



Appendix 5: Wodgina Project - Targeted Bilby Survey

TURNER RIVER SOLAR HUB PROJECT TARGETED BILBY SURVEY

PREPARED FOR: FORTESCUE





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EXECUTIVE SUMMARY

Pilbara Energy (Generation) Pty Ltd (PEG), a wholly owned subsidiary of Fortescue Ltd (Fortescue), is proposing to develop a renewable energy hub, the Turner River Solar Hub (TRSH) (the project), comprising of solar generation and a 220 kV transmission line connecting to Fortescue's existing power network in the Pilbara region of Western Australia (WA).

The TRSH is located approximately 25 kilometres (km) west of Iron Bridge and 120 km south of Port Hedland. This project now includes an area known as the North Star Junction West (NSJW) project (4,532.9 hectares [ha]). The project includes two development envelopes (DE) known as the TRSH northern and TRSH southern (Map 1.1). The TRSH southern DE was formally known as the North Star Junction West (NSJW) project (4,532.9 hectares [ha]).

Spectrum Ecology & Spatial (Spectrum) completed a two-phase detailed and targeted vertebrate fauna assessment of the NSJW project (TRSH southern DE) in 2023 (Spectrum, 2025b). In addition, Fortescue's annual Fauna Monitoring Program (2012-2024) includes some monitoring sites located within the Project area. During the above assessment, Spectrum confirmed the presence (individual captured and scats) of the Bilby (*Macrotis lagotis*), a significant species listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act, Vulnerable) and WA's *Biodiversity Conservation Act 2016* (BC Act, Vulnerable) at the NSJW project (TRSH southern DE).

Fortescue engaged Spectrum to undertake a targeted survey for the Bilby (*Macrotis lagotis*, EPBC Act and BC Act, Vulnerable) within and between the two TRSH DEs (the Survey Area).

The distribution of the Bilby was predicted using an occurrence-based (presence-background) species distribution model (SDM) approach. The SDM extent covered an area of 178,231 km², encompassing the entire Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region. Thirty-seven environmental variables were selected to represent the habitat preferences of the Bilby and predict potential occurrence within the SDM Study Area. The SDM results were expressed as two outputs; the median probability of occurrence as a percentage across the area of interest and the probability of occurrence categorised into three likelihood ranks: "Low", "Medium", and "High".

Targeted searches for the Bilby were completed that aligned with the 2-hectare plot technique as defined in the Bilby survey guidelines (DBCA, 2017). The searches included looking for Bilby evidence (tracks, scats, diggings, and burrows) in line with Southgate et al. (2019), for approximately 50 person minutes at each site. Overall, 62 plots targeting the Bilby were completed, equating to 65.8 person-hours of active searching and 130.4 km traversed within and surrounding the Survey Area.

The literature review identified 24 previous surveys and monitoring programs that have been undertaken in the desktop Study Area (50 km buffer around the Survey Area), with 17 located within 10 km. Of these 17, 12 overlap the Survey Area and eight completed targeted searches for the Bilby.

The Bilby was previously recorded in the Survey Area by Spectrum (2025b), with a female Bilby captured in a cage and multiple burrows, diggings, tracks and scats recorded. The DBCA Fauna Database returned 397 Bilby records within the Study Area, while Fortescue's Internal Database returned 364, which included 12 records from within the Survey Area. These records were from Fortescue's Annual Fauna Monitoring Program and two previous surveys. An additional nine records are located within 2 km of the Survey Area. Of the 17 regional surveys completed within 10 km of the Survey Area, 12 recorded the Bilby, which includes the three previously mentioned surveys and monitoring.

The final SDM model achieved a very high performance with an AUC of 0.941, which indicates the model was highly efficient at measuring presences and pseudo-absences. Amongst the 37 environmental variables tested, 12 variables were the most influential when explaining the distribution of Bilbies, with the type of land system and soil environmental variables contributing most to the model. The environmental variable with the highest gain when used in isolation is soils, which appears to be the most important variable for the species. A total of 6,948 (97.4%) of the Survey Area was assigned a Medium or High probability rank.

Seven broad fauna habitat types were present at the Survey Area: Plain (sand), Plain (stony/gibber), Drainage Line/River/Creek (major), Drainage Line/River/Creek (minor), Granite Outcrops (boulder piles), Granite Outcrops (flat domes), and Hills/Ranges/Plateaux. Of these habitats, the most suitable for the Bilby is the Plain (sand) which comprises (87.9%) of the Survey Area, followed by two drainage lines (major and minor). These three are considered critical habitat for the Bilby as they contain suitable burrowing substrate and plant species, including *Acacia stellaticeps*, *A. bivenosa*, *A. colei* and *Senna notabilis*, whose root systems contain invertebrate larvae that the Bilby use as a food resource. The remaining habitats are considered supporting with the Plain (stony/gibber), likely used the most frequently for foraging and dispersal. The habitats present are not restricted to the Survey Area and continue across the surrounding Abydos Plain. As the Bilby is highly mobile and forages over vast areas, Bilbies may expand into other parts of the critical habitats mapped within the Survey Area.

Confirmed presence of Bilby was recorded from three sites: WDG_37, WDG_38 and MR GB AS41, with all three sites located near an area of known Bilby occurrence previously recorded by Spectrum (2025b). Site WDG_38 was separated from the main area of Bilby activity by a road and other infrastructure. All three sites are located within two of the critical habitats, Plain (sand) and Drainage Line/River/Creek (minor). Fresh diggings, scats and burrows were recorded, with site WDG_38 confirmed as the present location of the Bilby (at the time of the survey). The Bilby is likely crossing the road regularly to move between its burrows and foraging areas. Scat samples collected were sent for DNA analysis, which showed only one individual to be present, which is likely the female captured during the previous survey. Potential, unconfirmed evidence was recorded elsewhere, in the form of old and ambiguous diggings.

Based on the previous surveys and evidence, it's likely that Bilbies have been inhabiting the area surrounding these sites for some time. Additional Bilbies could be occupying areas adjacent to the Survey Area, which aligns with previous records located to the north of the Survey Area.

Forty non-target species were recorded during the survey, including three significant species:

- Brush-tailed Mulgara (*Dasyercus blythi*, DBCA Priority 4 [P4]), – likely burrows and diggings;
- Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*, DBCA P4) – potential tracks; and
- Western Pebble-mound Mouse (*Pseudomys chapmani*, DBCA P4) – one active mound.

1. INTRODUCTION

1.1. Project Background

Pilbara Energy (Generation) Pty Ltd (PEG), a wholly owned subsidiary of Fortescue Ltd (Fortescue), is proposing to develop a renewable energy hub, the Turner River Solar Hub (TRSH) (the project), comprising of solar generation and a 220 kV transmission line connecting to Fortescue's existing power network in the Pilbara region of Western Australia (WA).

The TRSH is located approximately 25 kilometres (km) west of Iron Bridge and 120 km south of Port Hedland. This project now includes an area known as the North Star Junction West (NSJW) project (4,532.9 hectares [ha]). The project includes two development envelopes (DE) known as the TRSH northern and TRSH southern (Map 1.1). The TRSH southern DE was formally known as the North Star Junction West (NSJW) project (4,532.9 hectares [ha]).

Spectrum Ecology & Spatial (Spectrum) completed a two-phase detailed and targeted vertebrate fauna assessment of the NSJW project (TRSH southern DE) in 2023 (Spectrum, 2025b). In addition, Spectrum completes Fortescue's annual Fauna Monitoring Program, with some monitoring sites located within the NSJW project area (Spectrum, 2019, 2020b, 2021, 2022, Spectrum, 2023, 2024, 2025a).

Spectrum recorded confirmed presence (individual captured and scats) of the Bilby (*Macrotis lagotis*), a significant species listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act, Vulnerable) and WA's *Biodiversity Conservation Act 2016* (BC Act, Vulnerable) at the NSJW project (TRSH southern DE) (Spectrum, 2025b).

1.2. Project Scope

Fortescue engaged Spectrum to undertake a targeted survey for the Bilby (*Macrotis lagotis*, EPBC Act and BC Act, Vulnerable) within and between the two TRSH DEs which covers 7,135.4 ha (herein referred to as the Survey Area, see Map 1.1).

The scope of work for this project included the following:

- Completion of Species Distribution Modelling (SDM) for the Bilby (*Macrotis lagotis*; EPBC Act & BC Act, Vulnerable) in the Pilbara Craton Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion; and
- Conducting a targeted significant fauna survey for the Bilby within the Survey Area (4,532.9 ha).

Throughout this report, areas will be referred to as per the below:

- Survey Area (Turner River Solar Hub; area to be surveyed as provided by Fortescue); and
- Study Area (desktop Study Area; Survey Area plus 50 km buffer).

1.3. Legislation & Guidelines

Native Fauna in Western Australia are protected by various legislation (Appendix A), including:

- BC Act, WA;
- EP Act, WA; and
- EPBC Act, Commonwealth.

The targeted Bilby survey was compliant with survey guidelines, as outlined in:

- Environmental Protection Authority (EPA) Environmental Factor Guideline: Terrestrial Fauna (EPA, 2016);
- EPA Technical Guidance Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020) (EPA, 2020);
- Terrestrial Vertebrate Fauna Assessment Guidelines 100-GU-EN-0006 (Fortescue, 2014);
- Environmental Datasets – Data Governance 100-GU-EN-0020 (Fortescue, 2012);
- Geographic Information Systems and Raw Data Guidelines 100-GU-EN-0009 (Fortescue, 2011); and
- Environmental Document Standard Terminology 100-GU-EN-0002 (Fortescue, 2010).

In addition to the above, species-specific guidelines were also reviewed:

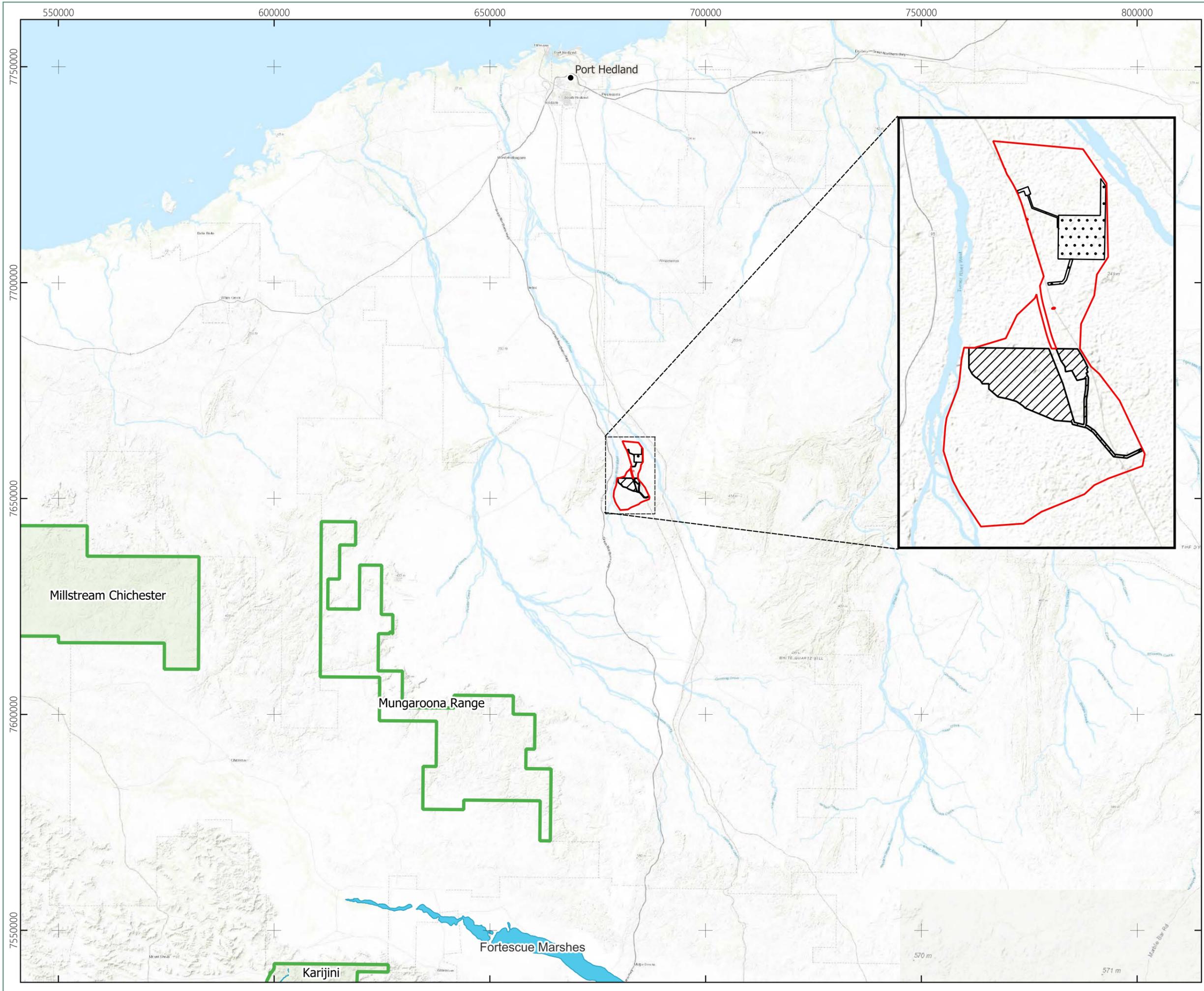
- Survey guidelines for Australia's threatened mammals (Department of Sustainability Environment Water Population and Communities, 2011); and
- Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia (Department of Biodiversity Conservation and Attractions, 2017).

1.3.1. Significant Fauna Definitions

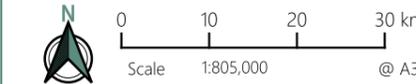
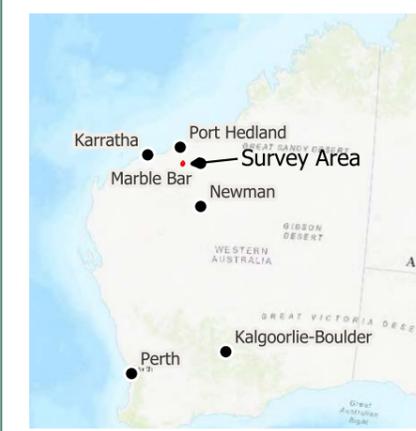
Significant fauna can include (EPA, 2016):

- Being identified as a Threatened or Priority species;
- Species with restricted distribution;
- Degree of historical impact from threatening processes; or
- Providing an important function required to maintain the ecological integrity of a significant ecosystem.

The Bilby is considered to be a significant species as it has been identified as a Threatened species under both the EPBC Act and BC Act (Vulnerable).



- Legend**
- Survey Area
 - Study Area (50 km Buffer)
 - Turner River Solar Hub Southern Development Envelope
 - Turner River Solar Hub Northern Development Envelope
 - Directory of Important Wetlands - Fortescue Marsh
 - Nature Reserve / National Park Boundary



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre



Author: EM Date: 30-01-2025

Location of the Survey Area

Turner River Solar Hub Project

2. EXISTING INFORMATION

2.1. Bioregion

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies Australia into regions based on dominant landscape, climate, lithology, geology, landform and vegetation (Thackway and Cresswell, 1995a).

The Survey Area is in the Pilbara Craton IBRA Bioregion (Figure 2.1). The climate is classified semi-desert-tropical with very hot summers and mild or warm winters with 9 to 11 months of dry weather annually and a mean average rainfall of between 250-350 mm each year (Kendrick, 2001a). The bioregion is geologically complex with great mineral wealth and is also biologically special. There are high levels of species endemism and species-rich ecosystems including persisting populations of threatened species (McKenzie, May and McKenna, 2003).

The Pilbara Craton is made up of four subregions: the Chichester, Fortescue Plains, Hamersley and Roebourne. The Survey Area is located in the central Pilbara within the Chichester subregion (Figure 2.1). The Chichester subregion is characterised by undulating Archaean granite and basalt plains with significant areas of basaltic ranges (Kendrick, 2001a; McKenzie, May and McKenna, 2003). The plains of this subregion support hummock grasslands characterised by shrub steppe of *Acacia pyrifolia* over *Triodia pungens*. The ranges are dominated by *Eucalyptus leucophloia* tree steppes (Kendrick, 2001a; McKenzie, May and McKenna, 2003).

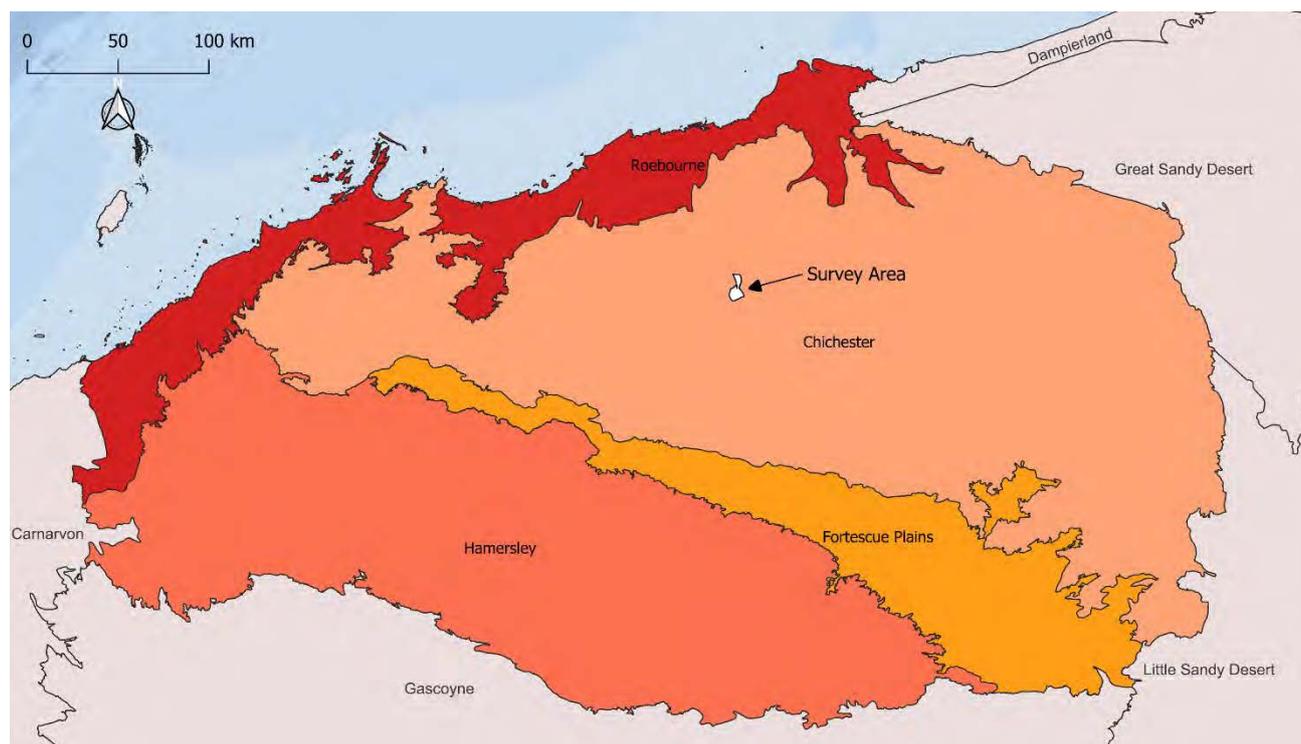


Figure 2.1: IBRA Classification

2.2. Climate

The climate of the Pilbara bioregion is classified as tropical, arid to semi-arid, with a median annual rainfall of 300 mm. Rainfall for the region can be variable, falling mainly in summer cyclonic events from December to February (Thackway and Cresswell, 1995b).

Two broad climatic zones occur across the Pilbara region. Semi-desert tropical climatic conditions occur in coastal areas, as well as some higher-rainfall inland areas, which experience 9-11 months of dry weather, with hot humid summers and warm winters. Dry desert climatic conditions occur across the remaining inland areas, which typically experience higher temperatures and lower rainfall, with hot dry summers and mild winters with up to 12 months of dry weather (Leighton, 2004). The Study Area is located within the dry inland area.

Annual rainfall is highly variable, but generally follows an inland-to-coastal and southern-to-northern increasing trend (Leighton, 2004). The driest months are in spring (September to October), with tropical cyclones and local thunderstorms producing much of the summer and early autumn rainfall (Mckenzie, Van Leeuwen and Pinder, 2009). Winter rainfall is also highly variable, generally decreasing from the coast through to inland areas (Leighton, 2004).

Monthly maximum temperatures in the Pilbara region range from an average of 25°C in July to 37°C in January, while minimum temperatures range between 12°C in July and 25°C in January (Mckenzie, Van Leeuwen and Pinder, 2009). According to the Köppen-Geiger climate classification, the Survey Area has a hot desert climate (Class BWh) (Peel, Finlayson and McMahon, 2007). This classification includes arid regions where annual evaporation exceeds annual precipitation, and have a mean annual temperature $\geq 18^{\circ}\text{C}$.

2.3. Disturbance History

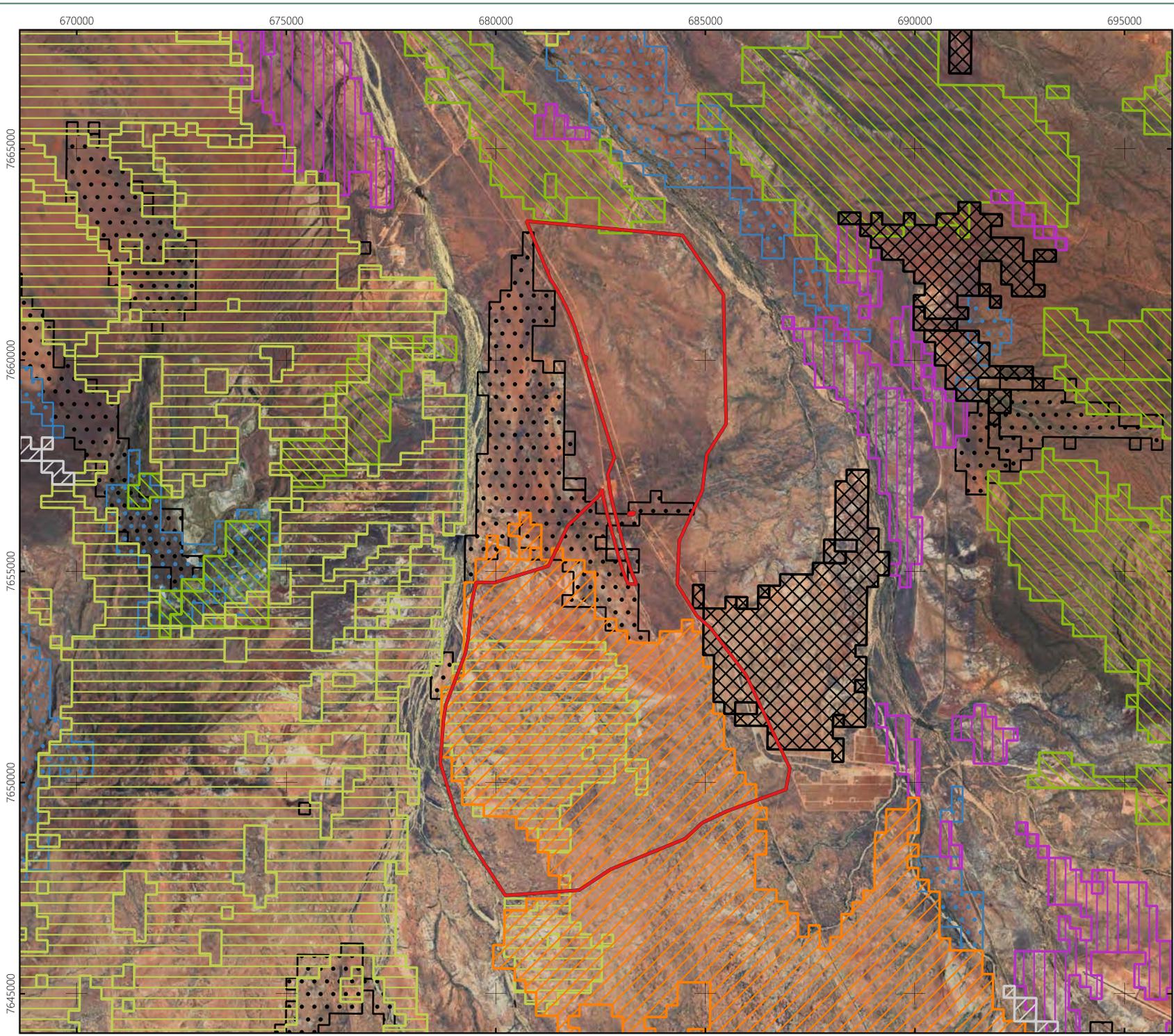
The dominant current and historical land uses across the Pilbara region involves grazing of native pasture, conservation, crown reserves, mining leases, and Aboriginal lands and reserves. Historically, pastoralism has been the most significant land use within the Pilbara. Since the 1960's mining, predominantly iron ore, has become a significant land use with much of the Pilbara now under mining tenure (Kendrick, 2001b).

2.4. Fire History

The fire history of the Survey Area for the eight years (2018 to August 2024) prior to the assessment was assessed using North Australia and Rangelands Fire Information (NAFI) (Charles Darwin University, 2023). Five fires have impacted the Survey Area during this period and are detailed in Table 2.1 and shown on Map 2.1. The highest impact from fire was recorded in 2022, with over half (51.5% or 3,675.4 ha) of the Survey Area burnt, followed by 2021 fires, with 22.8% (1,627.9 ha) burnt, which also included the same area as the 2022 fire. The recent fire in 2024 impacted 7.5 ha or 0.1% of the south-eastern portion of the Survey Area, which was not burnt during the 2021 or 2022 fires. NAFI utilises satellite imagery to map fire scars with an accuracy ranging from 85% to 90%. Therefore, the fire data presented in Table 2.1 and Map 2.1, might be subject to some degree of variation.

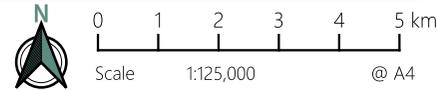
Table 2.1: Previous Fires Impacting the Survey Area

| Fire Year | Extent within Survey Area (ha) | % of Survey Area |
|-----------|--------------------------------|------------------|
| 2024 | 157.7 | 2.2% |
| 2022 | 3,675.4 | 51.5% |
| 2021 | 1,627.9 | 22.8% |
| 2019 | 7.5 | 0.1% |
| 2017 | 432.3 | 6.1% |



Legend

- Survey Area
- NAFI Fire History**
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024 to 19 Aug



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre



Author: EM Date: 30-01-2025

Fire History

Turner River Solar Hub Project

MAP

2.1

Prepared for
Fortescue

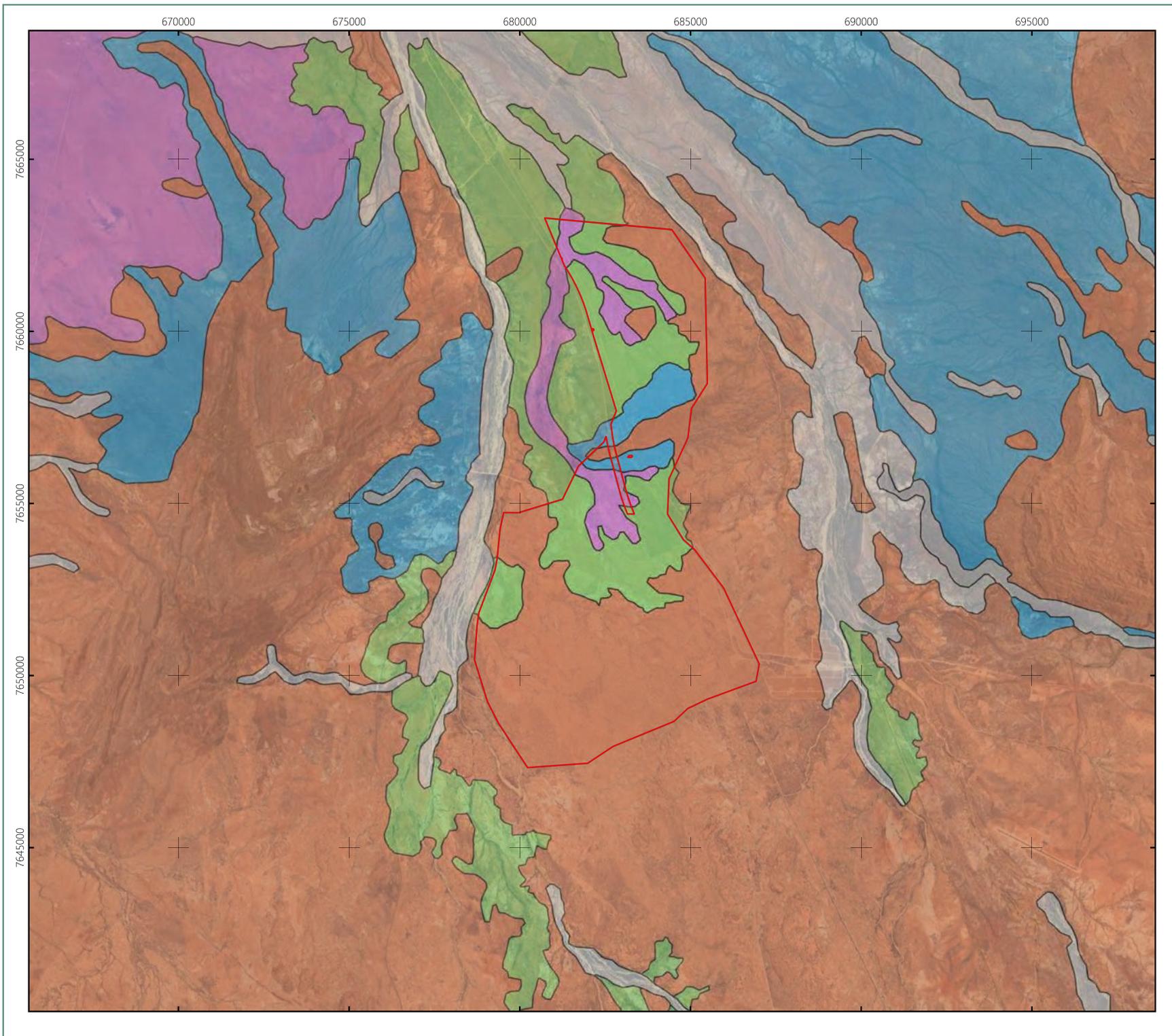
2.5. Geology

The geology of Western Australia has been mapped at a scale of 1:50,000, 1:100,000, 1:250,000, and 1:500,000. The Study Area occurs in the central west of the 1:500,000 scale geological mapping (DMIRS, 2020), which is the finest-scale digital mapping available for the area mapped to the state extent.

Geological mapping was completed within the Survey Area, recording four units, as listed in Table 2.2 and mapped on Map 2.2. Two units cover most of the Survey Area (86.8%), with X-PIP accounting for 59.1% and R-PIP representing 27.7%. All units are well represented elsewhere in WA, except R-PIP of which 84% occurs in the Pilbara IBRA region.

Table 2.2: Surface Geology

| Unit Name | Unit Code | Description | Area in Survey Area (ha) | % of Survey Area | Total WA Extent (ha) | Total Pilbara Extent (ha) | % of Pilbara Extent Within Survey Area |
|--------------|------------------------------|--|--------------------------|------------------|----------------------|---------------------------|--|
| X-PIP | Exposed Unit, PIP | Exposed bedrock | 4,217.0 | 59.1 | 14,351,074 | 8,412,613 | 0.05 |
| R-PIP | Residual or relict unit, PIP | Residual or relict unit; undivided | 1,973.1 | 27.7 | 355,640 | 298,866 | 0.66 |
| W-PIP | Sheetwash unit, PIP | Clay, silt and sand in distal sheetwash fan and slope deposits; local ferruginous pisoliths and gravel | 562.8 | 7.9 | 3,809,878 | 1,200,066 | 0.05 |
| C-PIP | Colluvial unit, PIP | Colluvium derived from different rock types; includes gravel, sand, silt and clay | 382.5 | 5.4 | 2,737,565 | 1,218,680 | 0.03 |
| Total | | | 7,135.4 | 100 | | | |



- Legend**
- Survey Area
 - Geological Unit Code**
 - X-PIP
 - R-PIP
 - W-PIP
 - C-PIP
 - Unit Not in Survey Area

0 1 2 3 4 km
 Scale 1:150,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre

Author: EM Date: 30-01-2025

Surface Geology (1:500,000)

Turner River Solar Hub Project

MAP

2.2

Prepared for Fortescue

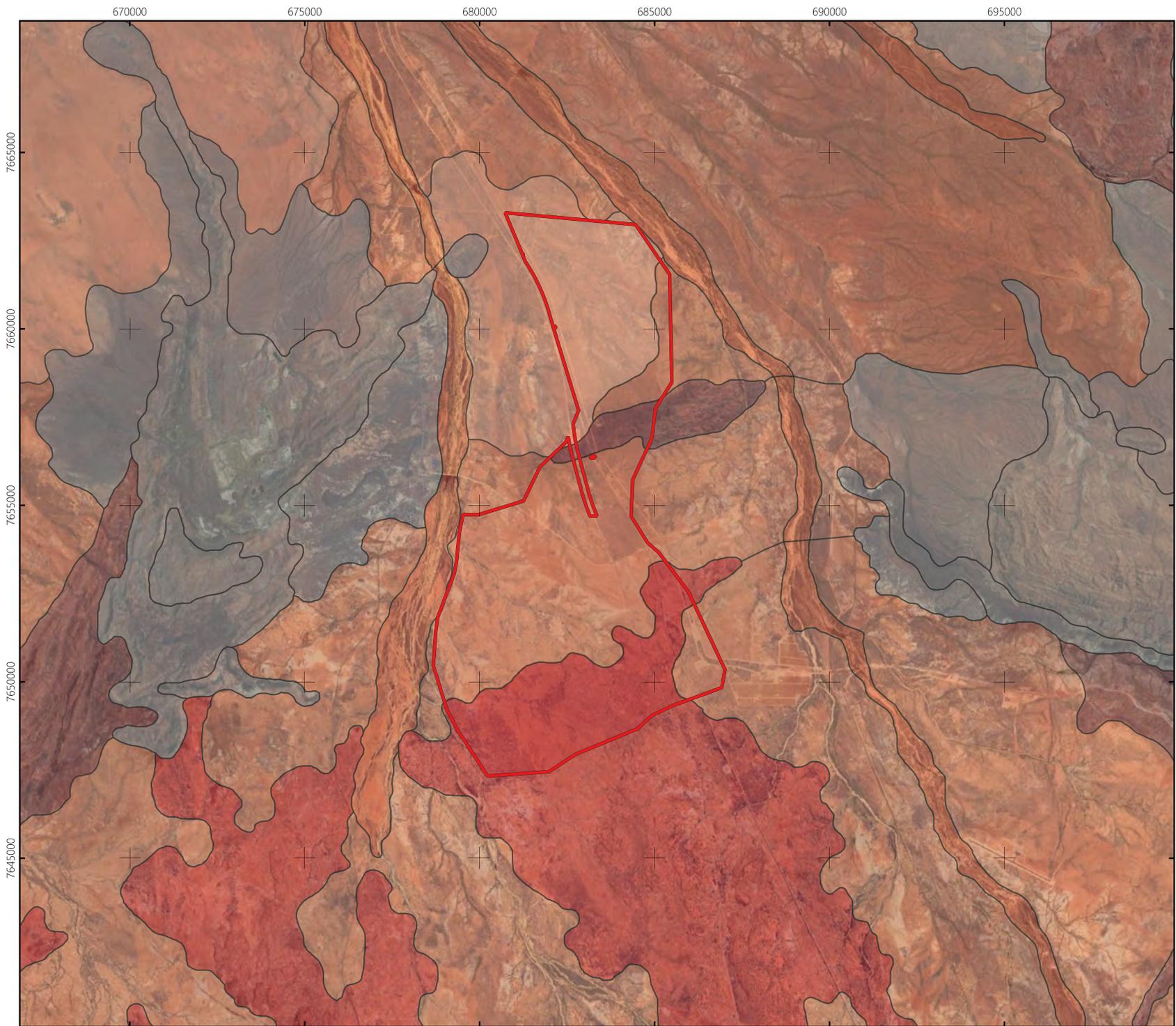
2.6. Land Systems

The land systems of Western Australia have been mapped at a scale of 1:250,000 (DAFWA 2016).

A total of five land systems were mapped across the Survey Area, three of which are dominant and account for 96.8%: Macroy (49.9%), Boolaloo (25.0%) and Uaroo (21.9%). The dominant land systems encompass stony and sandy plains, granite hills and spinifex grasslands. The two remaining land systems, Talga and River, encompasses 3.2% and less than 0.01% of the Survey Area, respectively. All land systems are well represented in the region with the Survey Area covering less than 1% of the land systems extent in the Pilbara (Table 1.3; Map 2.3).

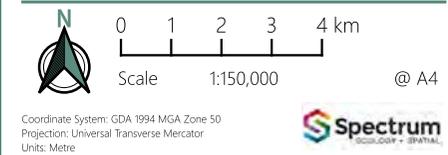
Table 2.3: Land Systems

| Description | Area in Survey Area (ha) | % of Survey Area | Total WA Extent (ha) | % of Total Extent within Survey Area | Total Pilbara Extent (ha) | % of Pilbara Extent Within Survey Area |
|--|--------------------------|------------------|----------------------|--------------------------------------|---------------------------|--|
| Boolaloo Land System: Granite hills, domes, tor fields and sandy plains supporting spinifex grasslands with scattered shrubs. | 1,783.5 | 25.0 | 247,383 | 0.7 | 238,382 | 0.8 |
| Macroy Land System: Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands. | 3,558.6 | 49.9 | 1,332,648 | 0.3 | 1,330,647 | 0.3 |
| River Land System: 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. | 1.3 | <0.1 | 595,308 | <0.01 | 481,994 | <0.1 |
| Talga Land System: Hills and ridges of greenstone and chert and stony plains supporting hard and soft spinifex grasslands. | 229.4 | 3.2 | 212,465 | 0.1 | 202,285 | 0.1 |
| Uaroo Land System: Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered acacia shrubs. | 1,562.6 | 21.9 | 1,381,842 | 0.1 | 987,003 | 0.2 |
| Total | 7,135.4 | 100 | | | | |



Legend

- Survey Area
- Land Systems**
- Boolaloo Land System
- Macroy Land System
- River Land System
- Talga Land System
- Uaroo Land System
- Land System not in Survey Area



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre

Author: EM Date: 30-01-2025

Land Systems

Turner River Solar Hub Project

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MAP
2.3

2.7. Beard Vegetation Mapping

Pre-European vegetation mapping was originally undertaken by John Beard (Beard *et al.*, 2013) at various scales across the state and has since been updated to be consistent with the National Vegetation Information System (NVIS) descriptions at a scale of 1:250,000 (Department of Primary Industries and Regional Development, 2019). State-wide vegetation statistics are available from 2018 for these associations, which lists pre-European extent, current extent, area in DBCA managed lands and is a useful tool to determine if a vegetation association is rare or otherwise significant (Department of Biodiversity Conservation and Attractions, 2019).

The Survey Area is located within the Abydos Plain, with two vegetation sub-associations (SAs) mapped, SA93.4 and SA626.1 (Table 2.4, Map 2.4). Sub-association 93.4 is dominant and accounts for 94.9% of the Survey Area. Over 99% of the pre-European vegetation extent remains for both SAs.

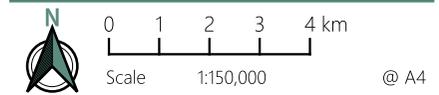
Table 2.4: Beard Vegetation Sub Associations

| SA | Flora Description | Area in Survey Area (ha) | % of Survey Area | Pre-European Extent WA (ha) | Current Extent WA (ha) | Current Pilbara Extent WA (ha) | % Remaining | % of Current WA Extent in Survey Area | % Current Pilbara Extent in Survey Area |
|-------|---|--------------------------|------------------|-----------------------------|------------------------|--------------------------------|-------------|---------------------------------------|---|
| 93.4 | Hummock grassland with scattered shrubs or mallee <i>Triodia</i> spp. <i>Acacia</i> spp., <i>Grevillea</i> spp. <i>Eucalyptus</i> spp. | 6,767.7 | 94.9 | 2,481,889 | 2,478,504 | 2,480,782 | 99.9 | 0.3 | 0.3 |
| 626.1 | Hummock grassland with sparse shrubs <i>Triodia</i> spp. <i>Acacia</i> spp. | 367.7 | 5.2 | 117,724 | 117,198 | 117,724 | 99.6 | 0.3 | 0.3 |



Legend

- Survey Area
- Beard Vegetation Sub-Associations**
- 93.4
- 626.1
- Sub-Association not in Survey Area



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre



Author: EM

Date: 30-01-2025

Beard Vegetation Sub-Associations

Turner River Solar Hub Project

MAP

Prepared for
Fortescue

2.4

2.8. Significant Species Information

2.8.1. Bilby, *Macrotis lagotis*

Conservation Status: EPBC Act & BC Act: Vulnerable.

Distribution, Habitat and Ecology: The Bilby is a medium-sized marsupial that formerly inhabited the arid and semi-arid zones of 70% of Australia (Department of Environment and Conservation [DEC], 2012). The distribution of this species has contracted to less than 20% of their former range, and the distribution is thought to have further decreased to the north, due to threatening processes (DCCEEW, 2023). The remaining populations occur in the Northern Territory, some isolated areas in south-west Queensland and within central and northern WA (DEC, 2012; Dziminski et al., 2020; Northover et al., 2023).

Within WA, the Bilby populations are limited to the Pilbara, Kimberley and the central desert and rangelands regions. The current Bilby distribution within the Pilbara region encompasses the eastern portion or around 48%. The western boundary of this distribution extends south-east from around 50 km west of Port Hedland to approximately 350 km past Newman (Dziminski, Carpenter and Morris, 2020). However, there are historic or unreliable records in areas to the west and south-west of their current distribution in the Pilbara (Dziminski, Carpenter and Morris, 2020).

The Bilby inhabits a variety of substrate and vegetation types in northern WA from sand plains with low *Acacia* spp. over hummock grasses to Mulga shrubland on loamy-clay soils, and can broadly fit into three landscape types as per the Cramer et al. (2017) conceptual model (Cramer *et al.*, 2017; Northover *et al.*, 2023) which is detailed in Table 2.5.

Table 2.5: Suitable Habitat Characteristics of the Bilby in the North of WA

| Landform | Substrate | Vegetation |
|---|---|--|
| Fluvial, includes a variety of drainage lines: <ul style="list-style-type: none"> • creek lines including upland systems • broad paleodrainage, low-lying and perched systems • calcrete | <ul style="list-style-type: none"> • sandy to sandy loam soils • alluvial and calcrete • salt channels and lakes | <ul style="list-style-type: none"> • Low shrubs of <i>Acacia</i> spp. and <i>Melaleuca</i> spp. over <i>Cyperus bulbosus</i>. and hummock grasslands usually with <i>Triodia basedowii</i>, <i>T. pungens</i> and <i>T. schinzii</i> |
| Residual, includes: <ul style="list-style-type: none"> • Laterite • Silcrete • Stony rises • Uplands • Breakaways • Plateaus • Granitic hills | <ul style="list-style-type: none"> • sandy to sandy loam soils • red earths usually with lateritic, small gravel, stony matrix | <ul style="list-style-type: none"> • Low shrubs of <i>Acacia</i> spp., including Mulga shrubland (<i>A. aneura</i>), over hummock and tussock grasslands |
| Sand plain and sand dune, includes: <ul style="list-style-type: none"> • Flat to gently undulating plains • Dune fields • Isolated dunes | <ul style="list-style-type: none"> • Soil texture ranges from coarse sand to light medium clay • Non-calcareous gradational soils • Duplex soils – red sand, loamy sand plains and dune fields | <ul style="list-style-type: none"> • Low woodland (<10 m) of <i>Eucalyptus</i> and <i>Acacia</i> spp. over shrub-steppe communities over <i>Triodia</i> hummock grasslands, occasionally with rich understorey; or • Pindan woodland over hummock and tussock grassland (Kimberley) |

Where rainfall is higher in northern WA, the Bilby tends to occupy all three landforms, while in the south of WA, they are more restricted to fluvial and residual landforms (Cramer *et al.*, 2017). It is uncertain why the residual landforms are so important, as the substrate tends to be harder and includes less inundated run-

off areas. They also include shrub species such as *Acacia hilliana* that support root-dwelling larvae that the Bilby use for food, so it appears these areas are more suitable for foraging (Cramer *et al.*, 2017). Additionally, it appears that fire may influence the type and availability of food resources and may assist in improving habitat favourability in parts of their range (Cramer *et al.*, 2017; Northover *et al.*, 2023).

Within the Pilbara, some preliminary distribution modelling undertaken by Dziminski and Carpenter (2017) showed that the habitat variables of soil type, depth and elevation are the major variables predicting preferred Bilby habitat. Observations have also shown that in addition to the species requiring a substrate that is suitable for burrowing, such as sand, sandy clay or sandy gravel, the Bilby also has an association with certain stands of *Acacia* species (and other plants) that provide a key food resource as they host root-dwelling larvae (Cramer *et al.*, 2017; Northover *et al.*, 2023). In particular, the Cossidae (moth) larvae appears to be a major food resource for the Bilby (Dziminski and Carpenter, 2017; Southgate *et al.*, 2019). Within the Pilbara, these plant species include:

- *Acacia bivenosa*;
- *A. colei*;
- *A. dictyophleba*;
- *A. hilliana*[^]
- *A. melleodora*;
- *A. rhodophloia*[^]
- *A. stellaticeps*;
- *A. trachycarpa* including dwarf variant; and
- *Senna notabilis*.

Note: [^]- species occurs in the Pilbara, but observations of Bilby diggings for root dwelling larvae only in Tanami Desert (NT), Central Desert or Gibson Desert IBRA regions (Southgate *et al.*, 2019).

The larvae are extracted from the root systems by the Bilby which is the only known species in the arid and semi-arid areas of Australia that opens the root system in this specific way (Southgate *et al.*, 2019).

The Bilby also consumes a variety of invertebrates such as spiders, beetles, and termites, along with plant materials such as seeds and bulbs. The majority of the food resources for the Bilby are either acquired from the soil surface or by digging (Southgate *et al.*, 2019).

The Bilby is a nocturnal species that shelters during the day in an extensive burrow system of up to 4.5 m in length and 2 m deep, which could spiral down, have side branches, or blocked tunnel entrances (freshly dug soil). Most burrows have a single entrance; however, some can have multiple entrances like rabbit warrens. A single individual may use up to 18 burrows (Moseby *et al.*, 2003; DEC, 2012).

Bilbies are exceedingly mobile and can cover vast distances while foraging (DCCEEW, 2023). The size of the Bilby's home range is estimated to be between 0.18 km² and 3.16 km² (from Arid Recovery in SA) and is dependent on the location and availability of foraging habitat supporting insects, fungi and vegetation (Pavey, 2006; DCCEEW, 2023). However, their home range in many areas is still not well understood (DCCEEW, 2023). Sudden shifts in spatial distribution can occur, particularly in sandy deserts, in response to changing food availability. Females can display long-term site fidelity whereas males display a roaming behaviour allowing them to mate with multiple females (Pavey, 2006).

Threats:

Some of the key threats to the Bilby include the following (DCCEEW, 2023):

- Predation by Feral Cats, Foxes and Dingoes (Dogs).
- Habitat loss, degradation and fragmentation due to factors such as land clearing, agriculture, mining and infrastructure developments.
- Competition for resources and degradation of habitat from introduced herbivores and domestic livestock.
- Unmanaged fire and unsuitable fire regimes which impact habitat suitability.
- Loss of traditional owner ecological knowledge and land management practices.
- Extinction risks elevated from reduced genetic fitness and population resilience.

Additionally, many of these threats can have significant interactions, such as unmanaged fire and livestock grazing reducing the density of vegetation, facilitating easier capture of prey by predators (DCCEEW, 2023).

3. METHODS

3.1. Desktop Survey

A desktop review of relevant and available biological data sources of the Study Area, specifically for the Bilby, was undertaken prior to the field survey. The Study Area includes a buffer of approximately 50 km surrounding the Survey Area (Map 1.1), or as listed in Table 3.1.

3.1.1. Biological Database Searches

The following databases outlined in Table 3.1 were searched and incorporated into the desktop assessment.

Table 3.1: Summary of Database Searches

| Data Source | Custodian | Details | Buffer |
|---|---|------------------------------------|--------|
| Commonwealth Protected Matters Search Tool (PMST) | Department of Climate Change, Energy, the Environment and Water (DCCEEW) | Date: 04/04/2023 | 50 km |
| Threatened Fauna Database | Department of Biodiversity Conservation and Attraction (DBCA) | Date: 4/05/2023 Reference: 7635 | 50 km |
| NatureMap | DBCA | Date: 13/06/2023 | 50 km |
| Atlas of Living Australia | National Research Infrastructure for Australia (NCRIS) / Commonwealth Scientific and Industrial Research Organisation (CSIRO) / Global Biodiversity Information Facility (GBIF) | Date: 04/04/2023 | 50 km |
| Fortescue Internal Database | Fortescue | Date: 03/07/2024 | 40 km |

3.1.2. Literature Review

Previously conducted surveys within the desktop Study Area were reviewed for the presence of Bilbies and the previous survey effort undertaken for this species to understand what areas were searched and the species' likelihood of occurrence, including if confirmed or potential evidence was recorded.

Reports were incorporated if they were provided by Fortescue, publicly available, or within Spectrum's database. The 29 survey reports plus the Fortescue's ongoing Fauna Monitoring Program that were incorporated into the desktop assessment, are listed in Table 2.2. Surveys within 10 km of the Survey Area provided local context, while the remaining reports provided regional context.

Table 3.2: Previously Conducted Biological Assessments

| Biological Assessment Name | Survey Level | Survey Timing | Distance to Survey Area |
|---|---|-----------------------------------|--------------------------|
| NSJW Detailed Vertebrate Fauna (Spectrum, 2025b) | Detailed and targeted – vertebrate fauna | May & September/October 2023 | Within Survey Area |
| Fortescue Fauna Monitoring – 2013-2024 (ecologia, 2014, 2015a, 2015b; Ecoscape, 2017, 2018; Spectrum, 2019, 2020b, 2021, 2022, 2023, 2024, 2025a) | Significant fauna monitoring - Annual | 2013-2024 | Partially in Survey Area |
| North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna (360 Environmental (360), 2023) | Detailed and targeted – vertebrate fauna & SRE – single phase | March 2022 | Partially in Survey Area |
| North Star Junction Flora and Fauna Assessments (Ecoscape, 2021) | Basic – vertebrate fauna | May 2021 | Partially in Survey Area |
| Pilbara Transmission Project Targeted Flora and Fauna (Ecoscape (Australia), 2020a) | Targeted – vertebrate fauna | September 2019 | Partially in Survey Area |
| Pilbara Transmission Project Terrestrial Fauna Desktop (Spectrum Ecology, 2018) | Desktop – vertebrate fauna & SRE | October 2018 | Partially in Survey Area |
| North Star Project Level 2 Vertebrate Fauna (ecologia, 2012a) | Detailed and targeted – vertebrate fauna | Mar-Apr & Oct-Nov 2011 | Partially in Survey Area |
| North Star Access Corridor Flora, Vegetation & Vertebrate Fauna (ecologia, 2012b) | Basic – vertebrate fauna | May 2012 | Partially in Survey Area |
| Conservation Significant Vertebrate Fauna Species Habitat Assessment: Roy Hill Rail (TE, 2011) | Basic & targeted – vertebrate fauna | January – February 2011 | Partially in Survey Area |
| Targeted Fauna Assessment of the Rail Duplication (Bamford, 2010) | Targeted – vertebrate fauna | November 2010 | Partially in Survey Area |
| Targeted Flora and Fauna of Rail Corridor GDP Areas 2449, 2462 & 2515 (Ecoscape, 2009) | Targeted – vertebrate fauna | June 2009 | Partially in Survey Area |
| Conservation Significant Vertebrate Fauna – Proposed Rail Corridor and Borrow Pits (ATA Environmental (ATA), 2007) | Targeted & basic – vertebrate fauna | June to September 2006 (9 phases) | Partially in Survey Area |
| Fortescue Stage A Rail (Biota, 2004) | Detailed – vertebrate fauna | March – April 2004 | Partially in Survey Area |
| Wodgina Lithium Project: Level 2 Vertebrate Fauna (Western Wildlife (WW), 2020) | Detailed – vertebrate fauna | April 2019 & October 2019 | 1.6 km W |
| Pippingarra and Wodgina Roads Flora & Fauna (Ecoscape, 2020b) | Basic – vertebrate fauna | July 2020 | 1.9 km E |
| North Star Filtration Plan Relocation Flora & Fauna (ecologia, 2014c) | Basic – vertebrate fauna | August 2014 | 1.5 km W |
| Wodgina Project: Level 1 & Targeted Fauna (Stantec, 2018) | Basic & targeted – vertebrate fauna | July 2018 | 3.6 km NW |
| North Star Aerodrome Flora & Fauna (ecologia, 2015c) | Basic – vertebrate fauna | August 2015 | 5.3 km W |
| Hercules Project: Terrestrial Fauna (Outback Ecology Services (Outback), 2012) | Detailed & targeted – vertebrate fauna (single phase only) | March 2011 | 6.5 km W |
| Wodgina DSO Project: Terrestrial Fauna (Outback, 2009) | Detailed and targeted vertebrate fauna | April-May 2009 & July-August 2009 | 5.5 km W |

| Biological Assessment Name | Survey Level | Survey Timing | Distance to Survey Area |
|--|---|-------------------------------------|-------------------------|
| Wodgina Gas Pipeline Targeted Fauna (360, 2018b) | Targeted – vertebrate fauna & SRE | June 2018 | 6.1 km W |
| P1000 Pilgangoora Project Flora & Fauna (APM, 2024) | Targeted – vertebrate fauna | September–October 2023 | 9.1 km N |
| Wodgina Aerodrome Targeted Fauna (360, 2018a) | Targeted – vertebrate fauna | June 2018 | 11.6 km NW |
| Pilgangoora Baseline Vertebrate Fauna (360, 2016) | Detailed – vertebrate fauna (single phase only) | March 2016 | 13 km NE |
| E45/2287 Infill Pilgangoora Project Flora & Fauna (Animal Plant Mineral (APM), 2023) | Targeted – vertebrate fauna | March 2023 | 15.5 km NE |
| Glacier Valley Terrestrial Vertebrate Fauna (Spectrum, 2021b) | Detailed – vertebrate fauna | May – October 2020 | 20.9 km E |
| Hemi Gold Detailed Vertebrate Fauna (Western Wildlife, 2023) | Detailed and targeted – vertebrate fauna & basic of transport corridors | September 2021, March & August 2022 | 28.1 km NW |
| Abydos DSO Project: Terrestrial Vertebrate Fauna Baseline Survey (Outback, 2011a) | Detailed – vertebrate fauna | May & September 2010 | 34.9 km E |
| Mt Dove DSO Project: Vertebrate Fauna (Outback, 2011b) | Detailed – vertebrate fauna | May & September 2010 | 32.8 km NW |
| Panorama Project Area: Baseline Fauna (Bamford, 2001) | Detailed – vertebrate fauna | June & September 2001 | 36 km E |

3.1.3. Species Distribution Modelling

Species distribute in space and time according to their dispersal capabilities, ecophysiology needs, and the interaction with other species (Guisan, Thuiller and Zimmermann, 2017). Species distribution modelling looks to predict the locations of a species, associating known records (presences) to a set of environmental predictor variables that might help to describe any abiotic and biotic interactions. The relationship between known presences and environmental predictors are statistically compared using a wide range of mathematical techniques (Zurell *et al.*, 2020) Some mathematical models require presence and known absence locations, whereas others require presence and randomly generated background points. Some models may also only require presence data, in order to expand the opportunities to model understudied or rare species. Amongst the presence background mathematical models available, maximum entropy algorithms using MaxEnt is one of the most popular methods amongst the peer-reviewed literature (Elith *et al.*, 2011).

The distribution of the Bilby was predicted using an occurrence based (presence-background) SDM approach. The SDM extent covered an area of 178,231 km² or 17,823,126 ha, encompassing the entire Pilbara IBRA region.

3.1.3.1. Species Data & Environmental Variables

Species distribution modelling predicts species' probable locations from known "presences" and randomly generated "pseudo-absences", which are locations where the species is not present. Existing species locations sourced from the DBCA Threatened Fauna Database results were checked for accuracy and validity and used as occurrence records to train the model. Species records that were located within 20 m of each other were removed to address possible data duplication and model bias. To account for sampling bias and

spatial autocorrelation, sampling intensity across the SDM Study Area was represented as a separate variable. To achieve this, a bias layer was constructed from occurrence points of all species using a two-dimensional Kernel Density estimate in ArcGIS (Phillips and Dudík, 2008; Fourcade *et al.*, 2014).

Thirty-seven environmental variables were selected to represent the habitat preferences of the Bilby and predict potential occurrence within the SDM Study Area (Table 3.3). These variables were selected to meet ecophysiological requirements of the species related to the abiotic landscape and soil characteristics, geology, and climate preferences. Commonwealth Scientific and Industrial Research Organisation's (CSIRO's) soil and landscape grids were chosen focusing on slope, ridges and valleys, soil composition, and a Digital Elevation Model (DEM) obtained from the United States Geological Survey (USGS) Earth Explorer service was used (Grundy *et al.*, 2015; O'Brien and Searie, 2021).

Two vegetation indices were calculated from Landsat 8 level 2 satellite imagery (<https://earthexplorer.usgs.gov/>). The Normalised Vegetation Index (NDVI) and the Normalised Difference Wetness Index (NDWI) represent the greenness and moisture in vegetation (Qi *et al.*, 1994; Gao, 1996; Xue and Su, 2017). A set of categorical variables were used to represent the SDM Study Areas' environment: Soil Landscape Systems (Department of Primary Industries and Regional Development, 2022), Vegetation Units of Western Australia (Western Australian Government, 2020), and identified Soil types (Northcote *et al.*, 1968). All environmental datasets were set at the same resolution provided by CSIRO's soil and landscape grids at 88 m pixels (Table 3.3). To avoid multicollinearity and ensure the selection of only the most representative variables, a correlation test was undertaken. Environmental variables were assessed against each other for the SDM Study Area. Variables with correlation higher than 0.7 were excluded when performing the SDM (Dormann *et al.*, 2013).

Table 3.3: Environmental Predictor Variables

| Environmental Variable | Description | Type | Source |
|-----------------------------|---|-------------|--------|
| Landscape Attributes | | | |
| Slope (%)^ | Slope measures the inclination of the land surface from the horizontal. | Numeric | CSIRO |
| Slope (%) Median 300 m^ | The median slope within a 300 m radius representing the typical slope in the local landscape. | Numeric | |
| Slope Relief Class^ | Soil relief landform pattern classification based on Speight (2009). | Categorical | |
| Aspect^ | The direction in which a land surface slope face is expressed in degrees from north. | Numeric | |
| Depth of Regolith | Metres of in situ and transported material overlying unweathered bedrock. | Numeric | |
| Topographic Wetness Index^ | TWI estimates the relative wetness within moist catchments but is more commonly used as a measure of position on the slope with larger values indicating a lower slope position. | Categorical | |
| Topographic Position Index^ | Topographic classification identifying upper, middle and lower parts on the slope with larger values indicating a lower slope position. | Numeric | |
| MrVBF | MrVBF is a topographic index designed to identify areas of deposited material at a range of scales based on the observations that valley bottoms are low and flat relative to their surroundings and that large valley bottoms are flatter than smaller ones. | Categorical | |
| Roughness^ | Measure of the deviation of surface from its ideal form. | Numeric | |
| Relief^ | The difference between a locations highest and lowest elevations. | Numeric | |

| Environmental Variable | Description | Type | Source |
|---|---|-------------|------------------------|
| Relief 1000 m Radius [^] | The elevation range measures the full range of elevation within a 1000 m circular radius and can be used as a representation of local relief. | Numeric | |
| Relief 300 m Radius | The elevation range measures the full range of elevations within a 300 m circular radius and can be used as a representation of local relief. | Numeric | |
| Plan Curvature [^] | Contour is the rate of change of aspect (across the slope and represents topographic convergence or divergence). | Numeric | |
| Profile Curvature [^] | The rate of change of potential gradient down a flow line and represents the changes in flow velocity down a slope. | Numeric | |
| Digital Elevation Model (DEM) [^] | Height above sea level. | Numeric | USGS |
| Soil Attributes | | | |
| Soils | National description of Australian soil types. | Categorical | CSIRO |
| Depth to Soil | Depth of soil profile (A & B horizons) in metres. | Numeric | |
| Bulk Density [^] | Bulk Density of the soil (g/cm ³) at a depth of 0 – 5 cm. | Numeric | |
| pH [^] | pH in Calcium Chloride of the soil within the 0 – 5 cm depth layer. | Numeric | |
| Soil Available Water Capacity [^] | Computed plant-available water capacity of the soil at a depth of 0-5 m. | Numeric | |
| Soil Sand (%) | Percentage of sand content of the soil at a depth of 0-5 cm. | Numeric | |
| Soil Silt (%) [^] | Percentage of silt content of the soil at a depth of 0-5 cm. | Numeric | |
| Soil Clay (%) [^] | Percentage of clay content of the soil at a depth of 0-5 cm. | Numeric | |
| Soil Organic Carbon [^] | Mass fraction of carbon by weight in the < 2 mm soil material as determined by dry combustion at 900 Celsius. | Numeric | |
| Soil Total Phosphorus | Percentage of phosphorus content of the soil at a depth of 0-5 cm. | Numeric | |
| Soil Total Nitrogen [^] | Mass fraction of total nitrogen in the soil by weight. | Numeric | |
| Effective Cation Exchange Capacity [^] | Cations extracted using barium chloride (BaCl ₂) plus exchangeable H + Al. | Numeric | |
| Geology, Land systems, & Water Courses | | | |
| Geology 1M | Seamless national coverage of outcrop and surficial geology. | Categorical | Geoscience Australia |
| Land Systems | Soil-landscape mapping at the systems level. | Categorical | |
| Lakes & Flats [^] | Euclidean distance from lakes and flats (swamps, saline coastal flats, and land subject to inundation). | Numeric | Calculated by Spectrum |
| Minor Watercourse | Euclidean distance from minor watercourse. | Numeric | |
| Major Watercourse [^] | Euclidean distance from major watercourse. | Numeric | |
| Vegetation | | | |
| Beard Vegetation | Pre-European vegetation maps original natural vegetation assumed to have existed prior to European settlement in Western Australia. | Categorical | DPIRD |
| Vegetation Indices | | | |
| NDVI [^] | Normalised Difference Vegetation Index (June 2021) from Landsat 8 Imagery. | Numeric | Calculated by Spectrum |
| NDWI [^] | Normalised Difference Water Index (June 2021) from Landsat 8 Imagery. | Numeric | |

| Environmental Variable | Description | Type | Source |
|------------------------|--------------------------|---------|-----------------|
| Bioclimatic | | | |
| Bioclim1 [^] | Annual Mean Temperature. | Numeric | Hijmans 2005 |
| Bioclim12 | Annual Precipitation. | Numeric | |

[^] Excluded from SDM due to correlation with other layers or based on MaxEnt model importance.

3.1.3.2. Maximum Entropy Model Parameterization & Validation

The SDM was generated using the software package MaxEnt v.3.4.3 (Phillips, Anderson and Schapire, 2006). MaxEnt models species' distributions to predict the probability of species occurrence based on a set of environmental variables in conjunction with known occurrence records and pseudo-absences (Phillips, Dudík and Schapire, 2004). Model settings and input parameters were optimised over three to five unique models. Key settings include 10,000 background points, 10 iterations, and a subsample replicate run type where presences were randomly partitioned into testing (80%) and training (20%) datasets to validate the model independently.

The predictive performance of models was tested by the area under the receiver operating curve (AUC) to the independent testing dataset (Hao *et al.*, 2019; Zurell *et al.*, 2020). AUC is considered as the probability that a presence location has a higher occurrence value than an absence location. Models with AUC values above 0.75 were considered of high performance. Environmental predictor variables were selected or extracted from the models according to the percent contribution and the permutation importance until the best performing model was found. A high permutation importance indicates that an environmental variable contains information that is not present in other variables.

3.1.3.3. Model Outputs

The SDM results were expressed as two outputs that display the probability of occurrence within the SDM Study Area. The first output represents the median probability of occurrence as a percentage across the area of interest as predicted by the SDM. The second output converts the probability of occurrence into three likelihood ranks: Low, Medium, and High. These ranks were defined using a data driven approach where the threshold of each represents the 95% (Medium) and 50% (High) occurrence of known presence records over the median predicted model output.

3.2. Survey Methods

3.2.1. Survey Timing & Weather

The targeted survey was completed from 4 to 9 August 2024, immediately following considerable rainfall, as outlined in Table 3.4. Additional survey sites located within the Survey Area were completed between 31 July to 1 August 2024 as part of Fortescue's Fauna Monitoring Program. Bilbies can be surveyed at any time of the year using non-invasive techniques (DBCA, 2017).

Table 3.4: Rainfall Recorded During the Survey

| Month | July 2024 | | August 2024 | | | | | | | | |
|----------------------|-----------|----|-------------|------|------|-----|-----|----|----|----|----|
| Day | 30 | 31 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 |
| Rainfall (mm) | 0 | 0 | 0.2 | 10.1 | 15.3 | 1.4 | 0.1 | 0 | 0 | 0 | 0 |

Source: SILO Data (-21.2 E 118.75N)

Rainfall data was extracted from the Scientific Information for Land Owners (SILO) database (Queensland Government, 2024) for the centre of the Wodgina Targeted Bilby Assessment Study Area (-21.2066, 118.7585). SILO sources climatic data from the Bureau of Meteorology (BOM) and interpolates data between weather stations to provide a complete data set for any location. Figure 3.1 represents the total monthly rainfall for 2023 to 2024, and it also shows the monthly long-term median rainfall and median temperature. The BOM reference climate normal period of January 1961 to December 1990 was used for calculating climate statistics and evaluating rainfall conditions recorded prior to the survey (BOM, 2024a). Rainfall conditions were considered 'typical' if the total rainfall recorded over a period was between the 25th and 75th percentiles, for annual rainfall this range was 206.8 mm to 418.2 mm. Rainfall totals outside of the typical range were considered 'dry' or 'wet', and 'very dry' or 'very wet' if they were below the 10th or above the 90th percentiles, respectively (2024b). The following data was recorded:

- In the year preceding the Targeted survey, 174 mm of rainfall was recorded at the site, 154.6 mm lower than the median of the long term total annual rainfall (328.6 mm) for the same period.
- A total of 51.6 mm of rainfall was recorded in the three months prior to the survey (4 May to 4 August 2024), 24.3 mm higher than the median of the long term total rainfall (27.3 mm) for the same period.
- The rainfall conditions were typical for the three months preceding the Targeted survey and dry compared to the annual conditions of the climate reference period.

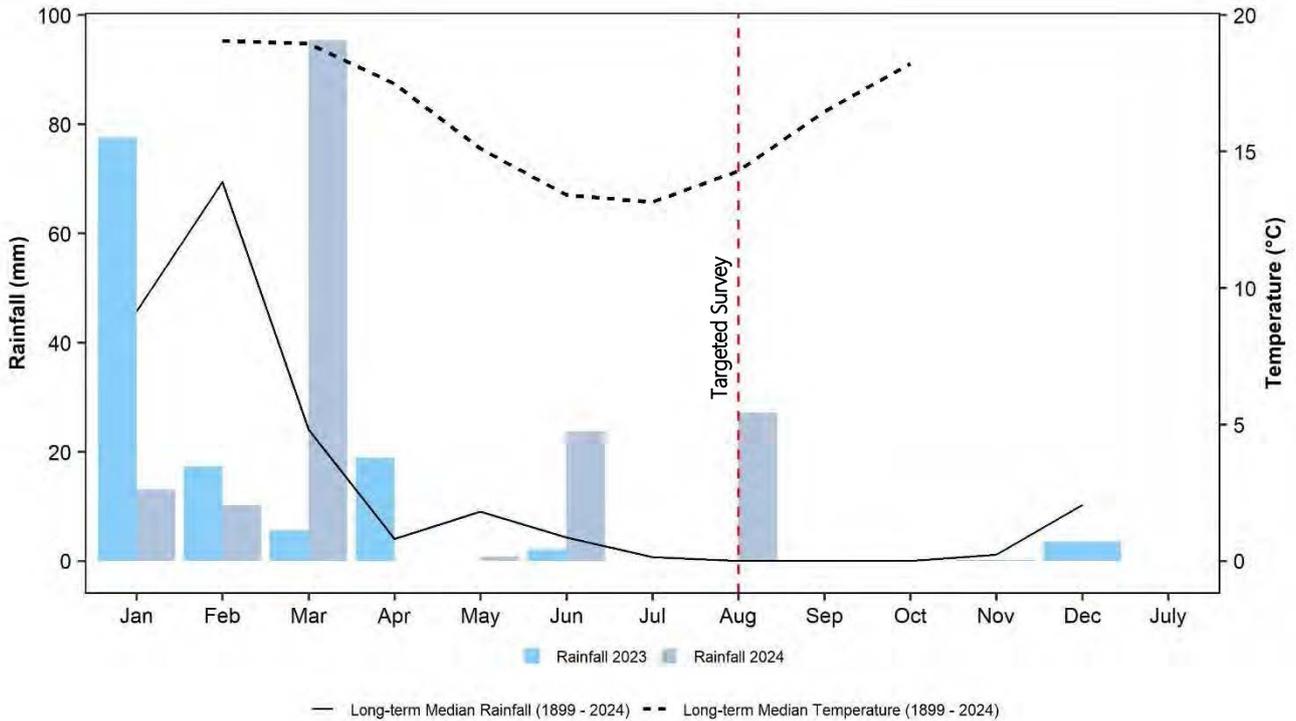


Figure 3.1: Rainfall Data at SILO Request Location (-21.2066, 118.7585).

This figure represents the total monthly rainfall (mm), median monthly rainfall (mm), and median temperature (°C).

3.2.2. Survey Personnel

The field personnel details are presented in Table 3.5.

Table 3.5: Project Staff

| Name | Position | Qualification | Years Consulting Experience | Tasks |
|--------------------|---------------------|---------------|-----------------------------|---|
| Astrid Heidrich | Principal Zoologist | MSc. | 16 | Report review |
| Christopher Parker | Principal Ecologist | MSc. | 15 | Species Distribution Modelling |
| Erica MacIntyre | Senior Zoologist | BSc. | 10 | Project management, field survey, data analysis, report writing |
| Joel Wilson | Senior Zoologist | MSc (Res.) | 4 | Field survey, data analysis |

3.2.3. Survey Techniques & Sites

Previous assessments in the Survey Area and surrounds, were reviewed as outlined in section 3.1.2. Areas that contained potential evidence during Spectrum’s (2024b) survey were revisited (where possible), to see if further evidence was present. The SDM output was also used to assist in the site selection process.

Targeted searches were completed that aligned with the 2-hectare (ha) plot technique as defined in the Bilby survey guidelines (DBCA, 2017). The 2-ha plots were spaced at approximately 1 km (where possible) over the Survey Area to ensure coverage, and some sites were moved to align with the “High” SDM output. Additional sites were completed in areas of preferred habitat, and/or where the SDM output suggested ground-truthing. Additional searching was completed while traversing between sites using transects.

The targeted searches included looking for Bilby evidence in the form of tracks, scats, diggings, and burrows for approximately 50 person minutes at each site. Where plant species could be identified in the field, more focus was placed on specific species such as *Acacia* (see section 2.8.1), which are known to contain root-dwelling larvae (RDL) that the Bilby favours as a food source (Southgate *et al.*, 2019). Only clear tracks, scats and diggings at the base of vegetation containing RDL were recorded as confirmed presence as outlined by Southgate *et al.* (2019). If any ambiguous diggings or potential burrows were recorded, further searching was undertaken in the vicinity to attempt to find further evidence to confirm presence. Additional habitat, and tracking conditions were recorded, such as vegetation, substrate type, weather conditions, density of vegetation present, trackability of substrate, and shadow extent.

Overall, 62 plots were completed (54 during this survey and eight during annual monitoring), equating to 65.8 person-hours searching and 130.4 km traverses within and surrounding the Survey Area (Table 3.6, Table 3.7, Map 3.1, and Appendix B).

Survey sites are listed in Table 3.6, with more detail provided in Appendix B,. Site locations are displayed on Map 3.1.

Table 3.6: Bilby Search Sites

| Site | Location | | Survey Effort Person Minutes | SDM Output |
|--------|----------|----------|---------------------------------|------------|
| | Easting | Northing | | |
| WDG_01 | 681479 | 7662787 | 84 | Medium |
| WDG_02 | 682610 | 7662458 | 52 | Medium |
| WDG_03 | 683400 | 7662518 | 54 | Medium |
| WDG_04 | 682643 | 7661494 | 40 | Medium |
| WDG_05 | 683634 | 7661435 | 106 | Medium |
| WDG_06 | 685197 | 7661560 | 80 | Medium |
| WDG_07 | 683420 | 7660571 | 60 | Medium |
| WDG_08 | 684537 | 7660480 | 90 | Medium |
| WDG_09 | 683713 | 7659498 | 104 | Medium |
| WDG_10 | 684625 | 7659475 | 46 | Medium |
| WDG_11 | 683053 | 7658377 | 46 | Medium |
| WDG_12 | 684598 | 7658530 | 52 | Medium |
| WDG_13 | 683622 | 7656477 | 40 | Medium |
| WDG_14 | 683846 | 7656188 | 24 | Medium |
| WDG_15 | 681992 | 7656014 | 158 | High |
| WDG_16 | 683483 | 7655813 | 18 | Medium |
| WDG_17 | 684224 | 7655520 | 70 | High |
| WDG_18 | 682832 | 7655435 | 122 | High |
| WDG_19 | 679644 | 7654429 | 60 | High |
| WDG_20 | 680810 | 7654526 | 40 | High |

| Site | Location | | Survey Effort | SDM Output |
|---------------------------|----------|----------|----------------|------------|
| | Eastings | Northing | Person Minutes | |
| WDG_21 | 681357 | 7654456 | 56 | High |
| WDG_22 | 682651 | 7654478 | 62 | High |
| WDG_23 | 683571 | 7654520 | 102 | Medium |
| WDG_24 | 680602 | 7653572 | 46 | High |
| WDG_25 | 681439 | 7653448 | 110 | Medium |
| WDG_26 | 682681 | 7653513 | 60 | High |
| WDG_27 | 683621 | 7653405 | 68 | High |
| WDG_28 | 684544 | 7653675 | 50 | Medium |
| WDG_29 | 679501 | 7653586 | 34 | Medium |
| WDG_30 | 680759 | 7652506 | 78 | Medium |
| WDG_31 | 682221 | 7652298 | 40 | High |
| WDG_32 | 683640 | 7652441 | 86 | High |
| WDG_33 | 685944 | 7652199 | 28 | High |
| WDG_34 | 679607 | 7651504 | 58 | Medium |
| WDG_35 | 680958 | 7651620 | 56 | High |
| WDG_36 | 683864 | 7651723 | 50 | High |
| WDG_37 | 685919 | 7651313 | 17 | High |
| WDG_38 | 686290 | 7651198 | 136 | Medium |
| WDG_39 | 678734 | 7650597 | 52 | High |
| WDG_40 | 680186 | 7650612 | 56 | High |
| WDG_41 | 681573 | 7650401 | 62 | High |
| WDG_42 | 683339 | 7650867 | 62 | Medium |
| WDG_43 | 684634 | 7650490 | 58 | High |
| WDG_44 | 685776 | 7650315 | 44 | Medium |
| WDG_45 | 679141 | 7649646 | 86 | Medium |
| WDG_46 | 680673 | 7649478 | 60 | High |
| WDG_47 | 681640 | 7649433 | 48 | Medium |
| WDG_48 | 682425 | 7649728 | 148 | Medium |
| WDG_49 | 683574 | 7649598 | 50 | Medium |
| WDG_50 | 684590 | 7649515 | 50 | Medium |
| WDG_51 | 680687 | 7648487 | 52 | Medium |
| WDG_52 | 681631 | 7648478 | 58 | Medium |
| WDG_53 | 682570 | 7648492 | 58 | Medium |
| WDG_54 | 681624 | 7647448 | 46 | Medium |
| Total | | | 3,473 | |
| Total Person Hours | | | 57.9 | |

Coordinate Reference System: GDA94 / MGA Zone 50

An additional eight Bilby sites were completed as part of the annual Fauna Monitoring Program for Fortescue, and have been included in this report. Four of these sites are located within the Survey Area while the additional four are located up to 6.6 km from the Survey Area. This provides further information about Bilbies in the vicinity of the Survey Area. The monitoring sites follow the same methods as used for this survey (2 ha search sites) with the addition of four cameras installed at one of the monitoring sites within the Survey Area where a resident Bilby was previously recorded. The cameras are installed long-term at active burrows and other recent signs to monitor the movements and activity levels of the resident Bilby. The monitoring sites are outlined in Table 3.7 and shown on Map 3.1.

Table 3.7: Fortescue Fauna Monitoring Bilby Sites

| Site | Location | | Survey Effort Person Minutes | SDM Output | Distance from Survey Area |
|---------------------------|----------|-----------|---------------------------------|----------------|------------------------------|
| | Easting* | Northing* | | | |
| MR GB OS 12 | 685687 | 7650691 | 42 | Medium | Within Survey Area |
| MR GB OS 13 | 681220 | 7662425 | 56 | Medium | Within Survey Area |
| MR GB OS 14 | 682355 | 7659785 | 44 | Medium | Within Survey Area |
| MR GB OS 15 | 682893 | 7657639 | 40 | Medium | 1.6 km S |
| MR GB AS 41 | 686874 | 7648323 | 140 | Medium to High | Within Survey Area |
| MR GB OS C02 | 675074 | 7643300 | 54 | Medium | 6.6 km SW |
| MR GB OS C03 | 676923 | 7651572 | 46 | Medium to High | 2.0 km W |
| MR GB OS C04 | 689893 | 7650254 | 52 | Medium to High | 2.9 km E |
| Total | | | 474 | | |
| Total Person Hours | | | 7.9 | | |

*Coordinate Reference System: GDA94 / MGA Zone 50

3.2.4. Scat Collection

Scats were collected and stored in silica-based desiccant with a layer of cotton wool between the sample and the desiccant. The scat samples were then sent for DNA analysis at Helix Solutions. The scats were analysed to determine the potential number of individuals present, based on their genotypic variation. The DNA extraction was completed using the QIAGEN QIAamp Fast DNA Stool mini kit. Detailed methods of the DNA extraction and sequencing are presented in Appendix B.

675000

680000

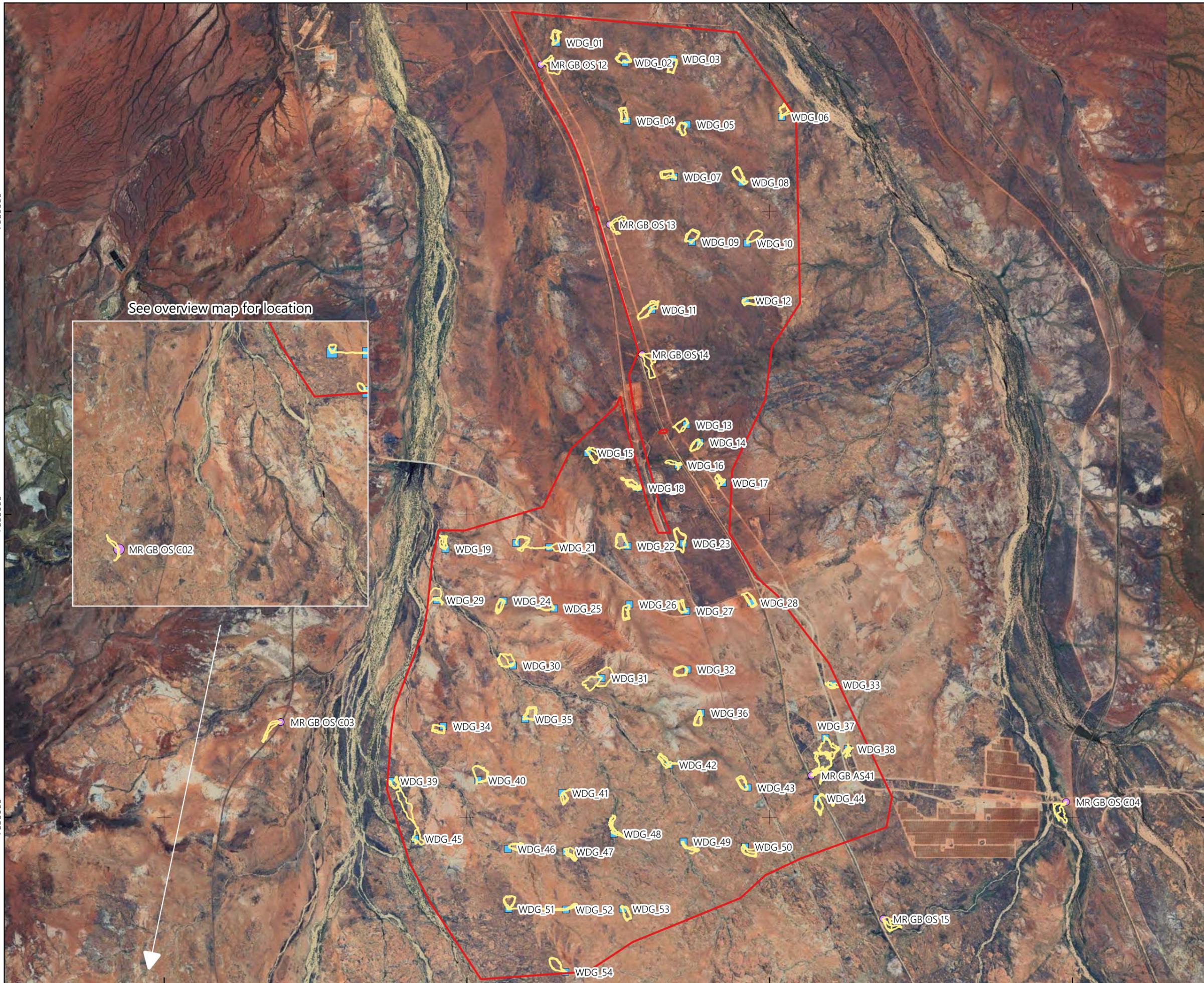
685000

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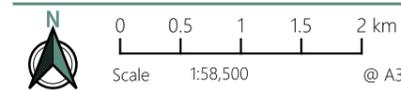
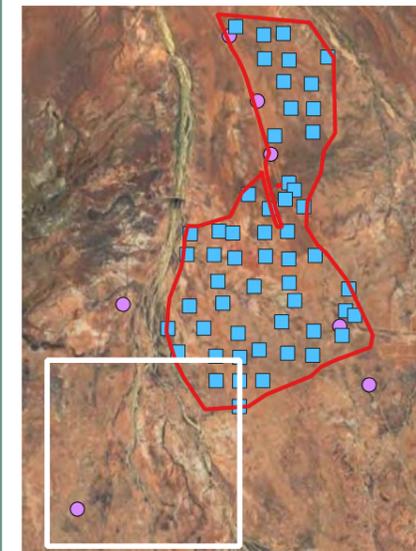
Survey Area

Survey Sites & Tracks

Survey Sites

Monitoring Sites

Tracks



Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator
Units: Metre



Author: GF

Date: 30-01-2025

Survey Sites

Turner River Solar Hub Project

MAP

Prepared for
Fortescue

3.1

3.2.5. Fauna Habitat Mapping

Fauna habitat mapping was previously completed for the majority of the Survey Area (see Table 3.2), primarily from Spectrum's (2025b) and 360's (2023) assessments. Fauna habitat mapping was reviewed and adjusted after ground truthing, and areas previously not mapped were filled in.

Fauna habitat mapping identifies areas of vegetation and land features that are distinguishable from other areas. Typically, each fauna habitat supports a characteristic fauna assemblage that is adapted to the features of the fauna habitat. Fauna habitat types are identified and mapped based on the following information:

- General vegetation type (Department of Primary Industries and Regional Development, 2019);
- Vegetation types mapped within the Survey Area;
- Previous fauna habitat mapping supplied by Fortescue;
- Vegetation structure;
- Landforms;
- Geological units;
- Soil substrate;
- Aerial imagery;
- Fauna assemblage; and
- Field observations.

The fauna habitat was recorded at each site and also opportunistically while traversing the Survey Area. The fauna habitat types were matched to Fortescue's domain names.

3.3. Limitations & Constraints

Survey specific limitations and constraints for the targeted fauna assessment completed at the Survey Area are discussed in Table 3.8.

Table 3.8: Survey Limitations & Constraints

| Limitation | Constraint | Comment |
|---|------------|---|
| Availability of the contextual information at a regional and local scale. | No | Database searches provided detailed information, adequate to guide field survey design and effort for the fauna survey. There were multiple assessments conducted within and in the vicinity of the Survey Area, and these have been included in the desktop assessment. |
| Competency/experience of the consultant carrying out the survey including experience in bioregion surveyed. | No | Senior Zoologist's Erica MacIntyre and Joel Wilson have suitable knowledge and experience conducting fauna surveys in the Pilbara region of Western Australia. Erica managed and completed the detailed fauna survey at NSJW and was therefore familiar with the area. The project was overseen by Principal Zoologist Astrid Heidrich, who has more than 15 years' experience conducting surveys in the Pilbara. |
| Timing/weather/season/cycle. | Partial | Bilby surveys can be conducted at any time of year using non-invasive techniques. The rain and windy conditions just prior to the survey may have impacted tracks, diggings and burrows, by making them less obvious or washing away recent evidence. However, the rain also assisted in identifying and finding fresh evidence. |
| Disturbances (e.g., fire, flood, accidental human intervention) which affected results of survey. | No | No significant disturbances were recorded at the Survey Area that have affected the results of the fauna assessment. However, a few fires have impacted the Survey Area as outlined in section 2.4. One fire in 2022 burnt approximately 51.5% of the Survey Area and the vegetation is still regrowing. |
| Remoteness and/or access problems. | No | The Survey Area has limited access tracks, so a helicopter was used to ensure full access to the area. |

| Limitation | Constraint | Comment |
|---|------------|---|
| Fauna Specific | | |
| Scope (what faunal groups were sampled and were some sampling methods not able to be employed because of constraints such as weather conditions). | No | The sampling techniques employed were adequate for the target species. The rainfall prior to the survey may have impacted secondary evidence. |
| Proportion of fauna identified, recorded, and/or collected. | No | All vertebrate fauna species and signs encountered were identified in the field by experienced zoologists. Some diggings and burrows are not possible to attribute to a certain species as they could belong to multiple species. |
| The proportion of the task achieved and further work which might be needed. | No | All components of the targeted fauna assessment were completed. |
| Resources (degree of expertise available in animal identification to taxon level). | No | Fauna resources available were adequate and did not compromise the outcome of the survey. 29 previous reports and ongoing fauna monitoring programs were reviewed |
| Intensity (in retrospect, was the intensity adequate). | No | Targeted searches for the Bilby were completed within areas of suitable habitat with suitable intensity. |
| Completeness (was the relevant area fully surveyed). | No | The habitat types that may host the Bilby were adequately surveyed. |

4. RESULTS & DISCUSSION

4.1. Desktop Survey

4.1.1. Previous Survey Effort

The literature review identified 24 previous surveys and monitoring programs that have been undertaken in the Study Area. The locations of the surveys are shown on Map 4.1 and included in Appendix C. Seventeen of these reports occurred within 10 km of the Survey Area (local context) and 12 of the previous surveys (not including a desktop assessment) overlapped the Survey Area and included the following (Table 4.1, Map 4.2, Appendix C):

- NSJW Detailed Vertebrate Fauna Assessment (Spectrum, 2025b);
- Fortescue Fauna Monitoring from 2013 to 2024 (ecologia, 2014b, 2014a, 2014d, 2015a, 2015b; Ecoscape, 2015, 2016b, 2016a, 2017, 2018; Spectrum, 2019, 2020a, 2021, 2022, 2023, 2024, 2025a);
- North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna Assessment (360, 2023);
- North Star Junction Flora and Fauna Assessments (Ecoscape, 2021);
- Pilbara Transmission Project Targeted Flora and Fauna (Ecoscape, 2020a);
- North Star Project Level 2 Vertebrate Fauna Assessment (ecologia, 2012a);
- North Star Access Corridor Flora, Vegetation & Vertebrate Fauna Assessment (ecologia, 2012b);
- Targeted Fauna Assessment of the Rail Duplication (Bamford, 2010);
- Significant Vertebrate Fauna of Roy Hill Infrastructure Corridor (TE, 2011);
- Targeted Flora and Fauna of Rail Corridor GDP Areas 2449, 2462 & 2515 (Ecoscape, 2009);
- Conservation Significant Vertebrate Fauna – Proposed Rail Corridor and Borrow Pits (ATA, 2007); and
- Fortescue Stage A Rail (Biota, 2004).

Of the 29 fauna surveys and on monitoring program, 17 included targeted searches for the Bilby, which included 15 surveys within 10 km of the Survey Area (Table 4.1, Map 4.2). Spectrum (2025b) completed 45.5 hours of targeted searches for the Bilby, with five trapping grids (that included cage trapping) and 22 motion cameras recording 5,448 hours at the NSJW project. This area encompasses 63.5% of the total Survey Area. Another eight surveys (including the monitoring) completed targeted searches partially within the Survey Area. The recent detailed and targeted survey completed by 360 Environmental (2023) included two trapping grids and one targeted Bilby transect search (1.5 km by four personnel at 20 m spacing, approximately 6 km total length) located in the northern portion of the Survey Area (Table 4.1, Map 4.2).

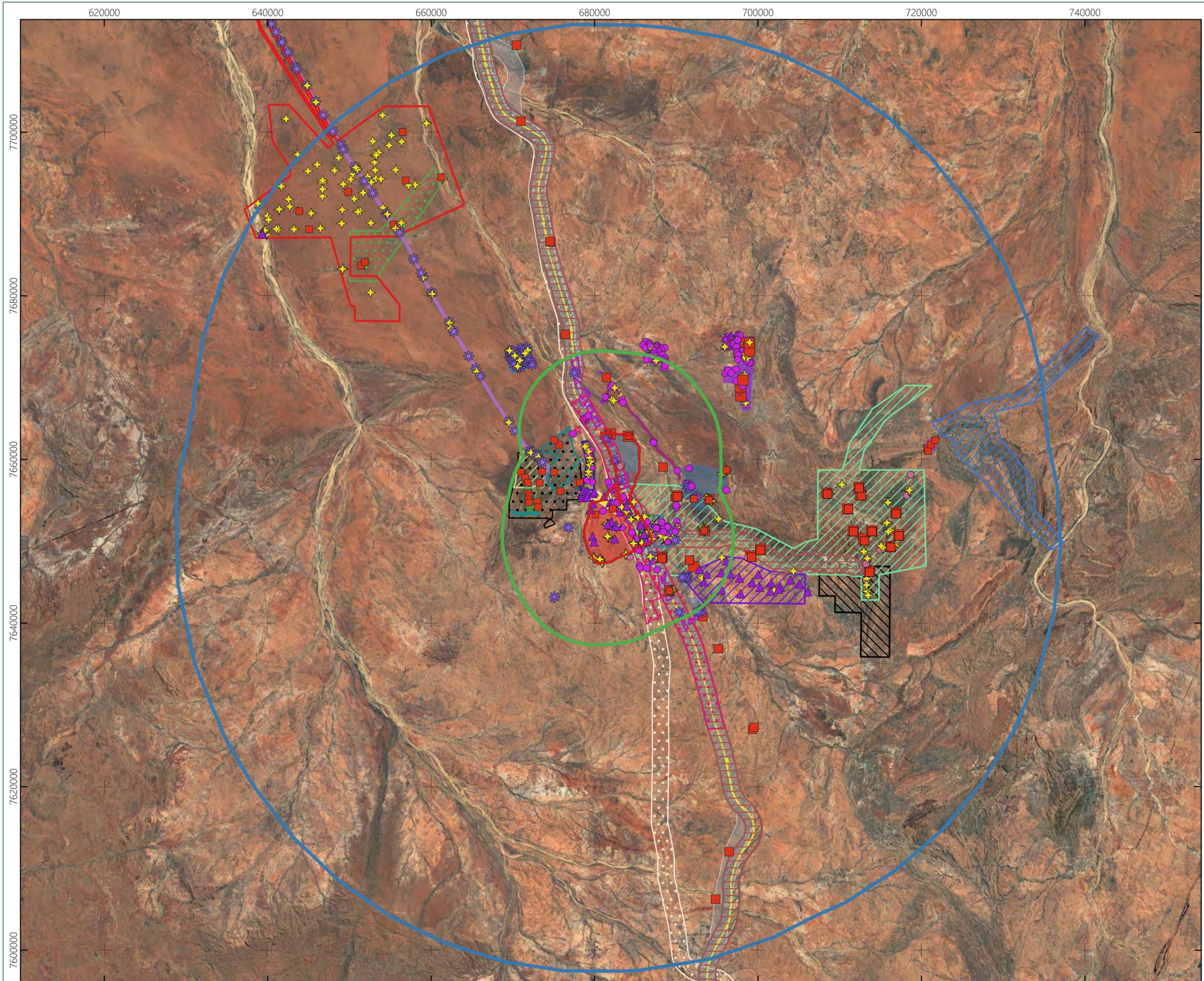
Table 4.1: Previous Survey Effort & Likelihood of Occurrence within 10 km of the Survey Area

| Source | Survey Type | Distance from Survey Area | Likelihood of Occurrence | Previous Survey Effort | | | | |
|--|-------------------------------------|---------------------------|-------------------------------------|--|--|----------------------------|---|---|
| | | | | Trapping Grid | Habitat Assessment (HA) | Opportunistic Observations | Targeted Bilby Search | Motion Camera |
| NSJW Detailed Vertebrate Fauna Assessment (Spectrum, 2025b) | Detailed & targeted | Within | Recorded | 5 x trapping grids | 33 | 9 | 45.5 hours of searches for secondary evidence | 22 x MCs (3-45 nights & 5,448 hours recording) |
| Fortescue Fauna Monitoring 2013-2024 (ecologia, 2014, 2015a, 2015b; Ecoscape, 2017, 2018; Spectrum, 2020, 2021, 2022, 2023, 2025a) | Annual significant fauna monitoring | Partially in | Recorded | - | - | Completed | 5 x Bilby 2 ha search sites in Survey Area 4 x Bilby 2 ha search sites within 10 km | 1 x in Survey Area 2 x MCs within 10 km |
| North Star Junction Renewable Energy Infrastructure Project Vertebrate Fauna (360, 2023) | Detailed & targeted | Partially in | Previously Recorded (DBCA Database) | 2 x trapping grids in Survey Area 5 x trapping grids within 10 km | 4 x in Survey Area, 21 x within 10 km | Completed | 5^ x transect searches – approx. 6 km per search 32 km total (1 x in Survey Area, 4^ x within 10 km) | 40 x MCs within 10 km |
| North Star Junction Flora and Fauna Assessments (Ecoscape, 2021) | Basic | Partially in | Recorded - potential evidence | - | 3 x in Survey Area 12 x within 10 km | Completed | - | 6 x MCs for 1-3 nights within 10 km |
| Pilbara Transmission Project Targeted Flora and Fauna (Ecoscape (Australia), 2020a) | Targeted | Partially in | Recorded - old evidence | - | - | - | Driving transects & grid searches completed, no mention of where or how many completed. | - |
| North Star Project Level 2 Vertebrate Fauna (ecologia, 2012a) | Detailed & targeted | Partially in | Medium | 16 x trapping grids within 10 km | Completed | Completed | 3 hour searching sandy plains with large spinifex | 14 sites with 156 hours recording (1 x MC in Survey Area) |

| Source | Survey Type | Distance from Survey Area | Likelihood of Occurrence | Previous Survey Effort | | | | |
|--|-------------------------------------|---------------------------|---|--|--|----------------------------|---|--|
| | | | | Trapping Grid | Habitat Assessment (HA) | Opportunistic Observations | Targeted Bilby Search | Motion Camera |
| North Star Access Corridor Flora, Vegetation & Vertebrate Fauna (ecologia, 2012b) | Basic | Partially in | Medium | - | Completed | Completed | - | - |
| Conservation Significant Vertebrate Fauna Species Habitat Assessment: Roy Hill Rail (TE, 2011) | Basic & targeted | Partially in | Recorded - old evidence only | - | 7 x in Survey Area, 30 x within 10 km | - | Searches in suitable habitat | 22 x MCs with 5,448 hours of recording |
| Targeted Fauna Assessment of the Rail Duplication (Bamford, 2010) | Targeted | Partially in | Recorded - old evidence only | - | - | Completed | Searches for burrows, diggings and tracks in sandy habitats | - |
| Targeted Flora and Fauna of Rail Corridor GDP Areas 2449, 2462 & 2515 (Ecoscape, 2009) | Targeted | Partially in | Recorded – old and active | - | Completed | Completed | Transects* | - |
| Conservation Significant Vertebrate Fauna – Proposed Rail Corridor and Borrow Pits (ATA, 2007) | Targeted & basic – vertebrate fauna | Partially in | Recorded – old and active | - | Completed from helicopter to identify significant fauna habitat to target for searches | Completed | Grid searches with between 3-12 people spaced at 5-50m | - |
| Fortescue Stage A Rail (Biota, 2004) | Detailed | Partially in | Only recorded during the Hope Down surveys, unsure of locations | 3 x trapping grids within 10 km (Hope Downs) | - | - | - | - |
| North Star Filtration Plan Relocation Flora & Fauna (ecologia Environment, 2014c) | Basic – vertebrate fauna | 1.5 km W | Medium | - | 10 | Completed | Searches in sandy spinifex plains | 8 x motion cameras at 8 sites (approx. 40 hours each, total 334 hours & 47 mins) |

| Source | Survey Type | Distance from Survey Area | Likelihood of Occurrence | Previous Survey Effort | | | | |
|---|-----------------------------|---------------------------|---|------------------------|-------------------------------|----------------------------|--|--|
| | | | | Trapping Grid | Habitat Assessment (HA) | Opportunistic Observations | Targeted Bilby Search | Motion Camera |
| Pippingarra and Wodgina Roads Flora & Fauna (Ecoscape, 2020b) | Basic – vertebrate fauna | 1.9 km E | Previously recorded, low likelihood post survey | - | Completed for habitat mapping | Completed | 23 x 30 min searches across 1 ha | 10 |
| Wodgina Lithium Project: Level 2 Vertebrate Fauna (WW, 2020) | Detailed | 1.6 km W | Not provided due to lack of habitat | 6 x trapping grids | Completed for habitat mapping | Completed | - | 82 at 40 sites (208 trap nights) |
| Wodgina Project: Level 1 & Targeted Fauna (Stantec, 2018) | Basic & targeted | 3.6 km NW | Confirmed – Gas pipeline & Aerodrome) Unlikely – Mine Area | - | 54 | - | Searches in suitable habitat | 32 x MCs |
| North Star Aerodrome Flora & Fauna (ecologia, 2015c) | Basic – vertebrate fauna | 5.3 km W | | - | Completed for habitat mapping | - | 19 hours active searches for all significant fauna* | 13 sites (208 hours total) |
| Wodgina Hercules Project: Terrestrial Fauna (Outback, 2012) | Detailed & targeted | 6.5 km W | Unknown | 4 x trapping grids | Completed | Completed | - | - |
| Wodgina DSO Project: Terrestrial Fauna (Outback, 2009) | Detailed & targeted | 5.6 km W | Unknown | 6 x trapping grids | Completed | Completed | - | - |
| Wodgina Gas Pipeline Targeted Fauna Survey (360, 2018b) | Targeted | 6.1 km NW | Confirmed | - | - | - | 6 x 2 ha searches within 10 km 40 x 2 ha searches outside | 3 x MCs within 10 km 12 x MCs outside All - 36 trap nights |
| P1000 Pilgangoora Project Flora & Fauna (APM, 2024) | Targeted – vertebrate fauna | 9.1 km N | Possible | | | | Targeted searches across a linear distance of 26 km* | 11 x MCs totalling 152 trap nights |

Notes: ^ 1 x Bilby search located just outside 10 km ~225 m; * Transects completed through each area targeting all significant fauna.



Legend

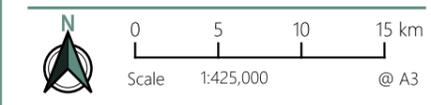
- Survey Area
- 10 km Buffer
- Study Area (50 km Buffer)

Previous Surveys Completed - Surveyed Areas

- Spectrum (2024)
- 360 (2023)
- Ecoscape (2021)
- Ecoscape (2020)
- Spectrum (2018)
- ecologia (2012a)
- ecologia (2012b)
- Terrestrial Ecosystems (2011)
- Bamford (2010)
- Ecoscape (2009)
- ATA Environmental 2007
- Biota (2004)
- Western Wildlife (2020)
- Stantec (2018)
- Outback Ecology (2012)
- Outback Ecology (2009)
- 360 (2018a)
- 360 (2018b)
- Spectrum (2021)
- Western Wildlife (2023)
- Outback Ecology (2011a)
- Outback Ecology (2011b)
- Bamford (2001)
- 360 (2016)
- APM (2023)
- APM (2024)
- ecologia (2015c)
- ecologia (2014b)
- ecologia (2014c)
- Ecoscape (2020b)

Previous Surveys Completed - Survey Effort

- Habitat Assessment
- ★ Motion Camera
- Opportunistic Site & Targeted Active Search
- Systematic Terrestrial Vertebrate Fauna Trapping
- ▲ Targeted Active Search
- ✱ Greater Bilby - occupancy site
- ↑ Greater Bilby - abundance site
- Targeted Search Area - Bilby



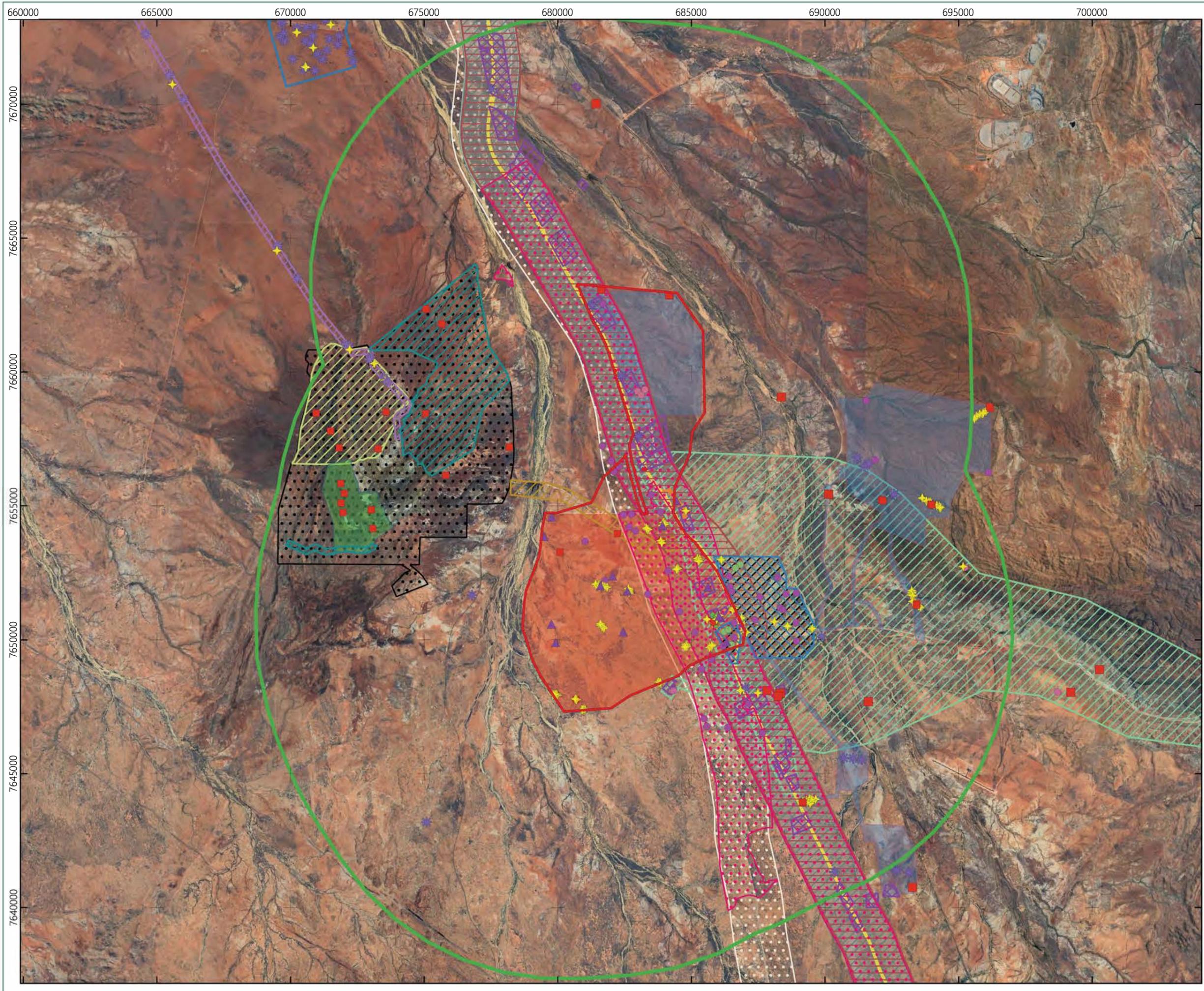
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 Projection: Universal Transverse Mercator
 Units: Metre

Spectrum
ecology + science

Author: EM Date: 30-01-2025

Previous Survey Effort - Regional Context

Turner River Solar Hub Project



Legend

- Survey Area
- 10 km Buffer

Previous Surveys Completed - Surveyed Areas

- Spectrum (2024)
- 360 (2023)
- Ecoscape (2021)
- Ecoscape (2020)
- Spectrum (2018)
- ecologia (2012a)
- ecologia (2012b)
- Terrestrial Ecosystems (2011)
- Bamford (2010)
- Ecoscape (2009)
- ATA Environmental 2007
- Biota (2004)
- Western Wildlife (2020)
- Stantec (2018)
- Outback Ecology (2012)
- Outback Ecology (2009)
- 360 (2018a)
- 360 (2018b)

Previous Surveys Completed - Survey Effort

- Habitat Assessment
- ★ Motion Camera
- Opportunistic Site, Targeted Active Search
- Systematic Terrestrial Vertebrate Fauna Trapping
- ▲ Targeted Active Search, Targeted active search
- ★ Greater Bilby - occupancy site
- ↑ Greater Bilby - abundance site
- Targeted Search Area - Bilby

N

 Scale: 1:130,000 @ A3
 0 1 2 3 4 5 km

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre

Author: EM Date: 05-09-2024

Previous Survey Effort -
 Local Context

Wodgina Project

MAP

4.2

Prepared for Fortescue

4.1.2. Previous Bilby Records

During a previous detailed and targeted vertebrate fauna survey completed within the Survey Area, potential evidence (in the form of old diggings and old burrows) was recorded from four locations, and a female Bilby was captured in a cage from an additional, fifth site (Spectrum, 2025b). The site was located in sandy plain habitat adjacent to minor drainage line habitat and some granite outcroppings. In addition to the trap capture, four burrows, scats, tracks and multiple diggings were recorded at the same site which was subsequently incorporated into Fortescue’s Annual Fauna Monitoring Program and has since been monitored twice per year (site MR GB AS 41, Table 4.2, Map 4.3). Bilby evidence recorded from the site (and therefore within the Survey Area) during the monitoring has been included in Table 4.2 (Spectrum, 2025a).

The DBCA Fauna Database returned 397 Bilby records within the Study Area, while the Fortescue Internal Database returned 364. This demonstrates that the Bilby is frequently recorded within the Study Area and is widespread throughout the region.

No records were identified within the Survey Area from the DBCA Database; however, four were located just outside the boundary (within 100 m). These records were from 2013, with two of the four being certain, (motion camera records). Fortescue’s Database contained 12 records within the Survey Area and an additional five within a 2 km radius. These records were made during two previous surveys (ATA, 2007; Ecoscape, 2009) and comprise secondary evidence (scats, burrows, and diggings). Two other records were made during two relatively recent surveys and occur within 100 m east of the Survey Area (Ecoscape, 2020, 2021). Details of the records within the Survey Area and a 2 km buffer are detailed in Table 4.2 and shown on Map 4.3.

Table 4.2: Previous Bilby Records within the Survey Area and 2 km Buffer

| Survey Phase or Date | Site / Location / Distance | Type of Record / Reference | Fauna Habitat# | Habitat Definition# | Easting^ | Northing^ |
|--|----------------------------|---|--|---------------------|----------|-----------|
| Previous Records – Fortescue Internal Database – Previous Surveys & Fauna Monitoring | | | | | | |
| 22/07/2009 | GDP2449 | Old burrow (Ecoscape, 2009) | Plain (sand) | Critical | 686333 | 7650954 |
| August 2006 | Burrow pit P4A | Inactive burrow | Plain (sand) | Critical | 681599 | 7662775 |
| August 2006 | Burrow pit P4A | >15 (active and inactive) burrows and diggings (ATA, 2007) | Plain (sand) | Critical | 681367 | 7662760 |
| August 2006 | Burrow pit P4A | Old digging | Formerly Plain (sand), now Cleared | N/A | 681569 | 7661500 |
| August 2006 | North of burrow pit P4C | Old digging | Plain (sand) | Critical | 683082 | 7658342 |
| August 2006 | Burrow pit P4C | Old digging | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 683176 | 7657666 |
| 25/05/2013 | J-ML-FA_BB13 | Inactive burrow (recently active) | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 682351 | 7659743 |
| 25/05/2013 | J-ML-FA_BB14 | Inactive burrow (recently active) | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 682389 | 7659812 |

| Survey Phase or Date | Site / Location / Distance | Type of Record / Reference | Fauna Habitat# | Habitat Definition# | Easting^ | Northing^ |
|---|--|---|--|---------------------|----------|-----------|
| 25/05/2013 | J-ML-FA_BB15 | Inactive burrow (recently active) | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 682410 | 7659789 |
| 25/05/2013 | J-ML-FA_BB16 | Inactive burrow (recently active) | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 682382 | 7659832 |
| 16/05/2019 | MR GB OS 13 | Old diggings | Formerly Plain (sand), now Cleared – disturbed, rehabbed | N/A | 682349 | 7659703 |
| 22/07/2021 | MR GB OS 12 | Scats | Drainage Line/River/Creek (minor) | Critical | 681423 | 7662812 |
| Previous Records – Fortescue Internal Database – Previous Surveys & Fauna Monitoring (up to 2 km outside) | | | | | | |
| 22/09/2019 | HV1905 27 m E | Old burrow (Ecoscape, 2020a) | Formerly Spinifex Sand Plain, now Cleared/Disturbed | N/A | 686974 | 7650492 |
| 27/05/2021 | NSJ_FN_P_FS04 84 m E | Potential diggings (x3) (Ecoscape, 2021) | Spinifex Sand Plain | Critical | 686880 | 7650825 |
| 16/05/2019 | R_F_P_MR GB OS15 1.4 km S | Two potential old diggings (Spectrum, 2020b) | Spinifex Sand Plain | Critical | 686904 | 7648294 |
| 11/07/2020 | R_F_P_MR GB OS15 1.4 km S | Potential tracks (gait pattern only) (Spectrum, 2021) | Spinifex Sand Plain | Critical | 686904 | 7648294 |
| 22/07/2022 | R_F_P_MR GB OS15 1.4 km S | Scats (Spectrum, 2023) | Spinifex Sand Plain | Critical | 686904 | 7648294 |
| Previous Records – DBCA Database – Previous Survey (up to 2 km outside) | | | | | | |
| 4/12/2013 | Roy Hill Rail Line 87.9 m E (in rail cut out) | Motion camera recording | Spinifex Sand Plain | Critical | 682989 | 7655465 |
| 4/12/2013 | Roy Hill Rail Line 92 m E (in rail cut out) | Unknown | Spinifex Sand Plain | Critical | 682991 | 7655474 |
| 4/12/2013 | Roy Hill Rail Line 84.5 m W (in rail cut out) | Motion camera recording | Spinifex Sand Plain | Critical | 682971 | 7655587 |
| 4/12/2013 | Roy Hill Rail Line 81.8 m W (in rail cut out) | Unknown | Spinifex Sand Plain | Critical | 682971 | 7655596 |
| NSJW Survey | | | | | | |
| 17/05/2023 | NS01 | Female captured in cage | Spinifex Sand Plain | Critical | 685937 | 7650777 |
| 15/05/2023 | NS01 | Active burrow | Spinifex Sand Plain | Critical | 685937 | 7650778 |
| 17/05/2023 | NS01 | Old burrow recorded during Phase 1, active in Phase 2 | Spinifex Sand Plain | Critical | 685904 | 7650708 |
| 17/05/2023 | NS01 | Inactive burrow | Spinifex Sand Plain | Critical | 685906 | 7650707 |
| 30/09/2023 | NS01 | Active burrow | Minor Drainage Line | Critical | 685960 | 7650764 |
| 27/09/2023 | NS01 | Active burrow | Spinifex Sand Plain | Critical | 685858 | 7650640 |
| 27/09/2023 | NS01 | Multiple confirmed diggings, scratchings and scat piles | Spinifex Sand Plain | Critical | 685843 | 7650632 |

| Survey Phase or Date | Site / Location / Distance | Type of Record / Reference | Fauna Habitat# | Habitat Definition# | Easting^ | Northing^ |
|---|----------------------------|---|---------------------|---------------------|----------|-----------|
| 20/05/2023 | NS01-TS | Confirmed tracks | Minor Drainage Line | Critical | 686045 | 7650915 |
| 20/05/2023 | NS01-TS | Confirmed tracks | Spinifex Sand Plain | Critical | 686078 | 7650998 |
| 20/05/2023 | NS01-TS | Confirmed tracks | Spinifex Sand Plain | Critical | 686173 | 7651006 |
| 24/05/23 to 29/06/23 | NS01-MC30-LT | 39 video records of Bilby entering and leaving burrow | Spinifex Sand Plain | Critical | 685942 | 7650774 |
| 4/06/23, 16/06/23 & 7/09/23 | NS01-MC33-LT | Three photos of a Bilby entering burrow over three days | Spinifex Sand Plain | Critical | 685943 | 7650777 |
| 1/09/23 & 21/09/23 | NS01-MC57 | Two photos of Bilby at burrow | Spinifex Sand Plain | Critical | 685944 | 7650775 |
| 26/08/23 to 21/09/23 | NS01-MC63 | Five photos of Bilby at burrow | Spinifex Sand Plain | Critical | 685944 | 7650776 |
| 22/05/2023 | NSOPP06 | Potential, old burrow | Spinifex Sand Plain | Critical | 685739 | 7652040 |
| 23/05/2023 | NSOPP08 | Potential old disused burrow | Spinifex Sand Plain | Critical | 679715 | 7650593 |
| 2/10/2023 | NSOPP12 | Potential old digging | Spinifex Sand Plain | Critical | 682368 | 7649956 |
| 3/10/2023 | NSOPP13 | Potential old digging | Spinifex Sand Plain | Critical | 679770 | 7654577 |
| 4/10/2023 | BD01 | Potential old digging | Spinifex Sand Plain | Critical | 686420 | 7651188 |
| Fauna Monitoring Program 2024 (Spectrum, 2025a) | | | | | | |
| 26/03/2024 | MR GB OS 12 | Potential evidence only – two test burrows | Spinifex Sand Plain | Critical | 681295 | 7662490 |
| 26/03/2024 | MR GB OS C04 | Potential evidence only - old burrow and diggings | Major Drainage Line | Critical | 689868 | 7650132 |
| 25/03/2024 | MR GB AS 41 | Confirmed evidence - active burrow | Spinifex Sand Plain | Critical | 685901 | 7650706 |
| 25/03/2024 | MR GB AS 41 | Confirmed evidence - scat | Spinifex Sand Plain | Critical | 685880 | 7650686 |
| 25/03/2024 | MR GB AS 41 | Confirmed presence - clear tracks | Minor Drainage Line | Critical | 685826 | 7650487 |
| 25/03/2024 | MR GB AS 41 | Confirmed presence - clear tracks | Minor Drainage Line | Critical | 685832 | 7650554 |
| 30/03/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 1/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 4/04/2024 | MR GB AS 41 MC1 | Individual on motion camera | Spinifex Sand Plain | Critical | 685797 | 7650796 |
| 6/04/2024 | MR GB AS 41 MC1 | Individual on motion camera | Spinifex Sand Plain | Critical | 685797 | 7650796 |
| 6/04/2024 | MR GB AS 41 MC2 | Individual on motion camera | Spinifex Sand Plain | Critical | 685943 | 7650776 |
| 6/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 13/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 16/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |

| Survey Phase or Date | Site / Location / Distance | Type of Record / Reference | Fauna Habitat# | Habitat Definition# | Easting^ | Northing^ |
|----------------------|----------------------------|------------------------------------|---------------------|---------------------|----------|-----------|
| 19/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 20/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 21/04/2024 | MR GB AS 41 MC2 | Individual on motion camera | Spinifex Sand Plain | Critical | 685943 | 7650776 |
| 21/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 22/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 23/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 24/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 27/04/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 29/04/2024 | MR GB AS 41 MC1 | Individual on motion camera | Spinifex Sand Plain | Critical | 685797 | 7650796 |
| 30/04/2024 | MR GB AS 41 MC2 | Individual on motion camera | Spinifex Sand Plain | Critical | 685943 | 7650776 |
| 1/05/2024 | MR GB AS 41 | Confirmed evidence - active burrow | Spinifex Sand Plain | Critical | 685898 | 7650705 |
| 2/05/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 10/05/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 15/05/2024 | MR GB AS 41 MC1 | Individual on motion camera | Spinifex Sand Plain | Critical | 685797 | 7650796 |
| 16/05/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 18/05/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 5/06/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 5/07/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 13/07/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |
| 27/07/2024 | MR GB AS 41 MC1 | Individual on motion camera | Spinifex Sand Plain | Critical | 685797 | 7650796 |
| 29/07/2024 | MR GB AS 41 MC3 | Individual on motion camera | Spinifex Sand Plain | Critical | 685902 | 7650705 |

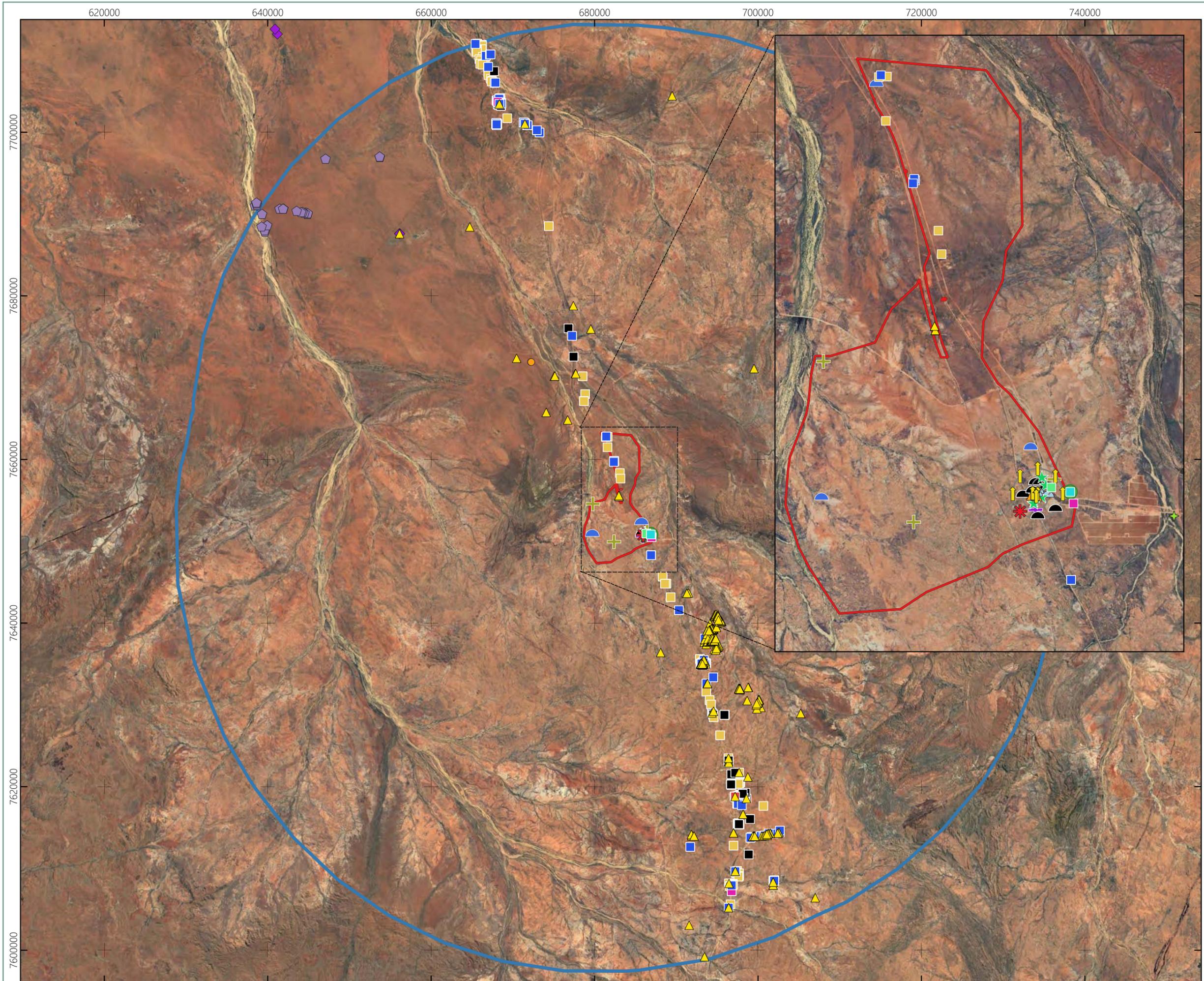
^ = Coordinate reference system – GDA94, MGA94, Zone 50, # = see section 4.2.1, for further information regarding habitat.

It is often difficult to confirm from the majority of the database search results whether the secondary evidence records were potential presence or confirmed presence for the Bilby (Southgate *et al.*, 2019), as this information is not always included in the attributes, especially for any records prior to the Southgate *et al.* (2019) journal article. As outlined in section 3.2.3, confirmed presence is limited to clear tracks, scats and multiple diggings at the base of vegetation containing RDL that Bilbies use as food resource (Southgate *et al.*, 2019). Additionally, it is also likely that some of the records from the two databases are duplicates.

Of the 17 regional surveys completed within 10 km of the Survey Area, 12 recorded the Bilby. This includes the two recently confirmed records of the female Bilby (NSJW and Fauna Monitoring Program). The remaining 10 records include:

- three reports cite old evidence (Bamford, 2010; TE, 2011; Ecoscape, 2020);
- one mentions potential evidence (Ecoscape, 2021);
- two state both old and fresh evidence (ATA, 2007; Ecoscape, 2009);
- one was previously recorded from DBCA searches (360, 2023);
- while two reports (Biota, 2004; Stantec, 2018) confirmed Bilby evidence from three previous surveys, with two already included in Table 4.1 (360, 2018a, 360, 2018b).

Dziminski *et al.* (2020) investigated the validity of records in the Pilbara region as part of their comprehensive review of the historic and recent records of the Bilby in the Pilbara. This study outlined a confirmed Bilby range and identified areas that require further surveying due to inaccurate and historic records. The Survey Area falls inside the confirmed Bilby range and none of the previous records from the Study Area were considered inaccurate.



Legend

- Survey Area
- Study Area (50 km Buffer)

Previous Bilby Records

- DBCA Database
- Fortescue Database
 - Fortescue Fauna Monitoring
 - Ecoscape (2021)
 - Ecoscape (2020)
 - Bamford (2010)
 - Ecoscape (2009)
 - ATA (2007)
 - Other Consultant

Bilby Evidence Recorded at NSJW (Spectrum, 2025b) & 2024 wet season Fauna Monitoring (Spectrum, 2025a)

- Capture
- Motion camera
- Confirmed active burrow
- Confirmed digging
- Confirmed tracks
- Inactive burrow
- Potential old burrow
- Potential old digging
- Confirmed Scat
- Potential old burrow and diggings

Other Surveys

- Western Wildlife (2023)
- 360 (2018b)
- 360 (2018a)

Scale: 1:425,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre

Author: EM Date: 30-01-2025

4.1.3. Species Distribution Modelling

Two models were tested in the selection process, the final model achieved a very high performance with an AUC of 0.941 (Figure 4.1). A high AUC indicates the model was highly efficient at measuring presences and pseudo-absences. The statistical results of the model are displayed in Figure 4.1 and the spatial representation of the distribution is presented in Map 4.4.

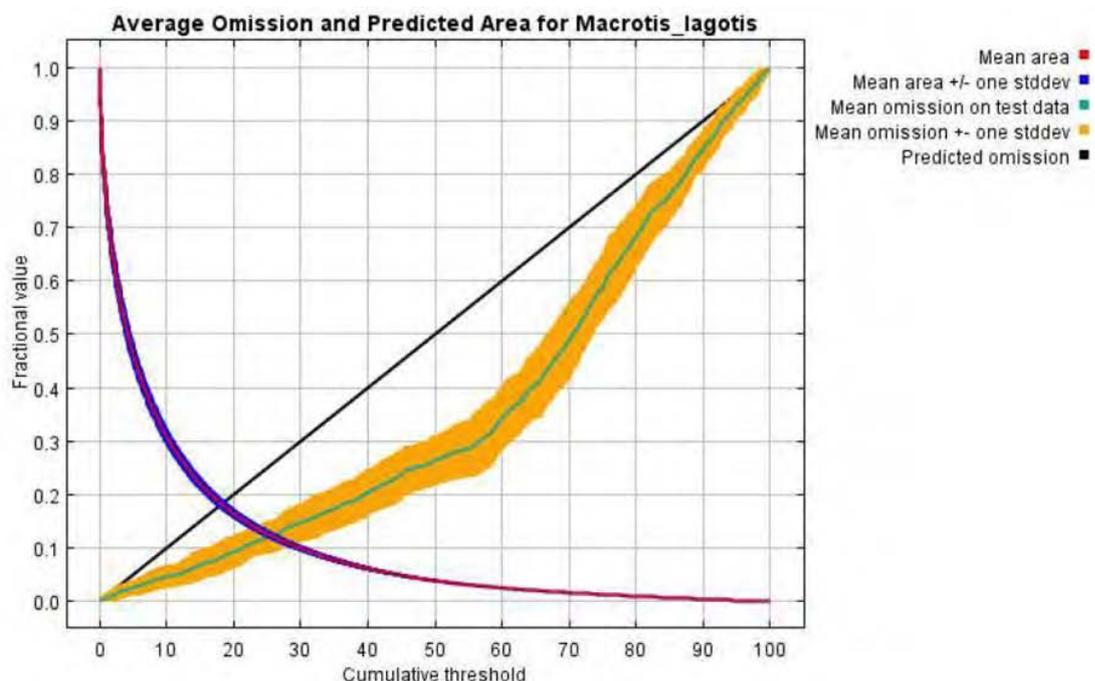


Figure 4.1: Average Omission & Predicted Area for Bilby
As a function of the cumulative threshold, average over the replicate runs (100).

Amongst the 37 environmental variables tested, 12 variables were the most influential when explaining the distribution of Bilbies (Table 4.3). The type of land system and soil environmental variables contributed most to the model, with 37.7% and 30.3% contribution, respectively. The environmental variable with the highest gain when used in isolation is soils, which appears to be the most important variable for the species, and fits with the species ecology. The environmental variable that decreases the gain the most when it is omitted is annual precipitation, which, therefore, appears to have the most information that is not present in the other variables. This result reinforces the hypothesis that Bilbies are associated with certain land systems, vegetation and soils which supports their burrowing and foraging requirements.

Table 4.3: Variable Contribution & Permutation Importance of the Best Performing Model

| Environmental Variable | Description | Percent Contribution | Permutation Importance |
|------------------------|--|----------------------|------------------------|
| Land Systems | Soil-landscape mapping at the systems level. | 37.7 | 6 |
| Soils | National description of Australian soil types. | 30.3 | 15.4 |

| Environmental Variable | Description | Percent Contribution | Permutation Importance |
|----------------------------|---|----------------------|------------------------|
| Pre-European Vegetation | Pre-European vegetation (The Department of Primary Industry Regional Development, 2019) maps original natural vegetation assumed to have existed prior to European settlement in Western Australia. | 9.9 | 14.5 |
| Bioclim12 | Annual precipitation. | 6.9 | 18.3 |
| Geology | Seamless national coverage of outcrop and surficial geology. | 6.1 | 6 |
| Depth to Soil [^] | Depth of soil profile (A & B horizons) in metres. | 3.1 | 4.4 |
| MrVBF* | MrVBF is a topographic index designed to identify areas of deposited material at a range of scales based on the observations that valley bottoms are low and flat relative to their surroundings and that large valley bottoms are flatter than smaller ones. | 3.1 | 0.3 |
| Depth of Regolith | Metres of in situ and transported material overlying unweathered bedrock. | 1 | 18.4 |
| Relief | The difference between a locations highest and lowest elevations. | 0.6 | 10.8 |
| Soil Sand (%) | Percentage of sand content of the soil at a depth of 0-5 cm. | 0.6 | 3.8 |
| Major Watercourse | Euclidean distance from major watercourse. | 0.6 | 1.5 |
| Soil Total Phosphorus | Percentage of phosphorus content of the soil at a depth of 0-5 cm. | 0.2 | 0.6 |

[^]Excluded from SDM based on MaxEnt model importance. *Excluded from SDM due to correlation with other layers.

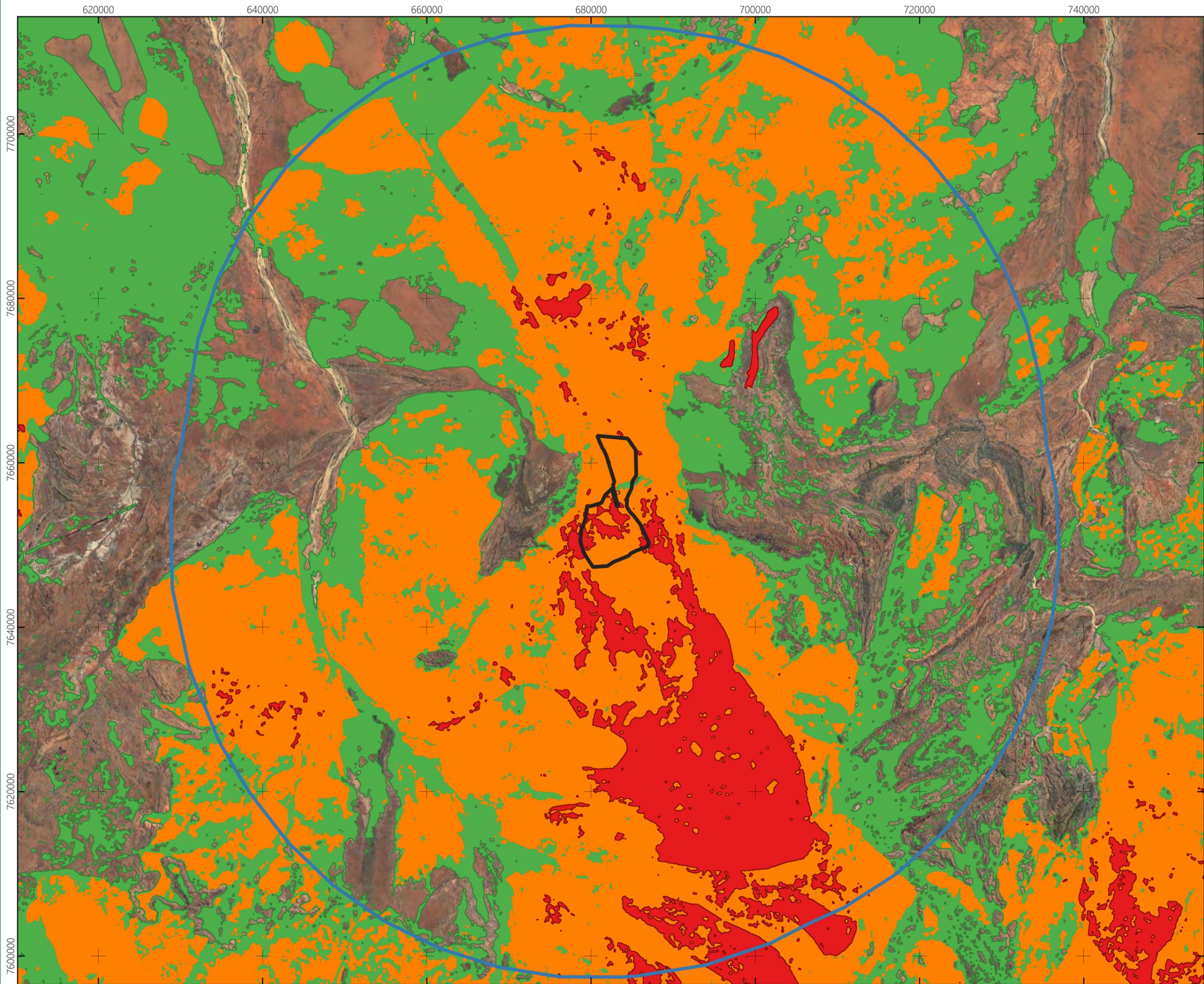
An assessment of the probability ranks within the Study Area was performed, and the total predicted extent of the Bilby occupied 8,558,206.0 ha (48.0%), although the western portion of the Pilbara has no recent records (Dziminski and Carpenter, 2017). The range of probability of occurrence values for Medium and High likelihood ranks contain 95% and 50% of all known records of the Bilby, respectively.

Within the Study Area (probability of occurrence >0.05 or likelihood ranks Low to High), 298,213.2 ha (29.9%) was classified as having a Low probability rank (0.05 – 0.19). Areas of Medium (0.2 – 0.8) and High (0.8 – 1.0) probability ranks represented 408,567.1 ha (41.0%) and 76,137.1 ha (7.6%) of the total modelled extent, respectively. Thus, 48.6% (484,704.2 ha) of the Study Area is classified as a Medium or High likelihood rank.

Within the Survey Area, 180.3 ha (2.5%) was classified as having a Low probability rank (0.05 – 0.19), 5,362.9 ha (75.2%) was identified as Medium (0.2 – 0.8), while 1,585.1 ha or 22.2% was categorised as having a High probability rank (0.8 – 1.0, Table 4.4, Map 4.4). Therefore, a combined total of 6,948 97.4% of the Survey Area is assigned a Medium or High likelihood rank.

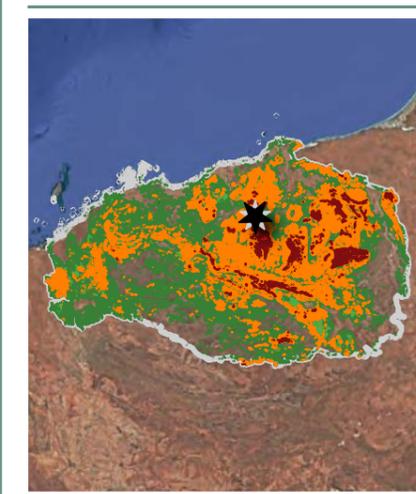
Table 4.4: Species Distribution Modelling Habitat Category Extents

| Species | Category | Representative Colours on Map | Survey Area (ha) | Percentage of Survey Area | Study Area (ha) | Percentage of Study Area | Pilbara IBRA (ha) | Percentage of Pilbara IBRA |
|--------------|-----------------------|-------------------------------|------------------|---------------------------|------------------|--------------------------|--------------------|----------------------------|
| Bilby | 1 – Low 0.05-0.19 | Green | 180.3 | 2.5% | 298,213.2 | 29.9% | 5,412,156.8 | 30.4% |
| | 2 – Medium 0.2-0.8 | Orange | 5,362.9 | 75.2% | 408,567.1 | 41.0% | 2,891,663.8 | 16.2% |
| | 3 – High 0.8-1 | Red | 1,585.1 | 22.2% | 76,137.1 | 7.6% | 254,385.4 | 1.4% |
| Total | | | 7,128.3 | 99.9% | 782,917.4 | 78.5% | 8,558,206.0 | 48.0% |



Legend

- Survey Area
- Study Area
- SDM
 - Low
 - Medium
 - High
- Pilbara IBRA Region



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre



Author: EM Date: 30-01-2025

Species Distribution Modelling

Turner River Solar Hub Project

4.2. Survey Results & Discussion

4.2.1. Bilby Habitat

Seven broad fauna habitat types were recorded from the Survey Area, these are predominately based on habitat mapping completed from previous surveys (360, 2023; Spectrum, 2025b). These habitats are summarised in Table 4.5, detailed in Table 4.6, and shown on Map 4.5:

Table 4.5: Broad Fauna Habitat Types and Extents in Survey Area

| Fortescue Habitat Type | Spectrum Habitat Type | Extent (ha) | Percentage of Survey Area |
|-----------------------------------|---------------------------------|----------------|---------------------------|
| Plain (sand) | Spinifex Sand Plain | 6,272.8 | 87.9% |
| Plain (stony/gibber) | Spinifex Rocky Plain | 212.1 | 3.0% |
| Drainage Line/River/Creek (major) | Major Drainage Line | 43.5 | 0.6% |
| Drainage Line/River/Creek (minor) | Minor Drainage Line | 78.3 | 1.1% |
| Granite Outcrops (boulder piles) | Granite Domes and Boulder Piles | 121.1 | 1.7% |
| Granite Outcrops (flat domes) | N/A (360, 2023) | 28.6 | 0.4% |
| Hills/Ranges/Plateaux | Hills, Ranges and Plateaux | 62.7 | 0.9% |
| Cleared | Cleared/Disturbed | 316.4 | 4.4% |
| | Total | 7,135.4 | |

Suitable habitat for the Bilby was recorded from the majority of the Survey Area and from all habitats, with the exception of the Hills/Ranges/Plateaux and Cleared/Disturbed areas, with the former habitat likely only used sporadically. The female Bilby that was recorded from the Survey Area occupied Plain (sand), and Drainage Line/River/Creek (minor) habitat, with surrounding areas of Granite Outcrops (boulder piles). The latter is likely used for foraging or dispersal purposes only, due to the close proximity to critical habitat. The Bilby was also located within an area that has recently become fragmented by infrastructure (roads, rail line, power line corridor, camp and existing solar farm area) and other disturbances, such as an adjacent gravel pit and the recent fires that have impacted the eastern portion of the Survey Area.

Critical habitats in the Survey Area: Plain (sand, 87.9%), Drainage Line/River/Creek (minor, 1.7%) and Drainage Line/River/Creek (major, 0.6%).

The Plain (sand) and the Drainage Line/River/Creek (minor) habitats are the most likely areas to be occupied by the Bilby, followed by the Drainage Line/River/Creek (major) (Table 4.6, Map 4.5). The Bilby is typically found in areas where *Acacia bivenosa*, *A. colei*, *A. dictyophleba*, *A. melleodora*, *A. stellaticeps* and *A. trachycarpa* occurs, as these species host RDL (Southgate *et al.*, 2019). The Survey Area included *A. bivenosa*, *A. colei*; *A. stellaticeps*; and *A. trachycarpa*, with *A. stellaticeps* being the most common and widespread species. *Senna notabilis*, another plant known for hosting RDL, was also present in low density across the Survey Area. However, it is likely that the recent fires in 2021-2022 impacted the suitability of those habitats for the Bilby.

Supporting habitat in Survey Area: Plain (stony/gibber, 3.0%), Hills/Ranges/Plateaux (0.9%), Granite Outcrops (flat domes, 0.4%) and Granite Outcrops (boulder piles, 1.7%).

The Bilby may use the Plain (stony/gibber) for foraging and dispersal. The other two more elevated habitats may be used infrequently due to the proximity to critical habitat within the Survey Area, and likely only the lower elevated and sandier areas (Table 4.6, Map 4.5).

Additional areas were considered cleared and disturbed (Cleared), these areas provide little to no value to fauna. However, some rehabilitated areas have been included as disturbed and could potentially provide supporting habitat.

The critical and supporting fauna habitat types recorded from the Survey Area broadly align with those outlined in Table 2.5 (Cramer *et al.*, 2017; Northover *et al.*, 2023).

All the habitats present in the Survey Area are not restricted to this area and continue in the surrounding Abydos Plain. Given their high mobility and ability to forage over extensive areas, Bilbies may move into other parts of the mapped critical habitat (Plain (sand) and Drainage Line/River/Creek (minor & major) within the Survey Area (Map 4.5).

Table 4.6: Broad Fauna Habitat Types in the Survey Area

| Habitat Type | Habitat Definition (Fortescue) | Habitat Description | Bilby Suitability | Habitat Photo |
|--------------|--------------------------------|--|---|--|
| Plain (sand) | Critical | <p>Widespread, flat sand plains consisting of varied substrate with mostly sand, or sandy-loam with some patches of quartz or granitic stones and low granitic outcropping scattered throughout.</p> <p>Vegetation consists of sparse <i>Corymbia hamersleyana</i> over <i>Acacia orthocarpa</i> and <i>A. ancistrocarpa</i> over patches of <i>A. stellaticeps</i> over <i>Triodia epactia</i> and <i>T. lanigera</i> low hummock grasses.</p> <p>Isolated patches of <i>Corymbia hamersleyana</i> scattered trees over <i>Acacia acradenia</i> over <i>Triodia schinzii</i> low hummock grasses occur in some areas associated with the patches of calcrete and quartz stones.</p> <p>Some small patches were recorded that comprised sparse vegetation on clay, however the small size of the area is unlikely to support a distinct fauna assemblage.</p> <p>Leaf and wood litter sparse, and generally restricted to underneath vegetation.</p> | <p>Suitable for breeding, foraging and dispersal.</p> <p>Predominantly sandy substrate, suitable for burrowing and contains scattered areas of plant species that may be used as a food resource due to hosting RDL: <i>Acacia stellaticeps</i>, <i>A. bivenosa</i>, <i>A. colei</i> and <i>Senna notabilis</i>.</p> <p>A large part of the southern portion of the Survey Area, and this habitat type, has been recently burnt over two consecutive years, which may impact some of its suitability for the Bilby.</p> |  |

| Habitat Type | Habitat Definition (Fortescue) | Habitat Description | Bilby Suitability | Habitat Photo |
|-----------------------------------|--------------------------------|---|--|--|
| Plain (stony/gibber) | Supporting | <p>Small areas of flat plain with abundant ironstone stones/pebbles and some quartz.</p> <p>Vegetation consists of <i>Corymbia hamersleyana</i>, over <i>Acacia acradenia</i>, over <i>Triodia schinzii</i> low hummock grasses.</p> <p>Leaf and wood litter generally sparse and restricted to underneath vegetation on loamy clay.</p> | <p>Suitable for foraging and dispersal.</p> <p>Digging potential with two species of shrubs that may contain RDL: <i>A. stellaticeps</i>, and <i>A. bivenosa</i></p> |  |
| Drainage Line/River/Creek (major) | Critical | <p>Wide drainage lines with large eucalypts, and sandy, gravel or small creek stone substrate that may fill intermittently during the wet season or during flooding events, or create pools that retain water sporadically. This habitat also includes the immediately adjacent low-lying drainage areas which are predominately sandy or may occasionally contain granite domes or outcropping. These areas typically feature denser vegetation and may be sporadically inundated during heavy rainfall events.</p> <p>The vegetation within the drainage line consists of <i>Eucalyptus camaldulensis</i> with scattered <i>Corymbia hamersleyana</i> over <i>Acacia trachycarpa</i> and <i>A. tumida</i> over Buffel grass *<i>Cenchrus ciliaris</i> and <i>Triodia epactia</i> and <i>T. longiceps</i>. hummock grasses. The surrounding drainage areas include various <i>Acacia</i> species such as <i>A. trachycarpa</i> and <i>A. stellaticeps</i> over hummock grasses. Leaf</p> | <p>Suitable for breeding, foraging and dispersal.</p> <p>Two species of shrubs that may contain RDL: <i>A. trachycarpa</i> and <i>A. stellaticeps</i>.</p> <p>However, this habitat has been impacted by recent fires and grazing, limiting its suitability.</p> |  |

| Habitat Type | Habitat Definition (Fortescue) | Habitat Description | Bilby Suitability | Habitat Photo |
|-----------------------------------|--------------------------------|---|---|--|
| Drainage Line/River/Creek (minor) | Critical | <p>Narrow drainage lines dominated by shrubs and a sandy substrate that fills intermittently during the wet season or from flooding events. Occasional pools of water may be retained after large rainfall events. This habitat also includes the immediately adjoining areas of low-lying drainage areas which are predominately sandy or may occasionally contain some granite domes or outcropping. These areas are generally more densely vegetated and may be intermittently flooded during significant rainfall events.</p> <p>The vegetation is characterised by <i>Acacia</i> species, such as <i>A. trachycarpa</i> and <i>Acacia tumida</i> over <i>Triodia epactia</i> and <i>Triodia longiceps</i> low hummock grasses over mixed herbs and tussock grasses. Some leaf and wood litter present.</p> | <p>Suitable for breeding, foraging and dispersal.</p> <p>Two species of shrubs that may contain RDL: <i>Acacia trachycarpa</i> and <i>A. stellaticeps</i>.</p> <p>However, this habitat has been impacted by recent fires in the southern part of the Survey Area and by grazing, limiting its suitability.</p> |  |
| Granite Outcrops (boulder piles) | Supporting | <p>This habitat is dominated by large, exposed granitic formations, including boulder piles and domes. These granitic formations rise prominently in the landscape, shaped by billions of years of extensive erosion. A sandy substrate occurs between granite piles and domes with very sparse leaf and wood litter.</p> <p>The vegetation is sparse due to the lack of substrate, with <i>Terminalia circumalata</i> over <i>Acacia eriopoda</i> and <i>A. tumida</i> over <i>Triodia epactia</i> hummocks.</p> | <p>Typically not suitable, but may use lower areas (more likely flat domes) for movement and/or foraging due to the surrounding Plain (sand) habitat. Some digging opportunities in sandier areas between granite outcrops.</p> <p>One species of shrub that may contain RDL - <i>Acacia stellaticeps</i>.</p> |  |

| Habitat Type | Habitat Definition (Fortescue) | Habitat Description | Bilby Suitability | Habitat Photo |
|-------------------------------|--------------------------------|---|--|--|
| Granite Outcrops (flat domes) | Supporting | <p>This habitat is dominated by low, flat, granitic domes that are lacking in boulder piles. A sandy substrate occurs within the vicinity and between domes. This area is restricted to the northern part of the Survey Area.</p> <p>The vegetation is sparse due to the lack of substrate, with open <i>Acacia</i> shrublands over <i>Triodia</i> hummock grassland (360 Environmental, 2023).</p> | <p>Typically not suitable, but may use lower areas (more likely flat domes) for movement and/or foraging due to the surrounding Plain (sand) habitat. Some digging opportunities in sandier areas between granite outcrops.</p> <p>One species of shrub that may contain RDL - <i>Acacia stellaticeps</i>.</p> |  |
| Hills / Ranges / Plateaux | Supporting | <p>Rocky hills and slopes with some rocky outcropping and shallow soils. Vegetation is dominated by <i>Acacia</i> spp. over <i>Triodia</i> hummock grassland.</p> | <p>This habitat is generally unsuitable due to its rocky substrate and shallow soils. It is likely occasionally used for foraging and dispersal only, and more likely the areas of lower elevation.</p> |  |

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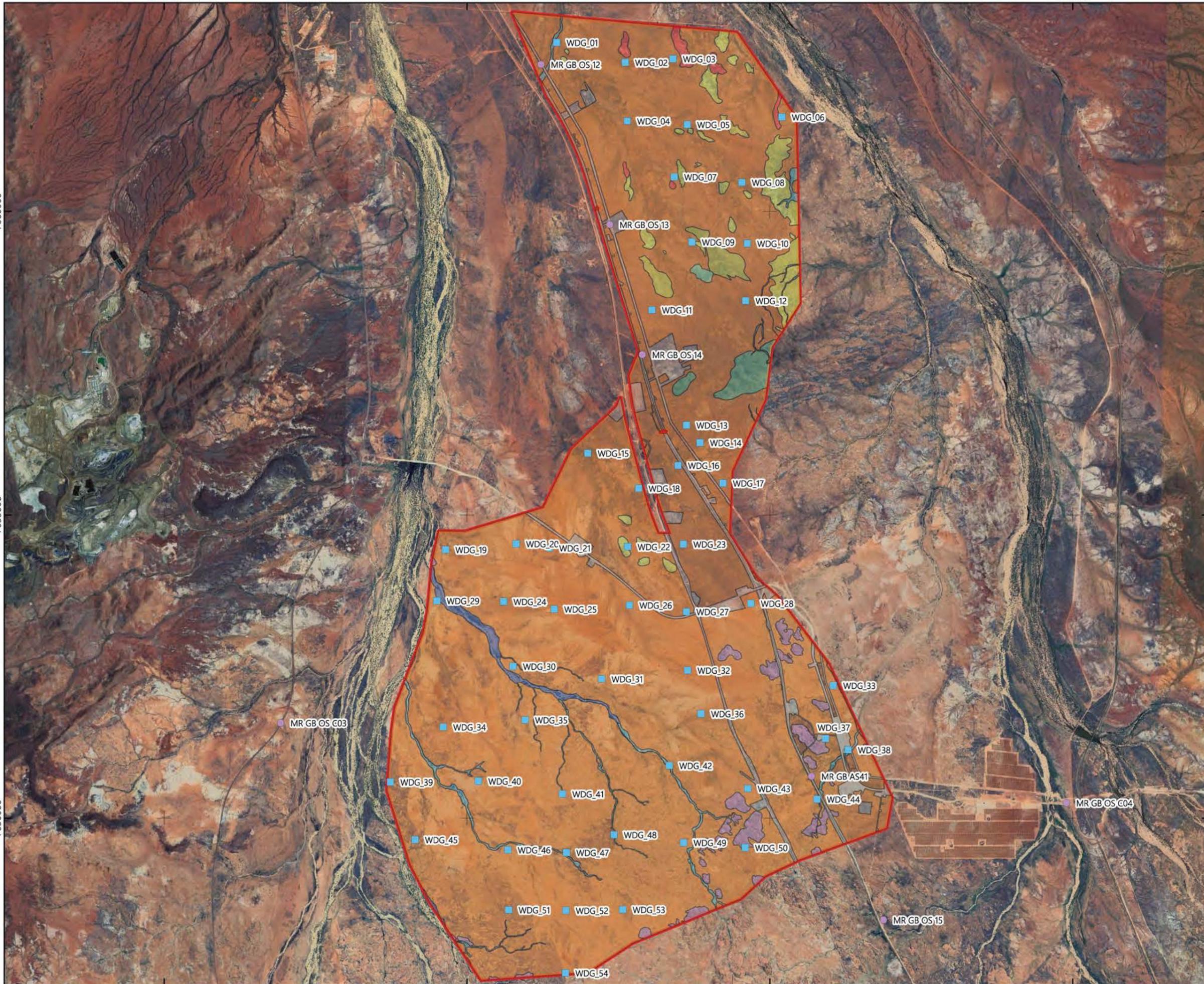
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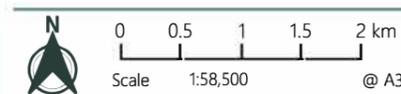
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Legend

- Survey Area
- Survey Sites
- Monitoring Sites
- Fauna Habitat Types**
- Plain (sand)
- Plain (stony/gibber)
- Drainage Line/River/Creek (Major)
- Drainage Line/River/Creek (Minor)
- Granite Outcrops (boulder piles)
- Granite Outcrops (flat dome)
- Hills/Ranges/Plateaux
- Cleared/Disturbed



Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator
 Units: Metre



Author: EM Date: 09-09-2024

Fauna Habitat Types

Turner River Solar Hub Project

MAP

Prepared for Fortescue

4.5

4.2.2. Bilby Evidence

During the survey, confirmed presence of the Bilby was recorded from three sites: WDG_37, WDG_38 and MR GB AS 41 (see Map 4.5 and Map 4.6). Two of these sites (WDG_37 and MR GB AS 41) were completed at a known location of the Bilby recorded by Spectrum (2025b) during the NSJW detailed and targeted fauna assessment. The monitoring site (MR GB AS 41) was completed just prior to this targeted survey, with minimal scats (two samples) and fresh evidence recorded. Therefore, site WDG_37, focused on searching the area further to the north of the known activity area. The third site, WDG_38, was located to the east (across a road) of the other two sites, where old evidence had previously been recorded (Spectrum, 2025b). This small area was confirmed as being occupied by the Bilby, with fresh diggings, scats and active burrows. The resident female Bilby recorded from site MR GB AS 41 (and WDG_37) likely crosses the road regularly to move between its burrows and foraging areas (sites MR GB AS 41 /WDG_37 and WDG_38). The locations and details of the confirmed evidence recorded are detailed in Table 4.7, and all records are shown on Map 4.6.

During the survey, a total of 23 scat samples of varying age was collected from the sites. All scat samples were sent to Helix Solutions for analysis (Appendix D). Of the 23 samples collected, three contained fresh DNA and were successfully genotyped, with the remaining 20 failing across six repeat runs. Sequence analysis was then completed on the 20 failed samples; nine of which were successfully sequenced and matched to the Bilby. The remaining 11 were unsuitable for DNA sequencing due to DNA degradation from scat age and exposure to adverse weather conditions, such as recent rainfall. The three samples successfully genotyped all belonged to one individual (identity 6 in Appendix D) which is likely the female Bilby that Spectrum (2025b) previously trapped at the same location. It should be noted that other scat samples collected for Fortescue's Fauna Monitoring Program from Main Line Rail Bilby sites were also assessed at the same time and provided in a singular DNA report (Appendix D).

In addition to the confirmed evidence at three sites, potential evidence of the Bilby was recorded from 10 sites within the Survey Area, with old, ambiguous diggings and burrows that may be attributed to this species. The secondary evidence was difficult to confirm, partially due to the weather conditions preceding the survey (heavy rainfall). These sites were WDG_01, WDG_05, WDG_06, WDG_09, WDG_19, WDG_22, WDG_23, WDG_27, WDG_48, and MR GB OS C03. Site WDG_01 was in close proximity to an area where scats and other evidence had been recorded previously during the ongoing Fauna Monitoring Program and one other survey (ATA, 2007) during which recent evidence was recorded (fresh burrows and potential old diggings and burrows). Therefore, evidence at site WDG_01 may align with this older evidence, indicating that Bilbies may have been present some time ago. Details of potential diggings and burrows are outlined in Table 4.7, and are shown on Map 4.6.

Other signs from other more common species, such as the Australian Bustard and goannas (*Varanus* spp.), were detectable in some plots, indicating that if Bilbies were present, they would have been detected. The heavy rain and windy weather conditions that occurred just prior to the survey, and the windy conditions that continued, likely impacted the presence of secondary evidence, although improving the assessment of the age of signs.

Based on the previous surveys and evidence recorded, it is likely that Bilbies have been inhabiting the area surrounding sites MR GB AS41 /WDG_37 and WDG_38 for some time. Additionally, further Bilbies could be occupying areas adjacent to the Survey Area and using it for dispersal and foraging, which aligns with previous evidence (especially scats) recorded in the north.

Table 4.7: Bilby Evidence Recorded

| Site | Location | | Record Type | Photo |
|---------------------------|----------|-----------|----------------------------|--|
| | Easting* | Northing* | | |
| Confirmed Evidence | | | | |
| WDG_37 | 685796 | 7651060 | Scat (S01 ,left) |  |
| | 685966 | 7651067 | Scat (S09, right) | |
| | 685836 | 7651035 | Burrow (B02, left) |  |
| | 685725 | 7650729 | Burrow B03, right) | |
| | 686001 | 7651226 | Digging & scat (S01, left) |  |
| | 685924 | 7651042 | Digging (D07, right) | |

| Site | Location | | Record Type | Photo |
|--------|----------|-----------|-------------------------------------|--|
| | Easting* | Northing* | | |
| | 685920 | 7651039 | Track (T01) |  |
| WDG_38 | 686242 | 7651108 | Scat (S02, left) |  |
| | 686289 | 7651059 | Scat (S03, right) | |
| | 686250 | 7651097 | Digging (D04, left) |  |
| | 686288 | 7651059 | Scratchings (D09, right) | |
| | 686269 | 7651082 | Burrow (B02, left) |  |
| | 686260 | 7651017 | Burrow (B04, right, current burrow) | |

| Site | Location | | Record Type | Photo |
|---------------------------------|----------|-----------|--|--|
| | Easting* | Northing* | | |
| MR GB AS 41 | 685770 | 7650735 | Scat (S02) |  |
| | 685958 | 7650772 | Digging (D02, left) |  |
| | 685929 | 7650754 | Digging (D04, right) | |
| | 685796 | 7650795 | Burrow (B01, left) |  |
| | 685908 | 7650735 | Burrow (B04, right – fresh test burrow) | |
| Potential – Old Evidence | | | | |
| WDG_01 | 681426 | 7662823 | Potential old burrow (B01, left, filled with sand) |  |
| | 681435 | 7662810 | Potential old burrow B02, right) | |

| Site | Location | | Record Type | Photo |
|--------|----------|-----------|--------------------------|--|
| | Easting* | Northing* | | |
| | 681485 | 7662792 | Old digging (D01, left) |  |
| | 681432 | 7662829 | Old digging (D04, right) | |
| WDG_05 | 683518 | 7661358 | Old digging (D01, left) |  |
| | 683525 | 7661334 | Old digging (D09, right) | |
| WDG_27 | 685796 | 7651060 | Old digging (D01, left) |  |
| | 685966 | 7651067 | Old digging (D03, right) | |
| WDG_48 | 682408 | 7649779 | Old digging (D03, left) |  |
| | 682375 | 7649917 | Old digging (D08, right) | |

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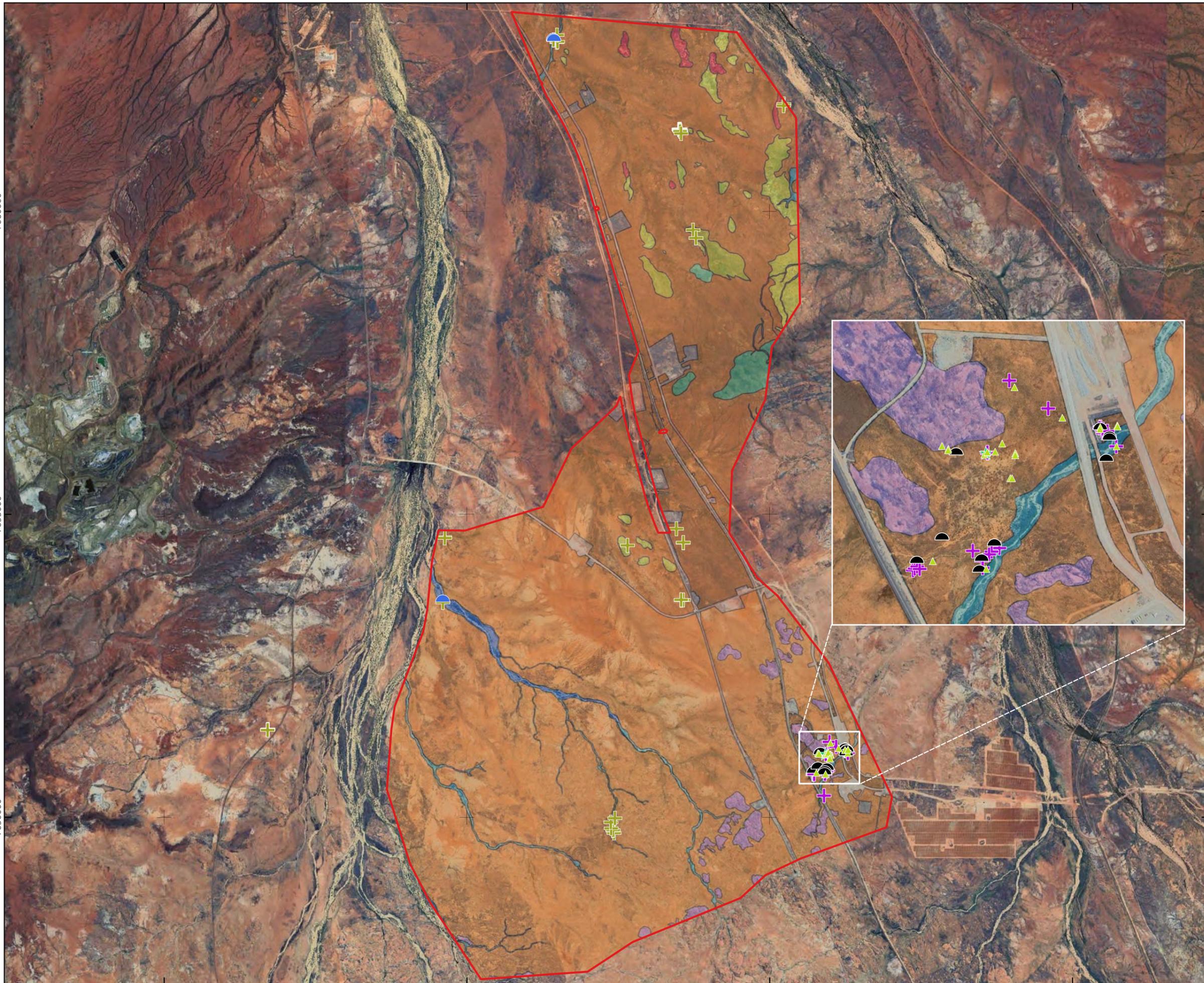
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Legend

Survey Area

Bilby Evidence

Confirmed Bilby Evidence

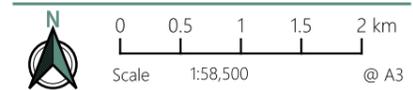
- Burrow
- Digging
- Scat
- Track

Potential Bilby Evidence

- Burrow
- Digging

Fauna Habitat Types

- Plain (sand)
- Plain (stony/gibber)
- Drainage Line/River/Creek (Major)
- Drainage Line/River/Creek (Minor)
- Granite Outcrops (boulder piles)
- Granite Outcrops (flat dome)
- Hills/Ranges/Plateaux
- Cleared/Disturbed



Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator
Units: Metre



Author: EM

Date: 30-01-2025

Confirmed & Potential Bilby Evidence

Tuner River Solar Hub Project

MAP

Prepared for
Fortescue

4.6

4.2.3. Other Species Recorded

A total of 40 non-target species were also recorded during the survey. This included eight species of mammals, 28 birds and four reptiles (Table 4.8). Three of the mammal species recorded are considered significant fauna; Brush-tailed Mulgara (*Dasyercus blythi*, DBCA Priority 4 (P4)), Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*, DBCA P4) and the Western Pebble-mound Mouse (*Pseudomys chapmani*, DBCA P4; refer to section 4.2.4), while the remaining five species of mammal are introduced species. This includes the Feral Cat (*Felis catus*) and Dingo/Dog (*Canis familiaris*) which are a known threat to Bilbies and other native species. Additionally, the presence of European Cattle (*Bos taurus*), Horses (*Equus ferus*) and Donkey (*Equus africanus*) may impact Bilbies by competing for resources. The introduced herbivores degrade habitat by removing vegetation cover (overgrazing) and by trampling, causing soil compaction and damaging regenerating vegetation.

Table 4.8: Other Species Recorded

| Species Name | Scientific Name | Conservation Status | | | Comments |
|----------------------------|---|---------------------|--------|------|---|
| | | EPBC Act | BC Act | DBCA | |
| Mammals | | | | | |
| Brush-tailed Mulgara | <i>Dasyercus blythi</i> | - | - | P4 | Burrows and diggings likely from this species at 10 sites |
| Spectacled Hare-wallaby | <i>Lagorchestes conspicillatus leichardti</i> | - | - | P4 | Potential tracks of this species at two sites |
| Western Pebble-mound Mouse | <i>Pseudomys chapmani</i> | - | - | P4 | One active mound |
| *Dingo, Dog | <i>Canis familiaris</i> | - | - | - | |
| *Cat | <i>Felis catus</i> | - | - | - | |
| *Horse | <i>Equus ferus</i> | - | - | - | |
| *Donkey | <i>Equus africanus</i> | - | - | - | |
| *European Cattle | <i>Bos taurus</i> | - | - | - | |
| Birds | | | | | |
| Emu | <i>Dromaius novaehollandiae</i> | - | - | - | |
| Australian Bustard | <i>Ardeotis australis</i> | - | - | - | |
| Spinifex Pigeon | <i>Geophaps plumifera</i> | - | - | - | |
| Diamond Dove | <i>Geopelia cuneata</i> | - | - | - | |
| Little Buttonquail | <i>Turnix velox</i> | - | - | - | |
| Little Eagle | <i>Hieraaetus morphnoides</i> | - | - | - | |
| Wedge-tailed Eagle | <i>Aquila audax</i> | - | - | - | |
| Spotted Harrier | <i>Circus assimilis</i> | - | - | - | |

| Species Name | Scientific Name | Conservation Status | | | Comments |
|----------------------------|---------------------------------|---------------------|--------|------|----------|
| | | EPBC Act | BC Act | DBCA | |
| Rainbow Bee-eater | <i>Merops ornatus</i> | - | - | - | |
| Nankeen Kestrel | <i>Falco cenchroides</i> | - | - | - | |
| Brown Falcon | <i>Falco berigora</i> | - | - | - | |
| Galah | <i>Eolophus roseicapilla</i> | - | - | - | |
| Purple-backed Fairywren | <i>Malurus assimilis</i> | - | - | - | |
| White-winged Fairywren | <i>Malurus leucopterus</i> | | | | |
| Brown Honeyeater | <i>Lichmera indistincta</i> | - | - | - | |
| Singing Honeyeater | <i>Gavicalis virescens</i> | - | - | - | |
| Grey-headed Honeyeater | <i>Ptilotula keartlandi</i> | - | - | - | |
| Yellow-throated Miner | <i>Manorina flavigula</i> | - | - | - | |
| Red-browed Pardalote | <i>Pardalotus rubricatus</i> | | | | |
| Black-faced Woodswallow | <i>Artamus cinereus</i> | - | - | - | |
| Pied Butcherbird | <i>Cracticus nigrogularis</i> | - | - | - | |
| White-winged Triller | <i>Lalage tricolor</i> | - | - | - | |
| Willie Wagtail | <i>Rhipidura leucophrys</i> | - | - | - | |
| Torresian Crow | <i>Corvus orru</i> | - | - | - | |
| Rufous Songlark | <i>Cincloramphus mathewsi</i> | - | - | - | |
| Painted Finch | <i>Emblema pictum</i> | - | - | - | |
| Australian Zebra Finch | <i>Taeniopygia castanotis</i> | - | - | - | |
| Australian Pipit | <i>Anthus australis</i> | - | - | - | |
| Reptiles | | | | | |
| Western Ring-tailed Dragon | <i>Ctenophorus caudicinctus</i> | - | - | - | |
| Central Military Dragon | <i>Ctenophorus isolepis</i> | - | - | - | |
| Western Ring-tailed Dragon | <i>Ctenophorus caudicinctus</i> | - | - | - | |
| Leopard Skink | <i>Ctenotus pantherinus</i> | - | - | - | |

Note: * = Introduced species

4.2.4. Other Significant Fauna Recorded

Three species of non-target significant fauna were recorded during the survey. Burrows and diggings likely belonging to the Brush-tailed Mulgara (*Dasyercus blythi*, DBCA P4) were recorded at 10 sites: WDG_02, WDG_05, WDG_06, WDG_15, WDG_18, WDG_23, WDG_26, WDG_32, WDG_37, and WDG_48. Numerous tracks recorded at sites (WDG_15 and WDG_18) were potentially from the Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*, DBCA P4). Spectrum (2023) recorded this species within 500 m of the Survey Area on a motion camera in 2022 as part of Fortescue's Fauna Monitoring Program. Additionally, an individual was recently sighted in September 2024, crossing the road near the Iron Bridge Gatehouse, approx. 8 km east of the Survey Area (Fortescue's Plant and Animal Register). The Western Pebble-mound Mouse (*Pseudomys chapmani*, DBCA P4) was recorded at site WDG_50, from one active mound. Details of the records are listed in Table 4.9, and shown on Map 4.7.

Table 4.9: Other Significant Fauna Recorded

| Species | Site | Location | | Record Type | Photo |
|--|--------|----------|----------|--------------|--|
| | | Easting | Northing | | |
| Brush-tailed Mulgara <i>Dasyercus blythi</i> | WDG_02 | 682688 | 7662481 | Burrow (B01) |  |
| | WDG_06 | 685228 | 7661745 | Burrow (B01) |  |
| | WDG_15 | 682151 | 7655875 | Burrow (B01) |  |

| Species | Site | Location | | Record Type | Photo |
|--|--------|----------|----------|----------------|--|
| | | Easting | Northing | | |
| | WDG_18 | 682580 | 7655575 | Diggings (D07) |  |
| Brush-tailed Mulgara <i>Dasyercus blythi</i> | WDG_48 | 682411 | 7649782 | Burrow (B02) |  |
| Spectacled Hare-wallaby <i>Lagorchestes conspicillatus leichardti</i> | WDG_15 | 682115 | 7655845 | Track (T02) |  |

| Species | Site | Location | | Record Type | Photo |
|---|--------|----------|----------|----------------------|---|
| | | Easting | Northing | | |
| | WDG_18 | 682625 | 7655547 | Track (T06) |  |
| Western Pebble-mound Mouse <i>Pseudomys chapmani</i> | WDG_50 | 684784 | 7649427 | Active mound (PMM01) |  |

* Coordinate Reference System: GDA94 / MGA Zone 50

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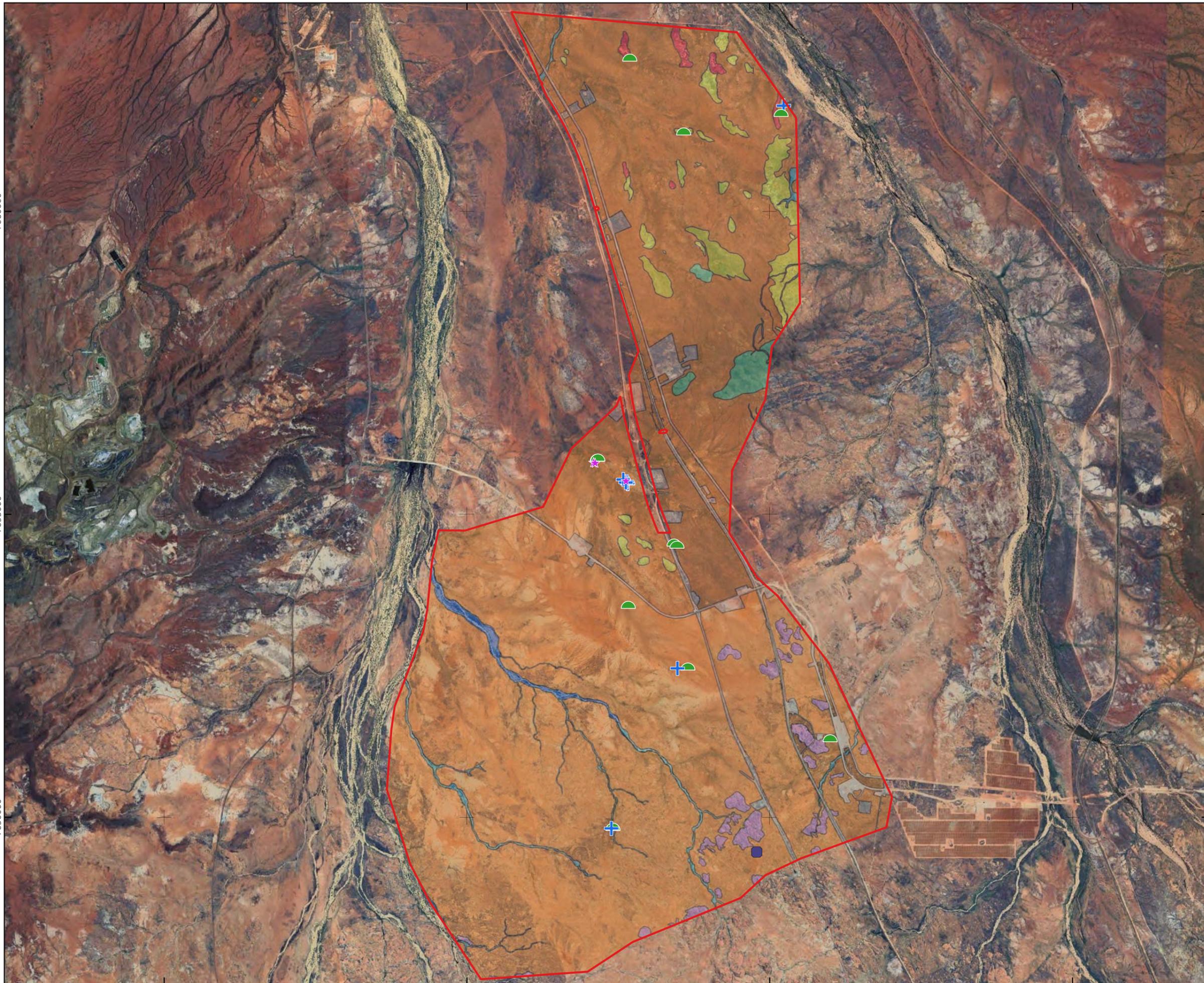
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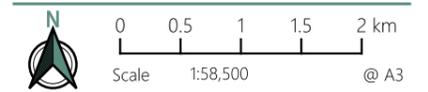
Survey Area

Other Significant Fauna Recorded

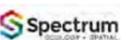
- Brush-tailed Mulgara - Burrow
- Brush-tailed Mulgara - Digging
- Western Pebble-mound Mouse - Mound
- Spectacled Hare-wallaby - Track

Fauna Habitat Types

- Plain (sand)
- Plain (stony/gibber)
- Drainage Line/River/Creek (Major)
- Drainage Line/River/Creek (Minor)
- Granite Outcrops (boulder piles)
- Granite Outcrops (flat dome)
- Hills/Ranges/Plateaux
- Cleared/Disturbed



Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator
Units: Metre



Author: EM

Date: 30-01-2025

Other Significant Fauna Recorded

Tuner River Solar Hub Project

MAP

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4.7

5. CONCLUSION

Twelve previous surveys have been completed partially within the Survey Area, with eight focussing on targeted searches for the Bilby.

The Bilby has previously been recorded from confirmed evidence (individual captured) in the Survey Area in 2023 by Spectrum (2025b), with additional records of potential evidence at other sites. Another 12 previous records of older evidence (confirmed and potential) have been found within the Survey Area as recorded on Fortescue's Internal Database and previous surveys. An additional five records from this database were located within 2 km of the Survey Area. The DBCA database search results had four records from 2013, just outside the Survey Area.

A total of 62 plots were completed during the survey, equating to 65.8 person-hours of searching, and 130.4 km of the Survey Area and surrounding area was traversed.

The SDM model achieved a very high performance with an AUC of 0.941, which indicates the model was highly efficient at measuring presences and pseudo-absences. Of the environmental variables tested, the type of land system and soil environmental variables contributed most to the model. With soils having the highest gain when used in isolation which appears to be the most important variable for the Bilby. Within the Study Area, 48.6% (484,704.2 ha) is classified as a Medium or High likelihood ranks, which contains 95% and 50% of all known records. Conversely, the Survey Area covered a total of 6,948 97.4%) which is assigned a combined Medium or High probability rank. The habitat mapping confirms this result, which identified three critical habitats, (Plain (sand), and Drainage Line/River/Creek (major & minor), that provide suitable breeding and foraging conditions for the Bilby. These habitats occupy 90.2% of the Survey Area and are suitable for burrowing and foraging due to the presence of plant species that contain RDL, a food resource for the Bilby. The remaining habitats are likely restricted to dispersal and occasional foraging only, if used at all. The habitats present are not restricted to the Survey Area and continue in the surrounding Abydos Plain. As the Bilby is highly mobile and forages over vast areas, Bilbies may move into additional areas of the critical habitats mapped within the Survey Area.

Confirmed Bilby presence was recorded from the already known Bilby location (WDG_37 and MR GB AS 41), with its area of occupancy increasing to include an additional small, fragmented area across a road surrounded by infrastructure and cleared areas (WDG_38). The female Bilby may be crossing the road regularly to move between burrows and foraging areas. Potential signs in the form of old burrows and old diggings were recorded elsewhere within the Survey Area.

Based on the previous surveys and evidence recorded during the current survey, it is likely that Bilbies have been inhabiting the area surrounding these sites for some time. Further Bilbies could be occupying areas adjacent to the Survey Area, which aligns with previous evidence (especially scats) recorded in the north.

Forty non-target species were recorded during the survey and included three significant species:

- Brush-tailed Mulgara – likely burrows and diggings;
- Spectacled Hare-wallaby – potential tracks; and
- Western Pebble-mound Mouse – one active mound.