or among samphire bushes on margins of salt lakes (Department of Parks and Wildlife, 2017). May use spinifex hummocks within Plain (sand) and Plain (stony/gibber) habitat within the Survey Area.
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	MI	MI, MA	Medium	The DBCA database shows two records, both 12 km north of the Survey Area in 2017. Suitable habitat may be present in the Survey Area after rainfall (interior wetlands, river pools) (Johnstone and Storr, 1998; Morcombe, 2003).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
MAMMALS						
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN	EN	Recorded	Two individuals were detected (at sites NS-TS06 and NS-TS07) during the field survey. The DBCA database shows 731 records, including one inside the Survey Area in 2012 and four less than 5 km outside the Survey Area in 2011 and 2013. Suitable habitats present in Survey Area include Granite Outcrops and Drainage Line/River/Creek habitats, as the taxon is known to use rocky escarpments and outcrops, eucalypt forest, woodland and drainage lines (Van Dyck and Strahan, 2008).
Dasyuridae	*Sminthopsis longicaudata*	Long-tailed Dunnart	P4	-	Medium	The DBCA database shows three records, including one 10.7 km west of the Survey Area in 2012, one 16 km east of the Survey Area in 2011 and one 18 km east of the Survey Area in 2011. Suitable habitat is present in Survey Area In the form of rugged, rocky areas in the arid zone: scree slopes, boulder and stony plateaus and adjacent stony plains with shrubs over spinifex hummock grasslands (Van Dyck and Strahan, 2008).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara, Ampurta	P4	-	High	The DBCA database shows 69 records, including two less than 1 km east of the Survey Area in 2001 and a further 15 records less than 5 km outside the Survey Area. Suitable habitat is present in Survey Area. Mulgara predominantly occur in hummock grasslands (e.g. *Triodia* spp.) and shrublands on sandy soils.
Macropodidae	*Lagorchestes conspicillatus leichardti*	Spectacled Hare-wallaby	P4	-	High	The DBCA database shows 153 records within 40 km of the Survey Area, including seven records the past 10 years. Suitable habitats in the form of hummock grasslands occur within the Survey Area (Menkhorst and Knight, 2010).
Megadermatidae	*Macroderma gigas*	Ghost Bat	VU	VU	High	The DBCA database shows 104 records, including six records within 5 km east of the Survey Area in 2011 and 2014. Suitable foraging habitat present in Survey Area but no caves likely to support permanent roosts were observed. All habitats within the Survey Area constitute foraging habitat for the taxon (Bat Call WA, 2021).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	P4	-	Recorded	Twenty Western Pebble-mound Mouse mounds were recorded within the Survey Area, all of which were recorded in Plain (stony/gibber) habitat. One mound located near NS-HAB02 was observed to be currently active. The DBCA dataset shows 112 records, including one inside the Survey Area in 1997, one 0.8 km east of the Survey Area in 2012 and a further 15 within 5 km of the Survey Area in 2010, 2012 and 2014. Suitable habitat is present in Survey Area in the Plain (stony/gibber) and Hills/Ranges/Plateaux habitats, as the taxon typically occupies gentler slopes of rocky ranges covered by stony mulch and hard spinifex, often with a sparse overstorey of Eucalyptus and scattered shrubs. (Van Dyck and Strahan, 2008).
Muridae	*Leggadina lakedownensis*	Short-tailed Mouse	P4	-	Medium	The DBCA dataset shows one record 14.7 km south of the Survey Area in 2001. Literature shows one record approximately 60 km south of the Survey Area (Biota Environmental Services, 2004). Suitable habitat present in Survey Area include Plain (sand) and Plain (stony/gibber), as the taxa is known to use spinifex grasslands (Van Dyck and Strahan, 2008).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	-	-	Medium	Locally significant due to taxonomic uncertainty regarding the subspecies status of *T. vulpecula* in the Pilbara and the isolation of the Pilbara population from other *T. vulpecula* populations. No nearby records identified from the database searches or literature; however, an individual was detected on a camera trap 65 km south of the Survey Area during an unpublished 360 Environmental survey in 2022. The taxon is known to use woodlands to forests with sufficient tree hollows and ground refuges, and therefore may use drainage lines within the Survey Area.
Rhinonycteridae	*Rhinonicteris aurantia* Pilbara form	Pilbara Leaf-nosed Bat	VU	-	Recorded	Low numbers of calls were recorded at site NS-TS06. Nightly recorded calls varied between 0 and 5 calls (Bob Bullen pers. comm. 2022). The DBCA dataset shows 363 records, including one less than 40 meters south of the Survey Area in 2017 and 11 less than 300 meters east of the Survey Area in 2016. Suitable habitat is present in Survey Area. Most easily observed foraging over pools; also, spinifex hummock grasslands (Bat Call WA, 2021b).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	VU	Previously Recorded	The DBCA dataset shows 369 records, including three records inside the Survey Area within Plain (stony/gibber) in 2001 and a further 136 records less than 3 km south of the Survey Area in 2012 and 2013. Suitable habitats present in Survey Area include the Plain (sand) and Plain (stony/gibber), both of which contain spinifex hummock grassland and *Acacia* shrubland (Van Dyck and Strahan, 2008).
REPTILES						
Pythonidae	*Liasis olivaceus barroni*	Pilbara Olive Python	VU	VU	High	One individual was observed during spotlighting at a permanent water source 300 m outside the Survey Area to the northeast of L45-624. The DBCA dataset shows 56 records, including one record 6 km east of the Survey Area in 2011. This taxon is likely to use drainage line habitats within the Survey Area; it typically occupies permanent and semi-permanent watercourses, particularly those associated with rocky outcrops (Pearson, 1993, 2003).
Scincidae	*Ctenotus nigrilineatus*	Pin-striped Finesnout Ctenotus	P1	-	Medium	The DBCA dataset shows one record 14.7 km west of the Survey Area in 2001. Suitable habitat present in Survey Area (Plain (sand) with hummock grasslands adjacent to Granite Outcrops and watercourses) (Bamford Consulting, 2017).

Family	Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Justification
			State	Federal		
Typhlopidae	*Anilios ganei*	Gane's Blind Snake	P1	-	Medium	The DBCA dataset shows three records, including two 11 km north of the Survey Area in 2005 and one 17 km west of the Survey Area in 2018. Suitable habitat is present in the Survey Area within drainage lines that intersect Hills/Ranges/Plateaux habitat (taxon is associated with moist gorges and gullies) (Wilson and Swan, 2017).

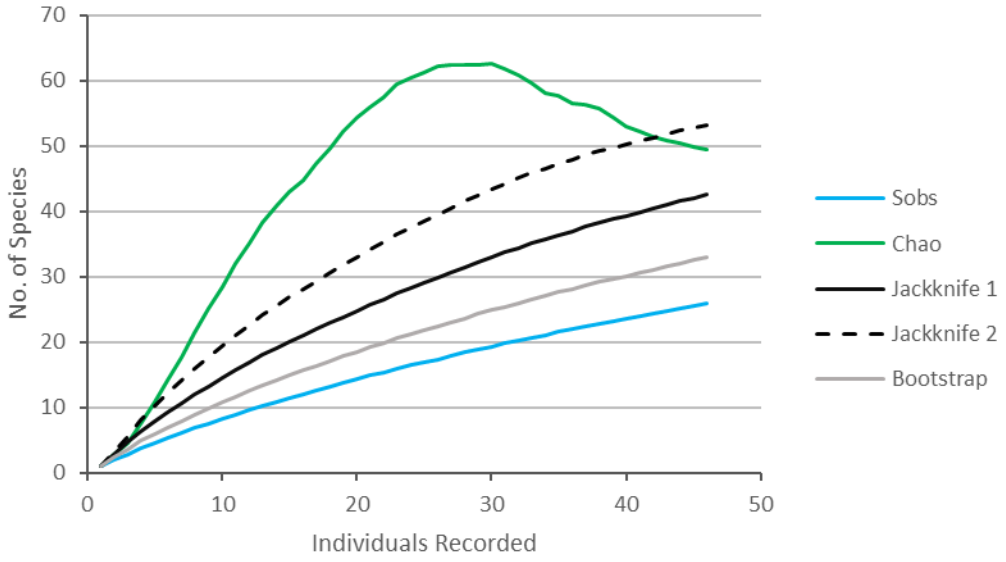
4.6 Survey Adequacy

4.6.1 Birds

The species accumulation curve for birds in the Survey Area was based on birds observed at each trap site. The Sobs curve doesn't appear to be levelling off (Graph 2), suggesting that additional survey effort at trap sites would yield additional taxa. All richness estimates were above the Sobs curve indicating that the observed species richness was lower than what was predicted by the analysis.

Estimated species richness ranged from 42 to 53 with an observed species richness of 26 taxa. Richness indicated that the surveys were approximately 49.0% (Jackknife 1) to 78.8% (Bootstrap) adequate in recording the full complement of bird taxa present during the field survey at sampling locations within the Survey Area.

Bird records were relatively low during the survey, likely due to high daytime temperatures. This impacted the number of records used to estimate richness, as did the fact that only records located at trap sites (i.e. duplicated surveys) were used. Forty-six of the 101 total bird records were used, and 17 of the 26 taxa were singletons and six were doubletons. The Chao estimate sees a spike in the richness estimate due to the small sample size and large number of singletons within the data.



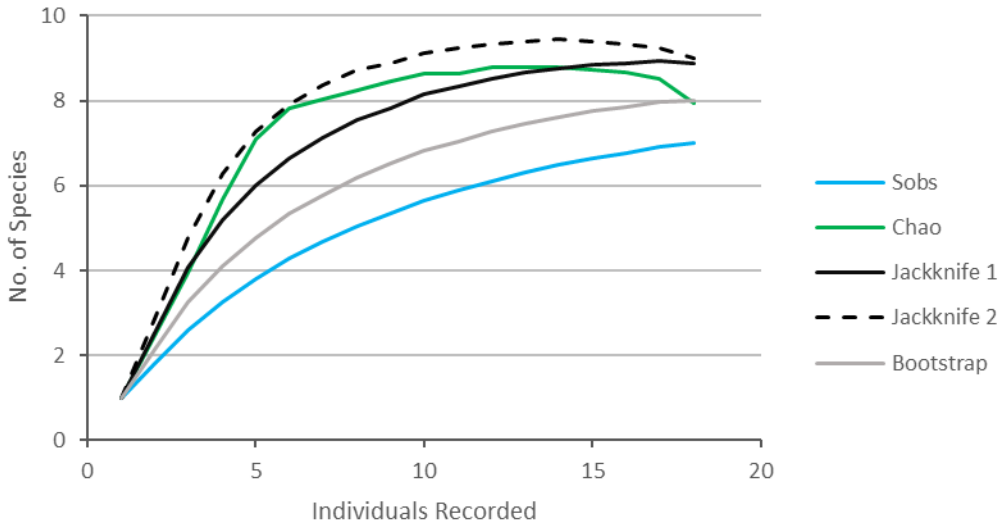
Graph 2: Avian Species Accumulation Curve

4.6.2 Mammals

The species accumulation curve for mammals in the Survey Area was based on captures and observations at each trap site. The Sobs curve appears to be approaching an asymptote (Graph 3), suggesting that further survey effort at trap sites would have yielded relatively few additional taxa. All richness estimates were above the Sobs curve indicating that the observed species richness was lower than what was predicted by the analysis.

Estimated species richness for the Survey Area ranged from 7 to 9 taxa, with an observed value of 7 taxa. Richness estimators indicated that the surveys were approximately 77.8% (Jackknife 2) to 88.1% (Chao) adequate in recording the full complement of mammal taxa present during the field survey at sampling locations within the Survey Area.

Mammal records were relatively low during the survey, likely due to high daytime temperatures. This impacted the number of records used to estimate richness, as did the fact that only records located at trap sites (i.e. duplicated surveys) were used. Eighteen of the 107 total mammal records were used.



Graph 3: Mammalian Species Accumulation Curve

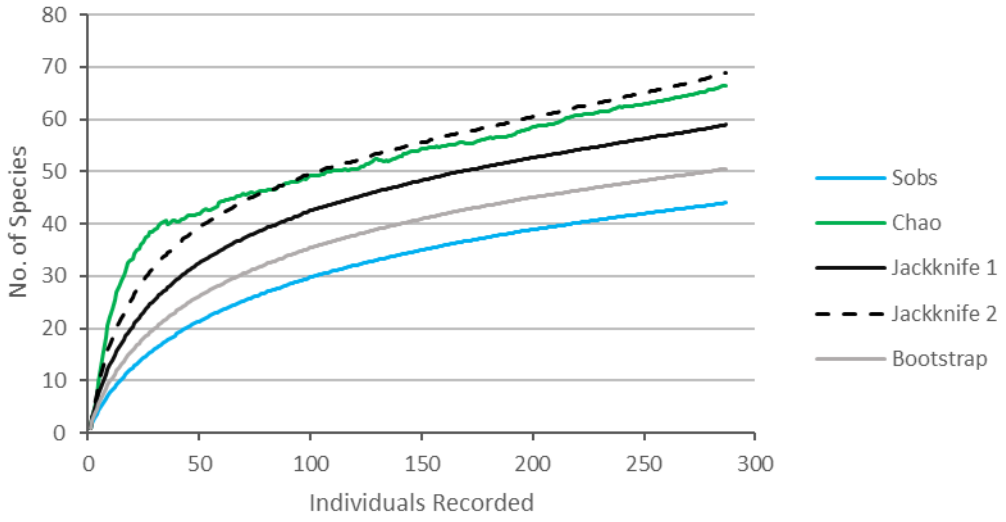
4.6.3 Reptiles

The species accumulation curve for reptiles in the Survey Area was based on captures and observations at each trap site. The Sobs curve doesn't appear to be levelling off (Graph 4), suggesting that additional survey effort would yield additional taxa. All richness estimates were above the Sobs curve indicating that the observed species richness was lower than what was predicted by the analysis.

All richness curves including the observed number of species were greater than the Sobs curve, indicating that the observed species richness was higher than what was predicted by the

analysis. Estimated species richness for the Survey Area ranged from 50 to 69, with an observed value of 44 taxa. Richness estimators indicated that the surveys were approximately 63.9% (Jackknife 2) to 87.1% (Bootstrap) adequate in recording the full complement of reptile taxa present during the field survey at sampling locations within the Survey Area.

Unique reptile records were relatively high during the survey, 286 of the 339 total reptile records were used, and 15 of the 44 taxa were singletons and five were doubletons.



Graph 4: Reptilian Species Accumulation Curve

4.6.4 Amphibians

There were a limited number of amphibians collected during the survey (three species, 12 records), therefore a species accumulation curve has not been produced for these taxa.

5 Discussion

5.1 Fauna Habitat

The six broad fauna habitats identified within the Survey Area are typical of the Pilbara bioregion and consistent with habitats identified by previous studies in the region (Bamford Consulting Ecologists, 2010; Biologic Environmental Survey, 2011, 2013, 2014; Eco Logical Australia, 2012; ENV Australia Pty Ltd, 2012; Ecoscape (Australia) Pty Ltd, 2013, 2016; Rio Tinto, 2016; Phoenix Environmental Sciences, 2017; Biota Environmental Sciences, 2018). All identified fauna habitats extend outside the Survey Area to form larger ecosystems.

The Drainage Line/River/Creek (major and minor) habitat is of high value to a number of significant fauna taxa due to an abundance of microhabitats such as hollow-bearing trees, logs, leaf litter, and overall higher vegetation densities than most other habitats within the Survey Area. Significant bird species such as Peregrine Falcons and Grey Falcons may find nesting opportunities in the *Eucalyptus* trees. Both the major and minor Drainage Line/River/Creek habitats are valuable for their role as an ecological linkage through the landscape as they provide continuous corridors of vegetation cover that allow fauna to traverse large distances. Significant taxa such as the Northern Quoll and Pilbara Olive Python are likely to use these habitats for dispersal. These habitats may also occasionally inundate, providing a temporary water source for fauna species.

The Granite Outcrops contain numerous crevices and cavities that provide excellent refuge for a wide variety of small fauna taxa, particularly reptiles. However, the majority of this habitat type has recently been burnt, therefore its value may be limited until further regeneration of vegetation occurs. Minimal vegetation and leaf litter remains, and food and shelter availability may be impacted. Rocky habitats such as the Granite Outcrops in the Survey Area are also critical to the survival of the Northern Quoll (Department of the Environment, 2016). Aerial imagery indicates that Granite Outcrops are abundant in the region surrounding the Survey Area.

The Plain (stony/gibber) and Plain (sand) habitats contain fewer microhabitat opportunities than the other habitats discussed above and are widespread in the surrounding regional landscape. The Plain (stony/gibber) habitat was confirmed to be used by the Western Pebble-mound Mouse, and Plain (sand) habitat may be used by taxa that inhabit burrows, including the Bilby and Brush-tailed Mulgara. The Hills/Ranges/Plateaux habitat was provided similar habitat value to the Plain (stony/gibber) habitat as it was not found to contain caves or overhangs.

5.2 Fauna Assemblage

The inventory of fauna taxa recorded during the field survey is typical for the Pilbara bioregion and consistent with the database search results and studies conducted in the region (Bamford Consulting Ecologists, 2010; Biologic Environmental Survey, 2011, 2013, 2014; Eco Logical Australia, 2012; ENV Australia Pty Ltd, 2012; Ecoscape (Australia) Pty Ltd, 2013, 2016; Rio Tinto, 2016; Phoenix Environmental Sciences, 2017; Biota Environmental Sciences, 2018).

The fauna assemblages recorded within the Survey Area were not highly variable or diverse and were reflective of the habitats within the Survey Area. The fauna assemblages within the Drainage Line/River/Creek habitats (both major and minor) were found to have high species diversity, particularly given their relatively small extents within the Survey Area compared to other fauna habitats. The Plains habitats (stony/gibber and sand) also contained high species diversity; however, these habitats received the greatest amount of survey effort due to their large extents within the Survey Area. In contrast, the species diversity within the Granite Outcrop and Hills/Ranges/Plateaux habitats were comparatively low. This may be due to their limited extents within the Survey Area, however, may also be influenced by evidence of recent fires in large portions of these habitat types.

5.3 Significant Fauna

5.3.1 Recorded

Northern Quoll (*Dasyurus hallucatus*) – EN (BC Act); EN (EPBC Act)

The Northern Quoll is a medium-sized carnivorous, nocturnal marsupial that favours rocky areas, taking refuge in rock crevices and using gullies and drainage lines. They have a relatively large home-range size of up to 150 ha for males and 35 ha for females, and males can move up to 1.85 km between den sites in one night (Oakwood, 2000; Department of the Environment, 2016). Northern Quolls reproduce once a year, averaging seven young per litter (Department of the Environment, 2016). They have a short life span, with the females typically only surviving one or two years while the males die off annually following intense physical exertion during the breeding season (Department of the Environment, 2016). The species can be locally common, but its former range has retracted considerably (van Dyck and Strahan, 2008).

The species is known to occur within the region, including a historical record from within the Survey Area, and four records less than 5 kms from the survey Area (Department of Biodiversity Conservation and Attractions, 2022a). One individual was recorded during spotlight searches. Spot analysis confirmed two individuals were detected by camera traps, at 0.95 individuals per 100 camera trap nights. It was not possible to confirm whether the individual detected by camera trap at NS-TS07 was the same individual that was observed during spotlighting. By comparison, monitoring undertaken by DBCA recorded an average of 3.61 individuals per 100 trap nights across 15 locations throughout the Pilbara region (Dunlop, Birch and Moore, 2018).

Preferred denning habitats, such as rocky areas with suitable cavities, were observed within the Granite Outcrops within the Survey Area. Drainage Line/River/Creek (major and minor) and Hills/Ranges/Plateaux habitats constitute important dispersal habitat for the taxon. These habitats are considered to represent habitat critical for the survival of the taxon by the EPBC Referral Guidelines (Department of the Environment, 2016). All other habitats may be used for dispersal or foraging; however, the Northern Quoll does not depend on these habitats.

Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) – VU (BC Act); VU (EPBC Act)

The Pilbara Leaf-nosed Bat was originally considered to be the same species as the Orange Leaf-nosed Bat, which occurs in the Kimberley, Northern Territory, and northwest Queensland. It is now considered to be a separate form based on morphology and genetic data, however, formal reclassification has not yet been undertaken (Cramer *et al.*, 2016). The taxon is restricted to areas with suitable day roosts, which are typically deep caves that retain humidity or disused underground mines (Cramer *et al.*, 2016).

Pilbara Leaf-nosed Bats were recorded on six days of the seven-day recording period at site NS-TS06. Call numbers were low, with nightly counts ranging between 0 and 5. Call times suggest the site is not in close proximity to a roost site calls (Bob Bullen pers. comm. 2022). No roosting habitat was recorded within the Survey Area.

Pilbara Grasswren (*Amytornis whitei whitei*) – P4 (listed as *A. striatus striatus*) (DBCA)

The Pilbara Grasswren is restricted to spinifex associations on rocky slopes and ridges, preferring areas with tall, dense spinifex hummocks (Menkhorst *et al.*, 2017). Its distribution across the ironstone Chichester, Hamersley, Ophthalmia and Parry Ranges is bisected by the Fortescue River, with an outlying population south of the Ashburton River in the Barlee Range. It is widely but patchily distributed and generally uncommon (Johnstone and Storr, 2004; Johnstone, Burbidge and Darnell, 2013). The taxon underwent recent taxonomic revision and is listed under is former name of Striated Grasswren (*A. striatus striatus*) by DBCA. DBCA has advised that *A. whitei whitei* should still be treated as Priority 4 pending further updates to the DBCA Threatened and Priority Fauna List (Amy Mutton pers. comm. 2022).

The taxon was recorded near site NS-TS01. It is likely to use all habitat types within the Survey Area, however, will likely favour unburnt areas such as the plains habitats found within the L45-615, L45-624, and MO-B tenements within the Survey Area, where tall, dense spinifex is present.

Western Pebble-mound Mouse (*Pseudomys chapmani*) – P4 (DBCA)

The Western Pebble-mound Mouse is endemic to the Pilbara, where it builds pebble mounds from small stones. Pebble mounds are restricted to suitable-class stones and are usually found on gentle slopes and spurs that are often vegetated by hard spinifex (Ford & Johnson, 2007; Van Dyck & Strahan, 2008). Active mounds are characterized by the conical shape of the mound with clear, distinct entrance holes (Anstee, 1996). Pebble mounds constructed by the Western Pebble-mound Mouse are found throughout the Pilbara, however studies have shown that not all mounds in an area are occupied by a Pebble-mound Mouse at any one time (Anstee, 1996).

Twenty Western Pebble-mound Mouse mounds were recorded during the current survey, including one active mound, within the Plain (stony/gibber) habitat. The taxon is also likely to use Hills/Ranges/Plateaux habitats within the Survey Area. These habitats occur more widely in the region outside the Survey Area.

5.3.2 Previously Recorded

Bilby, Dalgyte (*Macrotis lagotis*) – VU (BC Act); VU (EPBC Act)

The Bilby is a solitary and nocturnal bandicoot, characterised by its distinct rabbit like ears and long face with a pointed snout (Department of Biodiversity Conservation and Attractions, 2017a). The range of the Bilby has declined northwards, with wild subpopulations now restricted predominantly to the Tanami Desert in the Northern Territory and the Gibson, Little Sandy and Great Sandy Deserts, and Pilbara in Western Australia (Southgate, 1990; Department of Biodiversity Conservation and Attractions, 2017a). The Bilby occupies a wide range of vegetation types, including open tussock grassland on upland hills, Mulga woodland/shrubland growing on ridges and rises and spinifex growing on sandplains and dunes, drainage systems, salt lake systems and other alluvial areas (Pavey, 2006; Department of Biodiversity Conservation and Attractions, 2017a).

While the taxon was not detected during the field surveys, three records of the species have occurred within the Survey Area in tenement L45-617 in 2001 (Department of Biodiversity Conservation and Attractions, 2022a). One of these records was identified with certainty and consisted of three burrows (Biota Environmental Sciences, 2002, Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland – Vertebrate Fauna survey). The other two records within the Survey Area are moderately certain and unknown (Department of Biodiversity Conservation and Attractions, 2022a). An additional 136 records have been recorded within 3 km south of the Survey Area, all of which were recorded between 2011 and 2014. Of the 136 records, 133 are certain (Department of Biodiversity Conservation and Attractions, 2022a).

A variety of habitats within the Survey Area are suitable for the species, primarily the Plain (sand) habitat that is suitable for burrowing. This species may also occur in Plain (stony/gibber) habitat, however, this is likely to be less favourable due to difficult digging substrate. This species is unlikely to be reliant on habitat within the Survey Area as there is considerable suitable habitat adjacent to the Survey Area and across the wider region.

5.3.3 High Likelihood of Occurring within the Survey Area

Ghost Bat (*Macroderma gigas*) – VU (BC Act); VU (EPBC Act)

The Ghost Bat is patchily distributed in small colonies in northern Australia, including the Pilbara and Kimberley in WA, the Top End in the Northern Territory, and the northeast of Queensland. The species requires undisturbed roost caves or mineshafts, usually complex systems with several openings (van Dyck and Strahan, 2008). The species eats large insects, geckoes, frogs, small birds, and mammals (including other bats). The kills are made on the ground or in the air and then taken to a feeding perch, which is usually a rocky overhang or small cave (van Dyck and Strahan, 2008).

The Ghost Bat was not detected during the field survey, however the species can be difficult to detect as it does not call when hunting (Bat Call WA, 2015), therefore, ARUs must be placed directly near roost sites to detect the species. The taxon may use all habitats for foraging, however no preferred roosting habitat was recorded within the Survey Area.

Pilbara Olive Python (*Liasis olivaceous barroni*) – VU (BC Act); VU (EPBC Act)

The Pilbara Olive Python is a large python that occurs within the Pilbara, typically in escarpments and gorges where water is present. It generally shelters under rock piles, or under spinifex and often basks on top of rocks (Pearson, 1993, 2003). It is threatened due to its relatively small distribution, low population densities and may be affected by habitat disturbances such as grazing and fire. This species is known to frequent water bodies where it ambushes prey (Pearson, 1993). and is extremely difficult to detect. During a systematic survey of a large series of quadrats in the Pilbara, the species was only recorded in one quadrat (Doughty *et al.*, 2011). The Pilbara Olive Python is known to have large home ranges, particularly for an ambush predator, with Pearson (2003) recording an individual with a home range of roughly 450 ha.

One individual was observed next to a permanent pool of water along a major drainage approximately 300 m outside of the Survey Area. This individual's home range is likely to encompass portions of the Survey Area adjacent to this permanent pool, particularly in Drainage Line/River/Creek (major and minor) habitats.

Brush-tailed Mulgara (*Dasycercus blythi*) – P4 (DBCA)

The population of the Brush-tailed Mulgara fluctuates in response to seasonal conditions (Woinarski, Burbidge and Harrison, 2012). Its distribution is bound broadly by the Tanami Desert in the north, the Simpson Desert in the east, the Great Victoria Desert in the south and the Carnarvon, Murchison and Pilbara regions in the west (Woinarski, Burbidge and Harrison, 2012). It is associated with hummock spinifex grasslands, but also uses other vegetation types (often sandplains, grasslands, and woodlands) when mixed with or adjacent to hummock grasslands. It is mainly nocturnal and shelters during the day in burrow systems. The diet of the Brush-tailed Mulgara comprises a broad range of invertebrates and small vertebrates (Woinarski, Burbidge and Harrison, 2012).

Two records of the species occur less than 1 km east of the Survey Area in 2001 and an additional 15 records within 5 km of the Survey Area (Department of Biodiversity Conservation and Attractions, 2022a). The species is most likely to use Plain (sand) dominated by hummock grasslands and shrublands on sandy soils within the Survey Area.

Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) – P4 (DBCA)

The Spectacled Hare-wallaby primarily inhabits tussock and hummock grasslands, where it spends the daytime in tunnels below hummocks (Menkhorst and Knight, 2010). In the Pilbara region, the taxon has declined dramatically. This may be due to a combination of fox predation and the loss of large spinifex hummocks due to frequent burning (van Dyck and Strahan, 2008).

The DBCA database results returned 153 records within 40 km of the Survey Area, of which seven records occurred within the past 10 years. The taxon is likely to use unburnt areas within the Survey Area such as L45-615, L45-624, and MO-B, where tall, dense spinifex is present (primarily in Plain (stony/gibber) and Plain (sand) habitats).

5.3.4 Medium Likelihood of occurring within the Survey Area

Grey Falcon (*Falco hypoleucos*) – VU (BC Act); VU (EPBC Act)

The Grey Falcon is an elusive and endemic bird of the arid interior (Schoenjahn, Pavey and Walter, 2019). It is distributed sparsely over Australia's arid and semi-arid zones and is absent from Cape York Peninsula, south of the Great Dividing Range in Victoria, and south of 26°S in WA (Johnstone and Storr, 1998; BirdLife International, 2016). The Grey Falcon is restricted largely to areas with high average temperatures and average annual rainfall of less than 500 mm. It favours lightly timbered and untimbered lowland plains that are crossed by tree lined watercourses, but frequents other habitats, including grassland and sand dune habitats (Johnstone and Storr, 1998; BirdLife International, 2016).

The Grey Falcon typically uses refurbished nests built by other raptors or corvids in eucalypt-lined drainage lines and waterholes (Pizzey and Knight, 2013) and may therefore use the Drainage Line/River/Creek habitat for breeding, and all habitats for hunting. The regional population is unlikely to be dependent on habitats within the Survey Area as these habitats occur more widely in the region outside the Survey Area. The Grey Falcon was not recorded during the current survey, however, was previously recorded 2 km northwest of the Survey Area in 2014 and 6 km southeast of the Survey Area in 2012 (Department of Biodiversity Conservation and Attractions, 2022a).

Common Sandpiper (*Tringa hypoleucos*) – MI (BC Act); MI, MA (EPBC Act)

The Common Sandpiper typically feeds on molluscs, crustaceans, and a variety of insects. It is a migratory species that uses varied coastal and interior wetlands including narrow muddy edges of billabongs, river pools, mangroves among rocks and snags, reefs, or rocky beaches (Morcombe, 2003). It migrates from mid-northern latitudes of Asia (Menkhorst *et al.*, 2017)and likely breeds in the Russian far east (Pizzey and Knight, 2001).

This taxon has the potential to occasionally use permanent and temporary wetlands that occur within the Survey Area that have fringing vegetation, such as pools along the Shaw River, but is unlikely to rely on these habitats.

Pacific Swift (Fork-tailed Swift) (*Apus pacificus*) – MI (BC Act); MI, MA (EPBC Act)

The Pacific Swift (also called Fork-tailed Swift) is a non-breeding visitor to all states and territories of Australia and is found throughout WA with a preference for coastal areas (Higgins, 1999). The Pacific Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. The Pacific Swift occupies a large airspace range over varied habitats, ranging from rainforests to semi-deserts (Morcombe, 2003).

The taxon may use airspace above the Survey Area it will not be reliant on terrestrial habitats within the Survey Area.

Peregrine Falcon (*Falco peregrinus*) – OS (DBCA)

The Peregrine Falcon is an uncommon but wide-ranging bird across Australia (Barrett *et al.*, 2003). It occurs mainly along rivers and ranges as well as wooded watercourses and lakes. It nests primarily on cliffs, granite outcrops and quarries, although is also known to occupy existing raptor and corvid stick nests (Menkhorst *et al.*, 2017). The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as parrots, pigeons, and on the east coast, European Starlings (Olsen and Fuentes, 2008).

The Peregrine Falcon typically nests on cliff ledges or in refurbished nests built by other raptors or corvids (Pizzey and Knight, 2013) and may therefore use the Drainage Line/River/Creek habitats for breeding, and all habitats for hunting. The regional population is unlikely to be dependent on habitats within the Survey Area as these habitats occur more widely in the region outside the Survey Area. The Peregrine Falcon was not recorded during the current survey; however, it has been recorded twice within 12 km of the Survey Area since 2013 (Department of Biodiversity Conservation and Attractions, 2022c).

The taxon has previously been recorded 12 km north of the Survey Area in 2017 (Department of Biodiversity Conservation and Attractions, 2022c). It may use Drainage Line/River/Creek habitat within the Survey Area, particularly after rainfall when such habitats may be prone to inundation.

Gane's Blind Snake (*Anilios ganei*) – P1 (DBCA)

Gane's Blind Snake, like other blind snakes, is a burrowing, worm-like snake that feeds mostly on the larvae and pupae of ants and termites (Cogger, 2018). It is known to occur in areas between Newman and Pannawonica and is possibly associated with moist gorges and gullies (Wilson and Swan, 2017).

No individuals were captured during the survey; however, an individual was recorded approximately 11 km from the Survey Area in 2005 (Department of Biodiversity Conservation and Attractions, 2022a). The taxon is most likely to use Drainage Line/River/Creek (major and minor) habitats and potentially Plain (sand) habitat dominated by hummock grasses, as these habitats are sheltered and likely to retain some soil moisture.

Pin-striped Finesnout Ctenotus (*Ctenotus nigrilineatus*) – P1 (DBCA)

Ctenotus nigrilineatus is a small skink with distinct black-and-cream-coloured dorsolateral stripes extending the length of the entire individual. This species is recorded infrequently; however, they are generally associated with spinifex plains adjacent to granite outcrops and drainage lines (Bamford Consulting Ecologists, 2017).

This species was not recorded during this survey, however, the DBCA database shows one recorded 15 km south of Survey Area in 2001 (Department of Biodiversity Conservation and

Attractions, 2022a). If the species does occur within the Survey Area, it would be most likely to use Plain (sand) habitat dominated by hummock grasslands adjacent to granite outcrops habitat.

Long-tailed Dunnart (*Sminthopsis longicauda*) – P4 (DBCA)

The Long-tailed Dunnart is a nocturnal marsupial that is endemic to Australia, typically found in rocky areas of central Western Australia and central southern Northern Territory (Burbidge, McKenzie and Fuller, 1983; McKenzie, Woinarski and Burbidge, 2016). This species favours rocky scree and plateau areas, generally with little vegetation or spinifex hummock grassland, shrubs, and open woodland Territory (McKenzie, Woinarski and Burbidge, 2016).

Long-Tailed Dunnarts were not recorded during the current survey but are most likely to use the Hills/Ranges/Plateaux and Rocky Escarpments/Ridges/Mesa habitat within the Survey Area. They were recorded 15 km away (Ecoscape (Australia) Pty Ltd, 2017) in 2017 and are likely to be widely distributed throughout the region.

6 Conclusion

- Six fauna habitats were mapped. The Drainage Line/River/Creek (major and minor) habitats are of high value to significant fauna and overall fauna assemblages, largely due to their role as an ecological linkage. The Granite Outcrops contain important refuge and shelter opportunities for fauna; however, the majority of the Granite Outcrops habitat has been recently burnt, therefore its value may be limited until further regeneration of vegetation occurs. All fauna habitats identified within the Survey Area are typical of the Pilbara bioregion and consistent with habitats identified by previous studies in the region, and all identified fauna habitats extend outside the Survey Area to form larger ecosystems.
- The inventory of fauna taxa recorded during the field survey is typical for the Pilbara bioregion and consistent with the database search results and studies conducted in the region.
- Four significant fauna taxa were recorded during the fauna survey:
  - Northern Quoll (*Dasyurus hallucatus*) – EN (BC Act); EN (EPBC Act): Based on camera trapping evidence, it is possible that a low-density population uses habitats within the Survey Area, primarily Drainage Line/River/Creek (major and minor) and Hills/Ranges/Plateaux for dispersal and foraging. Granite Outcrops may be used for denning.
  - Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) – VU (BC Act); VU (EPBC Act): Low numbers of calls were recorded, and no suitable roosting habitat was observed within the Survey Area, therefore it is likely that all habitats within the Survey Area are used by foraging individuals.
  - Pilbara Grasswren (*Amytornis whitei whitei*) – P4 (DBCA): Likely to use all habitat types within the Survey Area, however, will likely favour areas with tall, dense spinifex, which were present in Plain (sand), Plain (stony/gibber), and Drainage Line/River/Creek habitats within tenements L45-615, L45-624, and MO-B.
  - Western Pebble-mound Mouse (Pseudomys chapmani) – P4 (DBCA): Twenty mounds were observed within Plain (stony/gibber) habitat, including one currently active mound, three recently active mounds and 16 old, inactive mounds.
- One significant fauna taxon has been recorded within the Survey Area prior to the current survey, the Bilby (*Macrotis lagotis*) – VU (BC Act); VU (EPBC Act), which was recorded within Plain (stony/gibber) habitat during a fauna survey in 2001. The Bilby may use a variety of habitats within the Survey Area, however, is expected to favour the Plain (sand) habitat because it is suitable for burrowing.
- Four significant fauna taxa were identified as having a high likelihood of occurrence within the Survey Area:

- Ghost Bat (*Macroderma gigas*) – VU (BC Act); VU (EPBC Act): The taxon may use all habitats for foraging; however no roosting habitat was recorded within the Survey Area.
- Pilbara Olive Python (*Liasis olivaceous barroni*) – VU (BC Act); VU (EPBC Act): This taxon was recorded 300 m outside the Survey Area boundary towards the northeast of the Survey Area and the species is most likely to use Drainage Line/River/Creek (major and minor) habitats within the Survey Area.
- Brush-tailed Mulgara (*Dasycercus blythi*) – P4 (DBCA): The species is most likely to use Plain (sand) dominated by hummock grasslands and shrublands on sandy soils within the Survey Area.
- Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) – P4 (DBCA): The taxon is likely to use unburnt areas within the Survey Area where tall, dense spinifex is present. Such areas were present in Plain (sand), Plain (stony/gibber), and Drainage Line/River/Creek habitats within tenements L45-615, L45-624, and MO-B.

- Four introduced mammal species were recorded within the Survey Area, European Cattle (**Bos primigenius taurus*), Dog/Dingo (**Canis familiaris*), Horse (**Equus ferus caballus*), and Cat (**Felis catus*).

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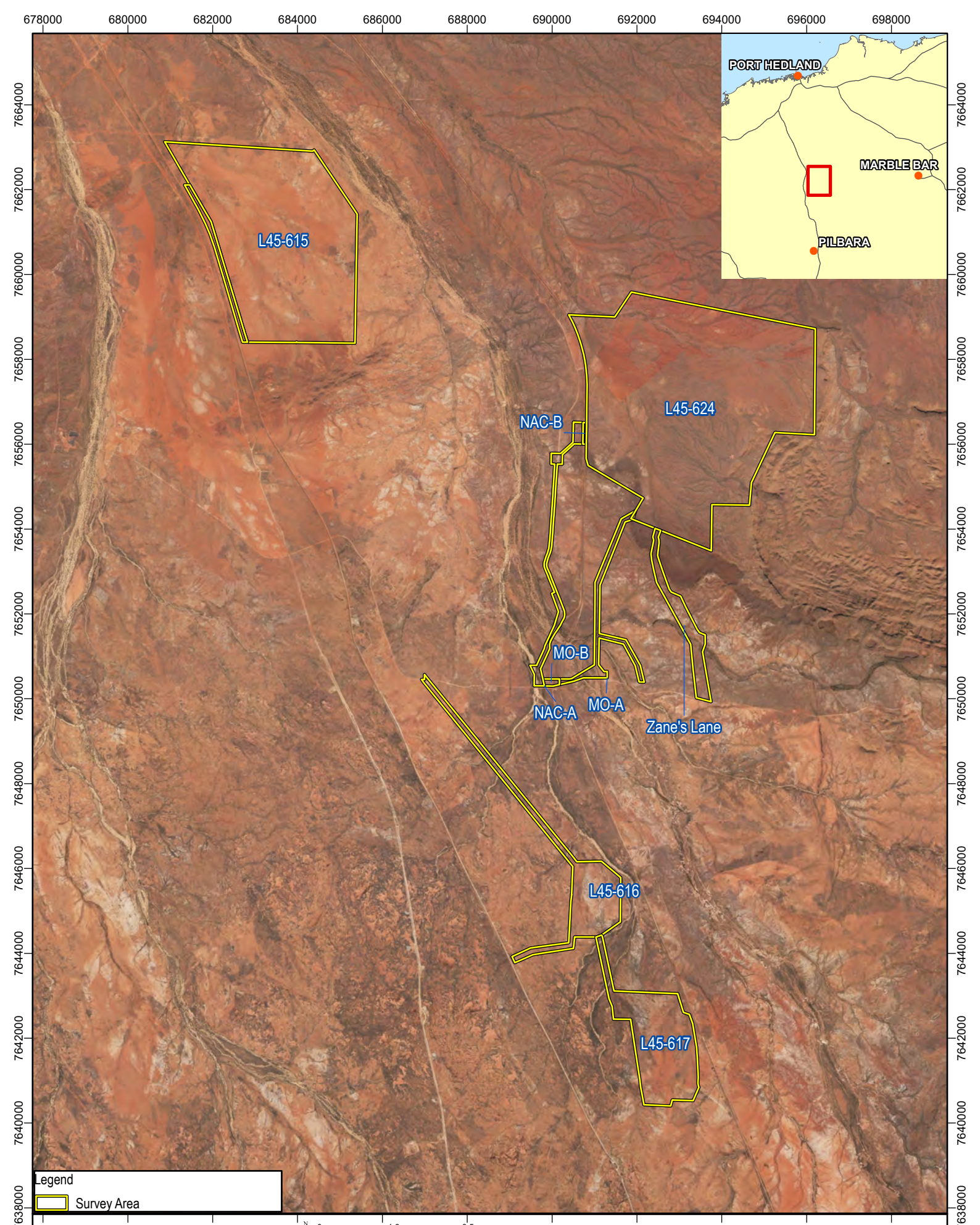
Figures



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Service Layer Credits: Landgate / SLIP

Coordinate System:	GDA 1994 MGA Zone 50
Scale:	1:110,000 at A4
Project Number:	5131
Date Drawn:	08-Mar-2023
Drawn by:	EC
Reviewed by:	EW

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Fortescue Metals Group Ltd

North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Survey Area

FIGURE 1

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx

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Scale:	1:110,000 at A4
Project Number:	5131
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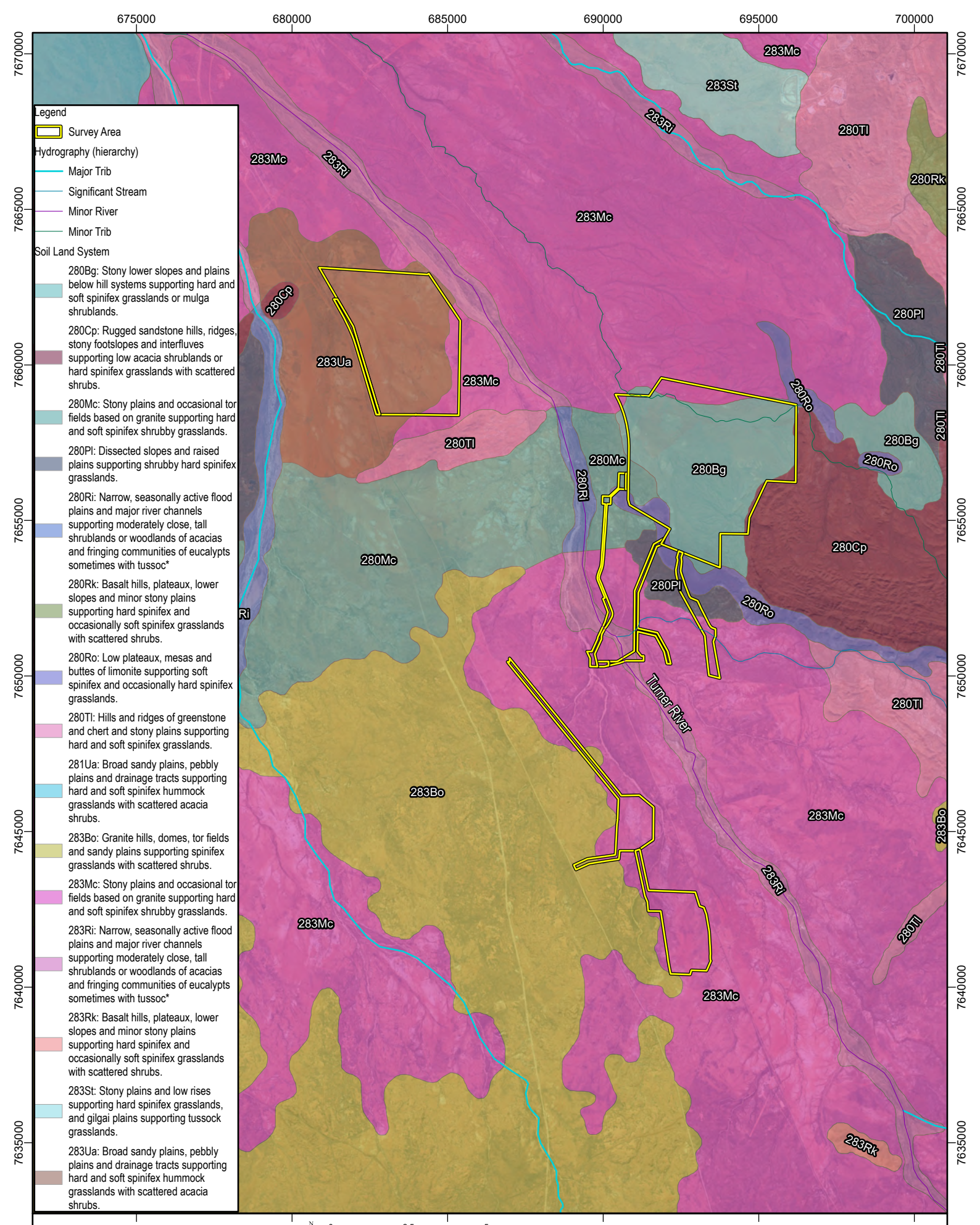
North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

IBRA Subregion

FIGURE 2

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Project Number:	5131
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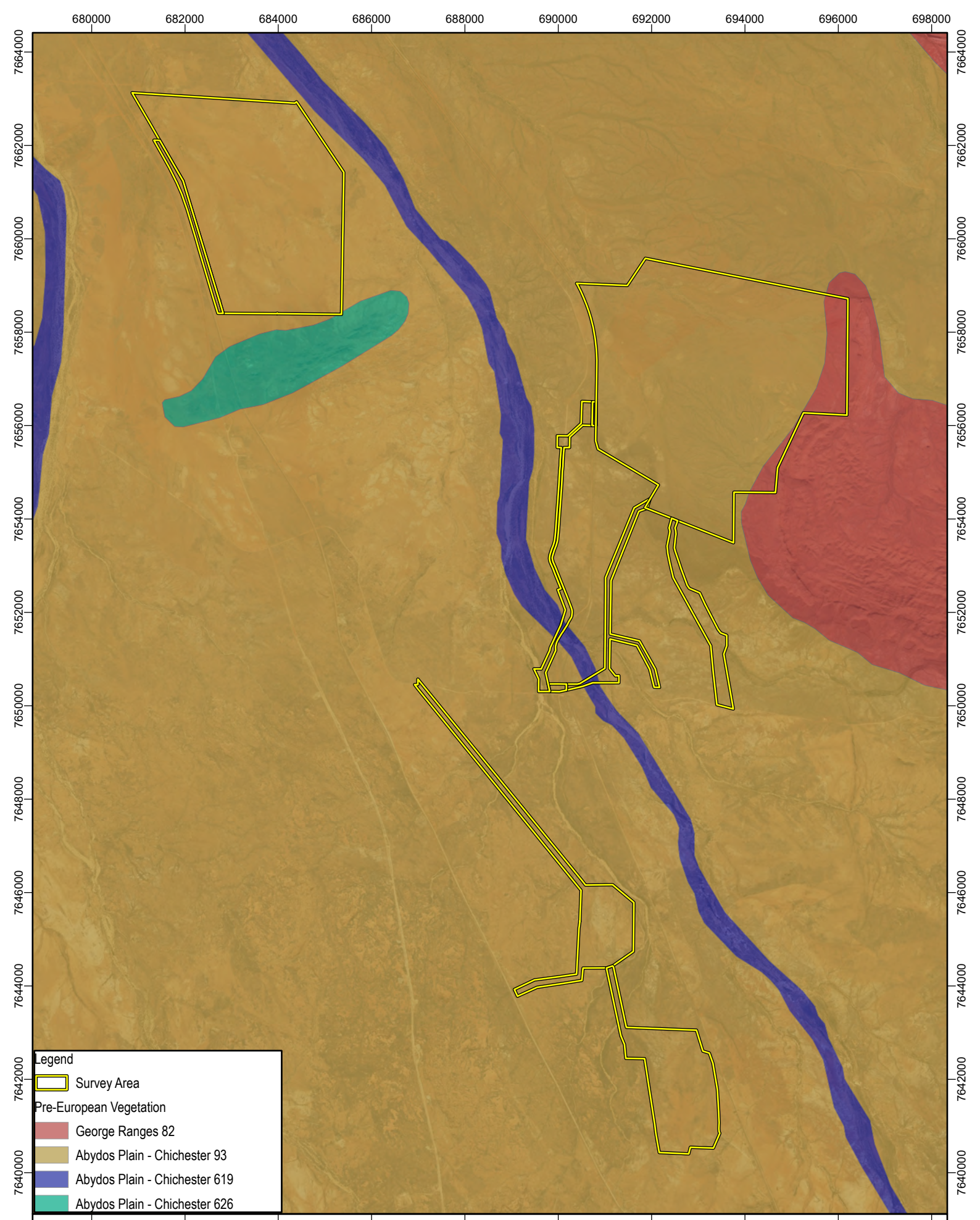
North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Soil Landscapes and Land Systems, and Hydrography

FIGURE 3

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Drawn by:	EC
Reviewed by:	EW

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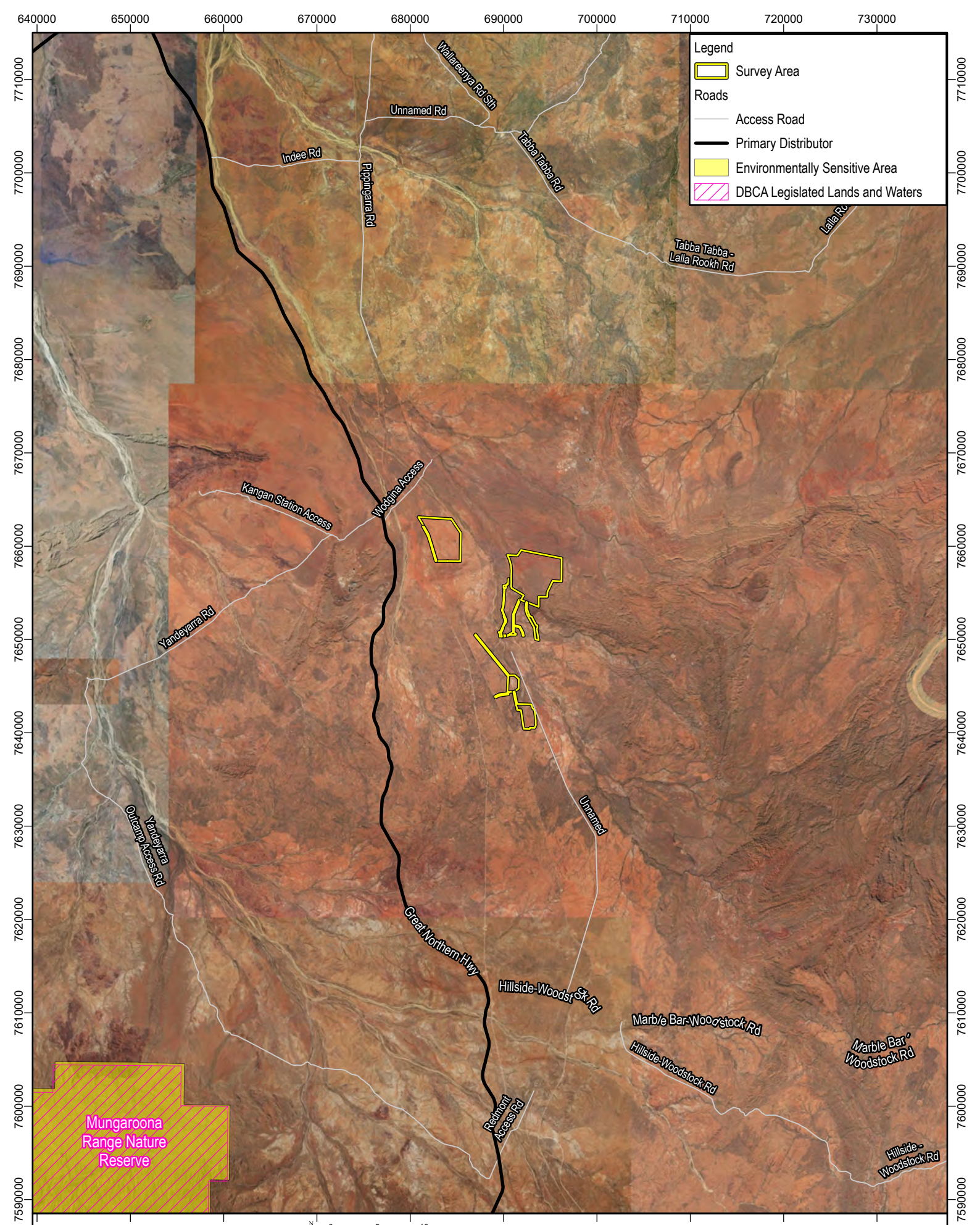
North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Broad Vegetation Types

FIGURE 4

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Reviewed by:	EW

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North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Conservation and Environmentally Sensitive Areas

FIGURE 5

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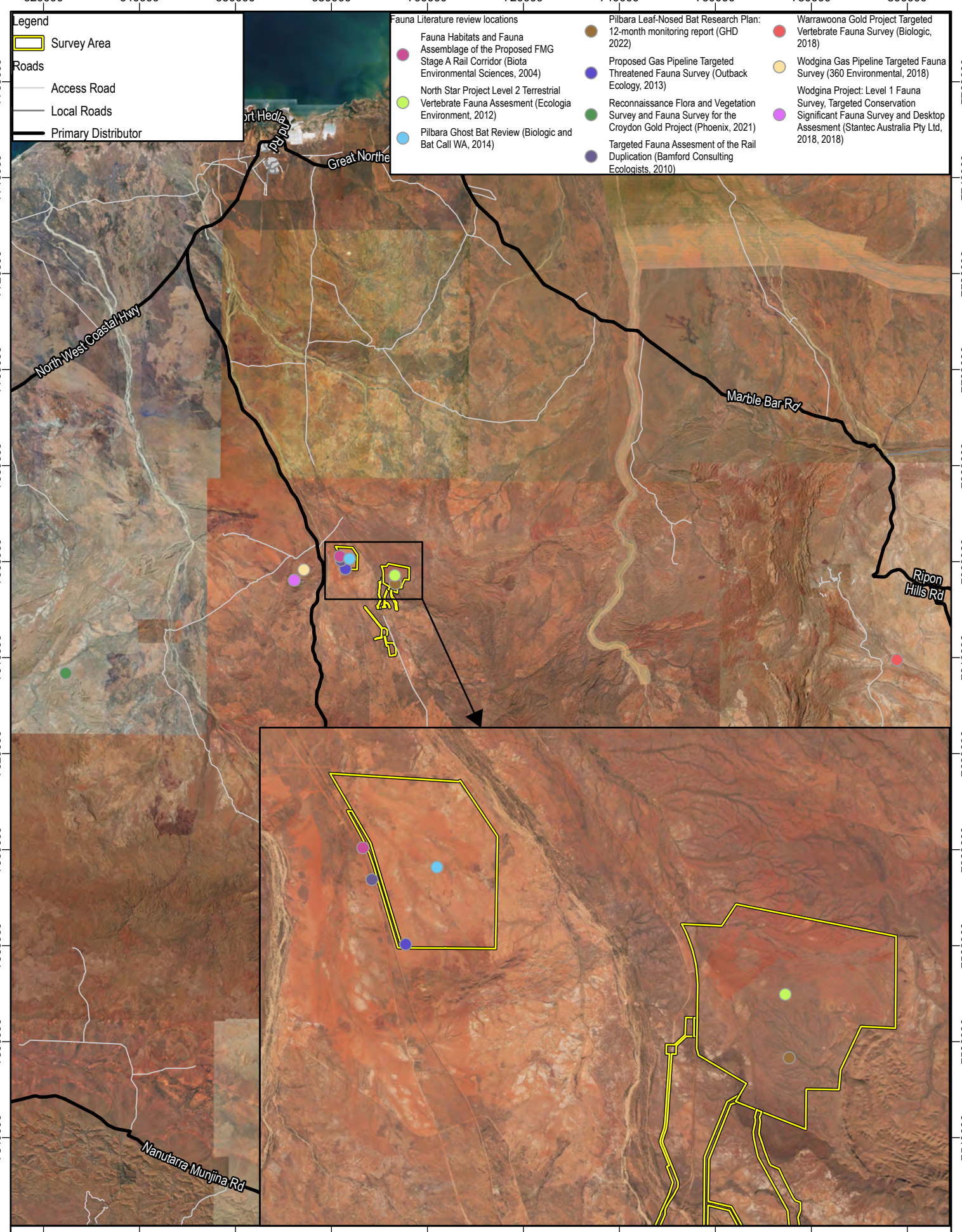

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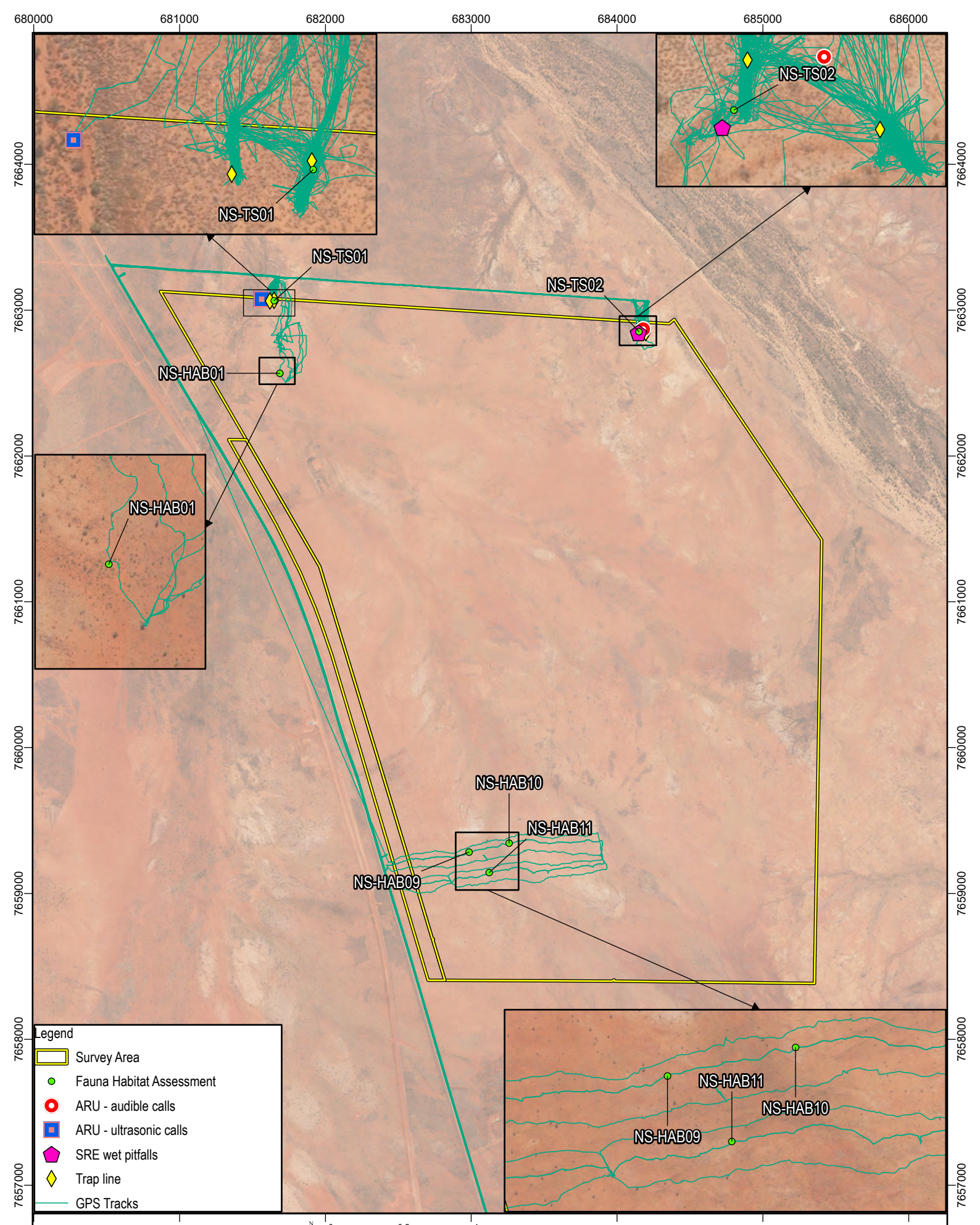
North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Previous Surveys in the Locality

FIGURE 6

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Drawn by:	EC
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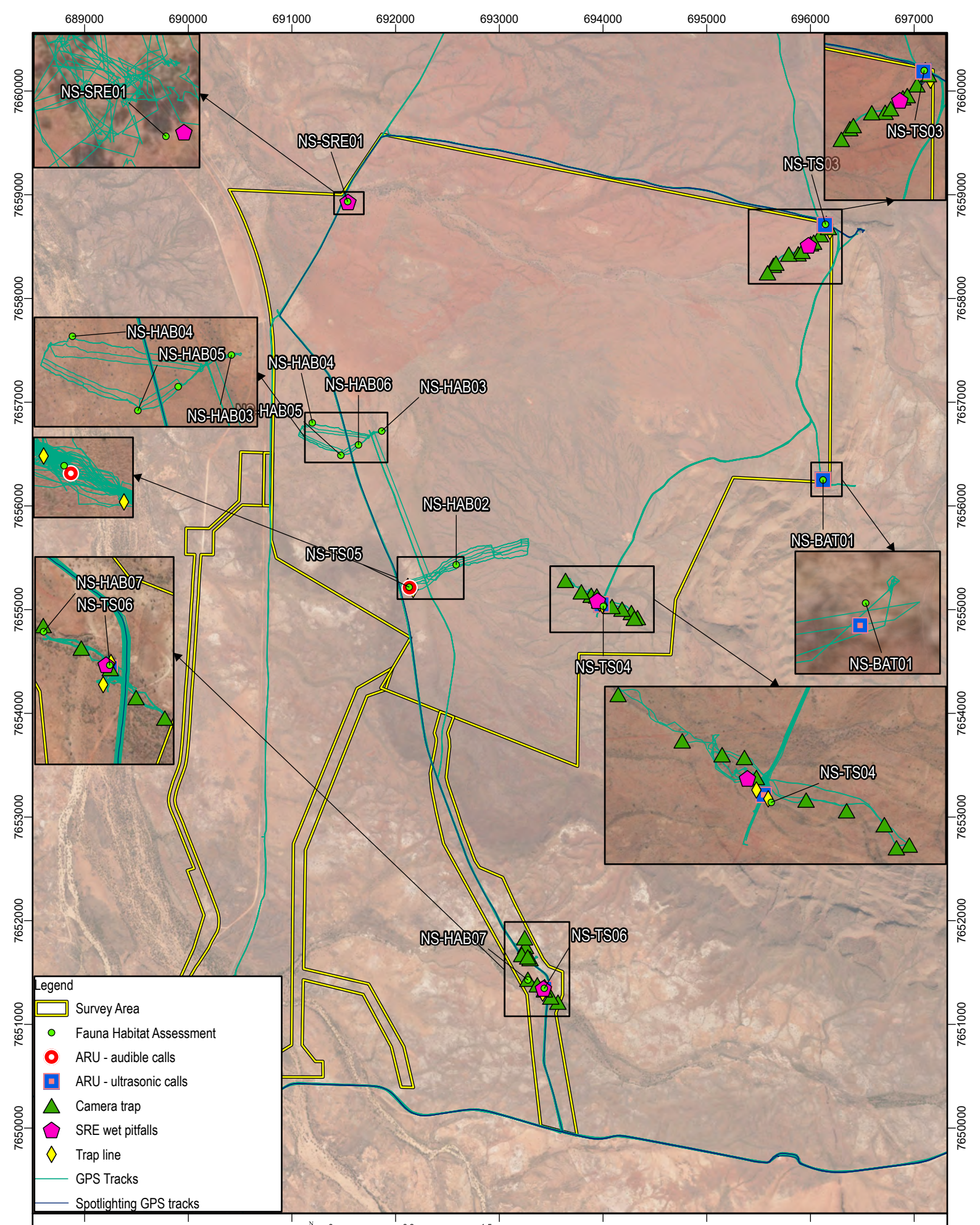
Fortescue Metals Group Ltd

North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Fauna Survey Effort

FIGURE 7 a

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_Fig_7_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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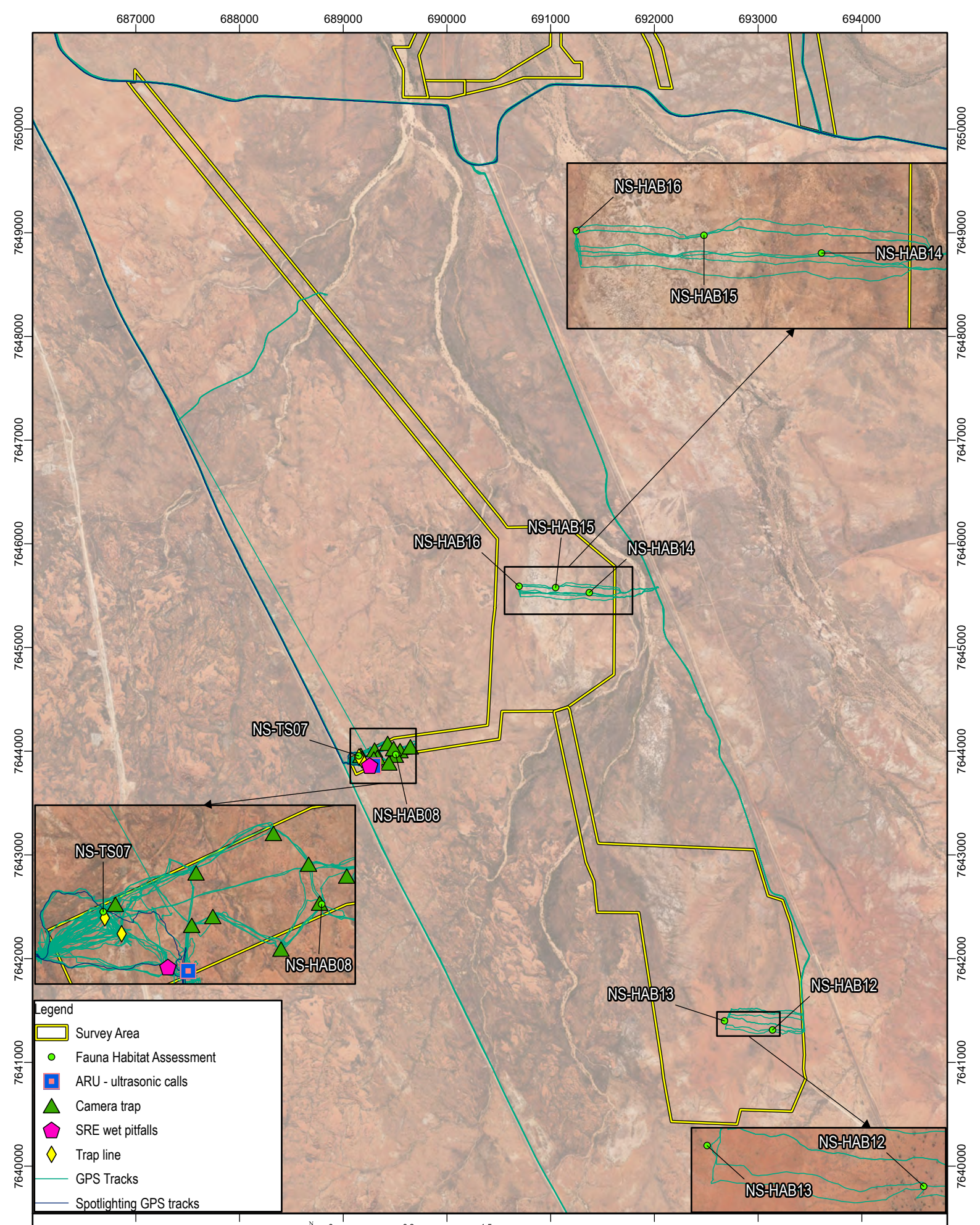
North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Fauna Survey Effort

FIGURE 7 b

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_Fig_7_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Drawn by:	EC
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North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment

Fauna Survey Effort

FIGURE 7 c

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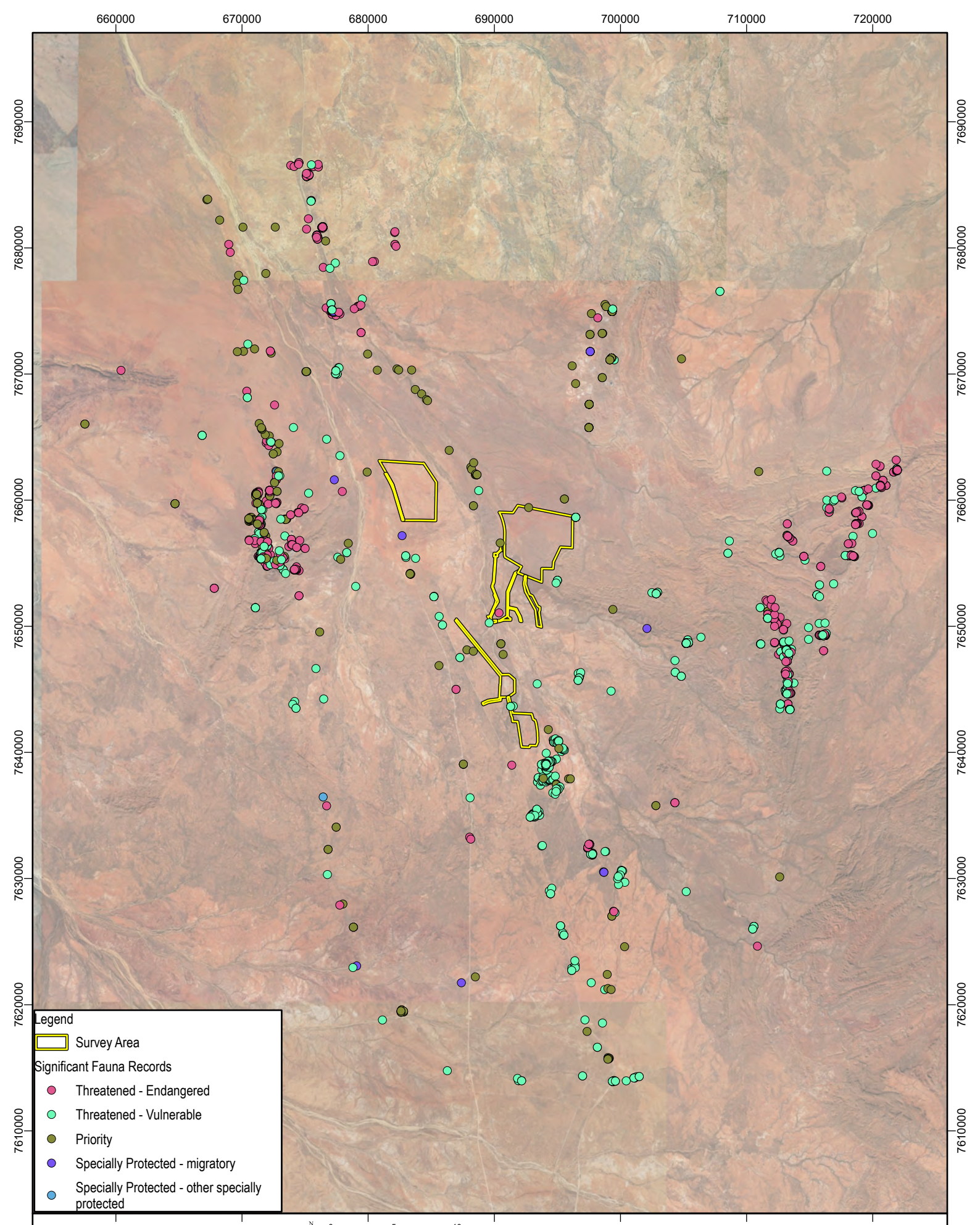

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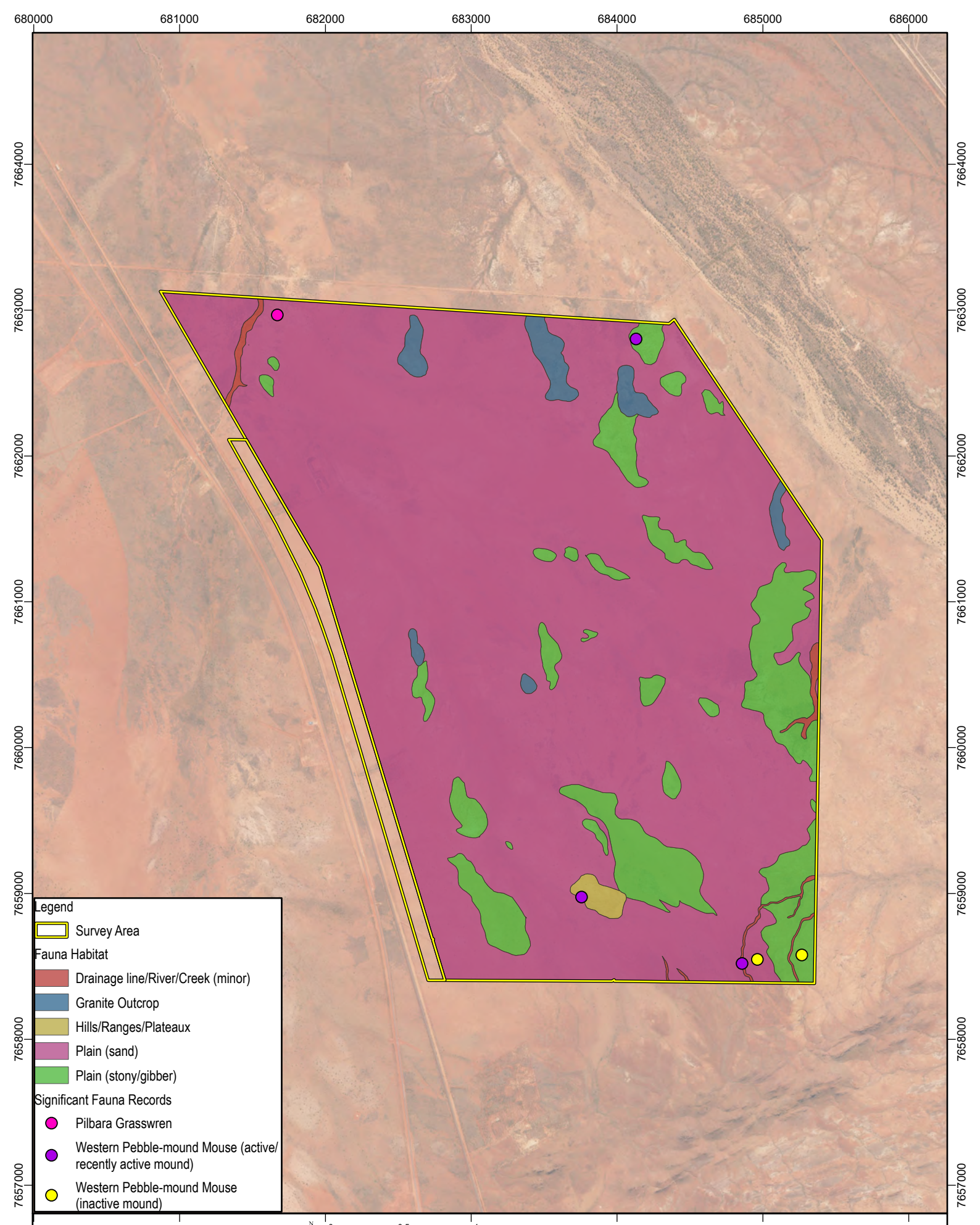
Fortescue Metals Group Ltd
North Star Junction Renewable Energy
Infrastructure Project Vertebrate Fauna Assessment

Threatened and Priority Fauna Locations Identified by DBCA Database Searches

FIGURE 8

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Project Number:	5131
Date Drawn:	07-Mar-2023
Drawn by:	EC
Reviewed by:	EW

Service Layer Credits:
Landgate / SLIP

Fortescue Metals Group Ltd
North Star Junction Renewable Energy
Infrastructure Project Vertebrate Fauna Assessment

Fauna Habitat and Significant Fauna Records

FIGURE 9 a

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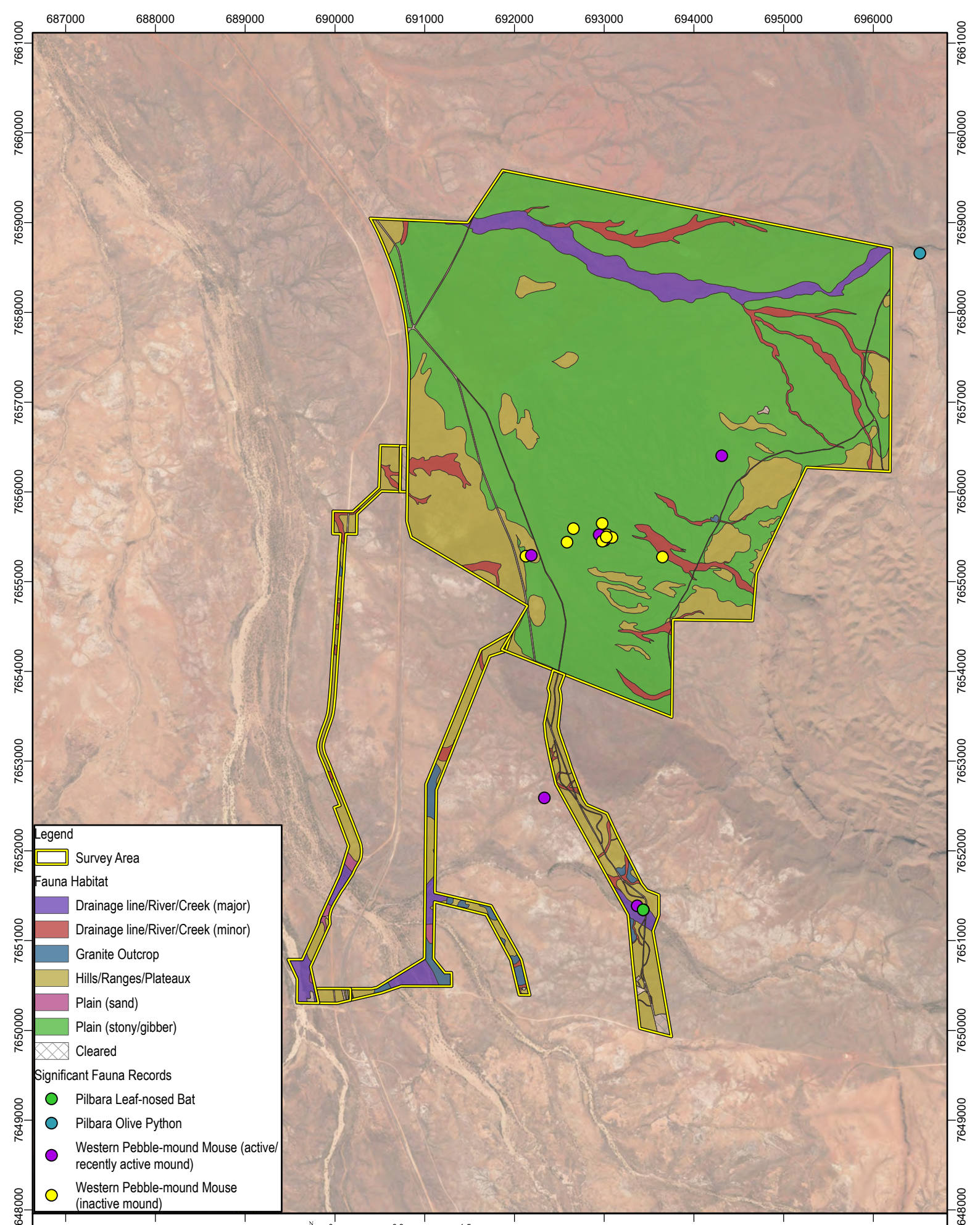

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Drawn by:	EC
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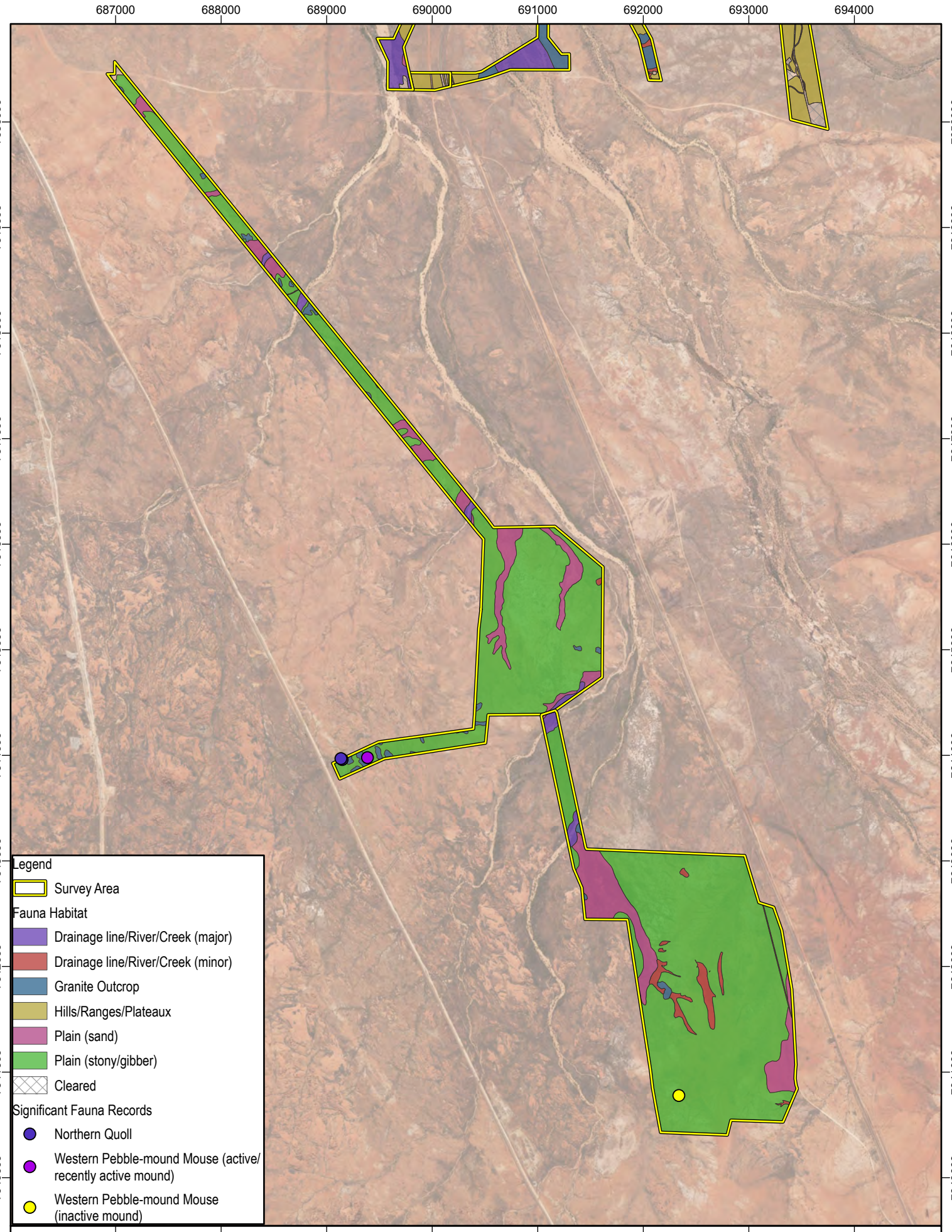
Fortescue Metals Group Ltd
North Star Junction Renewable Energy
Infrastructure Project Vertebrate Fauna Assessment

Fauna Habitat and Significant Fauna Records

FIGURE 9 b

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx



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Date Drawn:	07-Mar-2023
Drawn by:	EC
Reviewed by:	EW

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Fortescue Metals Group Ltd
North Star Junction Renewable Energy
Infrastructure Project Vertebrate Fauna Assessment

Fauna Habitat and Significant Fauna Records

FIGURE 9 c

Path: K:\Projects\1.0 EBS\5131 North Star Flora Fauna SRE Surveys - 360\5131_V02_North_Star_Vetebrate_Fauna_Assesment_Mapping\5131_V02_North_Star_Vertebrate_Fauna_Assessment.aprx

Appendices

Appendix A
Licence and Authorisation

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

FAUNA TAKING (BIOLOGICAL ASSESSMENT) LICENCE

Regulation 27, Biodiversity Conservation Regulations 2018

Licence Number: BA27000606

Licence Holder: Michael Lohr
360 Environmental
PO Box 14
West Perth WA 6872

Date of Issue: 10/03/2022

Date Valid From: 10/03/2022
Date of Expiry: 31/03/2023

LICENSED ACTIVITIES

Subject to the terms and conditions on this licence, the licence holder may –

1. Take and disturb fauna to undertake a comprehensive biological survey to inform environmental impact assessment for future development proposals for Fortescue Metals Group. Survey to be undertaken using a combination of cage traps, Elliott traps, dry pitfall traps, baited remote sensing cameras, ultrasonic bat detectors, acoustic call recorders, funnel traps and wet pit traps. Traps will be set within complete shade throughout the day and will be wrapped in hessian or calico. Active searching will be undertaken within the proposed survey area, focusing on areas more likely to contain short range endemic (SRE) invertebrate fauna. Active searching will consist of sifting of soil and/or leaf litter from suitable habitat areas within each site (Millipedes and land snails); examination of vegetative material below logs and bark (Pseudoscorpions, centipedes, millipedes), and an examination of (if present) areas of rock outcrops and associated rock piles. wet pitfall trap will be of approximately 1L size and have an opening diameter of approximately 80mm. Pitfall traps will be installed flush with the ground. Each trap will have a cover situated approximately 2cm off the ground. A total of approximately 750 ml of mixture will be poured into each trap. Mixture will be comprised of 80% ethanol and 20% propylene glycol, traps will be closed should a high number of vertebrate bycatch be identified.

LOCATIONS

1. North Star Solar site, approximately 95km west of Marble Bar.

AUTHORISED PERSONS

The following persons or persons of the specified class may assist in carrying out the licensed activities:

1. Evan Web
2. Lachlan Crossley
3. Lewis Berry
4. Lukas Geidans
5. Jack Hardie
6. Christina walker
7. Timothy Moulds
8. Simon Girando

CONDITIONS

1. Fauna must not be taken on CALM land, (as defined in the Conservation and Land Management Regulations 2002*),* unless authorised by a written notice of a lawful authority issued under regulations 4 and 8 of the Conservation and Land Management Regulations 2002.
2. If persons, other than the licence holder, are authorised to carry out/assist in carrying out the activities under the licence, the licence holder must ensure those persons have read and understand the licence terms and conditions.
3. The written authorisation of the person in possession or occupation of the land accessed and upon which fauna is taken, as required under regulation 101(2) and referred to in "Additional information" below, must:
   a) state location details (including lot or location number, street/road, suburb and local government authority);
   b) state land owner or occupier name, and contact phone number;
   c) specify the time period that the authorisation is valid for;
   d) be signed and dated; and
   e) be attached to this licence at all times.
4. This licence, and any written authorisation or lawful authority which authorises the take of fauna on specified locations must be carried at all times while conducting licensed activities and be produced on demand by a wildlife officer.
5. If a species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* is inadvertently captured, that species is to be released immediately at the point of capture. If the fauna is injured or deceased, the licence holder shall contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of any capture of threatened fauna must be included in the "Return of Fauna Taken."
6. The licence holder must not:
   a) release any fauna in any area where it does not naturally occur;
   b) transfer fauna to any other person or authority (other than the Western Australian Museum) unless approved in writing by the CEO; or
   c) dispose of the remains of fauna in any manner likely to interfere the natural or present day distribution of the species.
7. The licence holder must not take and remove more than ten specimens of any one protected species of fauna from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.
8. All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence must be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range must be offered to the Western Australian Museum.
9. All specimens and material retained under the authority of this licence must be offered to the Western Australian Museum for loan, for inclusion in its collection, or on request be made available to other persons involved in relevant scientific studies.
10. The licence holder must create, compile and maintain records and information as required in a DBCA approved "Return of Fauna Taken" of all fauna taking activities as they occur.
11. A DBCA approved "Return of Fauna Taken" must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the end of

each annual period of the licence (from the valid from date) (refer to "Additional Information" section below).

Danny Stefoni
LICENSING OFFICER
WILDLIFE PROTECTION BRANCH

Delegate of CEO

ADDITIONAL INFORMATION

1. It is an offence to take any species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* unless the person is authorised under Section 40. The penalty ranges between $300 000 and $500 000; Section 150 Biodiversity Conservation Act 2016.
2. Regulation 82 empowers the CEO to add, substitute or delete a term or condition of a licence or to correct errors. Such power may be exercised on application of a licence holder or by the CEO's own initiative. If an amendment to a licence term or condition is required, please contact the CEO or the Licensing Section on wildlifelicensing@dbca.wa.gov.au in the first instance. The licence holder, if adversely affected by a condition imposed in this licence, may apply to the State Administrative Tribunal for review of the decision of the CEO to impose that condition on a licence: regulation 89(2) Biodiversity Conservation Regulations 2018.
3. A person must not contravene a condition of a licence. The penalty for an offence involving the contravention of a condition of a licence is a fine of $10 000: regulation 84 of the Biodiversity Conservation Regulations 2018.
4. It is an offence for persons authorised by this licence to enter land that is not in their possession or under their control without first having the *prior* written authorisation of the current owner or occupier of the land to:

   a) enter the land; and

   b) carry out the activity authorised by this licence.

   The penalty for this offence is a fine of $5 000: regulation 101(2) of the Biodiversity Conservation Regulations 2018.
5. The licence holder must be able to produce for inspection upon request any information or records required by regulation 85(2) of the Biodiversity Conservation Regulations 2018 Penalty $10 000. It is an offence to knowingly include false or misleading information or make statements in records: regulation 85(3) of the Biodiversity Conservation Regulations 2018 Penalty $10 000. It is an offence to include any information or make any statement in a return that the licence holder knows to be false or misleading in a material particular: regulation 86 (2) of the Biodiversity Conservation Regulations 2018 Penalty $10 000.
6. The approved DBCA "Return of Fauna Taken" data file can be downloaded from the DBCA webpage (https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities).
7. The issuing of a licence under the Biodiversity Conservation Regulations 2018 does not constitute an animal ethics approval or a licence to use animals for scientific purposes as required under the *Animal*

Welfare Act 2002, Animal Welfare (Scientific Purposes) Regulations 2003. It is the responsibility of a licence applicant / licence holder to ensure that they comply with the requirements of all applicable legislation. Enquiries relating to the Animal Welfare Act licences and animal ethics approvals are to be directed to the Department of Primary Industries and Regional Development (https://www.agric.wa.gov.au/animalwelfare).

8. Threatened fauna can only be taken under a *Biodiversity Conservation Act 2016* Section 40 authorisation, Occurrences of threatened species must be reported to the CEO. For more information please see https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals.

9. Any interaction involving Nationally Listed Threatened Fauna that may be invasive and/or harmful to the fauna may require approval from the Commonwealth Department of the Environment and Energy http://www.environment.gov.au/about-us/business-us/permits-assessments-licences. Interaction with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the *Biodiversity Conservation Act 2016* and Biodiversity Conservation Regulations 2018.

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

AUTHORISATION TO TAKE OR DISTURB THREATENED SPECIES

Section 40 of the Biodiversity Conservation Act 2016

AUTHORISATION DETAILS

Authorisation type: Fauna

Authorisation number: TFA 2022-0015

Authorisation duration: From date signed by Minister's delegate, below, until 31 March 2023.

AUTHORISATION HOLDER

Michael Lohr

360 Environmental

PO Box 14

West Perth WA 6872

AREA TO WHICH THIS AUTHORISATION APPLIES

North Star Solar site, approximately 95 km west of Marble Bar (Pilbara Region).

AUTHORISED ACTIVITY

Purpose of taking/disturbance:

Undertake a comprehensive biological survey to inform environmental impact assessment for future development proposals (Fortescue Metals Group).

Threatened species authorised to be taken/disturbed (including conservation status):

Night parrot, *Pezoporus occidentalis* (Critically Endangered)

Northern quoll, *Dasyurus hallucatus* (Endangered)

Ghost bat, *Macroderma gigas* (Vulnerable)

Pilbara leaf-nosed bat, *Rhinonicteris aurantia* (Pilbara) (Vulnerable)

Quantity of threatened species authorised to be taken/disturbed:

Any number of individual animals of the above listed threatened fauna species may potentially be captured and released during the trapping program and/or disturbed by the survey activities.

Authorised taking/disturbance methodology:

Take threatened fauna during a fauna trapping program using a combination of cage traps, Elliott traps, dry pitfall traps, and funnel traps. Traps will be set within complete shade throughout the day and will be wrapped in hessian or calico. Cage and Elliott traps may be set with a consumable lure (universal bait, a mixture of peanut butter, rolled oats and sardines), and will be checked and cleared within three hours after sunrise. Cage and Elliott traps will be set for a maximum of seven nights. If temperature forecasts are expected to be ≥35ºC, traps will be closed throughout the day and reopened in the afternoon.

Disturb northern quolls by deployment (installation and retrieval) of remote cameras set with a consumable lure (universal bait, a mixture of peanut butter, rolled oats and sardines) that may be replenished.

Disturb ghost bats and Pilbara leaf-nosed bats by deployment (installation and retrieval) of bat detecting devices in cave entrances for up to four consecutive nights.

Disturb night parrots by deployment (installation and retrieval) of acoustic recording devices (for up to six consecutive nights per site) within areas of potential night parrot nesting and roosting habitat.

All proposed activities will be conducted in accordance with DBCA Standard Operating Procedures (SOPs) for fauna survey and monitoring techniques.

ADDITIONAL AUTHORISED PERSONS

Evan Web	Lachlan Crossley	Lewis Berry	Lukas Geidans
Jack Hardie	Christina Walker	Timothy Moulds	Simon Girando

Additional personnel who are suitably qualified and experienced in the authorised activities working under the direction of the authorisation holder.

Field assistants assisting with the authorised activities working under the direct supervision of the authorisation holder or suitably qualified and experienced named additional authorised person.

CONDITIONS

1. The written authorisation of the person in possession or occupation of the land accessed and upon which threatened fauna is taken or disturbed must:
   a) state location details (including lot or location number, street/road, suburb and local government authority);
   b) state land owner or occupier name, and contact phone number;
   c) specify the time period that the authorisation is valid for;
   d) be signed and dated; and
   e) be attached to this Authorisation to take or disturb threatened species at all times.
2. This Authorisation to take or disturb threatened species, and any other written authorisation or lawful authority which authorises the take or disturbance of fauna on specified locations for the authorised activities must be carried at all times while conducting authorised activities and be produced on demand by a wildlife officer.
3. Additional authorised persons who are not suitably qualified and experienced in the authorised activities, and field assistants assisting with the authorised activities, must be working under direct supervision of experienced and competent named authorised persons.
4. Any inadvertently captured species of non-target threatened fauna or non-threatened fauna (threatened fauna as defined in *Biodiversity Conservation Act 2016* Section 19) is to be released immediately at the point of capture. Details of such fauna must be included in the fauna taking/disturbance return as required under this authorisation.
5. The authorisation holder, unless specified in the authorised activities, must not:
   a) release any threatened fauna in any area where it does not naturally occur;
   b) transfer threatened fauna to any other person or authority (other than the Western Australian Museum) unless the fauna is injured or abandoned fauna (condition 6); or
   c) dispose of the remains of threatened fauna in any manner likely to confuse the natural or present-day distribution of the species.
6. All threatened fauna injuries, unexpected deaths, unplanned euthanasia, and abandoned young or eggs, must be reported by the authorisation holder to the DBCA Wildlife Protection Branch, Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) to notify of the incident and for advice on treatment or disposal. All deceased threatened fauna must be offered to the Western Australian Museum.

7. The authorisation holder must create, compile and maintain records and information as required in a DBCA approved "Return of Fauna Taken/Disturbed" of all fauna taking/disturbance activities as they occur.
8. A DBCA approved "Return of Fauna Taken/Disturbed" must be completed in full (including nil taking/disturbance details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the end of the authorisation duration and, if the authorisation duration is greater than 12 months, prior to the end of each annual period of the authorisation (from the date signed by the Minister's delegate) (refer to "Additional Information" section below). Where a licence to take or disturb fauna is issued in conjunction with this Authorisation to take or disturb threatened species, a combined "Return of Fauna Taken/Disturbed" may be completed and submitted.
9. A written report detailing the undertaken authorised activities, outcome, unintended incidents, injuries and mortalities of threatened fauna, implemented monitoring, mitigation and management, and explaining the records and information as required in a DBCA approved "Return of Fauna Taken/Disturbed" must be submitted, in addition to a "Return of Fauna Taken/Disturbed" to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au).

ADDITIONAL INFORMATION

1. Before undertaking the Authorised Activity, permission must be obtained from: (a) the owner or occupier of private land; or (b) the Department or Authority controlling Crown land, on which the Threatened Fauna occur. This includes obtaining the written endorsement from Department of Biodiversity, Conservation and Attractions (DBCA) if the authorised activity is proposed for land managed by DBCA.
2. This Authorisation to take or disturb threatened species does not constitute lawful authority issued under regulations 4 and 8 of the *Conservation and Land Management Regulations 2002*. Contact the applicable Department District Officer for further information.
3. The approved DBCA "Return of Fauna Taken/Disturbed" template can be obtained from DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au).
4. Any interaction involving nationally listed threatened fauna that may be harmful to the fauna and/or invasive may require approval from the Commonwealth Department of the Environment and Energy (http://www.environment.gov.au/biodiversity/threatened/permits). Interaction with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and *Environment Protection and Biodiversity Conservation Regulations 2000*.
5. It is the responsibility of the authorisation holder to ensure that they comply with the requirements of all applicable legislation.
6. An Authorisation to take or disturb threatened species does not constitute an animal ethics approval or a licence to use animals for scientific purposes as required under the *Animal Welfare Act 2002, Animal Welfare (Scientific Purposes) Regulations 2003*. Enquiries relating to the Animal Welfare Act scientific purposes licence and animal ethics committee approvals are to be directed to the Western Australian Department of Primary Industries and Regional Development (https://www.agric.wa.gov.au/animalwelfare).

Margaret Byrne

Dr Margaret Byrne

Executive Director of Biodiversity and Conservation Science

AS DELEGATE OF THE MINISTER

DATE: ...10.../.....3...../2022

Appendix B
Inventory of Vertebrate Fauna Potentially Occurring Within the Survey Area

Key: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation Priority List, Commonwealth - Listed under Environmental Protection and Biodiversity Conservation Act 1999, Recorded - Recorded during the current field survey, * - Introduced species

Conservation Status: CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Database Search: NM - NatureMap, PMST - EPBC Protected Matters Search Tool, DBCA - DBCA Threatened and Priority Fauna database search, Field - Recorded during the current field survey.

Literature: A - Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage A Rail Corridor (Biota Environmental Sciences, 2004), B - North Star Project Level 2 Terrestrial Vertebrate Fauna Assessment (ecologia Environment, 2012), C - Pilbara Ghost Bat Review (Biologic and Bat Call WA, 2014), D - Proposed Gas Pipeline Targeted Threatened Fauna Survey (Outback Ecology, 2013), E - Reconnaissance Flora and Vegetation Survey and Fauna Survey for The Croydon Gold Project (Phoenix Environmental Sciences, 2021), F - Targeted Fauna Assessment of The Rail Duplication (Bamford Consulting Ecologists, 2010), G - Warrawoona Gold Project Targeted Vertebrate Fauna Survey (Biologic, 2018), H - Wodgina Gas Pipeline Targeted Fauna Survey (360 Environmental Pty Ltd, 2018c), I - Wodgina Project Level 1 Fauna Survey, Targeted Conservation Significant Fauna Survey and Desktop Assessment (Stantec Australia Pty Ltd, 2018).

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
Amphibians																	
Limnodynastidae	*Neobatrachus aquilonius*	Northern Burrowing Frog				x											
	Neobatrachus sutor	Shoemaker Frog				x											
	Notaden nichollsi	Desert Spadefoot				x				x							
	Platyplectrum spenceri	Centralian Burrowing Frog				x				x							
Myobatrachidae	*Uperoleia glandulosa*	Glandular Toadlet				x				x							
	Uperoleia russelli	Northwest Toadlet				x											
	Uperoleia saxatilis	Pilbara Toadlet			x	x											
Pelodryadidae	*Cyclorana australis*	Giant Frog				x				x							
	Cyclorana maini	Sheep Frog			x	x			x	x							
	Litoria rubella	Little Red Tree Frog			x	x				x							
Birds																	
Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill							x								
	Gerygone fusca	Western Gerygone				x											
	Smicrornis brevirostris	Weebill				x			x	x							
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk			x	x				x							
	Accipiter cirrocephalus cirrocephalus					x											
	Accipiter fasciatus	Brown Goshawk		MA		x											
	Aquila audax	Wedge-tailed Eagle				x			x	x			x	x			x
	Circus assimilis	Spotted Harrier				x			x								
	Elanus axillaris	Black-shouldered Kite				x								x			
	Haliaeetus leucogaster	White-bellied Sea-Eagle		MA		x	x										
	Haliastur sphenurus	Whistling Kite		MA	x	x			x	x				x			x
	Hamirostra melanosternon	Black-breasted Buzzard															x
	Hieraaetus morphnoides	Little Eagle			x	x			x								
	Lophoictinia isura	Square-tailed Kite				x				x							
	Milvus migrans	Black Kite				x				x							x
	Milvus migrans affinis					x											
Acrocephalidae	*Acrocephalus australis*	Australasian Reed Warbler		MA		x											
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar				x			x	x							
Alaudidae	*Mirafra javanica*	Horsfield's Bush Lark				x			x	x							
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra			x	x				x							x
	Todiramphus pyrrhopygius	Red-backed Kingfisher			x	x			x	x							x
	Todiramphus sanctus	Sacred Kingfisher		MA		x			x	x							
Anatidae	*Anas gracilis*	Grey Teal			x	x				x							
	Anas superciliosa	Pacific Black Duck				x			x	x							
	Aythya australis	Hardhead				x											
	Chenonetta jubata	Australian Wood Duck (Wood Duck, Maned Duck)				x											
	Cygnus atratus	Black Swan				x				x							
	Dendrocygna eytoni	Plumed Whistling Duck				x											
	Malacorhynchus membranaceus	Pink-eared Duck				x											
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter				x				x							
Apodidae	*Apus pacificus*	Pacific Swift (Fork-tailed Swift)	IA	MI, MA		x	x	x	x	x							
Ardeidae	*Ardea alba modesta*	Great Egret (Eastern Great Egret)				x											
	Ardea intermedia	Intermediate Egret		MA		x											
	Ardea pacifica	White-necked Heron				x											x
	Egretta garzetta	Little Egret		MA		x											
	Egretta novaehollandiae	White-faced Heron				x			x	x							
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			x	x			x	x				x			x
	Artamus cyanopterus	Dusky Woodswallow				x											

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
	Artamus leucorynchus	White-breasted Woodswallow				x											
	Artamus minor	Little Woodswallow				x				x			x				
	Artamus personatus	Masked Woodswallow				x				x							
	Cracticus nigrogularis	Pied Butcherbird			x	x			x	x			x	x			
	Cracticus torquatus	Grey Butcherbird				x			x	x							
	Gymnorhina tibicen	Australian Magpie				x			x	x							
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew (Bush Thick-knee)				x				x							
Cacatuidae	*Cacatua sanguinea*	Little Corella			x	x			x	x				x			x
	Cacatua sanguinea westralensis	Western Little Corella											x				
	Eolophus roseicapilla	Galah			x	x			x	x			x	x			x
	Nymphicus hollandicus	Cockatiel			x	x			x	x			x				
Campephagidae	*Coracina maxima*	Ground Cuckooshrike				x											
	Coracina novaehollandiae	Black-faced Cuckooshrike		MA	x	x			x	x			x	x			x
	Lalage tricolor	White-winged Triller				x			x								
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar		MA	x	x						x	x			x	x
Casuariidae	*Dromaius novaehollandiae*	Emu							x					x			
Charadriidae	*Charadrius veredus*	Oriental Plover	IA	MI, MA		x	x	x									
	Elseyornis melanops	Black-fronted Dotterel			x	x			x	x							
	Erythrogonys cinctus	Red-kneed Dotterel				x											
	Vanellus tricolor	Banded Lapwing				x											
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork				x			x								
Columbidae	*Geopelia cuneata*	Diamond Dove			x	x			x	x				x			x
	Geopelia striata	Zebra Dove				x				x							
	Geophaps plumifera	Spinifex Pigeon			x	x			x	x			x	x			x
	Ocyphaps lophotes	Crested Pigeon			x	x			x	x				x			x
	Phaps chalcoptera	Common Bronzewing				x											
	Phaps histrionica	Flock Bronzewing (Flock Pigeon)				x											
Corvidae	*Corvus bennetti*	Little Crow			x	x											
	Corvus coronoides	Australian Raven				x											
	Corvus orru	Torresian Crow			x	x				x				x			x
	Corvus orru cecilae	Western Crow				x			x								
Cuculidae	*Centropus phasianinus*	Pheasant Coucal				x											
	Chalcites basalis	Horsfield's Bronze Cuckoo		MA		x			x	x							
	Chalcites osculans	Black-eared Cuckoo		MA			x			x							
	Heteroscenes pallidus	Pallid Cuckoo		MA		x			x	x							
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird				x			x								
Estrildidae	*Emblema pictum*	Painted Finch				x			x	x			x				x
	Neochmia ruficauda	Star Finch				x											
	Taeniopygia guttata	Zebra Finch			x	x			x	x				x			x
Falconidae	*Falco berigora*	Brown Falcon			x	x			x	x				x			
	Falco cenchroides	Australian Kestrel (Nankeen Kestrel)		MA	x	x			x	x			x	x			x
	Falco hypoleucos	Grey Falcon	VU	VU		x	x	x		x							
	Falco longipennis	Australian Hobby				x											
	Falco peregrinus	Peregrine Falcon	OS			x		x									
	Falco subniger	Black Falcon				x											
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	IA	MI, MA			x										
	Stiltia isabella	Australian Pratincole		MA		x											
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		MA		x											
	Hirundo rustica	Barn Swallow	IA	MI, MA			x										
	Petrochelidon ariel	Fairy Martin			x	x				x							
	Petrochelidon nigricans	Tree Martin		MA		x			x	x							
Laridae	*Chlidonias hybrida*	Whiskered Tern		MA		x				x							
Locustellidae	*Cincloramphus cruralis*	Brown Songlark							x	x							
	Cincloramphus mathewsi	Rufous Songlark							x	x							x
	Poodytes carteri	Spinifexbird				x			x	x				x			x
Maluridae	*Amytornis striatus*	Striated Grasswren	P4						x								

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
	Amytornis whitei whitei	Rufous Grasswren	P4 (listed as *A. striatus striatus*)		x	x				x							
	Malurus assimilis	Purple-backed Fairywren			x	x				x							
	Malurus lamberti	Variegated Fairywren							x								
	Malurus leucopterus	White-winged Fairywren			x	x			x	x				x			
	Stipiturus ruficeps ruficeps	Rufous-crowned Emu-wren				x											
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater				x			x	x							
	Certhionyx variegatus	Pied Honeyeater				x			x								
	Epthianura tricolor	Crimson Chat				x			x								
	Gavicalis virescens	Singing Honeyeater			x	x			x	x			x	x			x
	Lacustroica whitei	Grey Honeyeater				x											
	Lichmera indistincta	Brown Honeyeater				x			x	x							x
	Manorina flavigula	Yellow-throated Miner			x	x			x				x	x			x
	Melithreptus gularis	Black-chinned Honeyeater				x			x	x							
	Ptilotula keartlandi	Grey-headed Honeyeater			x	x			x	x			x				x
	Ptilotula ornata	Yellow-plumed Honeyeater											x				
	Ptilotula penicillata	White-plumed Honeyeater			x	x			x								
	Sugomel niger	Black Honeyeater							x								
Meropidae	*Merops ornatus*	Rainbow Bee-eater		MA	x	x	x		x	x		x	x	x		x	x
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		MA	x	x			x	x			x	x			x
Motacillidae	*Anthus australis*	Australian Pipit		MA		x				x				x			
	Motacilla cinerea	Grey Wagtail	IA	MI, MA			x										
	Motacilla tschutschensis	Yellow Wagtail	IA	MI, MA			x										
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird				x			x	x							
Otididae	*Ardeotis australis*	Australian Bustard			x	x			x	x				x			
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush			x	x			x	x			x				
	Pachycephala rufiventris	Rufous Whistler				x			x	x			x				
Pandionidae	*Pandion haliaetus*	Osprey	IA	MI, MA			x										
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote			x	x			x	x			x				
	Pardalotus striatus	Striated Pardalote				x			x								
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		MA		x											
Petroicidae	*Melanodryas cucullata*	Hooded Robin				x											
	Petroica goodenovii	Red-capped Robin				x											
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant				x											
	Phalacrocorax sulcirostris	Little Black Cormorant				x											
	Phalacrocorax varius	Pied Cormorant (Australian Pied Cormorant)				x											
Phasianidae	*Synoicus ypsilophorus*	Brown Quail				x				x							
Podargidae	*Podargus strigoides*	Tawny Frogmouth				x			x	x			x				
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe				x											
	Tachybaptus novaehollandiae	Australasian Grebe (Black-throated Grebe)				x											
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler				x				x							x
Psittaculidae	*Barnardius zonarius*	Australian Ringneck			x	x			x	x			x				
	Melopsittacus undulatus	Budgerigar			x	x			x	x							x
	Neophema elegans	Elegant Parrot				x											
	Pezoporus occidentalis	Night Parrot	CR	EN			x										
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird				x				x							
Rallidae	*Fulica atra*	Eurasian Coot				x											
	Hypotaenidia philippensis	Buff-banded Rail		MA		x				x							
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt		MA		x											
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail				x			x	x			x	x			x
	Rhipidura rufiventris	Northern Fantail				x											
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN	EN, MA			x										
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	IA	MI, MA		x	x	x									
	Calidris acuminata	Sharp-tailed Sandpiper	IA	MI, MA			x										
	Calidris ferruginea	Curlew Sandpiper	CR, IA	CR, MI, MA			x										
	Calidris melanotos	Pectoral Sandpiper	IA	MI, MA			x										
	Numenius madagascariensis	Far Eastern Curlew (Eastern Curlew)	CR, IA	CR, MI, MA			x										

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
	Tringa glareola	Wood Sandpiper	IA	MI, MA		x		x									
Strigidae	*Ninox boobook*	Boobook Owl								x							x
	Ninox connivens	Barking Owl				x											
Threskiornithidae	*Platalea regia*	Royal Spoonbill				x											
	Threskiornis spinicollis	Straw-necked Ibis		MA		x											
Turnicidae	*Turnix velox*	Little Buttonquail				x			x	x							x
Zosteropidae	*Zosterops luteus*	Yellow White-eye (Canary White-eye)				x											
Mammals																	
Bovidae	**Bos primigenius taurus*	European Cattle			x	x				x			x				x
Camelidae	**Camelus dromedarius*	Dromedary, Camel				x			x	x							
Canidae	**Canis familiaris*	Dog/Dingo			x	x			x				x				x
	**Vulpes vulpes*	Red Fox				x											
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara, Ampurta	P4			x		x								x	
	Dasycercus cristicauda	Crest-tailed Mulgara	P4						x					x			
	Dasykaluta rosamondae	Kaluta				x			x	x						x	x
	Dasyurus hallucatus	Northern Quoll	EN	EN	x	x	x	x	x	x			x		x		x
	Ningaui ridei	Wongai Ningaui							x								
	Ningaui timealeyi	Pilbara Ningaui			x	x			x	x							
	Planigale ingrami	Long-tailed Planigale				x											
	Planigale maculata	Common Planigale				x				x							
	Pseudantechinus macdonnellensis	Fat-tailed Pseudantechinus				x											
	Pseudantechinus roryi	Rory Cooper's false antechinus				x											
	Pseudantechinus woolleyae	Woolley's Pseudantechinus				x											
	Sminthopsis longicaudata	Long-tailed Dunnart	P4			x		x		x							
	Sminthopsis macroura	Stripe-faced Dunnart				x			x									x
	Sminthopsis ooldea	Ooldea Dunnart				x											
	Sminthopsis youngsoni	Lesser Hairy-footed Dunnart				x				x							
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat				x											
	Taphozous georgianus	Common Sheath-tailed Bat				x				x			x				x
Equidae	**Equus africanus asinus*	Donkey				x											
	**Equus ferus caballus*	Horse			x	x											
Felidae	**Felis catus*	Cat			x	x				x						x	x
Hipposideridae	*Hipposideros stenotis*	Northern Leaf-nosed Bat	P2					x									
Macropodidae	*Lagorchestes conspicillatus leichardti*	Spectacled Hare-wallaby	P4			x		x					x				
	Osphranter robustus	Euro				x			x	x			x	x			x
	Osphranter robustus erubescens	Euro, Biggada				x											
	Osphranter rufus	Red Kangaroo, Marlu			x	x								x			
	Petrogale rothschildi	Rothschild's Rock-wallaby				x				x							x
Megadermatidae	*Macroderma gigas*	Ghost Bat	VU	VU		x	x	x		x	x						x
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat															x
	Chaerephon jobensis	Northern Mastiff Bat			x	x							x				
Muridae	**Mus musculus*	House Mouse				x											
	Leggadina lakedownensis	Short-tailed Mouse	P4			x		x	x								
	Notomys alexis alexis	Spinifex Hopping-mouse			x	x										x	x
	Pseudomys chapmani	Western Pebble-mound Mouse	P4		x	x		x		x				x			x
	Pseudomys delicatulus	Delicate Mouse				x			x	x							
	Pseudomys desertor	Desert Mouse				x			x	x							
	Pseudomys hermannsburgensis	Sandy Inland Mouse			x	x			x	x							
	Zyzomys argurus	Common Rock-rat			x	x				x			x				x
Phalangeridae	*Trichosurus vulpecula arnhemensis*	Northern Brushtail Possum	VU (Kimberley)	VU		x											x
Rhinonycteridae	*Rhinonicteris aurantia Pilbara form*	Pilbara Leaf-nosed Bat	VU	VU	x	x	x	x		x		x				x	
Tachyglossidae	*Tachyglossus aculeatus acanthion*	Short-beaked Echidna				x			x								x
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	VU		x	x	x						x		x	
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat			x	x				x			x				x
	Nyctophilus geoffroyi geoffroyi	Lesser Long-eared Bat				x				x							
	Scotorepens greyii	Little Broad-nosed Bat			x	x				x			x				x
	Vespadelus finlaysoni	Finlayson's Cave Bat			x	x				x			x				x

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
Reptiles																	
Agamidae	*Ctenophorus caudicinctus*	Western Ring-tailed Dragon			x	x			x	x			x				x
	Ctenophorus isolepis citrinus	Yellowy Military Dragon				x											
	Ctenophorus isolepis isolepis	Central Military Dragon			x	x				x							
	Ctenophorus nuchalis	Central Netted Dragon			x	x				x							
	Ctenophorus reticulatus	Western Netted Dragon				x				x							
	Diporiphora amphiboluroides	Mulga Dragon							x								
	Diporiphora valens	Southern Pilbara Tree Dragon				x											
	Diporiphora vescus	Northern Pilbara Tree Dragon			x	x											
	Gowidon longirostris	Long-nosed Dragon			x	x				x			x				
	Pogona minor	Dwarf Bearded Dragon			x	x				x							
	Pogona minor mitchelli					x											
	Tympanocryptis cephalus	Coastal Pebble-mimic Dragon				x											
Carphodactylidae	*Nephrurus levis De Vis*	Three-Lined Knob-Tail			x	x				x							
	Nephrurus levis pilbarensis					x											
	Nephrurus wheeleri	Southern Banded Knob-tailed Gecko				x											
Chelidae	*Chelodina steindachneri*	Flat-shelled Turtle				x				x							
Diplodactylidae	*Crenadactylus ocellatus*	South-western Clawless Gecko				x				x							
	Diplodactylus conspicillatus	Variable Fat-tailed Gecko				x			x	x							
	Diplodactylus galaxias	Northern Pilbara Beak-faced Gecko				x				x							
	Diplodactylus savagei	Southern Pilbara Beak-faced Gecko				x				x							
	Diploductylus bilybara	Western Fat-tailed Gecko			x												
	Lucasium stendodactylum	Crowned Gecko			x	x			x	x							
	Lucasium wombeyi					x				x							
	Oedura fimbria	Western Marbled Velvet Gecko								x							
	Rhynchoedura ornata	Western Beaked Gecko				x				x							
	Strophurus elderi				x	x				x							
	Strophurus jeanae					x			x								
	Strophurus wellingtonae								x								
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder				x				x							
	Brachyurophis approximans				x	x				x							
	Demansia psammophis	Yellow-Faced Whip Snake				x				x							
	Demansia reticulata				x	x			x								
	Demansia rufescens	Rufous Whipsnake				x				x			x				
	Furina ornata	Moon Snake			x	x			x	x							
	Parasuta monachus	Inland Hooded Snake				x				x							
	Pseudechis australis	Mulga Snake				x				x							
	Pseudonaja mengdeni	Western Brown Snake				x				x							
	Pseudonaja modesta	Ringed Brown Snake			x	x				x							
	Pseudonaja nuchalis	Gwardar; Northern Brown Snake				x											
	Suta fasciata	Rosen's Snake				x				x							
	Suta punctata	Spotted Snake				x											
	Vermicella snelli					x											
Gekkonidae	*Gehyra pilbara*				x	x											
	Gehyra punctata				x	x				x							
	Gehyra variegata	Variegated gehyra			x	x			x	x							
	Heteronotia binoei	Bynoe's Gecko			x	x			x	x							
	Heteronotia planiceps					x											
	Heteronotia spelea	Pilbara Cave Gecko				x				x							
Pygopodidae	*Delma butleri*					x											
	Delma elegans					x				x							
	Delma fraseri					x				x							
	Delma nasuta					x			x	x							
	Delma pax				x	x			x	x							
	Delma tincta				x	x			x	x							
	Lialis burtonis				x	x			x	x							
	Pygopus nigriceps				x	x				x							

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
Pythonidae	*Antaresia childreni*	Children's Python			x	x				x							
	Antaresia perthensis	Pygmy Python				x			x	x							
	Aspidites melanocephalus	Black-headed Python				x											
	Liasis olivaceus barroni	Pilbara Olive Python	VU	VU	x	x	x	x		x			x				
Scincidae	*Carlia munda*				x	x			x	x							
	Carlia triacantha					x			x	x							
	Cryptoblepharus buchananii					x				x							
	Cryptoblepharus ustulatus					x				x							
	Ctenotus ariadnae								x								
	Ctenotus duricola	Eastern Pilbara Lined Ctenotus			x	x			x	x							
	Ctenotus fallens					x											
	Ctenotus grandis	Grand Ctenotus			x	x				x							
	Ctenotus grandis titan					x			x								
	Ctenotus hanloni	Nimble Ctenotus			x	x											
	Ctenotus helenae	Clay-Soil Ctenotus			x	x			x	x							
	Ctenotus inornatus	Bar-Shlouldered Ctenotus				x											
	Ctenotus leonhardii	Leonhardi's Ctenotus				x											
	Ctenotus nigrilineatus		P1			x		x									
	Ctenotus pantherinus	Leopard Ctenotus			x	x				x							
	Ctenotus pantherinus ocellifer					x			x								
	Ctenotus pantherinus pantherinus					x											
	Ctenotus piankai	Coarse Sands Ctenotus				x				x							
	Ctenotus rubicundus	Ruddy Ctenotus				x				x							
	Ctenotus saxatilis	Rock Ctenotus			x	x				x							
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus				x			x	x							
	Ctenotus serventyi	North-Western Sandy-Loam Ctenotus				x											
	Ctenotus uber johnstonei		P2						x								
	Cyclodomorphus melanops melanops				x	x			x	x							
	Egernia cygnitos	Western Pilbara Spiny-tailed Skink				x											
	Egernia depressa	Southern Pygmy Spiny-tailed Skink				x											
	Egernia epsisolus	Eastern Pilbara Spiny-tailed Skink			x	x				x							
	Egernia formosa					x				x			x				
	Eremiascincus richardsonii	Broad-banded Sand Swimmer				x											
	Lerista bipes				x	x			x	x							
	Lerista clara				x	x											
	Lerista jacksoni				x	x				x							
	Lerista labialis					x											
	Lerista muelleri					x			x	x							
	Lerista verhmens					x				x							
	Liopholis striata	Night Skink			x												
	Menetia greyii				x	x			x	x							
	Menetia surda surda					x											
	Morethia ruficauda exquisita					x											
	Morethia ruficauda ruficauda				x	x				x							x
	Notoscincus ornatus ornatus				x	x			x	x							
	Proablepharus reginae				x	x			x	x							
	Tiliqua multifasciata	Central Blue-tongue			x	x			x	x							
Typhlopidae	*Anilios ammodytes*				x				x	x							
	Anilios ganei		P1			x		x									
	Anilios grypus				x					x							
	Anilios pilbarensis				x												
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna			x	x				x							
	Varanus brevicauda	Short-tailed Pygmy Goanna			x	x				x							
	Varanus bushi	Pilbara Mulga Goanna			x												
	Varanus eremius	Pygmy Desert Goanna			x	x			x	x							
	Varanus giganteus	Perentie			x	x				x							x
	Varanus gouldii	Bungarra or Sand Goanna			x	x				x				x			

Family	Scientific Name	Common Name	Conservation Status		Recorded	Source			Literature								
			State	Commonwealth		NM	PMST	DBCA	A	B	C	D	E	F	G	H	I
	Varanus panoptes	Yellow-Spotted Monitor								x				x			
	Varanus panoptes panoptes					x											
	Varanus panoptes rubidus				x	x			x								
	Varanus pilbarensis	Northern Pilbara Rock Goanna				x				x			x				
	Varanus tristis	Racehorse Goanna			x	x				x							

Appendix C
Database Search Results

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By John Dagnall on 15/02/2022

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 118° 49' 11" E,21° 13' 33" S
Buffer 40km
Group By Family

Family	Species	Records
Acanthizidae	2	8
Accipitridae	13	144
Aegothelidae	1	7
Agamidae	13	455
Alaudidae	1	5
Ameiridae	1	1
Anatidae	7	59
Anhingidae	1	2
Apodidae	1	6
Araneidae	2	3
Ardeidae	7	58
Armadillidae	1	1
Artamidae	5	117
Baetidae	1	4
Boidae	6	96
Bolboceratidae	2	4
Bovidae	1	64
Bufonidae	1	2
Burhinidae	1	64
Buthidae	2	5
Cacatuidae	1	69
Caenidae	1	4
Camaenidae	3	19
Camelidae	1	9
Campephagidae	3	149
Candonidae	1	1
Canidae	2	3
Canthocamptidae	1	2
Caprimulgidae	1	39
Carabidae	8	25
Carphodactylidae	3	9
Centropodidae	1	30
Ceratopogonidae	1	4
Charadriidae	4	27
Cheluidae	1	10
Chironomidae	2	8
Chthoniidae	1	10
Ciconiidae	2	14
Coenagrionidae	1	3
Columbidae	6	509
Conchostraca	1	1
Corduliidae	1	1
Corixidae	1	4
Corvidae	4	205
Cracticidae	3	158
Cuculidae	2	24
Culicidae	1	1
Cyclopidae	6	30
Dasyuridae	13	1027
Dicaeidae	1	3
Dicruridae	4	338
Diplodactylidae	11	369
Dytiscidae	1	3
Ecnomidae	1	3
Ectinosomatidae	1	1
Elapidae	14	115
Emballonuridae	2	201
Equidae	2	21
Estrilidae	3	341
Falconidae	7	128
Felidae	1	223
Garypidae	1	8
Gekkonidae	6	413
Gerridae	1	2
Glareolidae	1	2
Gomphidae	1	3
Hadziidae	2	4
Halcyonidae	3	100
Hipposideridae	2	140
Hirundinidae	3	48
Hydraenidae	1	2
Hydrophilidae	1	4
Hydroptilidae	1	1
Hylidae	3	140
Ixodidae	1	2

Lamponidae	7	19
Laridae	1	1
Leptoceridae	1	2
Libellulidae	1	3
Limnodynastidae	3	21
Lymnaeidae	1	1
Macropodidae	8	433
Maluridae	5	141
Megadermatidae	1	85
Meliphagidae	10	375
Meropidae	1	152
Molossidae	2	9
Motacillidae	1	12
Muridae	8	1052
Myobatrachidae	3	91
NO FAMILY	1	6
Nematoda	1	1
Nemesiidae	1	7
Notonectidae	1	1
Oligochaeta	1	2
Olpiidae	1	48
Oonopidae	1	4
Ostracoda	1	2
Otididae	1	84
Pachycephalidae	5	126
Parabathynellidae	3	3
Paradoxosomatidae	1	18
Pardalotidae	2	37
Pelecanidae	1	5
Petroicidae	2	7
Phalacrocoracidae	4	10
Phalangeridae	1	2
Phasianidae	2	16
Pholcidae	1	1
Phreodrilidae	1	1
Planorbidae	1	4
Pleidae	1	2
Podargidae	1	2
Podicipedidae	2	15
Pomatostomidae	1	9
Prodidomidae	2	8
Psittacidae	7	214
Ptilonorhynchidae	2	23
Pygopodidae	9	103
Pyralidae	1	1
Rallidae	2	2
Recurvirostridae	1	4
Salticidae	4	8
Scarabaeidae	8	16
Scincidae	43	1863
Scolopacidae	2	2
Scolopendridae	3	4
Scutigeridae	1	1
Sparassidae	2	3
Strigidae	1	1
Sylviidae	2	69
Tachyglossidae	1	18
Terapontidae	1	6
Threskiornithidae	2	9
Thylacomyidae	1	406
Trigoniulidae	1	10
Trochanteriidae	1	3
Trombidiformes	1	54
Turnicidae	1	42
Typhlopidae	1	1
Urodacidae	2	3
Varanidae	12	424
Vespertilionidae	4	220
Zodariidae	4	20
Zosteropidae	1	1
TOTAL	**434**	**12464**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	25530	*Gerygone fusca (Western Gerygone)*			
2.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
3.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
4.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
5.	25536	*Accipiter fasciatus (Brown Goshawk)*			
6.	24285	*Aquila audax (Wedge-tailed Eagle)*			
7.	24289	*Circus assimilis (Spotted Harrier)*			
8.		*Elanus axillaris*			
9.	25540	*Elanus caeruleus (Black-shouldered Kite)*			
10.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
11.	24295	*Haliastur sphenurus (Whistling Kite)*			
12.	24296	*Hamirostra isura (Square-tailed Kite)*			
13.	47965	*Hieraaetus morphnoides (Little Eagle)*			
14.	25542	*Milvus migrans (Black Kite)*			
15.	24298	*Milvus migrans subsp. affinis (Black Kite)*			
Aegothelidae					
16.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Agamidae					
17.	30833	*Amphibolurus longirostris (Long-nosed Dragon)*			
18.	25458	*Ctenophorus caudicinctus (Ring-tailed Dragon)*			
19.	24865	*Ctenophorus caudicinctus subsp. caudicinctus (Ring-tailed Dragon)*			
20.	25459	*Ctenophorus isolepis (Crested Dragon, Military Dragon)*			
21.	24874	*Ctenophorus isolepis subsp. citrinus (Yellowy Military Dragon)*			
22.	24876	*Ctenophorus isolepis subsp. isolepis (Crested Dragon, Military Dragon)*			
23.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
24.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
25.	24899	*Diporiphora valens (Southern Pilbara Tree Dragon)*			
26.	42402	*Diporiphora vescus (Northern Pilbara Tree Dragon)*			
27.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
28.	24908	*Pogona minor subsp. mitchelli (Dwarf Bearded Dragon)*			
29.	30814	*Tympanocryptis cephalus (Pebble Dragon)*			
Alaudidae					
30.	25545	*Mirafra javanica (Horsfield's Bushlark, Singing Bushlark)*			
Ameiridae					
31.		*Stygonitocrella unispinosa*			
Anatidae					
32.	24312	*Anas gracilis (Grey Teal)*			
33.	24316	*Anas superciliosa (Pacific Black Duck)*			
34.	24318	*Aythya australis (Hardhead)*			
35.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
36.	24322	*Cygnus atratus (Black Swan)*			
37.	24325	*Dendrocygna eytoni (Plumed Whistling Duck)*			
38.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
Anhingidae					
39.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
Apodidae					
40.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
Araneidae					
41.		*Argiope protensa*			
42.		*Nephila edulis*			
Ardeidae					
43.	25557	*Ardea garzetta (Little Egret)*			
44.	25559	*Ardea intermedia (Intermediate Egret)*			
45.	41324	*Ardea modesta (great egret, white egret)*			
46.	24340	*Ardea novaehollandiae (White-faced Heron)*			
47.	24341	*Ardea pacifica (White-necked Heron)*			
48.		*Egretta garzetta*			
49.		*Egretta novaehollandiae*			
Armadillidae					
50.		*Buddelundia sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Artamidae					
51.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
52.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
53.	25567	*Artamus leucorynchus (White-breasted Woodswallow)*			
54.	24355	*Artamus minor (Little Woodswallow)*			
55.	24356	*Artamus personatus (Masked Woodswallow)*			
Baetidae					
56.		*Baetidae sp.*			
Boidae					
57.	25318	*Antaresia perthensis (Pygmy Python)*			
58.	25448	*Antaresia stimsoni (Stimson's Python)*			
59.	25241	*Antaresia stimsoni subsp. stimsoni (Stimson's Python)*			
60.	25320	*Aspidites melanocephalus (Black-headed Python)*			
61.	25486	*Liasis olivaceus (Olive Python)*			
62.	25238	*Liasis olivaceus subsp. barroni (Pilbara Olive Python)*		T	
Bolboceratidae					
63.		*Bolboleaus trifoveicollis*			
64.		*Bolboleaus truncatus*			
Bovidae					
65.	24251	*Bos taurus (European Cattle)*	Y		
Bufonidae					
66.	42306	*Platyplectrum spenceri (Centralian Burrowing Frog)*			
Burhinidae					
67.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
Buthidae					
68.		*Lychas sp. 1*			
69.		*Lychas sp. 2*			
Cacatuidae					
70.		*Eolophus roseicapillus*			
Caenidae					
71.		*Caenidae sp.*			
Camaenidae					
72.		*Rhagada convicta*			
73.		*Rhagada radleyi*			
74.		*Rhagada richardsonii*			
Camelidae					
75.	24254	*Camelus dromedarius (Dromedary, Camel)*	Y		
Campephagidae					
76.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
77.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
78.	24367	*Lalage tricolor (White-winged Triller)*			
Candonidae					
79.		*Candoninae' (pss)*			
Canidae					
80.	48920	*Canis familiaris (Dog, Dingo)*	Y		
81.	24040	*Vulpes vulpes (Red Fox)*	Y		
Canthocamptidae					
82.		*Elaphoidella humphreysi*			
Caprimulgidae					
83.	24368	*Eurostopodus argus (Spotted Nightjar)*			
Carabidae					
84.		*Carenum pulchrum*			
85.		*Conopterum pyripenne*			
86.		*Euryscaphus waterhousei*			
87.		*Gnathaphanus melbournensis*			
88.		*Helluapterus niger*			
89.		*Loxandrus micantior*			
90.		*Phorticosomus gularis*			
91.		*Trichocarenum cylindricum*			
Carphodactylidae					
92.	25497	*Nephrurus levis*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
93.	24969	*Nephrurus levis subsp. pilbarensis*			
94.	25498	*Nephrurus wheeleri*			
Centropodidae					
95.	25600	*Centropus phasianinus (Pheasant Coucal)*			
Ceratopogonidae					
96.		*Ceratopogonidae sp.*			
Charadriidae					
97.	24378	*Charadrius veredus (Oriental Plover)*		IA	
98.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
99.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
100.	24386	*Vanellus tricolor (Banded Lapwing)*			
Cheluidae					
101.	25339	*Chelodina steindachneri (Flat-shelled Turtle)*			
Chironomidae					
102.		*Chironominae sp.*			
103.		*Tanypodinae sp.*			
Chthoniidae					
104.		*Tyrannochthonius aridus*			
Ciconiidae					
105.	25578	*Ephippiorhynchus asiaticus (Black-necked Stork)*			
106.	24387	*Ephippiorhynchus asiaticus subsp. australis (Black-necked Stork)*			
Coenagrionidae					
107.		*Coenagrionidae sp.*			
Columbidae					
108.	24401	*Geopelia cuneata (Diamond Dove)*			
109.	25585	*Geopelia striata (Zebra Dove)*			
110.	24404	*Geophaps plumifera (Spinifex Pigeon)*			
111.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
112.	24409	*Phaps chalcoptera (Common Bronzewing)*			
113.	24411	*Phaps histrionica (Flock Bronzewing, Flock Pigeon)*			
Conchostraca					
114.		*Conchostraca (unident.)*			
Corduliidae					
115.		*Corduliidae sp.*			
Corixidae					
116.		*Corixidae sp.*			
Corvidae					
117.	24416	*Corvus bennetti (Little Crow)*			
118.	25592	*Corvus coronoides (Australian Raven)*			
119.	25593	*Corvus orru (Torresian Crow)*			
120.	24418	*Corvus orru subsp. cecilae (Western Crow)*			
Cracticidae					
121.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
122.	25595	*Cracticus tibicen (Australian Magpie)*			
123.	25596	*Cracticus torquatus (Grey Butcherbird)*			
Cuculidae					
124.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
125.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
Culicidae					
126.		*Culicidae sp.*			
Cyclopidae					
127.		*Diacyclops cockingi*			
128.		*Diacyclops humphreysi humphreysi*			
129.		*Diacyclops scanloni*			
130.		*Diacyclops sobeprolatus*			
131.		*Diacyclops sp.*			
132.		*Metacyclops/Pescecyclops sp.*			
Dasyuridae					
133.	30903	*Dasycercus blythi (Brush-tailed Mulgara, Ampurta)*		P4	
134.	24091	*Dasykaluta rosamondae (Little Red Kaluta)*			
135.	24093	*Dasyurus hallucatus (Northern Quoll)*		T	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
136.	24095	*Ningaui timealeyi (Pilbara Ningaui)*			
137.	24101	*Planigale ingrami (Long-tailed Planigale)*			
138.	24102	*Planigale maculata (Common Planigale)*			
139.	24103	*Pseudantechinus macdonnellensis (Fat-tailed Pseudantechinus)*			
140.	24105	*Pseudantechinus roryi (Rory's Pseudantechinus)*			
141.	24106	*Pseudantechinus woolleyae (Woolley's Pseudantechinus)*			
142.	24115	*Sminthopsis longicaudata (Long-tailed Dunnart)*		P4	
143.	24116	*Sminthopsis macroura (Stripe-faced Dunnart)*			
144.	24117	*Sminthopsis ooldea (Ooldea Dunnart)*			
145.	24120	*Sminthopsis youngsoni (Lesser Hairy-footed Dunnart)*			
Dicaeidae					
146.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
Dicruridae					
147.	24443	*Grallina cyanoleuca (Magpie-lark)*			
148.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
149.	24454	*Rhipidura leucophrys subsp. leucophrys (Willie Wagtail)*			
150.	25616	*Rhipidura rufiventris (Northern Fantail)*			
Diplodactylidae					
151.	25456	*Crenadactylus ocellatus (Clawless Gecko)*			
152.	24919	*Crenadactylus ocellatus subsp. horni (Clawless Gecko)*			
153.	24926	*Diplodactylus conspicillatus (Fat-tailed Gecko)*			
154.	41404	*Diplodactylus galaxias (Northern Pilbara Beak-faced Gecko)*			
155.	24944	*Diplodactylus savagei (Southern Pilbara Beak-faced Gecko)*			
156.	30933	*Lucasium stenodactylum*			
157.	30934	*Lucasium wombeyi*			
158.	24976	*Oedura marmorata (Marbled Velvet Gecko)*			
159.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			
160.	24927	*Strophurus elderi*			
161.	24932	*Strophurus jeanae*			
Dytiscidae					
162.		*Dytiscidae sp.*			
Ecnomidae					
163.		*Ecnomidae sp.*			
Ectinosomatidae					
164.		*Pseudectinosoma galassiae*			
Elapidae					
165.	25332	*Acanthophis wellsi (Pilbara Death Adder)*			
166.	25331	*Brachyurophis approximans (North-western Shovel-nosed Snake)*			
167.	25468	*Demansia psammophis (Yellow-faced Whipsnake)*			
168.	25295	*Demansia psammophis subsp. cupreiceps (Yellow-faced Whipsnake)*			
169.	25297	*Demansia rufescens (Rufous Whipsnake)*			
170.	25301	*Furina ornata (Moon Snake)*			
171.	25254	*Parasuta monachus*			
172.	25261	*Pseudechis australis (Mulga Snake)*			
173.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
174.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
175.	25264	*Pseudonaja nuchalis (Gwardar, Northern Brown Snake)*			
176.	25269	*Suta fasciata (Rosen's Snake)*			
177.	25307	*Suta punctata (Spotted Snake)*			
178.	25311	*Vermicella snelli*			
Emballonuridae					
179.	24174	*Saccolaimus flaviventris (Yellow-bellied Sheath-tailed Bat)*			
180.	24175	*Taphozous georgianus (Common Sheath-tailed Bat)*			
Equidae					
181.	24257	*Equus asinus (Donkey)*	Y		
182.	24258	*Equus caballus (Horse)*	Y		
Estrildidae					
183.	24631	*Emblema pictum (Painted Finch)*			
184.	25685	*Neochmia ruficauda (Star Finch)*			
185.	30870	*Taeniopygia guttata (Zebra Finch)*			
Falconidae					
186.	25621	*Falco berigora (Brown Falcon)*			
187.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
188.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
189.	24473	*Falco hypoleucos (Grey Falcon)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
				T	
190.	25623	*Falco longipennis (Australian Hobby)*			
191.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
192.	24476	*Falco subniger (Black Falcon)*			
Felidae					
193.	24041	*Felis catus (Cat)*	Y		
Garypidae					
194.		*Synsphyronus heptatrichus*			
Gekkonidae					
195.	24956	*Gehyra pilbara*			
196.	24958	*Gehyra punctata*			
197.	24959	*Gehyra variegata*			
198.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
199.	24963	*Heteronotia planiceps*			
200.	24962	*Heteronotia spelea (Desert Cave Gecko, Pilbara Cave Gecko)*			
Gerridae					
201.		*Gerridae sp.*			
Glareolidae					
202.	24482	*Stiltia isabella (Australian Pratincole)*			
Gomphidae					
203.		*Gomphidae sp.*			
Hadziidae					
204.		*Nedsia nr hurlberti*			
205.		*Nedsia sp.*			
Halcyonidae					
206.	25547	*Dacelo leachii (Blue-winged Kookaburra)*			
207.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
208.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
Hipposideridae					
209.	43368	*Rhinonicteris aurantia (Orange Leaf-nosed bat)*		P4	
210.	48095	*Rhinonicteris aurantia (Pilbara) (Pilbara leaf-nosed bat)*		T	
Hirundinidae					
211.	24491	*Hirundo neoxena (Welcome Swallow)*			
212.	48060	*Petrochelidon ariel (Fairy Martin)*			
213.	48061	*Petrochelidon nigricans (Tree Martin)*			
Hydraenidae					
214.		*Hydraenidae sp.*			
Hydrophilidae					
215.		*Hydrophilidae sp.*			
Hydroptilidae					
216.		*Hydroptilidae sp.*			
Hylidae					
217.	25371	*Cyclorana australis (Giant Frog)*			
218.	25375	*Cyclorana maini (Sheep Frog)*			
219.	25392	*Litoria rubella (Little Red Tree Frog)*			
Ixodidae					
220.		*Amblyomma limbatum*			
Lamponidae					
221.		*Asadipus cape*			
222.		*Lampona ampeinna*			
223.		*Lamponina elongata*			
224.		*Lamponina scutata*			
225.		*Notsodipus bidgemia*			
226.		*Notsodipus capensis*			
227.		*Notsodipus meedo*			
Laridae					
228.	25643	*Sterna hybrida (Whiskered Tern)*			
Leptoceridae					
229.		*Leptoceridae sp.*			
Libellulidae					
230.		*Libellulidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Limnodynastidae					
231.	25422	*Neobatrachus aquilonius (Northern Burrowing Frog)*			
232.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
233.	25430	*Notaden nichollsi (Desert Spadefoot)*			
Lymnaeidae					
234.		*Lymnaeidae sp.*			
Macropodidae					
235.	25479	*Lagorchestes conspicillatus (Spectacled Hare-wallaby)*		P4	
236.	24122	*Lagorchestes conspicillatus subsp. leichardti (Spectacled Hare-wallaby (mainland))*		P4	
237.	24129	*Macropus agilis (Agile Wallaby)*			
238.	25489	*Macropus robustus (Euro, Biggada)*			
239.	24135	*Macropus robustus subsp. erubescens (Euro, Biggada)*			
240.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
241.	48034	*Osphranter robustus (Euro, Biggada)*			
242.	24144	*Petrogale rothschildi (Rothschild's Rock-wallaby)*			
Maluridae					
243.	25647	*Amytornis striatus (Striated Grasswren)*			
244.	24539	*Amytornis striatus subsp. striatus (Striated Grasswren (inland))*		P4	
245.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
246.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
247.	24556	*Stipiturus ruficeps subsp. ruficeps (Rufous-crowned Emu-wren)*			
Megadermatidae					
248.	24180	*Macroderma gigas (Ghost Bat)*		T	
Meliphagidae					
249.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
250.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
251.	24570	*Epthianura tricolor (Crimson Chat)*			
252.	42314	*Gavicalis virescens (Singing Honeyeater)*			
253.	24572	*Lacustroica whitei (Grey Honeyeater)*			
254.	25661	*Lichmera indistincta (Brown Honeyeater)*			
255.	24583	*Manorina flavigula (Yellow-throated Miner)*			
256.	25665	*Melithreptus gularis (Black-chinned Honeyeater)*			
257.	42323	*Ptilotula keartlandi (Grey-headed Honeyeater)*			
258.	48088	*Ptilotula penicillata (White-plumed Honeyeater)*			
Meropidae					
259.	24598	*Merops ornatus (Rainbow Bee-eater)*			
Molossidae					
260.	24181	*Chaerephon jobensis (Greater Northern Freetail-bat, Northern Mastiff Bat)*			
261.		*Mormopterus (Ozimops) lumsdenae*			Y
Motacillidae					
262.	25670	*Anthus australis (Australian Pipit)*			
Muridae					
263.	24217	*Leggadina lakedownensis (Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga)*		P4	
264.	24223	*Mus musculus (House Mouse)*	Y		
265.	24224	*Notomys alexis (Spinifex Hopping-mouse)*			
266.	24233	*Pseudomys chapmani (Western Pebble-mound Mouse, Ngadji)*		P4	
267.	24234	*Pseudomys delicatulus (Delicate Mouse)*			
268.	24235	*Pseudomys desertor (Desert Mouse)*			
269.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
270.	24248	*Zyzomys argurus (Common Rock-rat)*			
Myobatrachidae					
271.	25439	*Uperoleia glandulosa (Glandular Toadlet)*			
272.	25445	*Uperoleia russelli (Northwest Toadlet)*			
273.	41428	*Uperoleia saxatilis (Pilbara Toadlet)*			
NO FAMILY					
274.		*No invertebrates*			
Nematoda					
275.		*Nematoda sp. 20 (PSS)*			Y
Nemesiidae					
276.		*Aname mellosa*			
Notonectidae					
277.		*Notonectidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Oligochaeta					
278.		*Oligochaeta sp.*			
Olpiidae					
279.		*Indolpium sp.*			
Oonopidae					
280.		*Cavisternum clavatum*			
Ostracoda					
281.		*Ostracoda (unident.)*			
Otididae					
282.	24610	*Ardeotis australis (Australian Bustard)*			
Pachycephalidae					
283.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
284.	24611	*Colluricincla harmonica subsp. brunnea (Grey Shrike-thrush)*			
285.	24618	*Oreoica gutturalis (Crested Bellbird)*			
286.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
287.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
Parabathynellidae					
288.		*Atopobathynella sp. A*			
289.		*Chilibathynella sp.*			
290.		*Notobathynella sp.*			
Paradoxosomatidae					
291.		*Antichiropus sp.*			
Pardalotidae					
292.	24627	*Pardalotus rubricatus (Red-browed Pardalote)*			
293.	25682	*Pardalotus striatus (Striated Pardalote)*			
Pelecanidae					
294.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Petroicidae					
295.	47997	*Melanodryas cucullata (Hooded Robin)*			
296.	24659	*Petroica goodenovii (Red-capped Robin)*			
Phalacrocoracidae					
297.		*Microcarbo melanoleucos*			
298.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
299.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
300.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
301.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Phasianidae					
302.	25701	*Coturnix ypsilophora (Brown Quail)*			
303.	24672	*Coturnix ypsilophora subsp. cervina (Brown Quail)*			
Pholcidae					
304.		*Trichocyclus gnalooma*			
Phreodrilidae					
305.		*Phreodrilid with dissimilar ventral chaetae*			
Planorbidae					
306.		*Planorbidae sp.*			
Pleidae					
307.		*Pleidae sp.*			
Podargidae					
308.	25703	*Podargus strigoides (Tawny Frogmouth)*			
Podicipedidae					
309.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
310.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Pomatostomidae					
311.	25706	*Pomatostomus temporalis (Grey-crowned Babbler)*			
Prodidomidae					
312.		*Wydundra barrow*			
313.		*Wydundra kennedy*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Psittacidae					
314.		*Barnardius zonarius*			
315.	25715	*Cacatua roseicapilla (Galah)*			
316.	25716	*Cacatua sanguinea (Little Corella)*			
317.	24736	*Melopsittacus undulatus (Budgerigar)*			
318.	24738	*Neophema elegans (Elegant Parrot)*			
319.	24742	*Nymphicus hollandicus (Cockatiel)*			
320.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
Ptilonorhynchidae					
321.		*Ptilonorhynchus guttatus*			
322.	24757	*Ptilonorhynchus maculatus subsp. guttatus (Western Bowerbird)*			
Pygopodidae					
323.	24997	*Delma butleri*			
324.	24998	*Delma elegans*			
325.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
326.	25000	*Delma haroldi*			
327.	25001	*Delma nasuta*			
328.	25002	*Delma pax*			
329.	25004	*Delma tincta*			
330.	25005	*Lialis burtonis*			
331.	25009	*Pygopus nigriceps*			
Pyralidae					
332.		*Pyralidae sp.*			
Rallidae					
333.	25727	*Fulica atra (Eurasian Coot)*			
334.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
Recurvirostridae					
335.	25734	*Himantopus himantopus (Black-winged Stilt)*			
Salticidae					
336.		*Grayenulla waldockae*			
337.		*Lycidas sp. 1*			
338.		*Lycidas sp. 2*			
339.		*Zebraplatys keyserlingi*			
Scarabaeidae					
340.		*Heteronyx mimus*			
341.		*Heteronyx parvulus*			
342.		*Onthophagus consentaneus*			
343.		*Onthophagus margaretensis*			
344.		*Onthophagus mjobergi*			
345.		*Onthophagus neboissi*			
346.		*Onthophagus pugnacior*			
347.		*Tesserodon novaehollandiae*			
Scincidae					
348.	25015	*Carlia munda (Shaded-litter Rainbow Skink)*			
349.	25017	*Carlia triacantha (Desert Rainbow Skink)*			
350.	30893	*Cryptoblepharus buchananii*			
351.	30892	*Cryptoblepharus ustulatus*			
352.	25036	*Ctenotus duricola*			
353.	25039	*Ctenotus fallens*			
354.	25462	*Ctenotus grandis*			
355.	25043	*Ctenotus grandis subsp. titan*			
356.	25044	*Ctenotus hanloni*			
357.	25045	*Ctenotus helenae*			
358.	25048	*Ctenotus inornatus*			
359.	25052	*Ctenotus leonhardii*			
360.	25058	*Ctenotus nigrilineatus (Pin-striped Fine-snout Skink, Black-lined Ctenotus)*		P1	
361.	25463	*Ctenotus pantherinus (Leopard Ctenotus)*			
362.	25064	*Ctenotus pantherinus subsp. ocellifer (Leopard Ctenotus)*			
363.	25065	*Ctenotus pantherinus subsp. pantherinus (Leopard Ctenotus)*			
364.	25062	*Ctenotus piankai*			
365.	25072	*Ctenotus rubicundus*			
366.	25073	*Ctenotus saxatilis (Rock Ctenotus)*			
367.	25074	*Ctenotus schomburgkii*			
368.	25077	*Ctenotus serventyi*			
369.		*Ctenotus superciliaris*			
370.	25466	*Cyclodomorphus melanops (Slender Blue-tongue)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
371.	25090	*Cyclodomorphus melanops subsp. melanops (Slender Blue-tongue)*			
372.	41406	*Egernia cygnitos (Western Pilbara Spiny-tailed Skink)*			
373.	25092	*Egernia depressa (Southern Pygmy Spiny-tailed Skink)*			
374.	41408	*Egernia epsisolus (Eastern Pilbara Spiny-tailed Skink)*			
375.	25094	*Egernia formosa*			
376.	25109	*Eremiascincus richardsonii (Broad-banded Sand Swimmer)*			
377.	25125	*Lerista bipes*			
378.	30928	*Lerista clara*			
379.	30929	*Lerista jacksoni*			
380.	25146	*Lerista labialis*			
381.	25155	*Lerista muelleri*			
382.	30925	*Lerista verhmens*			
383.	25184	*Menetia greyii*			
384.	25491	*Menetia surda*			
385.	25495	*Morethia ruficauda*			
386.	25193	*Morethia ruficauda subsp. exquisita*			
387.	25499	*Notoscincus ornatus*			
388.	25197	*Notoscincus ornatus subsp. ornatus*			
389.	25199	*Proablepharus reginae*			
390.	25202	*Tiliqua multifasciata (Central Blue-tongue)*			
Scolopacidae					
391.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
392.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
Scolopendridae					
393.		*Arthrorhabdus paucispinus*			
394.		*Ethmostigmus curtipes*			
395.		*Scolopendra morsitans*			
Scutigeridae					
396.		*Pilbarascutigera incola*			
Sparassidae					
397.		*Heteropoda hermitis*			
398.		*Pediana horni*			
Strigidae					
399.	25747	*Ninox connivens (Barking Owl)*			
Sylviidae					
400.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
401.	24837	*Eremiornis carteri (Spinifex-bird)*			
Tachyglossidae					
402.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
Terapontidae					
403.		*Leiopotherapon unicolor*			
Threskiornithidae					
404.	24842	*Platalea regia (Royal Spoonbill)*			
405.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Thylacomyidae					
406.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
Trigoniulidae					
407.		*Austrostrophus stictopygus*			
Trochanteriidae					
408.		*Fissarena castanea*			
Trombidiformes					
409.		*Acariformes sp.*			
Turnicidae					
410.	24851	*Turnix velox (Little Button-quail)*			
Typhlopidae					
411.	44634	*Anilios ganei (Gane's blind snake (Pilbara))*		P1	
Urodacidae					
412.		*Urodacus armatus*			
413.		*Urodacus hoplurus*			
Varanidae					
414.	25209	*Varanus acanthurus (Spiny-tailed Monitor)*			
415.	25210	*Varanus brevicauda (Short-tailed Pygmy Monitor)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
416.	25212	*Varanus eremius (Pygmy Desert Monitor)*			
417.	25216	*Varanus giganteus (Perentie)*			
418.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
419.	25524	*Varanus panoptes (Yellow-spotted Monitor)*			
420.	25222	*Varanus panoptes subsp. panoptes*			
421.	25223	*Varanus panoptes subsp. rubidus*			
422.	25224	*Varanus pilbarensis (Pilbara Rock Monitor, Northern Pilbara Rock Goanna)*			
423.		*Varanus sp.*			
424.	25526	*Varanus tristis (Racehorse Monitor)*			
425.	25227	*Varanus tristis subsp. tristis (Racehorse Monitor)*			
Vespertilionidae					
426.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
427.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
428.	24200	*Scotorepens greyii (Little Broad-nosed Bat)*			
429.	24205	*Vespadelus finlaysoni (Finlayson's Cave Bat)*			
Zodariidae					
430.		*Australutica sp.1*			
431.		*Masasteron tealei*			
432.		*Minasteron minusculum*			
433.		*Spinasteron woodstock*			
Zosteropidae					
434.	24857	*Zosterops luteus (Yellow White-eye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix D
Fauna Habitat Assessment Site Data

NS-TS01

Project:	North Star Junction				
Date	3/22/2022		**Personnel**	LC	
Zone	50	**Easting**	681650	**Northing**	7663066
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Ironstone,Quartz	
Soil type	Sandy clay		**Surface stone cover**	25 - 50%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	High quality		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	03bad0d5-6016-4f3d-94c5-37d0aa8d0430

NS-TS02

Project:	North Star Junction				
Date	3/16/2022		**Personnel**	LC	
Zone	50	**Easting**	684151	**Northing**	7662854
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Laterite,Quartz	
Soil type	Sandy clay		**Surface stone cover**	50 - 75%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Unknown		**Water Source**	Absent	
Disturbance	Weeds		**Microhabitats**	Hummocks,Leaf litter,Peeling bark,Rock crevices,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Hummock grassland (50-80%)		*Triodia sp.*	

Fulcrum photo ID	203bc79a-25cc-422c-801e-cb4fd20e2070

NS-TS03

Project:	North Star Junction				
Date	3/21/2022		**Personnel**	LC	
Zone	50	**Easting**	696146	**Northing**	7658716
Landform and soil			**Rock**		
Landform	Drainage line		**Rock type/s**	Calcrete,Granite	
Soil type	Clay		**Surface stone cover**	5 - 25%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Good		**Habitat Features**		
Fire History	Unknown		**Water Source**	Absent	
Disturbance	Vehicle tracks,Weeds		**Microhabitats**	Hollows - trees,Peeling bark,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)		*Eucalyptus sp.*	
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)		*Acacia sp.*	
Ground stratum	Mid (0.5-1 m)	Tussock grassland (50-80%)		*Buffel grass*	

Fulcrum photo ID	ecba03fb-1697-4dda-8452-6d135d14fe96

NS-TS04

Project:	North Star Junction				
Date	3/21/2022		**Personnel**	LC	
Zone	50	**Easting**	694003	**Northing**	7655033
Landform and soil			**Rock**		
Landform	Drainage line		**Rock type/s**	Granite,Quartz	
Soil type	Clay		**Surface stone cover**	75 - 100%	
Soil colour	Brown,Orange,Red		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Hummocks,Leaf litter,Peeling bark,Rock crevices,Woody debris	
Introduced fauna					
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)		*Acacia sp.*	
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)		*Triodia sp.*	

Fulcrum photo ID	ee200510-4146-423e-a324-f49f918230c4

NS-TS05

Project:	North Star Junction				
Date	3/17/2022		**Personnel**	LC	
Zone	50	**Easting**	692131	**Northing**	7655218
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Ironstone	
Soil type	Sand		**Surface stone cover**	5 - 25%	
Soil colour	Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Unknown		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Leaf litter,Peeling bark,Woody debris	
Introduced fauna					
Vegetation					
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*		
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Triodia sp.*		

Fulcrum photo ID	4af72495-0dd9-46b2-b597-a5964168c1e5

NS-TS06

Project:	North Star Junction				
Date	3/17/2022		**Personnel**	LC	
Zone	50	**Easting**	693434	**Northing**	7651350
Landform and soil			**Rock**		
Landform	Drainage line		**Rock type/s**		
Soil type	Rock		**Surface stone cover**	25 - 50%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	Disturbed		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	Clearing,Overgrazing,Vehicle tracks		**Microhabitats**	Leaf litter,Rock crevices,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)			
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*		

Fulcrum photo ID	b3b2813d-c060-47a1-9f13-8cc4686b9267

NS-TS07

Project:	North Star Junction				
Date	3/22/2022		**Personnel**	LC	
Zone	50	**Easting**	689150	**Northing**	7643958
Landform and soil			**Rock**		
Landform	Drainage line		**Rock type/s**	Granite,Quartz	
Soil type	Sandy clay		**Surface stone cover**	5 - 25%	
Soil colour	Grey,White		**Surface stone size classes present**	Boulders (>2 m)	
Condition					
Quality	High quality		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	Infrastructure		**Microhabitats**	Hummocks,Rock crevices	
Introduced fauna	Dog				
Vegetation					
Upper stratum	Absent				
Mid stratum					
Ground stratum	Low (>0.5 m)	Closed hummock grassland (>80%)		*Triodia sp.*	

Fulcrum photo ID	cf68825b-cbb1-4b86-9029-8c9f38b7478a

NS-BAT01

Project:	North Star Junction				
Date	3/21/2022		**Personnel**	LC	
Zone	50	**Easting**	696122	**Northing**	7656252
Landform and soil			**Rock**		
Landform	Outcrop/breakaway		**Rock type/s**	Granite,Quartz	
Soil type	Clay		**Surface stone cover**	75 - 100%	
Soil colour	Brown,Orange,Red		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm),Rocks (20 - 60 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Exfoliating rock,Hummocks,Leaf litter,Peeling bark,Rock crevices,Woody debris	
Introduced fauna					
Vegetation					
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)		*Acacia inaequilatera*	
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)		*Acacia sp.*	
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)		*Triodia sp.*	

Fulcrum photo ID	19281a40-c7ab-4a93-bc3e-6546f7950ab3

NS-SRE01

Project:	North Star Junction				
Date	3/21/2022		**Personnel**	LC	
Zone	50	**Easting**	691538	**Northing**	7658936
Landform and soil			**Rock**		
Landform	Drainage line		**Rock type/s**	Granite	
Soil type	Sandy clay		**Surface stone cover**	0 - 5%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	Good		**Habitat Features**		
Fire History	Unknown		**Water Source**	Absent	
Disturbance	Weeds		**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Low (<10 m)	Woodland (20-50%)	*Eucalyptus sp.*		
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Triodia sp. and buffel grass*		

Fulcrum photo ID	ad33b11f-811f-45e7-9e21-04b344a4a84f

NS-HAB01

Project:	North Star Junction				
Date	3/23/2022		**Personnel**	LC	
Zone	50	**Easting**	681688	**Northing**	7662568
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete	
Soil type	Sand		**Surface stone cover**	0 - 5%	
Soil colour	Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Leaf litter,Termite mounds,Woody debris	
Introduced fauna	Cat				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Triodia sp.*		

Fulcrum photo ID	d6b6a1a3-a4b8-4f59-8252-35cef7976d42

NS-HAB02

Project:	North Star Junction				
Date	3/24/2022		**Personnel**	LC,LB	
Zone	50	**Easting**	692585	**Northing**	7655434
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Granite,Ironstone,Quartz	
Soil type	Clay		**Surface stone cover**	50 - 75%	
Soil colour	Orange,Red		**Surface stone size classes present**	Stones (2 - 6 cm)	
Condition					
Quality	High quality		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Termite mounds,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	81754087-a88b-44a7-9964-a8898ae4e295

NS-HAB03

Project:	North Star Junction				
Date	3/24/2022		**Personnel**	LC,LB	
Zone	50	**Easting**	691866	**Northing**	7656723
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Ironstone,Quartz	
Soil type	Sandy clay		**Surface stone cover**	75 - 100%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Hummocks	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)		*Corymbia sp.*	
Mid stratum	Low (0.5-1 m)	Isolated shrubs and/or heath shrubs (<0.25%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	d62b3bc7-f5d7-4642-8490-8f4d0d6afa6a

NS-HAB04

Project:	North Star Junction				
Date	3/24/2022		**Personnel**	LC	
Zone	50	**Easting**	691197	**Northing**	7656802
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Ironstone,Quartz	
Soil type	Clay		**Surface stone cover**	50 - 75%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Hummocks,Leaf litter,Peeling bark,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Corymbia sp.*		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Triodia sp.*		

Fulcrum photo ID	49203304-60ae-4c76-b4b4-dfb8210d79e1

NS-HAB05

Project:	North Star Junction				
Date	3/24/2022		**Personnel**	LC	
Zone	50	**Easting**	691473	**Northing**	7656489
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Ironstone,Quartz	
Soil type	Sand		**Surface stone cover**	5 - 25%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Hummocks,Leaf litter,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Triodia sp.*		

Fulcrum photo ID	51e744af-7cda-4924-b590-be5c5d7e0a3a

NS-HAB06

Project:	North Star Junction				
Date	3/24/2022		**Personnel**	LC	
Zone	50	**Easting**	691642	**Northing**	7656590
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Ironstone,Quartz	
Soil type	Sandy loam		**Surface stone cover**	5 - 25%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	Vehicle tracks		**Microhabitats**	Hummocks,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	77cfca95-d97d-44fe-961a-99a5ef6aab87

NS-HAB07

Project:	North Star Junction				
Date	3/25/2022		**Personnel**	ML	
Zone	50	**Easting**	693276	**Northing**	7651430
Landform and soil			**Rock**		
Landform	Gully		**Rock type/s**	Calcrete,Granite,Ironstone,Quartz,Chert	
Soil type	Clay loam		**Surface stone cover**	50 - 75%	
Soil colour	Brown		**Surface stone size classes present**	Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm),Rocks (20 - 60 cm),Big Rocks (60 cm - 2 m)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**		
Disturbance	Overgrazing		**Microhabitats**	Hummocks,Leaf litter,Peeling bark,Rock crevices,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)		*Eucalyptus sp.*	
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)		*Melaleuca sp.*	
Ground stratum	Mid (0.5-1 m)	Sparse hummock grassland (0.25-20%)		*Triodia sp. and tussock grasses*	

Fulcrum photo ID	7589c8a5-3d8f-4012-bc9d-76d8ecb1a948

NS-HAB08

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC,LB	
Zone	50	**Easting**	689507	**Northing**	7643970
Landform and soil			**Rock**		
Landform	Outcrop/breakaway		**Rock type/s**	Granite	
Soil type	Sand		**Surface stone cover**	50 - 75%	
Soil colour	Brown		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm),Rocks (20 - 60 cm),Big Rocks (60 cm - 2 m),Boulders (>2 m)	
Condition			**Habitat Features**		
Quality	Good		**Water Source**	Absent	
Fire History	Recently burnt (<1 year)		**Microhabitats**	Exfoliating rock,Rock crevices,Woody debris	
Disturbance	None observed				
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*		
Ground stratum	Absent	Sparse hummock grassland (0.25-20%)	*Prostrate herb*		

Fulcrum photo ID	07f333a6-93fa-49c4-80d6-dd6faa1914dc

NS-HAB09

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC	
Zone	50	**Easting**	682986	**Northing**	7659285
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Quartz	
Soil type	Sand		**Surface stone cover**	0 - 5%	
Soil colour	Orange		**Surface stone size classes present**	Pebbles (<0.6 cm)	
Condition			**Habitat Features**		
Quality	High quality		**Water Source**	Absent	
Fire History	Burnt (1-5 years)		**Microhabitats**	Burrows,Hummocks,Leaf litter,Termite mounds,Woody debris	
Disturbance	None observed				
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia sp.*		
Ground stratum	Mid (0.5-1 m)	Open hummock grassland (20-50%)	*Triodia sp.*		

Fulcrum photo ID	a1cda28c-11d1-4851-a4ee-8dcc1f122f17

NS-HAB10

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC	
Zone	50	**Easting**	683261	**Northing**	7659347
Landform and soil			**Rock**		
Landform	Outcrop/breakaway		**Rock type/s**	Granite,Ironstone,Quartz	
Soil type	Clay loam		**Surface stone cover**	75 - 100%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	High quality		**Habitat Features**		
Fire History	Unknown		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Leaf litter,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	df3d28aa-8ea5-4b2f-ab92-a59d3d0c2f76

NS-HAB11

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC	
Zone	50	**Easting**	683124	**Northing**	7659145
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Quartz	
Soil type	Sand		**Surface stone cover**	0 - 5%	
Soil colour	Orange		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	High quality		**Habitat Features**		
Fire History	Burnt (1-5 years)		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Termite mounds,Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Hummock grassland (50-80%)		*Triodia sp.*	

Fulcrum photo ID	51480f21-1b65-4ec9-bebd-0fe25228ec8e

NS-HAB12

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LB	
Zone	50	**Easting**	693140	**Northing**	7641315
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	None	
Soil type	Sand		**Surface stone cover**		
Soil colour	Brown,Orange		**Surface stone size classes present**		
Condition					
Quality	Disturbed		**Habitat Features**		
Fire History	Recently burnt (<1 year)		**Water Source**	Absent	
Disturbance	Overgrazing		**Microhabitats**	Hollows - logs,Leaf litter,Termite mounds,Woody debris	
Introduced fauna					
Vegetation					
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)		*Corymbia sp.*	
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)		*Burnt Acacia sp.*	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		*Tussock grass*	

Fulcrum photo ID c14626eb-22c3-4638-834c-99ed14dca750

NS-HAB13

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LB	
Zone	50	**Easting**	692677	**Northing**	7641402
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Granite,Ironstone,Quartz	
Soil type	Sandy loam		**Surface stone cover**	25 - 50%	
Soil colour	Brown,Orange		**Surface stone size classes present**	Pebbles (<0.6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	None observed		**Microhabitats**	Hummocks,Leaf litter,Termite mounds	
Introduced fauna					
Vegetation					
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)		*Corymbia sp.*	
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		*Triodia sp.*	

Fulcrum photo ID 993bed78-95fc-4eab-a97b-441a6e9eafc2

NS-HAB14

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	ML	
Zone	50	**Easting**	691373	**Northing**	7645531
Landform and soil			**Rock**		
Landform	Undulating plain		**Rock type/s**	Quartz	
Soil type	Loam		**Surface stone cover**	75 - 100%	
Soil colour	Brown,Red		**Surface stone size classes present**	Small Stones (0.6 - 2 cm),Stones (2 - 6 cm),Small Rocks (6 - 20 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	Overgrazing		**Microhabitats**	Hummocks,Termite mounds	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia sp.*	

Fulcrum photo ID	e3e71770-0046-4117-a9c3-f76b35b3ad08

NS-HAB15

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC	
Zone	50	**Easting**	691049	**Northing**	7645580
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	Calcrete,Quartz	
Soil type	Clay loam		**Surface stone cover**	50 - 75%	
Soil colour	Brown		**Surface stone size classes present**	Pebbles (<0.6 cm),Small Stones (0.6 - 2 cm),Stones (2 - 6 cm)	
Condition					
Quality	Very good		**Habitat Features**		
Fire History	Recently burnt (<1 year)		**Water Source**	Absent	
Disturbance			**Microhabitats**	Hummocks,Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)		*Acacia sp.*	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		*Triodia sp.*	

Fulcrum photo ID	0dc698c7-3029-480a-9019-693e949b0667

NS-HAB16

Project:	North Star Junction				
Date	3/26/2022		**Personnel**	LC	
Zone	50	**Easting**	690696	**Northing**	7645593

Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	None
Soil type	Sandy loam	**Surface stone cover**	0 - 5%
Soil colour	Orange	**Surface stone size classes present**	Pebbles (<0.6 cm)
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Recently burnt (<1 year)	**Water Source**	Absent
Disturbance		**Microhabitats**	Termite mounds,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Corymbia sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia sp.*
Ground stratum	Low (>0.5 m)	Sparse tussock grassland (0.25-20%)	*Grass and mixed herbs*

Fulcrum photo ID	b8a53b1f-3374-4cd8-a65b-1c497616c897

Appendix E
Vertebrate Fauna Recorded During the Field Survey

Terrestrial Vertebrate Fauna Inventory - Records by Site

Key: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation Priority List, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999, Recorded - Recorded during the current field survey, * - Introduced species

Conservation Status: CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Family	Scientific Name	Common Name	Conservation Status		Site									Other	Total
			State	Commonwealth	NS-TS01	NS-TS02	NS-TS03	NS-TS04	NS-TS05	NS-TS06	NS-TS07	NS-BAT01	NS-SRE01		
Amphibians															
Myobatrachidae	*Uperoleia saxatilis*	Pilbara Toadlet				4					4				8
Pelodryadidae	*Cyclorana maini*	Sheep Frog			1										1
	Litoria rubella	Little Red Tree Frog					4							3	7
Birds															
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk												1	1
	Haliastur sphenurus	Whistling Kite		MA										1	1
	Hieraaetus morphnoides	Little Eagle												1	1
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra												1	1
	Todiramphus pyrrhopygius	Red-backed Kingfisher												1	1
Anatidae	*Anas gracilis*	Grey Teal												10	10
Artamidae	*Artamus cinereus*	Black-faced Woodswallow												10	10
	Cacatua sanguinea westralensis	Western Little Corella												3	3
Cacatuidae	*Eolophus roseicapilla*	Galah												2	2
	Nymphicus hollandicus	Cockatiel												30	30
	Coracina novaehollandiae	Black-faced Cuckooshrike												3	3
Campephagidae	*Eurostopodus argus*	Spotted Nightjar		MA										2	2
Caprimulgidae	*Elseyornis melanops*	Black-fronted Dotterel		MA										1	1
Charadriidae	*Geopelia cuneata*	Diamond Dove												6	6
Columbidae	*Geophaps plumifera*	Spinifex Pigeon					1				1			52	54
	Ocyphaps lophotes	Crested Pigeon												27	27
	Corvus bennetti	Little Crow												1	1
Corvidae	*Corvus orru*	Torresian Crow									4			8	12
	Cracticus nigrogularis	Pied Butcherbird												4	4
Estrildidae	*Taeniopygia castanotis*	Australian Zebra Finch												129	129

Family	Scientific Name	Common Name	Conservation Status		Site									Other	Total
			State	Common wealth	NS-TS01	NS-TS02	NS-TS03	NS-TS04	NS-TS05	NS-TS06	NS-TS07	NS-BAT01	NS-SRE01		
Falconidae	*Falco berigora*	Brown Falcon												2	2
	Falco cenchroides	Nankeen Kestral		MA										3	3
Hirundinidae	*Petrochelidon ariel*	Fairy Martin												4	4
Maluridae	*Amytornis whitei whitei*	Pilbara Grasswren	P4 (listed as *A. striatus striatus*)											1	1
	Malurus assimilis	Purple-backed Fairywren												1	1
	Malurus leucopterus	White-winged Fairywren												6	6
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater												7	7
	Manorina flavigula	Yellow-throated Miner												6	6
	Ptilotula keartlandi	Grey-headed Honeyeater												4	4
	Ptilotula penicillata	White-plumed Honeyeater												2	2
Meropidae	*Merops ornatus*	Rainbow Bee-eater		MA										14	14
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		MA										3	3
Otididae	*Ardeotis australis*	Australian Bustard												1	1
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush												1	1
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote												2	2
Psittacidae	*Barnardius zonarius*	Australian Ringneck												8	8
	Melopsittacus undulatus	Budgerigar												40	40
Mammals															
Bovidae	**Bos primigenius taurus*	European Cattle								2				24	26
Canidae	**Canis familiaris*	Dog/Dingo								1				2	3
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	VU	VU						3	2			2	7
	Ningaui timealeyi	Pilbara Ningaui						1		2	4				7
Emballonuridae	*Taphozous spp.*						1	1		1	1	1			5
Equidae	**Equus ferus caballus*	Horse												19	19
Felidae	**Felis catus*	Cat									1			1	2
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu					1	1		3				3	8
Molossidae	*Chaerephon jobensis colonicus*	Greater Northern Free-tailed Bat					1	1		1	1	1			5
Muridae	*Notomys alexis alexis*	Spinifex Hopping-mouse												1	1

Family	Scientific Name	Common Name	Conservation Status		Site									Other	Total
			State	Common wealth	NS-TS01	NS-TS02	NS-TS03	NS-TS04	NS-TS05	NS-TS06	NS-TS07	NS-BAT01	NS-SRE01		
	Pseudomys chapmani	Western Pebble-mound Mouse	P4											20	20
	Pseudomys hermannsburgensis	Sandy Inland Mouse					2								2
	Zyzomys argurus	Common Rock-rat									1				1
Rhinonycteridae	*Rhinonicteris aurantia* Pilbara form	Pilbara Leaf-nosed Bat	VU	VU						16					16
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat					1	1		1	1	1			5
	Scotorepens greyii	Little Broad-nosed Bat					1	1		1	1	1			5
	Vespadelus finlaysoni	Finlayson's Cave Bat					1	1		1	1	1			5
Reptilian															
Agamidae	*Ctenophorus caudicinctus*	Western Ring-tailed Dragon						4			1			7	12
	Ctenophorus isolepis	Central Military Dragon			1	7	1		4					19	32
	Ctenophorus nuchalis	Central Netted Dragon												1	1
	Diporiphora vescus	Northern Pilbara Tree Dragon												1	1
	Gowidon longirostris	Long-nosed Dragon				1	1							5	7
	Pogona minor minor	Western Bearded Dragon												1	1
Carphodactylidae	*Nephrurus levis*	Smooth Knob-tailed Gecko									1				1
Diplodactylidae	*Diplodactylus bilybara*	Western Fat-tailed Gecko			1	12									13
	Lucasium stenodactylus	Sand-plain Gecko				4	2	3	1						10
	Strophurus elderi	Jewelled Gecko					1								1
Elapidae	*Brachyurophis approximans*	North-western Shovel-nosed Snake									1				1
	Demansia psammophis reticulata	Reticulated Whipsnake				2									2
	Furina ornata	Moon Snake							1						1
	Pseudonaja modesta	Ringed Brown Snake				1			1						2
Gekkonidae	*Gehyra pilbara*	Pilbara Dtella												1	1
	Gehyra punctata	Spotted Pilbara Rock Dtella												5	5
	Gehyra variegata	Variegated Gehyra				2		1							3
	Heteronotia binoei	Bynoe's Gecko							3	4	5				12
Pygopodidae	*Delma pax*	Peaceful Delma				1	2								3
	Delma tincta	Excitable Delma						1			1				2
	Lialis burtonis	Burton's Snake-lizard				1					3				4

Family	Scientific Name	Common Name	Conservation Status		Site									Other	Total
			State	Common wealth	NS-TS01	NS-TS02	NS-TS03	NS-TS04	NS-TS05	NS-TS06	NS-TS07	NS-BAT01	NS-SRE01		
	Pygopus nigriceps	Western Hooded Scaly-foot									1				1
Pythonidae	*Antaresia childreni*	Children's Python												1	1
	Liasis olivaceus barroni	Pilbara Olive Python	VU	VU										1	1
Scincidae	*Carlia munda*	Shaded-litter Rainbow-skink					6	2		3	1			1	13
	Ctenotus duricola	Eastern Pilbara Lined Ctenotus			4	13			1	1	2			2	23
	Ctenotus grandis	Grand Ctenotus			2	2		1	5	2	49				61
	Ctenotus hanloni	Nimble Ctenotus			2	5	7	3	9	8	7			1	42
	Ctenotus helenae	Clay-soil Ctenotus			1						1				2
	Ctenotus pantherinus	Leopard Ctenotus			4	6		2	1	1	2			1	17
	Ctenotus saxatilis	Rock Ctenotus					1	2		4	9		1	1	18
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue									1				1
	Egernia epsisolus	Eastern Pilbara Spiny-tailed Skink									1			1	2
	Lerista bipes	North-western Sandslider			3	4	9		7		1				24
	Lerista clara	Sharp-blazed Three-toed Slider			1	1									2
	Lerista jacksonii	Jackson's Three-toed Slider						4							4
	Liopholis striata	Night Skink												1	1
	Menetia greyii	Common Dwarf Skink				1									1
	Morethia ruficauda	Lined Fire-tailed Skink			1	1				5	1				8
	Notoscincus ornatus	Ornate Soil-crevice Skink				1	1		1						3
	Proablepharus reginae	Western Soil-crevice Skink									1				1
	Tiliqua multifasciata	Central Blue-tongue			1				3		2				6
Typhlopidae	*Anilios ammodytes*	Pilbara Blind Snake							1		2				3
	Anilios grypus	Long-beaked Blind Snake				3					4				7
	Anilios pilbarensis	Pilbara Hook-snouted Blind Snake			1										1
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna								1	5				6
	Varanus brevicauda	Short-tailed Pygmy Goanna			2	2			1						5
	Varanus bushi	Pilbara Mulga Goanna					1								1
	Varanus eremius	Pygmy Desert Goanna					1		4						5
	Varanus giganteus	Perentie									1				1

Family	Scientific Name	Common Name	Conservation Status		Site									Other	Total
			State	Common wealth	NS-TS01	NS-TS02	NS-TS03	NS-TS04	NS-TS05	NS-TS06	NS-TS07	NS-BAT01	NS-SRE01		
	Varanus gouldii	Bungarra Or Sand Goanna					1		1					1	3
	Varanus panoptes rubidus	Yellow-Spotted Monitor						1							1
	Varanus tristis	Racehorse Goanna					2								2

Terrestrial Vertebrate Fauna Inventory - Records by Detection Method

Key: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation Priority List, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999, Recorded - Recorded during the current field survey, * - Introduced species

Conservation Status: CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Family	Scientific Name	Common Name	Conservation Status		Detection Method															Total
			State	Common wealth	ARU	Bucket	Burrow	Call	Camera	Funnel	Hand capture	Mound	Nest	Pipe	Scat	Sighting	Sighting - overhead	Tracks	Wet pitfall bycatch	
Amphibians																				
Myobatrachidae	*Uperoleia saxatilis*	Pilbara Toadlet				4								4						8
Pelodryadidae	*Cyclorana maini*	Sheep Frog				1														1
	Litoria rubella	Little Red Tree Frog				2								1		3			1	7
Birds																				
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk														1				1
	Haliastur sphenurus	Whistling Kite		MA													1			1
	Hieraaetus morphnoides	Little Eagle															1			1
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra						1												1
	Todiramphus pyrrhopygius	Red-backed Kingfisher														1				1
Anatidae	*Anas gracilis*	Grey Teal														10				10
Artamidae	*Artamus cinereus*	Black-faced Woodswallow														10				14
	Cacatua sanguinea westralensis	Western Little Corella														3				4
Cacatuidae	*Eolophus roseicapilla*	Galah														30				2
	Nymphicus hollandicus	Cockatiel														2				3
	Coracina novaehollandiae	Black-faced Cuckooshrike														3				30
Campephagidae	*Eurostopodus argus*	Spotted Nightjar		MA												1	1			3
Caprimulgidae	*Elseyornis melanops*	Black-fronted Dotterel		MA												1				2
Charadriidae	*Geopelia cuneata*	Diamond Dove														6				1
Columbidae	*Geophaps plumifera*	Spinifex Pigeon							2							52				6
	Ocyphaps lophotes	Crested Pigeon														27				54
	Corvus bennetti	Little Crow						1												27
Corvidae	*Corvus orru*	Torresian Crow						1	4							2	5			1
	Cracticus nigrogularis	Pied Butcherbird														4				13
Estrildidae	*Taeniopygia castanotis*	Australian Zebra Finch						18					1			110				129
Falconidae	*Falco berigora*	Brown Falcon														2				2
	Falco cenchroides	Nankeen Kestral		MA												3				3
Hirundinidae	*Petrochelidon ariel*	Fairy Martin														4				4
Maluridae	*Amytornis whitei whitei*	Pilbara Grasswren	P4 (listed as *A. striatus striatus*)													6				1

Family	Scientific Name	Common Name	Conservation Status		Detection Method																Total
			State	Common wealth	ARU	Bucket	Burrow	Call	Camera	Funnel	Hand capture	Mound	Nest	Pipe	Scat	Sighting	Sighting - overhead	Tracks	Wet pitfall bycatch	
	Malurus assimilis	Purple-backed Fairywren														1				1
	Malurus leucopterus	White-winged Fairywren														1				6
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater						4								3				7
	Manorina flavigula	Yellow-throated Miner						1								5				6
	Ptilotula keartlandi	Grey-headed Honeyeater														4				4
	Ptilotula penicillata	White-plumed Honeyeater														2				2
Meropidae	*Merops ornatus*	Rainbow Bee-eater		MA				8								6				14
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		MA												3				3
Otididae	*Ardeotis australis*	Australian Bustard														1				1
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush			1															1
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote						2												2
Psittacidae	*Barnardius zonarius*	Australian Ringneck														40				8
	Melopsittacus undulatus	Budgerigar														8				40
Mammals																				
Bovidae	**Bos primigenius taurus*	European Cattle							2						18	1		5		26
Canidae	**Canis familiaris*	Dog/Dingo							1									2		3
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	VU	VU					5							1		1		7
	Ningaui timealeyi	Pilbara Ningaui				3								3					1	7
Emballonuridae	*Taphozous spp.*				5															5
Equidae	**Equus ferus caballus*	Horse														3	7	9		19
Felidae	**Felis catus*	Cat							1						1					2
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu							5						1	1		1		8
Molossidae	*Chaerephon jobensis colonicus*	Greater Northern Free-tailed Bat			5															5
Muridae	*Notomys alexis alexis*	Spinifex Hopping-mouse																1		1
	Pseudomys chapmani	Western Pebble-mound Mouse	P4									20								20
	Pseudomys hermannsburgensis	Sandy Inland Mouse				1								1						2
	Zyzomys argurus	Common Rock-rat							1											1
Rhinonycteridae	*Rhinonicteris aurantia* Pilbara form	Pilbara Leaf-nosed Bat	VU	VU	16															16
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat			5															5
	Scotorepens greyii	Little Broad-nosed Bat			5															5
	Vespadelus finlaysoni	Finlayson's Cave Bat			5															5
Reptilian																				
Agamidae	*Ctenophorus caudicinctus*	Western Ring-tailed Dragon							3					1		7			1	12
	Ctenophorus isolepis	Central Military Dragon				5								8		19				32

Family	Scientific Name	Common Name	Conservation Status		Detection Method															Total
			State	Common wealth	ARU	Bucket	Burrow	Call	Camera	Funnel	Hand capture	Mound	Nest	Pipe	Scat	Sighting	Sighting - overhead	Tracks	Wet pitfall bycatch	
	Ctenophorus nuchalis	Central Netted Dragon									1									1
	Diporiphora vescus	Northern Pilbara Tree Dragon									1									1
	Gowidon longirostris	Long-nosed Dragon				1			1							5				7
	Pogona minor minor	Western Bearded Dragon														1				1
Carphodactylidae	*Nephrurus levis*	Smooth Knob-tailed Gecko												1						1
Diplodactylidae	*Diplodactylus bilybara*	Western Fat-tailed Gecko				10				2				1						13
	Lucasium stenodactylus	Sand-plain Gecko				1														1
	Strophurus elderi	Jewelled Gecko				7								3						10
Elapidae	*Brachyurophis approximans*	North-western Shovel-nosed Snake				1														1
	Demansia psammophis reticulata	Reticulated Whipsnake								2										2
	Furina ornata	Moon Snake								1										1
	Pseudonaja modesta	Ringed Brown Snake								2										2
Gekkonidae	*Gehyra pilbara*	Pilbara Dtella														1				1
	Gehyra punctata	Spotted Pilbara Rock Dtella														5				5
	Gehyra variegata	Variegated Gehyra								3										3
	Heteronotia binoei	Bynoe's Gecko				3				5				4						12
Pygopodidae	*Delma pax*	Peaceful Delma								2				1						3
	Delma tincta	Excitable Delma								1									1	2
	Lialis burtonis	Burton's Snake-lizard				2				1				1						4
	Pygopus nigriceps	Western Hooded Scaly-foot				1														1
Pythonidae	*Antaresia childreni*	Children's Python														1				1
	Liasis olivaceus barroni	Pilbara Olive Python	VU	VU												1				1
Scincidae	*Carlia munda*	Shaded-litter Rainbow-skink				2				4				3		1			3	13
	Ctenotus duricola	Eastern Pilbara Lined Ctenotus				14				4				3		2				23
	Ctenotus grandis	Grand Ctenotus				15				29				16					1	61
	Ctenotus hanloni	Nimble Ctenotus				11				27				3		1				42
	Ctenotus helenae	Clay-soil Ctenotus								2										2
	Ctenotus pantherinus	Leopard Ctenotus				5				8				3		1				17
	Ctenotus saxatilis	Rock Ctenotus				1			1	2				2		1			11	18
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue												1						1
	Egernia epsisolus	Eastern Pilbara Spiny-tailed Skink							1		1									2
	Lerista bipes	North-western Sandslider				19				1				4						24
	Lerista clara	Sharp-blazed Three-toed Slider								1				1						2
	Lerista jacksonii	Jackson's Three-toed Slider																	4	4

Family	Scientific Name	Common Name	Conservation Status		Detection Method															Total
			State	Common wealth	ARU	Bucket	Burrow	Call	Camera	Funnel	Hand capture	Mound	Nest	Pipe	Scat	Sighting	Sighting - overhead	Tracks	Wet pitfall bycatch	
	Liopholis striata	Night Skink					1													1
	Menetia greyii	Common Dwarf Skink								1										1
	Morethia ruficauda	Lined Fire-tailed Skink				5				2									1	8
	Notoscincus ornatus	Ornate Soil-crevice Skink				1								2						3
	Proablepharus reginae	Western Soil-crevice Skink												1						1
	Tiliqua multifasciata	Central Blue-tongue				2				4										6
Typhlopidae	*Anilios ammodytes*	Pilbara Blind Snake				2								1						3
	Anilios grypus	Long-beaked Blind Snake												7						7
	Anilios pilbarensis	Pilbara Hook-snouted Blind Snake				1														1
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna							3	3										6
	Varanus brevicauda	Short-tailed Pygmy Goanna				4				1										5
	Varanus bushi	Pilbara Mulga Goanna												1						1
	Varanus eremius	Pygmy Desert Goanna				2				2				1						5
	Varanus giganteus	Perentie							1											1
	Varanus gouldii	Bungarra Or Sand Goanna							1					1		1				3
	Varanus panoptes rubidus	Yellow-Spotted Monitor							1											1
	Varanus tristis	Racehorse Goanna							2											2

Terrestrial Vertebrate Fauna Inventory - Records by Habitat Type

Key: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation Priority List, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999, Recorded - Recorded during the current field survey, * - Introduced species

Conservation Status: CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Family	Scientific Name	Common Name	Conservation Status		Habitat type						Total
			State	Common wealth	Drainage line/River/Creek (major)	Drainage line/River/Creek (minor)	Granite Outcrop	Hills/Ranges/ Plateaux	Plain (sand)	Plain (stony/gibber)	
Amphibians											
Myobatrachidae	*Uperoleia saxatilis*	Pilbara Toadlet								8	8
Pelodryadidae	*Cyclorana maini*	Sheep Frog							1		1
	Litoria rubella	Little Red Tree Frog			7						7
Birds											
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk				1					1
	Haliastur sphenurus	Whistling Kite		MA						1	1
	Hieraaetus morphnoides	Little Eagle								1	1
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra			1						1
	Todiramphus pyrrhopygius	Red-backed Kingfisher			1						1
Anatidae	*Anas gracilis*	Grey Teal				10					10
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			2					3	5
	Cacatua sanguinea westralensis	Western Little Corella								3	3
Cacatuidae	*Eolophus roseicapilla*	Galah								2	2
	Nymphicus hollandicus	Cockatiel						20		10	30
	Coracina novaehollandiae	Black-faced Cuckooshrike			2			1			3
Campephagidae	*Eurostopodus argus*	Spotted Nightjar		MA	1					1	2
Caprimulgidae	*Elseyornis melanops*	Black-fronted Dotterel		MA		1					1
Charadriidae	*Geopelia cuneata*	Diamond Dove							1	5	6
Columbidae	*Geophaps plumifera*	Spinifex Pigeon			25		1		1	7	34
	Ocyphaps lophotes	Crested Pigeon			8					7	15
	Corvus bennetti	Little Crow			1						1
Corvidae	*Corvus orru*	Torresian Crow			1		2			8	11
	Cracticus nigrogularis	Pied Butcherbird								4	4
Estrildidae	*Taeniopygia castanotis*	Australian Zebra Finch			2		45		4	48	99
Falconidae	*Falco berigora*	Brown Falcon								2	2
	Falco cenchroides	Nankeen Kestral		MA						3	3
Hirundinidae	*Petrochelidon ariel*	Fairy Martin								4	4

Family	Scientific Name	Common Name	Conservation Status		Habitat type						Total
			State	Common wealth	Drainage line/River/Creek (major)	Drainage line/River/Creek (minor)	Granite Outcrop	Hills/Ranges/ Plateaux	Plain (sand)	Plain (stony/gibber)	
Maluridae	*Amytornis whitei whitei*	Pilbara Grasswren	P4 (listed as *A. striatus striatus*)						1		1
	Malurus assimilis	Purple-backed Fairywren								1	1
	Malurus leucopterus	White-winged Fairywren							3	3	6
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater							2	5	7
	Manorina flavigula	Yellow-throated Miner			1					5	6
	Ptilotula keartlandi	Grey-headed Honeyeater			1				2		3
	Ptilotula penicillata	White-plumed Honeyeater			1					1	2
Meropidae	*Merops ornatus*	Rainbow Bee-eater		MA	9		1	3	1		14
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		MA	1			2			3
Otididae	*Ardeotis australis*	Australian Bustard								1	1
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush			1						1
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote			1					1	2
Psittacidae	*Barnardius zonarius*	Australian Ringneck			8						8
	Melopsittacus undulatus	Budgerigar							10	30	40
Mammals											
Bovidae	**Bos primigenius taurus*	European Cattle			2	2		5	8	9	26
Canidae	**Canis familiaris*	Dog/Dingo			1	1				1	3
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	VU	VU	3	1	2			1	7
	Ningaui timealeyi	Pilbara Ningaui			2	1				4	7
Emballonuridae	*Taphozous spp.*				2		1	1			4
Equidae	**Equus ferus caballus*	Horse							3	16	19
Felidae	**Felis catus*	Cat							1	1	2
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu			1	3				3	7
Molossidae	*Chaerephon jobensis colonicus*	Greater Northern Free-tailed Bat			2		1	1			4
Muridae	*Notomys alexis alexis*	Spinifex Hopping-mouse							1		1
	Pseudomys chapmani	Western Pebble-mound Mouse	P4			1		4	1	14	20
	Pseudomys hermannsburgensis	Sandy Inland Mouse			2						2
	Zyzomys argurus	Common Rock-rat					1				1
Rhinonycteridae	*Rhinonicteris aurantia* Pilbara form	Pilbara Leaf-nosed Bat	VU	VU	16						16
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat			2		1	1			4

Family	Scientific Name	Common Name	Conservation Status		Habitat type						Total
			State	Common wealth	Drainage line/River/Creek (major)	Drainage line/River/Creek (minor)	Granite Outcrop	Hills/Ranges/ Plateaux	Plain (sand)	Plain (stony/gibber)	
	Scotorepens greyii	Little Broad-nosed Bat			2		1	1			4
	Vespadelus finlaysoni	Finlayson's Cave Bat			2		1	1			4
Reptilian											
Agamidae	*Ctenophorus caudicinctus*	Western Ring-tailed Dragon			1	2	1			8	12
	Ctenophorus isolepis	Central Military Dragon							11	21	32
	Ctenophorus nuchalis	Central Netted Dragon								1	1
	Diporiphora vescus	Northern Pilbara Tree Dragon								1	1
	Gowidon longirostris	Long-nosed Dragon			5					1	6
	Pogona minor minor	Western Bearded Dragon								1	1
Carphodactylidae	*Nephrurus levis*	Smooth Knob-tailed Gecko								1	1
Diplodactylidae	*Diplodactylus bilybara*	Western Fat-tailed Gecko							1	12	13
	Lucasium stenodactylus	Sand-plain Gecko			3	2				5	10
	Strophurus elderi	Jewelled Gecko								1	1
Elapidae	*Brachyurophis approximans*	North-western Shovel-nosed Snake								1	1
	Demansia psammophis reticulata	Reticulated Whipsnake								2	2
	Furina ornata	Moon Snake			1						1
	Pseudonaja modesta	Ringed Brown Snake								2	2
Gekkonidae	*Gehyra pilbara*	Pilbara Dtella							1		1
	Gehyra punctata	Spotted Pilbara Rock Dtella			1		4				5
	Gehyra variegata	Variegated Gehyra								3	3
	Heteronotia binoei	Bynoe's Gecko			4					8	12
Pygopodidae	*Delma pax*	Peaceful Delma			2					1	3
	Delma tincta	Excitable Delma				1				1	2
	Lialis burtonis	Burton's Snake-lizard								4	4
	Pygopus nigriceps	Western Hooded Scaly-foot								1	1
Pythonidae	*Antaresia childreni*	Children's Python			1						1
	Liasis olivaceus barroni	Pilbara Olive Python	VU	VU	1						1
Scincidae	*Carlia munda*	Shaded-litter Rainbow-skink			10	2				1	13
	Ctenotus duricola	Eastern Pilbara Lined Ctenotus			1				5	17	23
	Ctenotus grandis	Grand Ctenotus			2	1	1		2	55	61
	Ctenotus hanloni	Nimble Ctenotus			16	3			2	21	42
	Ctenotus helenae	Clay-soil Ctenotus							1	1	2

Family	Scientific Name	Common Name	Conservation Status		Habitat type						Total
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	Ctenotus pantherinus	Leopard Ctenotus			1	3			4	9	17
	Ctenotus saxatilis	Rock Ctenotus			6	1	8			3	18
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue								1	1
	Egernia epsisolus	Eastern Pilbara Spiny-tailed Skink					2				2
	Lerista bipes	North-western Sandslider			3				3	18	24
	Lerista clara	Sharp-blazed Three-toed Slider							1	1	2
	Lerista jacksonii	Jackson's Three-toed Slider				4					4
	Liopholis striata	Night Skink						1			1
	Menetia greyii	Common Dwarf Skink								1	1
	Morethia ruficauda	Lined Fire-tailed Skink			5		1		1	1	8
	Notoscincus ornatus	Ornate Soil-crevice Skink								3	3
	Proablepharus reginae	Western Soil-crevice Skink								1	1
	Tiliqua multifasciata	Central Blue-tongue							1	5	6
Typhlopidae	*Anilios ammodytes*	Pilbara Blind Snake								3	3
	Anilios grypus	Long-beaked Blind Snake								7	7
	Anilios pilbarensis	Pilbara Hook-snouted Blind Snake							1		1
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna			1		2			3	6
	Varanus brevicauda	Short-tailed Pygmy Goanna							2	3	5
	Varanus bushi	Pilbara Mulga Goanna			1						1
	Varanus eremius	Pygmy Desert Goanna								5	5
	Varanus giganteus	Perentie					1				1
	Varanus gouldii	Bungarra Or Sand Goanna			1					2	3
	Varanus panoptes rubidus	Yellow-Spotted Monitor				1					1
	Varanus tristis	Racehorse Goanna			2						2

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