



Biologic
ENVIRONMENTAL
SURVEY



MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Report to BHP Western Australian Iron Ore

11 November 2025

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Executive Summary

BHP Western Australian Iron Ore commissioned Biologic Environmental Survey Pty Ltd to undertake a single season targeted vertebrate fauna survey of the Mining Area C to Yandi Corridor and Runaway Valley North area (approximately 5,277 hectares, herein referred to as Study Area). The survey was completed during a single-phase field survey by six experienced zoologists from 21 – 30 May 2025. Eight Matters of National Environmental Significance (MNES) species under the *Environment Protection and Biodiversity Conservation Act 1999* (seven of which were previously recorded in and/ or surrounding the Study Area) were targeted:

- northern quoll (*Dasyurus hallucatus*) – Endangered;
- ghost bat (*Macroderma gigas*) – Vulnerable;
- greater bilby (*Macrotis lagotis*) – Vulnerable;
- Pilbara leaf-nosed bat (*Rhinionictis aurantia* 'Pilbara form') – Vulnerable;
- night parrot (*Pezoporus occidentalis*) – Endangered/ Critically Endangered;
- grey falcon (*Falco hypoleucos*) – Vulnerable;
- southern whiteface (*Aphelocephala leucopsis*) – Vulnerable; and
- Pilbara olive python (*Liasis olivaceus* subsp. *barroni*) – Vulnerable.

Species-specific targeted sampling during the field survey comprised habitat and habitat feature assessments, ultrasonic and acoustic sound recordings, camera trap transects, targeted searches, and nocturnal searches.

A total of 12 broad fauna habitat types were recorded and mapped across the Study Area; Stony Plain (28.59%, 1508.65ha), Hillcrest/ Hillslope (25.57%, 1349.70ha), Undulating Low Hills (24.26%, 1280.06ha), Gorge/ Gully (5.67%, 299.40ha), Drainage Area/ Floodplain (5.14%, 271.09ha), Hardpan Plain (2.76%, 145.72ha), Minor Drainage Line (2.66%, 140.42ha), Major Drainage Line (1.29%, 68.06ha), Sand Plain (0.96%, 50.66ha), Breakaway/ Cliff (0.77%, 40.63ha), Medium Drainage Line (0.40%, 21.12ha), and Artificial Wetlands (0.09%, 4.65ha). Ten of these habitats (Stony Plains, Major Drainage Line, Undulating Low Hills, Drainage Area/ Floodplain, Sand Plain, Hardpan Plain, Minor Drainage Line, Breakaway/ Cliff, Gorge/ Gully and Medium Drainage Line) within the Study Area provide critical habitat for various significant species.

One MNES species, the ghost bat, was recorded within the Study Area during the survey. Ghost bat was recorded twice during the survey; one ghost bat scat and a single ghost bat call was recorded via ultrasonic recorder. Critical foraging and dispersal habitat (66.05%) within the Study Area is provided by Stony Plain, Undulating Low Hills, Drainage Area/ Floodplain, Sand Plain, Hardpan Plain, Minor Drainage Line, Medium Drainage Line and Major Drainage Line, when proximal (<12 km) to critical roosts located outside the Study Area. As suggested by Bat Call (2021a) these habitats represent “productive plain areas with

thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* spp.) on sand or stony ground” and/or contain “isolated trees and trees on the edge of thin thickets on the plains” and “trees along the edges of watercourse woodlands”. Supporting dispersal (and foraging) habitat within the Study Area is provided by Breakaway/ Cliff, Artificial Wetland and Gorge/ Gully habitat.

Pilbara olive python was not recorded within the Study Area during the survey but has previously been confirmed as occurring. Multiple eDNA samples taken from five water features during the current survey did not identify the presence of Pilbara olive python. Seven water features were recorded during the survey and were considered critical foraging habitat for Pilbara olive pythons. Critical habitat is also provided within Gorge/ Gully and Breakaway/ Cliff habitats. Individuals that may be present within the Study Area are considered part of an ‘important population’ as defined by DoE (2013a).

Grey falcon was not observed within the Study Area during the survey. Potential critical habitat for the species may be provided within the Major Drainage Line and Medium Drainage Line where suitable tall trees for nesting are present. The Drainage Area/ Floodplain, Artificial Wetland and Minor Drainage Line may provide supporting habitat for foraging and dispersal. The grey falcon comprises a single interbreeding population in the Pilbara as it provides a key environment for the species survival, thus, any individuals that may occur would be considered part of an ‘important population’.

Northern quoll was not recorded during the survey but has previously been recorded on multiple occasions within close proximity of the Study Area, with the closest recorded approximately 650 m from the Study Area. Potential critical habitat for denning, foraging and dispersal occurs within Gorge/ Gully and Breakaway/ Cliff habitat. Potential supporting habitat for foraging and dispersal is provided within Hillcrest/ Hillslope, Drainage Area/ Floodplain, Artificial Wetland, Minor Drainage Line and Medium Drainage Line habitat where proximal to breeding habitat. Although northern quoll was considered highly likely to occur within the Study Area, it would however only occur in low numbers as the Study Area is unlikely to contain a population important for the long-term survival of the species.

Whilst the target species southern whiteface and Pilbara leaf-nosed bat were not recorded during the survey and limited previous records occur within the vicinity of the Study Area, potential critical and supporting habitat for these species does exist within the Study Area. Therefore, the southern whiteface is considered possible, and Pilbara leaf-nosed bat is considered likely to occur within the Study Area.

There is a lack of records in the vicinity of the Study Area for the greater bilby and only three records (32 km from the Study Area) for the night parrot. In addition, there is no suitable habitat for the night parrot (lack of large, long-unburnt hummocks and chenopod

shrubland) and marginally suitable habitat (small, fragmented patches of sandy habitat) for greater bilby within the Study Area. As such these species are considered unlikely to occur.

Three non-MNES significant fauna species, the brush-tailed mulgara, western pebble-mound mouse and peregrine falcon were recorded within the Study Area. Twenty-seven brush-tailed mulgara burrows (nine active, 18 inactive) and 36 diggings, 20 western pebble-mound mouse mounds (11 active, one recently inactive, and eight inactive) and one individual peregrine falcon were recorded during targeted searches and as opportunistic sightings.

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1 Introduction

1.1 Background

BHP Western Australian Iron Ore (BHP WAIO) commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a targeted vertebrate fauna survey within BHP WAIO's Mining Area C (MAC) to Yandi Corridor and Runaway Valley North area (hereafter referred to as the Study Area; Figure 1.1). The Study Area is located approximately 82 kilometres (km) north-west of Newman and covers approximately 5,277 hectares (ha).

1.2 Scope and Objectives

The overarching objective of this assessment was to determine the presence, or likely presence, of significant vertebrate fauna species within the Study Area, with a focus on Matters of National Environmental Significance (MNES: i.e. species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)). The MNES species targeted for this survey were:

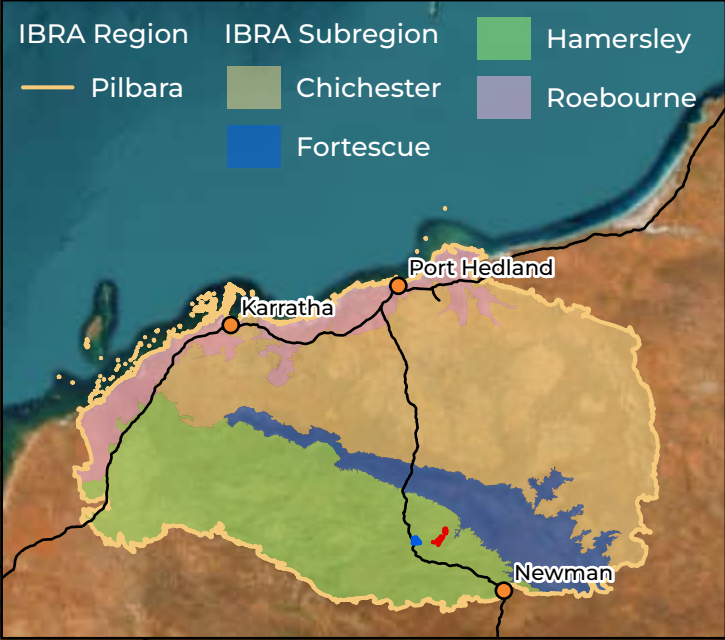
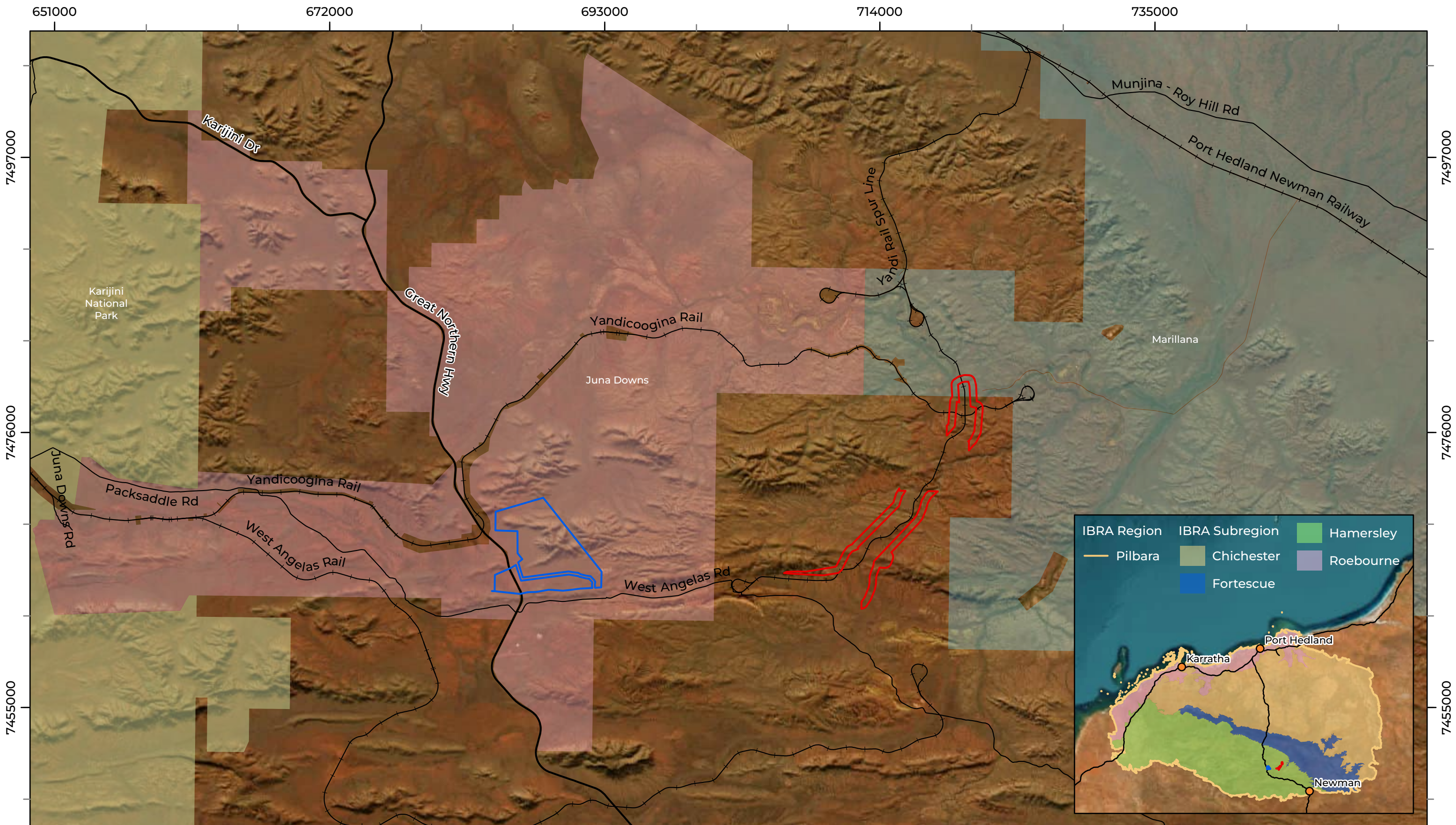
- northern quoll (*Dasyurus hallucatus*) – Endangered;
- ghost bat (*Macroderma gigas*) – Vulnerable;
- greater bilby (*Macrotis lagotis*) – Vulnerable;
- Pilbara leaf-nosed bat (*Rhinonicteris aurantia* 'Pilbara form') – Vulnerable;
- night parrot (*Pezoporus occidentalis*) – Critically Endangered;
- grey falcon (*Falco hypoleucos*) – Vulnerable;
- southern whiteface (*Aphelocephala leucopsis*) – Vulnerable; and
- Pilbara olive python (*Liasis olivaceus* subsp. *barroni*) – Vulnerable.

1.3 Compliance

This assessment was carried out in accordance with the following guidelines and recommendations developed by the relevant state and federal regulatory bodies, relevant survey-specific license conditions and, where relevant, BHP WAIO procedures:

- Bat Call (2021a) A review of ghost bat ecology, threats and survey requirements
- Bat Call (2021b) A review of Pilbara leaf-nosed bat ecology, threats and survey requirements
- BHP WAIO (2023a) Biological survey spatial data requirements (SPR-IEN-EMS-015; Version 12.0)

- BHP WAIO (2023b) Vertebrate fauna surveys in Western Australia procedure (SPR-IEN-EMS-012; Version: 12.0)
- Department of Biodiversity, Conservation and Attractions [DBCA] (2017) Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia
- DBCA (2024) Guidelines for determining the likely presence and habitat usage of night parrot (*Pezoporus occidentalis*) in Western Australia
- Department of Environment, Water, Heritage and the Arts [DEWHA] (2010a) Survey guidelines for Australia's threatened bats
- DEWHA (2010b) Survey guidelines for Australia's threatened birds
- DEWHA (2010c) Survey guidelines for Australia's threatened frogs
- Department of the Environment [DoE] (2013a) Significant impact guidelines 1.1: Matters of National Environmental Significance
- DoE (2016) EPBC Act referral guideline for the endangered northern quoll (*Dasyurus hallucatus*)
- Department of Sustainability, Environment, Water, Population and Communities [DSEWPaC] (2011a) Survey guidelines for Australia's threatened mammals
- DSEWPaC (2011b) Survey guidelines for Australia's threatened reptiles
- Environmental Protection Authority [EPA] EPA (2016) Environmental factor guideline: Terrestrial fauna
- EPA (2020) Technical guidance: terrestrial vertebrate fauna surveys for environmental impact assessment
- EPA (2023) Statement of environmental principles, factors, objectives and aims
- Threatened Species Scientific Committee [TSSC] TSSC (2008) Approved conservation advice for *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies).
- TSSC (2016a) Conservation advice: *Macroderma gigas*, ghost bat
- TSSC (2016b) Conservation advice: *Rhinonictis aurantia* (Pilbara form), Pilbara leaf-nosed bat
- TSSC (2020) Conservation advice: *Falco hypoleucos*, grey falcon



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Rail

National Park

Pastoral Station on Lease

- Juna Downs
- Marillana

Biologic

Scale 1:270,000

0 4 8 12 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 24/09/2025

BHP WAIO

MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 1.1: Study Area and regional context

2 Existing Environment

2.1 Biogeography

The Study Area is located within the Hamersley (PIL03) subregion of the Pilbara bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA; Figure 1.1) (Thackway & Cresswell, 1995). The Hamersley subregion is characterised by mountainous areas of Proterozoic sedimentary ranges (ironstone ranges) and plateaux dissected by gullies and gorges (Kendrick, 2003). Vegetation comprises of mulga low woodland over bunch grasses on fine-textured soils in valley floors, while skeletal soils of the ranges are dominated by snappy gum (*Eucalyptus leucophloia*) over *Triodia brizoides* (Kendrick, 2003). Drainage is typically into the Fortescue River to the north, the Ashburton River to the south, or the Robe River to the west (Kendrick, 2003).

The significant and dominant feature of this subregion is the Hamersley Range. This prominent range feature is a mountainous plateau, 450 km long, which receives significantly higher rainfall than the surrounding subregion giving rise to deeply incised gorges, up to 100 metres (m) deep, containing extensive permanent spring-fed streams and pools (Kendrick, 2003). The Hamersley Range (to the south) and Chichester Range (to the north) drain to give rise to the Fortescue Marsh and Fortescue River system (McKenzie *et al.*, 2009).

2.2 Climate

The Pilbara bioregion has a semi-desert to tropical climate, with rainfall occurring sporadically throughout the year, although mostly during summer (Thackway & Cresswell, 1995). Summer rainfall is usually the result of tropical storms in the north or tropical cyclones that impact upon the coast and move inland (Leighton, 2004). The winter rainfall is generally lighter and is the result of cold fronts moving north easterly across the state (Leighton, 2004). The average annual rainfall ranges from 200–350 millimetres (mm), although there are significant fluctuations between years, with some locations receiving up to 1,200 mm in some years (McKenzie *et al.*, 2009).

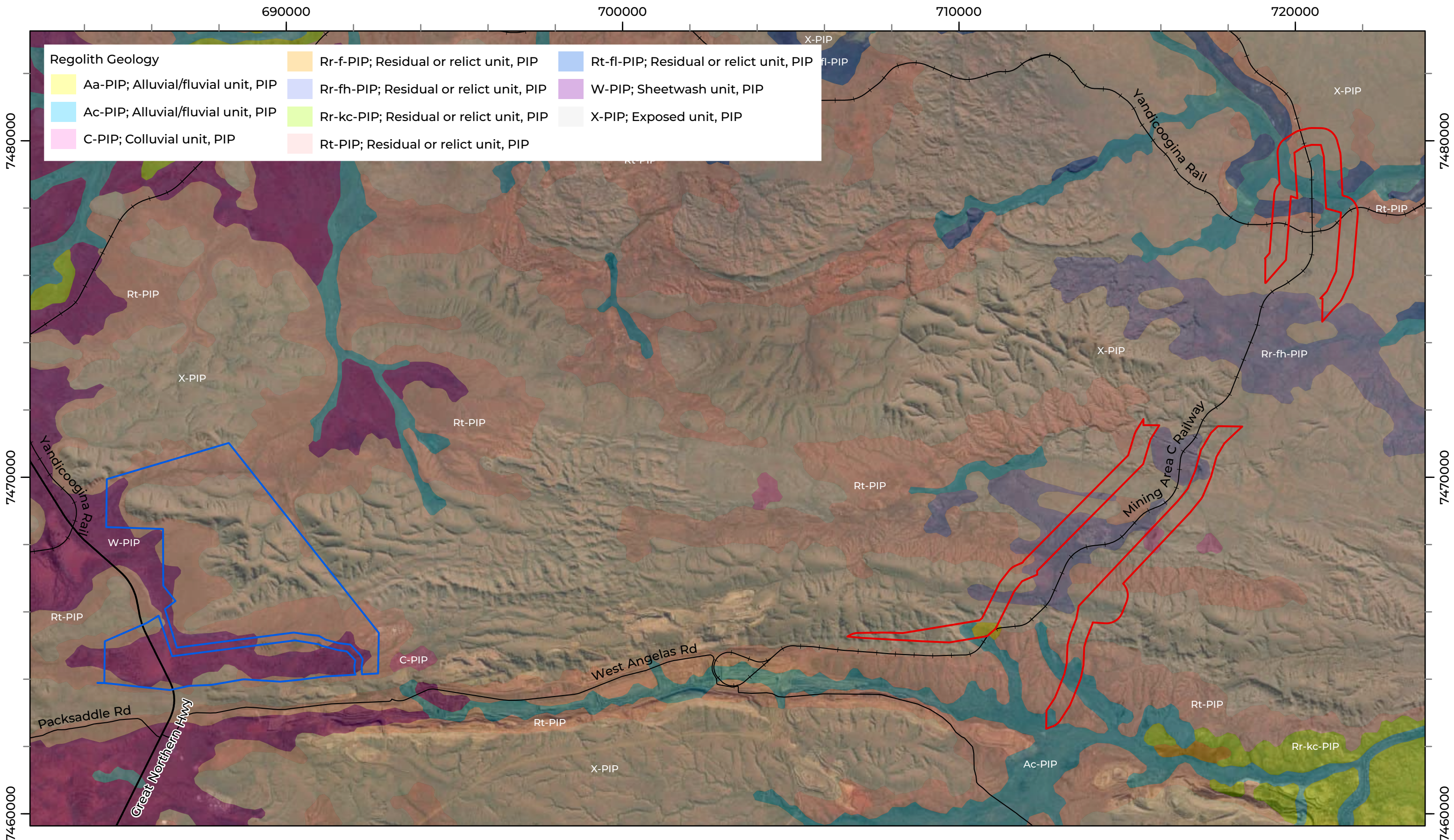
2.3 Geology

The Study Area is located within the Hamersley and Fortescue Basins (Geoscience Australia, 2013; Hickman *et al.*, 2010). The Fortescue Basin overlies the Pilbara Craton and entirely consists of the Fortescue Group, which is predominantly a volcanic succession, characterised by basaltic rocks. The Hamersley Basin then overlies the Fortescue Basin, consisting of banded iron formation, chert, pelite, felsic volcanic rocks, dolostone, and dolomitic mudstone (Geoscience Australia, 2013; Hickman *et al.*, 2010). At a finer scale, (1:105,000) regolith geology of the Study Area contains eight geological formations, of which the three most dominant

are X-PIP (2,450.46 ha; 46.44%), characterised by exposed bedrock, residual or relict unit Rt-PIP (1,539.39 ha; 29.17%), characterised by transported duricrust in alluvial/colluvial deposits the sheetwash unit, W-PIP (830.54 ha; 15.74%), broadly characterised by clays, silts and sands in sheetwash deposits (Table 2.1, Figure 2.1).

Table 2.1: Geological formations occurring within the Study Area

Unit Code/ Name	Description	Extent within Study Area	
		ha	%
X-PIP Exposed unit, PIP	Exposed bedrock	2,450.46	46.44
Rt-PIP Residual or relict unit, PIP	Transported duricrust; cemented sand, gravel, cobbles, and boulders in alluvial/colluvial deposits	1,539.39	29.17
W-PIP Sheetwash unit, PIP	Clay, silt and sand in distal sheetwash fan and slope deposits; local ferruginous pisoliths and gravel	830.54	15.74
Ac-PIP Alluvial/fluvial unit, PIP	Clay, silt, sand, and gravel in fluvial channels	198.48	3.76
Rr-fh-PIP Alluvial/fluvial unit, PIP	Clay, silt, sand, and gravel in fluvial channels	173.65	3.29
C-PIP Colluvial unit, PIP	Colluvium derived from different rock types; includes gravel, sand, silt and clay	30.53	0.58
Rt-fl-PIP Residual or relict unit, PIP	Transported limonitic duricrust; iron-cemented sand, gravel, cobbles and boulders	28.85	0.55
Aa-PIP Alluvial/fluvial unit, PIP	Sand- or clay-rich alluvium on alluvial plain	24.69	0.47
Total		5,276.61	100.00



Regolith Geology		
Aa-PIP; Alluvial/fluviol unit, PIP	Rr-f-PIP; Residual or relict unit, PIP	Rt-fl-PIP; Residual or relict unit, PIP
Ac-PIP; Alluvial/fluviol unit, PIP	Rr-fh-PIP; Residual or relict unit, PIP	W-PIP; Sheetwash unit, PIP
C-PIP; Colluvial unit, PIP	Rr-kc-PIP; Residual or relict unit, PIP	X-PIP; Exposed unit, PIP
	Rt-PIP; Residual or relict unit, PIP	

LEGEND

Study Area

MAC to Yandi Corridor

Runaway Valley North

Local Road

State Road

—+— Rail



Biologic

Scale 1:105,000

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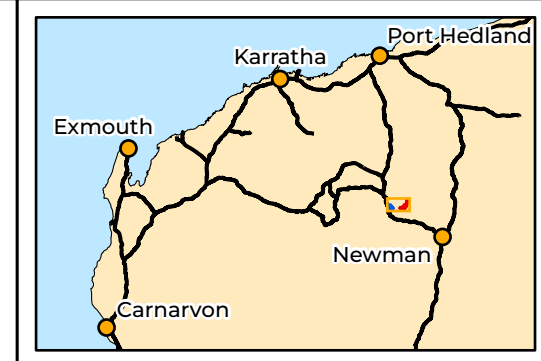
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Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator

Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 2.1: Broad geology of the Study Area

2.4 Land Systems

Review of the land system mapping, completed by (Payne *et al.*, 1998) and later refined by van Vreeswyk *et al.* (2004), identified eight land systems occurring within the Study Area (Figure 2.2; Table 2.2). The most dominant land system is the Newman land system, covering 46.44% of the Study Area.

Table 2.2: Land systems occurring within the Study Area

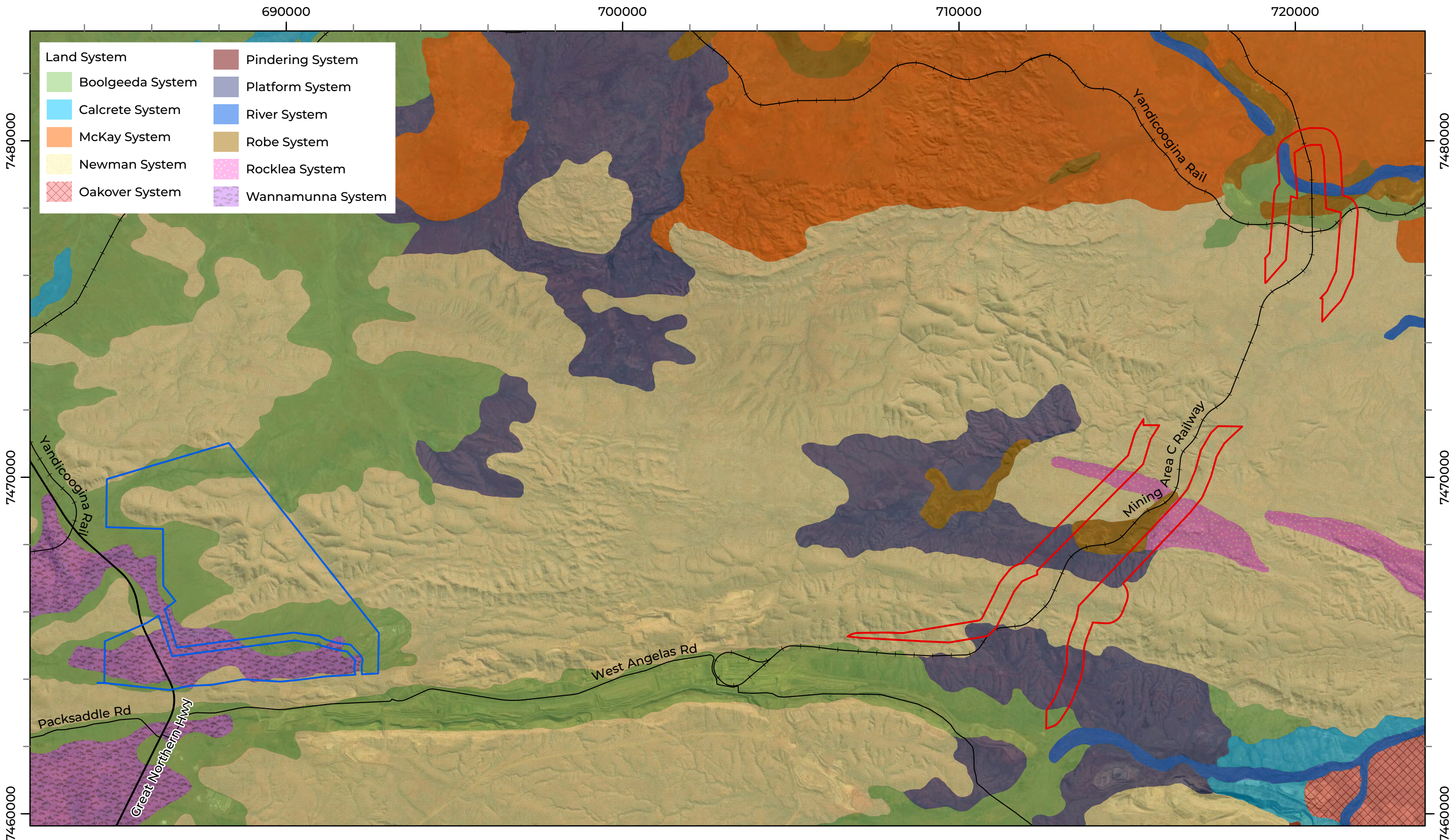
Name	Land Type	Description	Extent within Study Area	
			ha	%
Newman (New)	Hills and ranges with spinifex grasslands	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands	2,450.29	46.44
Boolgeeda (Bgd)	Stony plains with spinifex grasslands	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands	1,412.48	26.77
Wannamunna (Wnm)	Wash plains on hardpan with mulga shrublands	Hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasionally eucalypt woodlands)	740.35	14.03
Platform (Pla)	Stony plains with spinifex grasslands	Dissected slopes and raised plains supporting hard spinifex grasslands	278.78	5.28
McKay (McK)	Hills and ranges with spinifex grasslands	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts	135.33	2.56
Rocklea (Roc)	Hills and ranges with spinifex grasslands	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs	119.14	2.26
Robe (Rob)	Plateaux, mesas and breakaways with spinifex grasslands	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands	76.89	1.46
River (Riv)	Water course and drainage systems	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	63.36	1.20
Total			5,276.61	100

2.5 Soils

Broad soil landscape unit mapping shows the Study Area comprises two units: Fa13 and Fb3 (Northcote *et al.*, 1960-1968) (Figure 2.3; Table 2.3). The dominant soil type, Fa13 (97.04%), is largely associated with the Hamersley and Ophthalmia Ranges and has some areas of ferruginous duricrust as well as occasional narrow winding valley plains and steeply dissected pediments. The soils are frequently stony and shallow and there are extensive areas without soil cover. Chief soils are shallow stony earthy loams (Um5.51) along with some (Uc5.11) soils on the steeper slopes, and associated Dr2.33 and Dr2.32 (Bettany *et al.*, 1967).

Table 2.3: Soil units occurring within the Study Area

Unit Code	Description	Extent within Study Area	
		ha	%
Fa13	Ranges of banded jaspilite and chert along with shales, dolomites, and iron ore formations	5,120.57	97.04
Fb3	High-level valley plains set in extensive areas of unit Fa13	156.04	2.96
Total		5.276.61	100



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

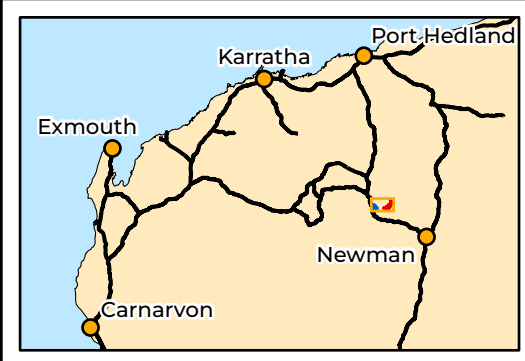
Rail

 **Biologic**

Scale 1:105,000

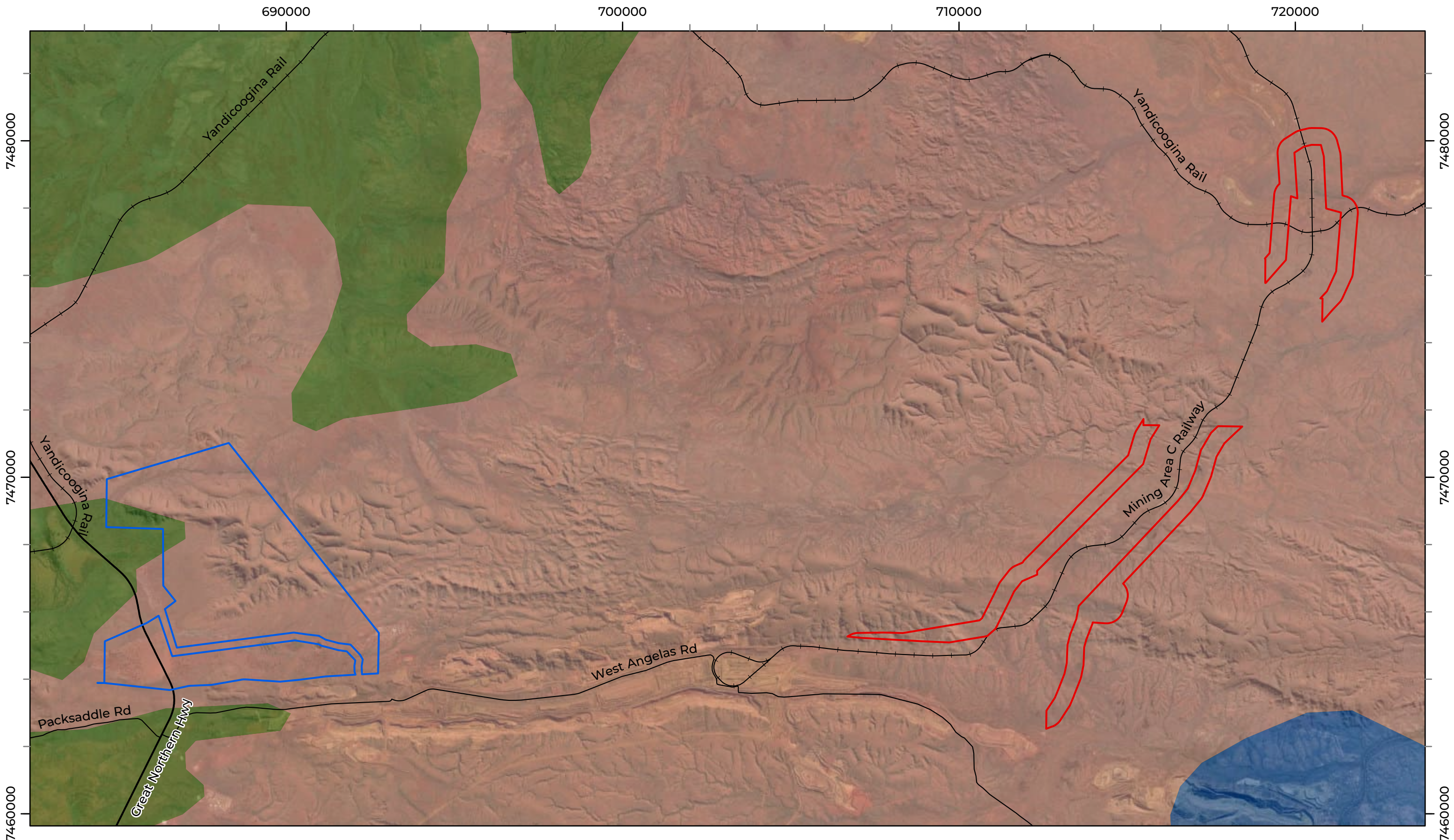
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Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 30/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

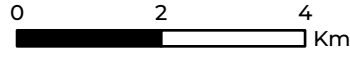
Figure 2.2: Land systems of the Study Area



LEGEND

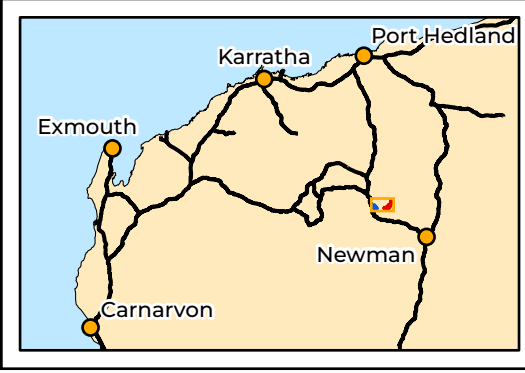
Study Area	Rail	Soil Unit
MAC to Yandi Corridor		Fa13
Runaway Valley North		Fa14
Local Road		Fb3
State Road		

**Biologic**



Scale 1:105,000

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 2.3: Soils of the
Study Area**

2.6 Hydrology

The surface and groundwater hydrology of the Pilbara is highly variable as a result of a dynamic climate with severe droughts and major flooding (DoW, 2010). Streamflow is highly seasonal and variable and is usually a direct response to rainfall. Most runoff occurs from January to March as a result of episodic cyclonic activities (DoW, 2010).

The Study Area occurs within the Ashburton and Fortescue River Basins. The catchments of these respective basins which the Study Area intersect are the Ashburton River and Upper Fortescue River catchments, the latter of which drains into the Fortescue Marsh. The Upper Fortescue River catchment also has limited hydrological connectivity with the Lower Fortescue River catchment as it is constricted at the western end by the Goodiadarrie Hills while the Ashburton River catchment connects to Ashburton River before draining into the Indian Ocean (EPA, 2013).

At a finer scale, the Study Area is located within two sub-catchments (an unnamed sub-catchment and the Weeli Wolli/ Marillana sub-catchment) with two major watercourses either within or close to the Study Area (Figure 2.4). Marillana Creek flows through the northern section of the Study Area. Approximately 8 km south-east of the Study Area there is also Pebble Mouse Creek, a major tributary of Welli Wolli Creek. Numerous minor ephemeral water courses flow throughout the Study Area (Figure 2.4).

2.6.1 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are ecosystems that rely upon groundwater for their continued existence (BoM, 2024). GDEs can be represented by many different assemblages of biota which rely on groundwater, and as a result come in many forms. For terrestrial ecosystems there are three key types of GDE (BoM, 2024); aquatic ecosystems: that rely on the surface expression of groundwater; terrestrial ecosystems: that rely on the subsurface presence of groundwater (this includes all vegetation ecosystems or Groundwater Dependent Vegetation (GDV)); and subterranean ecosystems (this includes cave and aquifer ecosystems).

Aboveground terrestrial GDEs are typically characterised by the presence of flora species that rely on groundwater, i.e. phreatophytes. Phreatophytes may be classified as either obligate or facultative depending on their reliance on groundwater (Eamus *et al.*, 2016):

- Obligate phreatophytes are flora species confined to habitats with access to groundwater.
- Facultative phreatophytes are flora species that can utilise groundwater to satisfy a proportion of their ecological water requirement (EWR) when it is available. However,

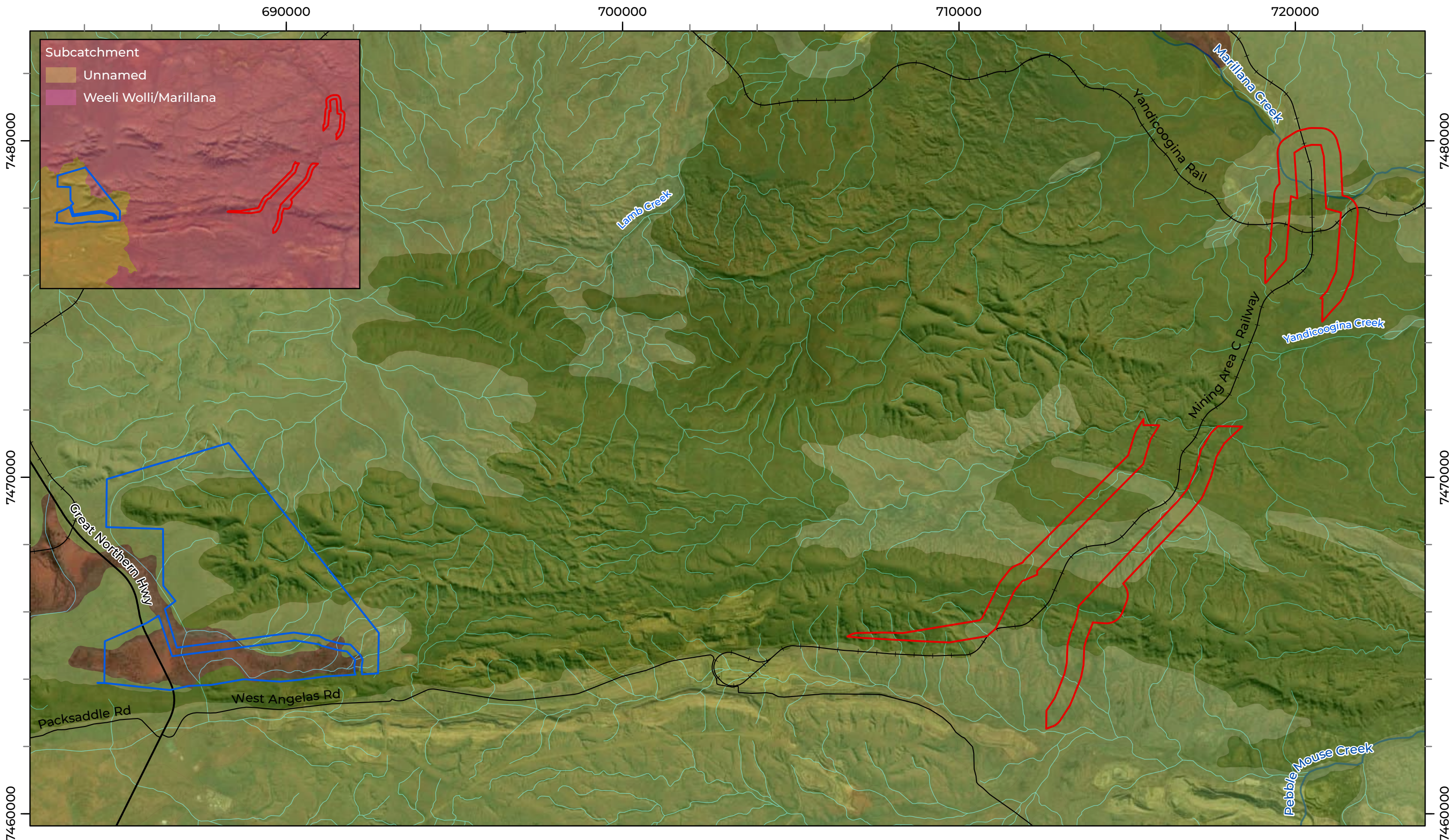
some individuals may also satisfy their EWR by relying solely on uptake from upper unsaturated soils layers where groundwater is inaccessible.

The Bureau of Meteorology (BoM) has developed the GDE Atlas as a national dataset of Australian GDEs to inform groundwater planning and management (BoM, 2024). It is the first and only national inventory of GDEs in Australia. The GDE Atlas contains information about three key types of ecosystems: aquatic ecosystems, terrestrial ecosystems, and subterranean ecosystems. Importantly, the GDE Atlas also includes the national inflow-dependent landscapes layer which is derived from remotely sensed data. This layer indicates the likelihood that a landscape is accessing water in addition to rainfall (such as soil moisture, surface water or groundwater) and generally represents a potential GDE dataset for all areas not yet studied or investigated in any detail. The BoM GDE Atlas indicates that the Study Area has potential to support terrestrial GDEs (BoM, 2024). Approximately 54.2% of the Study Area has moderate potential to support terrestrial GDEs (Figure 2.4). The remainder of the Study Area is mapped as having low potential to support terrestrial GDEs or has not been mapped (Figure 2.4).

2.6.2 Sheet-flow Dependent Ecosystems

Mulga is a vernacular term used in reference to a dominant arid-zone, group of tall shrubs, allied to the *Acacia aneura* taxonomic complex, of which there are 12 separate entities, excluding informal variants, putative hybrids and intergrades (Maslin & Reid, 2012). The term Mulga is also used to describe vegetation communities in which these taxa predominate (Maslin *et al.*, 2012). The structure and patterning of mulga communities varies from strongly banded (groved) through to open shrublands and woodlands across the landscape (Page & Grierson, 2012). The bandings act as a sink for nutrients and water to infiltrate the soil and are readily available for uptake by the flora located within the banding. This banding and overland sheet-flow supports a diverse biota within the Mulga bands and plays an important ecological function which is well documented (Dawson & Ahern, 1973; Saco *et al.*, 2007; Winkworth, 1973).

Land systems defined by van Vreeswyk *et al.* (2004) (Figure 2.2) were reviewed to determine the potential presence of sheet-flow dependent ecosystems in the Study Area. Aerial imagery was also reviewed to identify the distinctive banding (grove and intergrove) associated with sheet flow ecosystems of the Pilbara. The Study Area contains three land systems that have landforms subject to sheet-flow, with these being characterised by mulga groves within stony plains and hardpan plains (Section 2.4). The Boolgeeda land system includes small groves up to 20 m long within stony lower plains which are subject to sheet flow. The Wannamunna land system supports sheet flow on hardpan plains, with groves up to 1.5 km long by 150 m wide (Leighton, 2004).



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Rail

— Rail

Surface Hydrology

- Minor
- Major

Terrestrial GDE

- Moderate potential GDE - from national assessment
- Low potential GDE - from national assessment



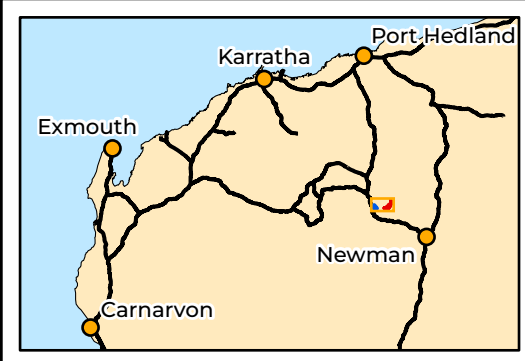
Biologic

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Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator

Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 2.4: Surface hydrology of the Study Area

2.7 Pre-European Vegetation

Two vegetation associations, Hammersley 18 and Hammersley 82 (Beard, 1975), occur within the Study Area (Table 2.4; Figure 2.5). The largest vegetation association is the Hammersley 82 association of undulating hummock grassland with scattered bloodwoods and snappy gum and *Triodia* spp., covering 59.55% of the Study Area. The remaining 40.45% of in the Study Area is the Hammersley 18 association of Mulga (*Acacia aneura*) low woodland and associated species. Shepherd *et al.* (2002) reinterpreted and updated the vegetation association mapping to reflect the National Vegetation Information System (NVIS Technical Working Group) standards (ESCAVI, 2003). The Study Area is located within the Hammersley System, and under Shepherd *et al.* (2002) comprises vegetation system associations:

- 82.3: Low tree steppe
- 18.11: Low woodland, open low woodland or sparse woodland.

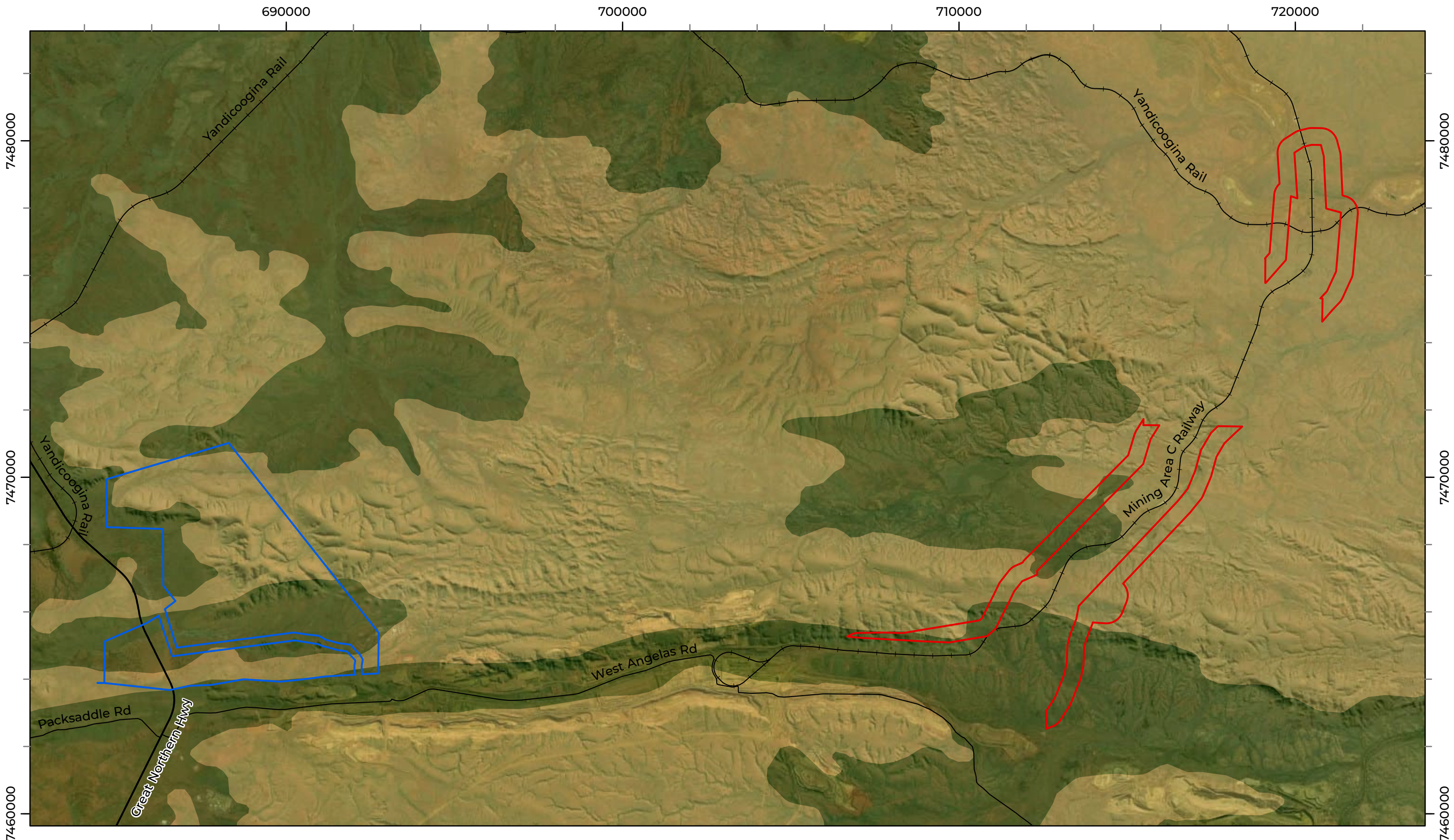
Table 2.4: Vegetation associations occurring within the Study Area

Code	Description	Study Area Extent	
HAMMERSLEY-18	Low woodland; mulga (<i>Acacia aneura</i>)	2,134.40 ha	40.45%
HAMMERSLEY-82	Hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i>	3,142.21 ha	59.55%

2.8 Land use and Tenure

Part of the Study Area is situated on the Juna Downs Pastoral Station, a small portion is situated on Marillana Pastoral Station and the remainder occurs on Unallocated Crown Land (Figure 1.1). The dominant land uses in the subregion including grazing, native pastures, conservation, urban areas, and mining (Kendrick, 2003), as well as recreation and tourism. Historically, land use in and around the Study Area has been mining and pastoral agriculture. Several mines including MAC, South Flank and Hope Downs, and their associated infrastructure are active in proximity to the Study Area. The Study Area encompasses active BHP geoscience tenure and off tenure areas. Karijini National Park is approximately 15.5 km west of the western most boundary of the Study Area (Figure 1.1).

The Banjima People hold native title over approximately 10,000 km² of land in the Pilbara region (tribunal file no. WAD6096/1998) from Mulga Downs in the north to MAC in the south (RNTBC, 2013). The Study Area contains some registered Department of Planning, Lands and Heritage (DPLH) Aboriginal Cultural Heritage sites, particularly in the MAC to Yandi Corridor areas.

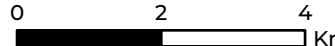


LEGEND

Study Area	Rail	Pre-European Vegetation
MAC to Yandi Corridor		Hammersley 18
Runaway Valley North		Hammersley 82
Local Road		
State Road		

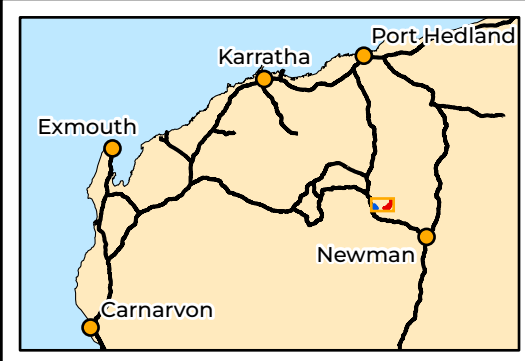
**Biologic**

Scale 1:105,000



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Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 2.5: Pre-European
vegetation associations of
the Study Area**

3 Desktop Assessment

3.1 Methods

A desktop assessment comprising database searches and a literature review was undertaken to identify vertebrate fauna species potentially occurring within the Study Area, with a focus on targeted MNES and other significant species (Table 3.1 and Table 3.2).

3.1.1 Database Searches

Six fauna databases were searched to obtain information on all vertebrate species previously recorded within the Study Area and surrounds (Table 3.1); four database searches contain information on all vertebrate species previously recorded (ALA, 2025); (BHP WAIO, 2025); (BirdLife Australia, 2025); (DBCA, 2025a), one identifies species of significance previously recorded (DBCA, 2025b), and one identifies species of significance known or likely to occur within the region based on modelled distribution (DCCEEW, 2025).

Table 3.1: Details of database searches conducted

Database	Data Access/ Receival Date	Search Area
DBCA (2025a) NatureMap	10/07/2025	Approximate central point of the Study Area (-22.9547 S, 118.8959 E) with a 50 km buffer
DBCA (2025b) Threatened and Priority Fauna Database	10/07/2025	
BirdLife Australia (2025) Birdata	24/06/2025	
DCCEEW (2025) Protected Matters Search Tool	24/06/2025	
ALA (2025) Atlas of Living Australia Species Records Online Database	24/06/2025	
BHP WAIO (2025) BHP WAIO Fauna Records Database	10/07/2025	

3.1.2 Literature Review

A total of 105 assessments were reviewed, comprising 47 detailed surveys, 29 basic surveys, 23 targeted surveys, four monitoring surveys, one desktop assessment, and one literature review (Table 3.2; detailed summary in Appendix A). Eight assessments overlapped a portion of the Study Area, 43 were undertaken within 10 km of the Study Area, and the remaining 54 were undertaken within 50 km of the Study Area (Table 3.2; Appendix A). Figure 3.1 illustrates the location of surveys conducted for BHP (BHP survey ID in Table 3.2; Appendix A) in relation to the Study Area.

Table 3.2: Literature sources used for the review

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
1. Astron (2025) Ministers North Consolidated Targeted	10640	Targeted	Within Study Area

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
Significant Vertebrate Fauna Surveys			
2. Biologic (2024) Mining Area C Targeted MNES Vertebrate Fauna Survey	10556	Targeted	Within Study Area
3. Biologic (2011a) Area C and Surrounds Vertebrate Fauna Survey.	1008	Detailed	Within Study Area
4. Biologic (2013e) South Flank Targeted Northern Quoll Survey	-	Targeted	Within Study Area
5. Biologic (2016c) South Flank Targeted Fauna Survey	-	Targeted	Within Study Area
6. Biologic (2011b) Area C to Yandi Fauna Survey	-	Basic	Within Study Area
7. Biologic and Bat Call WA (2014) Pilbara Regional Ghost Bat Review	-	Literature Review	Within Study Area
8. Biologic (2019a) MAC4 Pipeline Level 1 Vertebrate Fauna Assessment	-	Basic	Within Study Area
9. Onshore and Biologic (2011) Camp Hill Exploration Leases Level 2 Flora & Vegetation Survey and Level 1 Fauna Assessment.	381	Basic	0.82 km
10. Biota (2012c) South Flank to Jinidi Level 2 Fauna Survey.	1093	Detailed	1 km
11. Astron (2019) Hope Downs 2 Proposal Fauna Survey March 2019.	-	Detailed	1 km
12. ENV (2010b) Jinayri Access Road Vertebrate Fauna Survey.	499	Detailed	1 km
13. GHD (2021b) Ministers North Fauna Survey Level 2	-	Detailed	1 km
14. Ecologia (2004a) Area C: Deposits D, E and F Biological Survey.	348	Detailed	1.28 km
15. Biologic (2017b) Ministers North to Yandi Corridor Single Phase Flora, Vegetation and Fauna Survey	-	Detailed	1.5 km
16. Rapallo (2012) Level 2 Fauna Survey and Targeted Northern Quoll Survey of the Lamb Creek	-	Detailed	1.5 km
17. Biota (2022) MAC Phase 4 Marillana Creek Targeted MNES Survey	-	Targeted	1.5 km
18. Outback Ecology (2008) Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Terrestrial Vertebrate Fauna Assessment.	344	Detailed	1.79 km
19. Specialised Zoological (2008a) Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Bat Survey and Assessment	-	Targeted	1.79 km

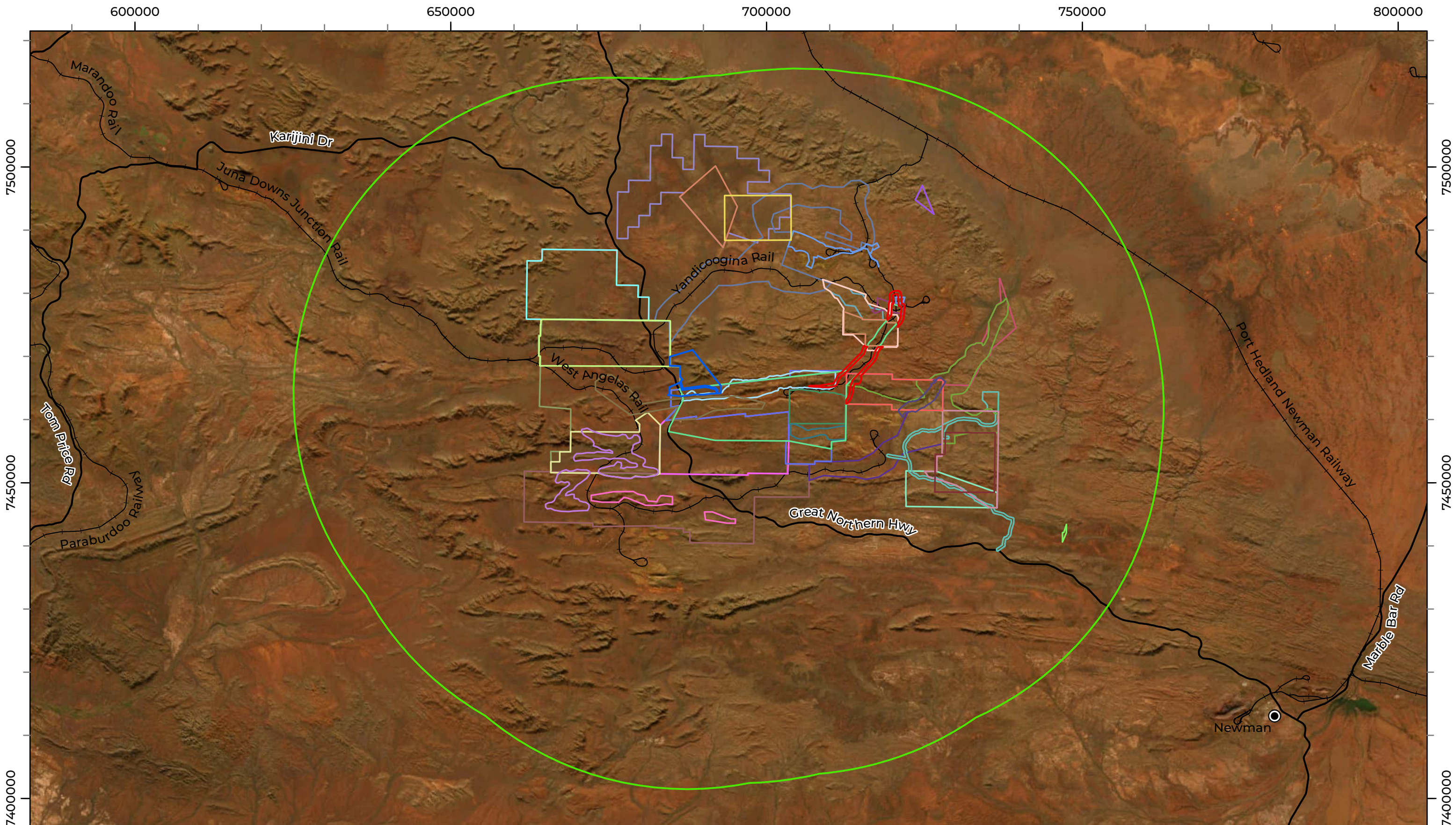
Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
20. Biota (2010) Yandicoogina Junction South West and Oxbow Fauna Survey.	1187	Detailed	1.90 km
21. Biologic (2017a) Ministers North level 2 vertebrate fauna survey.	10082	Detailed	2.07 km
22. Ecologia (2006c) Ministers North Biological Survey.	-	Basic	2.75 km
23. GHD (2021a) Ministers North Fauna Survey level 1.	-	Basic	3 km
24. Biologic (2018) Ministers North to Yandi Corridor Two phase Targeted Fauna Survey.	10140	Detailed	3.5 km
25. Biologic (2015b) Central Pilbara Ghost Bat Population and Roost Assessment: 2014	-	Targeted	5 km
26. Biologic (2023a) Central Pilbara Ghost Bat Monitoring: 2020 – 2021.	-	Monitoring	6 km
27. Biologic (2023b) Central Pilbara Ghost Bat Monitoring: 2021 – 2022.	-	Monitoring	6 km
28. Biologic (2023c) Central Pilbara Ghost Bat Monitoring: 2022 – 2023.	-	Monitoring	6 km
29. Biologic (2025) Central Pilbara Ghost Bat Monitoring: 2023 – 2024.	-	Monitoring	6 km
30. Biologic (2023d) Targeted Pilbara Olive Python Survey: South Flank and Mining Area C.	-	Targeted	6 km
31. Biologic (2010) East Packsaddle Level 1 Vertebrate Fauna Study.	350	Targeted	6 km
32. Ecologia (1997) Hope Downs Biological Survey	-	Detailed	6.09 km
33. Ecologia (2004b) Packsaddle Range Biological Survey.	357	Basic	6.17 km
34. ENV (2007a) Area C R-Deposit Fauna Assessment.	349	Detailed	6.35 km
35. HGM (1999) Marillana Creek Western Access Corridor - Biological Assessment.	-	Basic	6.91 km
36. Astron (2023) Yandi 45C Targeted Significant Vertebrate Fauna Survey.	-	Targeted	7 km
37. Ecologia (1998a) Mining Area C Biological Survey.	336	Detailed	7.25 km
38. Biologic (2011f) Yandi Vertebrate Fauna Review	-	Targeted	7.81 km
39. Maunsell Australia and Bamford Consulting (2003) Yandi Life of Mine Fauna and Flora	-	Basic	8.39 km
40. Biologic (2011e) Southern Flank Vertebrate Fauna Study.	1021	Detailed	8.39 km

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
41. Ecologia (2004c) Yandi Overland Conveyor and Stockyard Fauna and Flora Assessment	-	Desktop survey	8.70 km
42. Astron (2010) West Packsaddle Flora and Fauna Assessment.	-	Basic	9.04 km
43. Biologic (2013a) Area C West Vertebrate Fauna Survey.	1086	Detailed	9.35 km
44. Onshore and Biologic (2009) Biological Survey South Parmelia Exploration Leases.	-	Basic	9.5km
45. Biota (2009) Yandicoogina Targeted Northern Quoll survey.	-	Targeted	9.5 km
46. Ecologia (1995) Yandi stage II Iron Ore Project: Biological Assessment Survey	-	Detailed	9.64 km
47. Ecologia (1998b) Weeli Wolli Creek Biological Assessment Survey.	101	Detailed	9.68 km
48. ENV (2008a) Area C Southern Flank Deposit Fauna Assessment.	-	Basic	9.73 km
49. Biota (2013a) Area C West to Yandi level 2 Vertebrate Fauna Survey.	1070	Detailed	9.87 km
50. Ecologia (1996) Yandi Stage II Iron Ore Project - Pebble-mound Mouse <i>Pseudomys chapmani</i> - site survey	-	Targeted	10 km
51. Biota (2013b) South Parmelia Level 2 Vertebrate Fauna Survey.	1224	Detailed	10 km
52. Biologic (2011c) Barimunya Camp Vertebrate Fauna Survey	-	Basic	11.37 km
53. Specialised Zoological (2008b) Survey for conservation significant bats between Kurrajura siding and the Yandi WYE.	-	Basic	12 km
54. Ecologia (2008b) Marillana Creek (Yandi) Iron Ore Mine Modification.	122	Detailed	12.15 km
55. ENV (2010a) Area C West NVCP Flora, Vegetation and Fauna Assessment.	374	Basic	12.63 km
56. Ecologia (2008a) Area A and Additional Areas Level 2 Terrestrial Fauna Survey.	-	Detailed	12.94 km
57. Biologic (2013b) Marillana and Surrounds Targeted Mulgara Survey	-	Targeted	13.5km
58. Eco Logical (2012) Level 1 Flora and Fauna Surveys along	-	Basic	14 km (site 3)

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
the Great Northern Highway for Jimblebar Mine Module Transport.			
59. Outback Ecology (2010) Area C to Jinayri to Mount Newman Railway Terrestrial Vertebrate Fauna Survey.	366	Detailed	14.44 km
60. Biota (2014a) Yandi Billiards phase 1 Seasonal Fauna Survey	-	Detailed	14.5 km
61. Biologic (2024) Jinidi Targeted Fauna Survey.	-	Targeted	15 km
62. Biologic (2013d) Mudlark Vertebrate Fauna Survey	1080	Detailed	15 km
63. Biota (2014b) Yandi Billiards Targeted Northern Quoll Survey	-	Targeted	15 km
64. Biologic (2019b) Marillana Tenement and Infrastructure Corridor Targeted Vertebrate Fauna Survey	-	Targeted	15 km
65. ENV (2008b) Area C West Fauna Assessment.	372	Detailed	15.50 km
66. Biologic (2016b) Marillana targeted vertebrate fauna survey	-	Targeted	16 km
67. Biologic (2013c) Marillana Vertebrate Fauna Survey.	1077	Detailed	16.66 km
68. Ecologia (2005b) Mudlark Well Exploration Project Biological Survey.	421	Detailed	17.01 km
69. Ecologia (2008c) RGP5 fauna survey Kurrajura Siding to Yandi WYE including Yandi repeater	-	Basic	18 km
70. ENV (2010c) Jinayri Mining Lease Vertebrate Fauna Survey	-	Detailed	18.40 km
71. Ecologia (1999) West Angelas Iron Ore Project Mine Access Road Corridor Vertebrate Fauna Assessment Survey	-	Detailed	19.11 km
72. ENV (2008c) Jinayri Vertebrate Fauna Assessment.	1010	Detailed	19.18 km
73. Biologic (2019c) Pineapple Hill Detailed Vertebrate Fauna Survey.	10216	Detailed	20 km
74. Onshore (2017) Reconnaissance Flora and Vegetation Survey and Fauna Assessment Newman to Mining Area C Powerline Corridor	-	Basic	20 km
75. Ecologia (2005c) Survey for conservation significant bats between Kurrajura Sid Upper Marillana Exploration Project Biological Survey.	115	Basic	20 km

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
76. Biologic (2016a) Marillana Infrastructure Corridor Level 1 Vertebrate Fauna Survey	-	Targeted	20 km
77. Ecologia (2006b) Marillana Terrestrial Vertebrate Fauna Survey.	408	Detailed	20 km
78. Biologic (2011d) Jinidi Vertebrate Fauna Survey	-	Basic	20.28 km
79. 360 Environmental (2017) Upper Marillana and Munjina Baseline Vertebrate Fauna survey.	10084	Detailed	20.48 km
80. ENV (2009a) Munjina and Ministers North (Yandi Hub) Fauna Assessment.	423	Detailed	20.77 km
81. Ecologia (2006a) Jirridi Terrestrial Vertebrate Fauna Survey.	497	Detailed	21.22 km
82. ENV (2009c) Rapid Growth Project 5: Yandi Flora Survey and Assessment of Barimunya Airport and a Potential Borrow Area	-	Targeted	21.3 km
83. Biota (2012a) Jinidi to Mindy Level 1 Fauna Survey	-	Basic	22 km
84. Biologic (2012) Jinidi to Mainline Vertebrate Fauna Survey.	1065	Detailed	23.27 km
85. Biota (2012b) Koodaideri Southern Infrastructure Corridor Fauna Survey	-	Detailed	25 km
86. Biologic (2015a) Karijini Tenements Environmental Risk Assessment	-	Basic	25 km
87. GHD (2010) Coondewanna Exploration Tenement Level 2 Flora and Level 1 Fauna Report.	-	Basic	25 km
88. ENV (2008d) RGP5 Jimblebar Junction to Yandi Junction Railway Reserve and Repeaters 6, 7 and 8 Fauna Assessment	-	Basic	25 km
89. ENV (2011) Upper Marillana and Munjina Flora, Vegetation and Fauna Assessment	-	Basic	26.22 km
90. ENV (2007c) Upper Marillana Exploration Lease Fauna Assessment	-	Basic	26.82 km
91. Ecologia (1998c) West Angelas Iron Ore Project Vertebrate Fauna Assessment Survey	-	Detailed	26.97 km

Report	BHP Survey ID	Survey Type	Distance (central point) from Study Area
92. Ecologia (2005a) Mindy-Coondiner Exploration Project Biological Survey	-	Basic	27 km
93. Biota (2004) Fauna Habitats and Fauna Assemblage of the Proposed FMG phase A Rail Corridor	-	Detailed	27.36 km
94. ENV (2007b) Mindy North Exploration Fauna Assessment	-	Detailed	27.46 km
95. Biologic (2021c) West Angelas Beyond 2020; Level 2 Vertebrate and SRE Invertebrate Fauna Assessment Phase 1 & 2	-	Detailed	28.02 km
96. Ecologia (2014) Greater West Angelas Terrestrial Fauna Assessment	-	Detailed	29.41 km
97. Biota (2005a) Fauna Habitats and Fauna Assemblage of Deposits E and F at West Angelas Survey	-	Detailed	30.18 km
98. Biologic (2013f) Targeted conservation significant fauna survey- Karijini tenement E47/17	-	Targeted	30.51 km
99. ENV (2009b) Newman to Yandi Transmission Line Terrestrial Vertebrate Fauna Assessment.	-	Basic	32.81 km
100. Bamford Consulting (2012) Vertebrate Fauna Assessment of the Iron Valley Project Area	-	Targeted	36 km
101. Ecologia (2007) Rapid Growth Project 5 Kurrajura to Cowra Fauna Survey.	-	Basic	36 km
102. Integrated Environmental (1980) An Ecological Appreciation of the West Angelas Environment, Western Australia 1979	-	Detailed	36.34 km
103. ENV (2010d) Ophthalmia Flora, Vegetation and Fauna Assessment	-	Basic	42 km
104. GHD (2020) Fortescue Valley Targeted Bilby Survey	-	Targeted	45 km
105. Ninox (2009) A Fauna Survey of the Proposed Hope Downs 4 Mining Area, Near Newman, Western Australia.	1243	Detailed	50 km



LEGEND

- Study Area

 - MAC to Yandi Corridor
 - Runaway Valley North
 - Desktop Assessment Area
- State Road

Rail



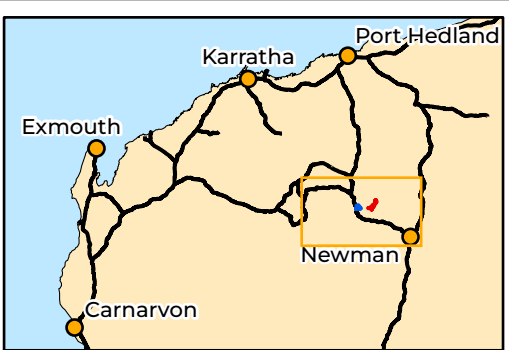
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Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 20/10/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 3.1: Previous fauna surveys in the Study Area

Year - Survey ID - Report Title

- 2024 - 10640 - Consolidated Ministers North Targeted Significant Vertebrate Fauna Survey
- 2019 - 10216 - Pineapple Hill Level 2 Vertebrate Fauna Survey
- 2017 - 10140 - Ministers North to Yandi Corridor Level 2 Vertebrate Fauna Survey
- 2017 - 10084 - Upper Marillana and Munjina Baseline Vertebrate Fauna Survey
- 2017 - 10082 - Ministers North Level 2 Vertebrate Fauna Survey
- 2013 - 1224 - South Parmelia Level 2 Vertebrate Fauna Survey
- 2013 - 1086 - Area C West Vertebrate Fauna Survey
- 2013 - 1080 - Mudlark Vertebrate Fauna Study
- 2013 - 1077 - Marillana Vertebrate Fauna Survey
- 2013 - 1070 - Area C West to Yandi Level 2 Vertebrate Fauna Survey
- 2012 - 1093 - South Flank to Jinidi Level 2 Vertebrate Fauna Survey
- 2011 - 381 - Camp Hill Flora and Vegetation Survey Report and Fauna Assessment
- 2011 - 1065 - Jinidi to Mainline Vertebrate Fauna Survey
- 2011 - 1021 - Southern Flank Vertebrate Fauna Study
- 2011 - 1008 - Area C and Surrounds Vertebrate Fauna Survey
- 2010 - 499 - Jinayri Access Road Vertebrate Fauna Survey
- 2010 - 374 - Area C West NVCP Flora Vegetation and Fauna Assessment
- 2010 - 1187 - Yandicoogina Junction South West Oxbow Fauna Survey
- 2009 - 423 - Munjina and Minsters North (Yandi Hub) Fauna Assessment
- 2009 - 366 - Area C to Jinayri to Mount Newman Railway Terrestrial Vertebrate Fauna Survey
- 2009 - 1243 - Fauna Survey of Proposed Hope Downs 4 Mining Area
- 2008 - 372 - Area C West Fauna Assessment
- 2008 - 344 - Area C Deposit A, D, P1 and P3 Vertebrate Fauna Survey Outback Ecology
- 2008 - 122 - Marillana Creek (Yandi) Iron Ore Mine Modification Level 2 Fauna Survey

- 2008 - 1010 - Jinayri Vertebrate Fauna Assessment
- 2007 - 349 - Area C Deposit R Fauna Assessment
- 2006 - 497 - Jirridi Terrestrial Fauna Survey
- 2006 - 408 - Marillana Terrestrial Vertebrate Fauna Survey
- 2005 - 421 - Mudlark Well Exploration Project Biological Survey
- 2005 - 115 - Upper Marillana Exploration Project Biological Survey
- 2004 - 357 - Area C Packsaddle Range Biological Survey
- 2004 - 348 - Area C Deposits D, E and F Biological Survey
- 2001 - 354 - Area C Packsaddle Vertebrate Fauna Assessment
- 1998 - 336 - Mining Area C Biological Survey
- 1998 - 101 - Weeli Wolli Creek Biological Assessment Survey

3.2 Results

The desktop assessment identified 379 vertebrate fauna species which have previously been recorded within or have the potential to occur within the Study Area, comprising 54 mammals, 169 birds, 144 reptiles, and 12 amphibians.

In addition to the eight target MNES species (Figure 3.2; Appendix B), a further 20 significant species (27 total) were identified in the desktop assessment as previously recorded and/ or potentially occurring within the Study Area (Table 3.3; Figure 3.3, Appendix B). The target MNES and additional significant species comprise seven mammals, 15 birds, and five reptiles, of which two have previously been recorded within the Study Area; ghost bat and Pilbara olive python (Table 3.3; Appendix B). The remaining species have previously been recorded within a 50 km radius of the Study Area (Figure 3.2; Figure 3.3; Table 3.3).

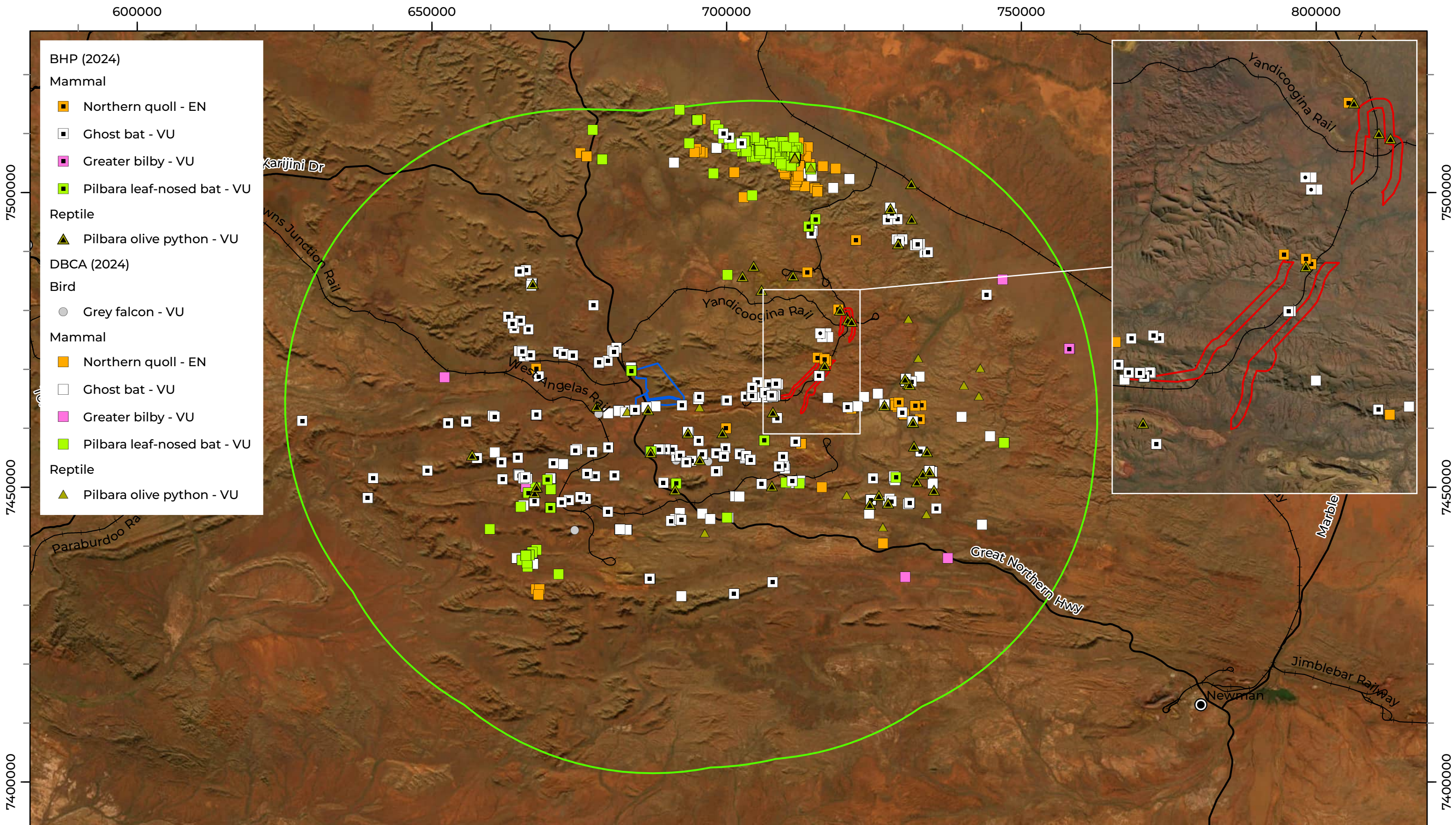
Due to the size of the desktop assessment search area, and likelihood of encompassing habitats which may not occur within the Study Area, results of the desktop review are likely to include species which may not occur within the Study Area (e.g. marine bird species). Additionally, many species tend to be patchily distributed even where appropriate habitats are present, and many species of birds can occur as regular migrants, occasional visitors or vagrants. For the purpose of this desktop assessment, extinct species and marine species have been excluded from the database search results and are not discussed hereafter.

The northern brushtail possum (*Trichosurus vulpecula* subsp. *arnhemensis*) record from the desktop assessment (Vulnerable EBPC Act/ *Biodiversity Conservation Act 2016* (BC Act)) does not represent either this species, or the southwest species (*Trichosurus vulpecula* subsp. *hypoleucus*), as confirmed via DNA sequencing conducted by Biologic (2021b) and Middleton *et al.* (2025). As such it has been excluded as a species of significance throughout.

Table 3.3: Species of significance identified in the desktop assessment

Species		Conservation Status				Previously recorded within Study Area
Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	
MAMMALS						
DASYURIDAE						
Dasyercus blythi	brush-tailed mulgara			P4		
Dasyurus hallucatus	northern quoll	EN	EN		EN	
MEGADERMATIDAE						
Macroderma gigas	ghost bat	VU	VU		VU	•
MURIDAE						
Leggadina lakedownensis	northern short-tailed mouse			P4		
Pseudomys chapmani	western pebble-mound mouse			P4		
RHINONYCTERIDAE						
Rhinonictis aurantia	Pilbara leaf-nosed bat	VU	VU			
THYLACOMYIDAE						
Macrotis lagotis	greater bilby	VU	VU		VU	
BIRDS						
ACANTHIZIDAE						
Aphelocephala leucopsis	southern whiteface	VU				
ACCIPITRIDAE						
Elanus scriptus	letter-winged kite			P4	NT	
Pandion haliaetus	eastern osprey	MI	MI			
APODIDAE						
Apus pacificus	fork-tailed swift	MI	MI			
CHARADRIIDAE						
Charadrius veredus	oriental plover	MI	MI			
FALCONIDAE						
Falco hypoleucos	grey falcon	VU	VU		VU	
Falco peregrinus	peregrine falcon		OS			
LARIDAE						

Species		Conservation Status				Previously recorded within Study Area
Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	
<i>Gelochelidon nilotica</i>	gull-billed tern	MI	MI			
<i>Sterna anaethetus</i>	bridled tern	MI	MI			
PSITTACIDAE						
<i>Pezoporus occidentalis</i>	night parrot	CR	CR		CR	
ROSTRATULIDAE						
<i>Rostratula australis</i>	Australian painted snipe	EN	EN		EN	
SCOLOPACIDAE						
<i>Actitis hypoleucos</i>	common sandpiper	MI	MI			
<i>Calidris ruficollis</i>	red-necked stint	MI	MI		NT	
<i>Tringa glareola</i>	wood sandpiper	MI	MI			
<i>Tringa nebularia</i>	common greenshank	MI / EN	MI			
Reptiles						
CARPHODACTYLIDAE						
<i>Underwoodisaurus seorsus</i>	Pilbara barking gecko			P2		
PYTHONIDAE (PREVIOUSLY BOIDAE)						
<i>Liasis olivaceus</i> subsp. <i>barroni</i>	Pilbara olive python	VU	VU			•
SCINCIDAE						
<i>Ctenotus uber</i> subsp. <i>johnstonei</i>	spotted ctenotus			P2		
<i>Liopholis kintorei</i>	great desert skink	VU	VU		VU	
TYPHLOPIDAE						
<i>Anilius ganeii</i>	Gane's blind-snake			P1		



- BHP (2024)
- Mammal
- Northern quoll - EN
 - Ghost bat - VU
 - Greater bilby - VU
 - Pilbara leaf-nosed bat - VU
- Reptile
- Pilbara olive python - VU
- DBCA (2024)
- Bird
- Grey falcon - VU
- Mammal
- Northern quoll - EN
 - Ghost bat - VU
 - Greater bilby - VU
 - Pilbara leaf-nosed bat - VU
- Reptile
- Pilbara olive python - VU

- LEGEND
- Study Area
- MAC to Yandi Corridor
 - Runaway Valley North
 - Desktop Assessment Area

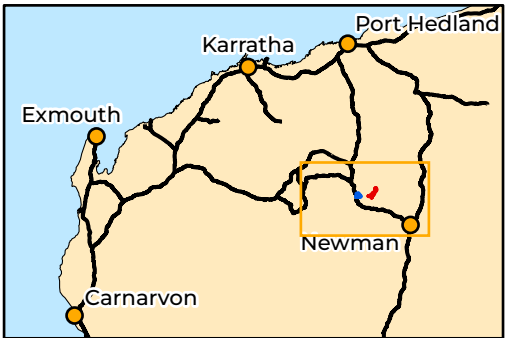
- State Road
- Rail

 **Biologic**

Scale 1:600,000

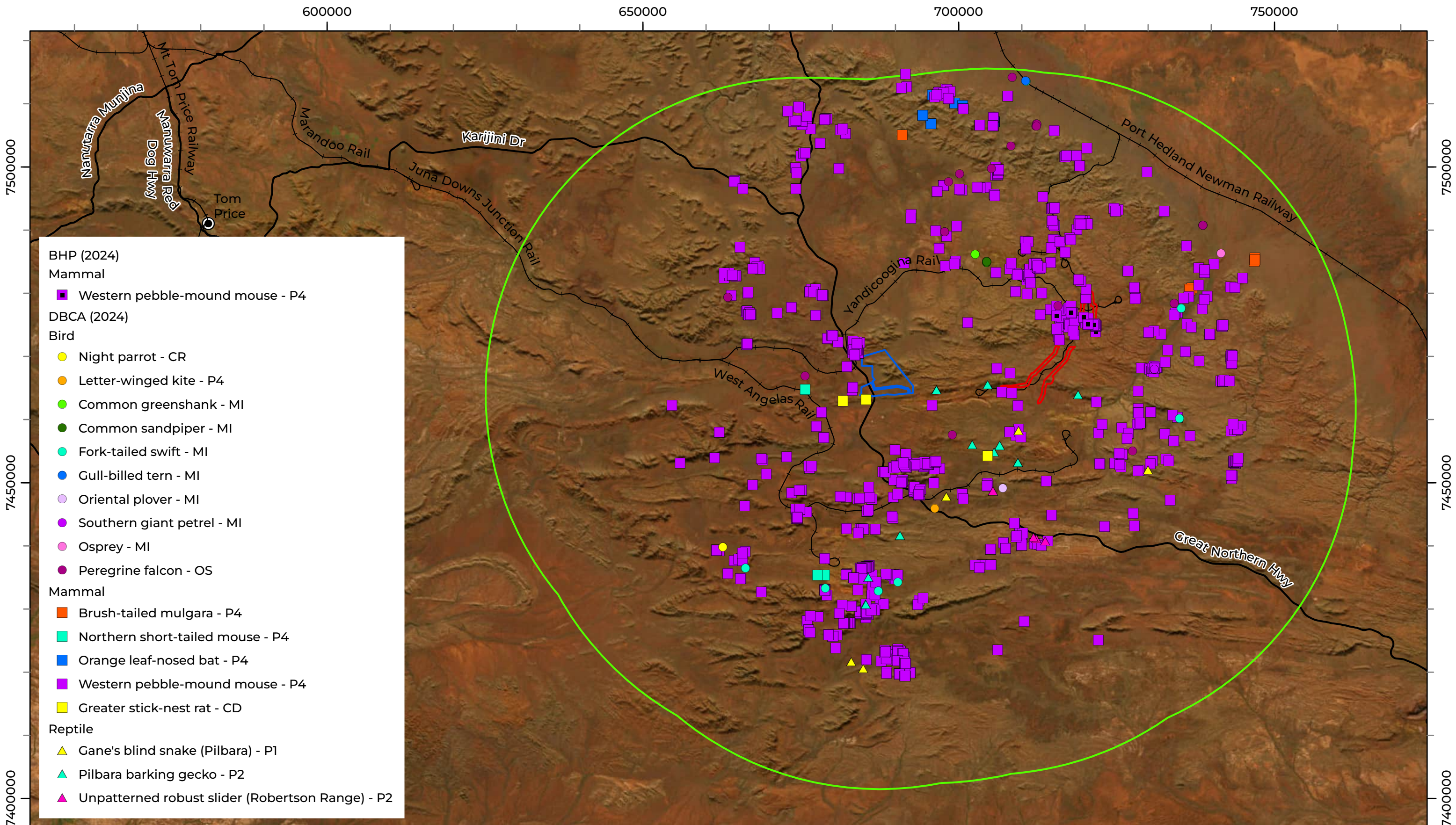
0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 20/10/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 3.2: Targeted MNES
fauna records from the
desktop assessment**



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Desktop Assessment Area

State Road

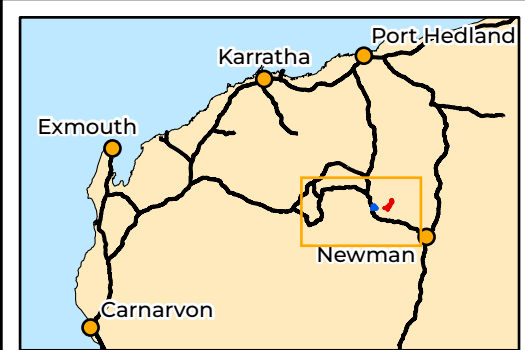
Rail

Biologic

Scale 1:560,000

0 10 20 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 20/10/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 3.3: Other significant fauna records from the desktop assessment

4 Methods

4.1 Survey Timing and Weather

The field survey was conducted between 21 – 30 May 2025. Current and long-term climatic data is available from the Bureau of Meteorology (BoM) weather station at Newman Aero (Station 007176), located approximately 100 km south-east of the Study Area (BoM, 2025). The Newman Aero weather station is expected to provide the most accurate long-term average dataset for climatic conditions within the Study Area.

In the 12 months prior to the survey, mean maximum and minimum temperatures recorded at Newman Aero were above the long-term averages for most months (Figure 4.1). Throughout all months except March 2025, the mean maximum temperature was within 2°C of the long-term average. Throughout all months except August, September, and October 2024, the mean minimum temperature was within 2°C of the long-term average (Figure 4.1). The rainfall received in the 12 months prior to the survey (391.0 mm) was higher than the long-term average (319.9 mm). Most of the rainfall during this 12-month period fell during November 2024 (63.4mm), December 2024 (121.2 mm) and February 2025 (76.0mm).

Observed maximum and minimum temperatures recorded during each day of the survey are provided in Table 4.1. No rainfall occurred during the survey period.

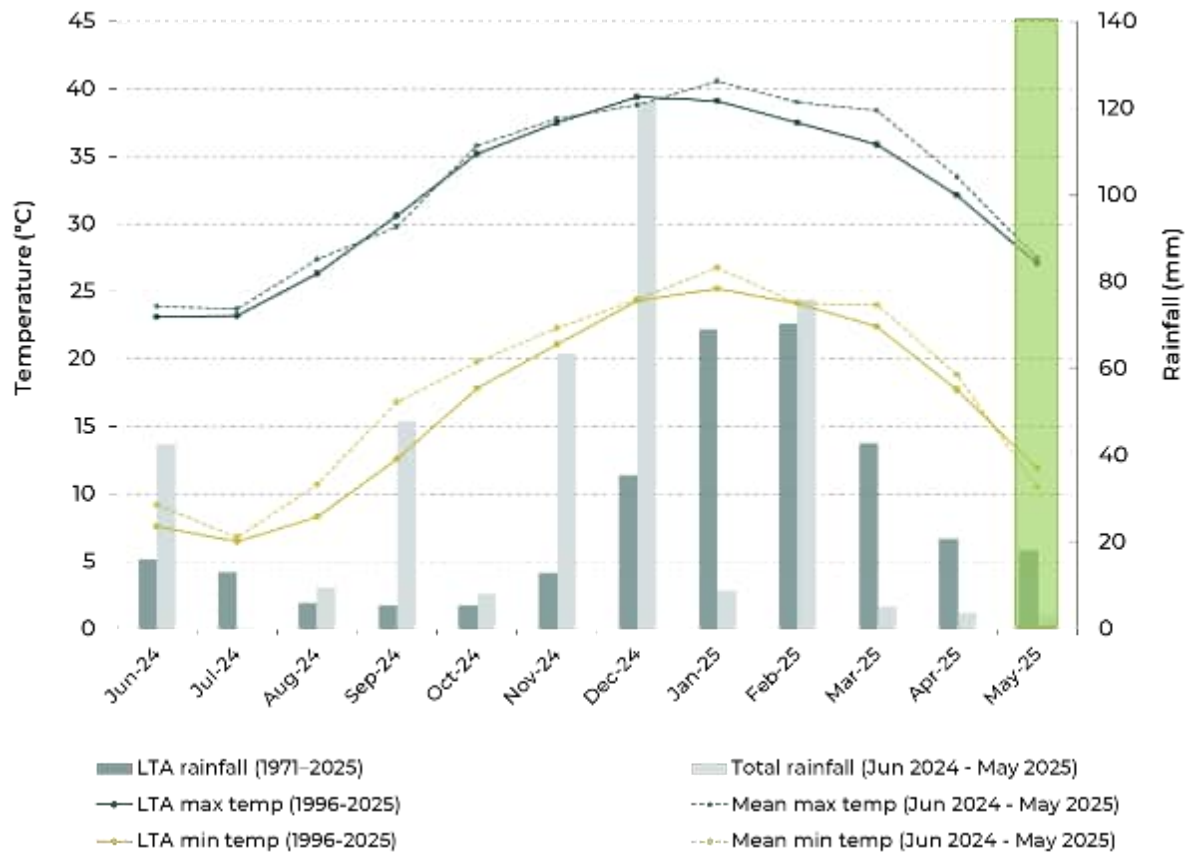


Figure 4.1: Current and long-term climatic data for Newman Airport (Station 007176) (BoM, 2025)

Table 4.1: Climatic conditions recorded at Newman Airport (BoM, 2025) during the survey

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
21/05/2025	6.8	25.2	0
22/05/2025	4.8	25.3	0
23/05/2025	8.2	25.5	0
24/05/2025	7.1	26.9	0
25/05/2025	7.6	29.0	0
26/05/2025	7.9	28.8	0
27/05/2025	8.8	29.2	0
28/05/2025	14.2	28.8	0
29/05/2025	19.0	25.6	0
30/05/2025	7.4	23.1	0

4.2 Personnel and Licences

The field survey was completed by zoologists with extensive experience undertaking targeted vertebrate fauna surveys in the Pilbara region, including with the target MNES species (Table 4.2). The survey was conducted under the *Animal Welfare Act 2002*'s Licence to use animals for scientific purposes (Licence No. U244/2022-2024), administered through the Department of Primary Industries and Regional Development (DPIRD). This is enabled through Biologic's chosen Animal Ethics Committee (AEC), Murdoch University, under permit RW3354/21. DBCA Regulation 27 "Fauna Taking (Biological Assessment) Licence", issued to Chris Knuckey (licence number BA27001317). Under Section 40 of the BC Act, threatened species sampling was completed under a DBCA "Authorisation to Take or Disturbed Threatened Species" issued to Chris Knuckey (authorisation number TFA 2425-0264).

Table 4.2: Survey personnel and experience

Name	Qualification	Experience
Tom Rasmussen	-	19 years Environmental Impact Assessment (EIA) (consulting) 19 years field survey 19 years vertebrate zoology/ ecology
Aidan Williams	BSc Botany and Conservation Biology	10 years EIA (consulting) 10 years field survey 8 years vertebrate zoology/ ecology
Jari Cornelis	MSc Philosophy BSc Zoology and Ecology	8 years EIA (consulting) 7 years field survey 8 years vertebrate zoology/ ecology
Sam Edwards	BSc Environmental Science and Management. Cert III Conservation and Land Management	4 years EIA (consulting) 6 years field survey 4 years vertebrate zoology/ ecology
Damon Guerinoni	-	3 years EIA (consulting) 2 years field survey 1 year vertebrate zoology/ ecology
Madison Griffiths	BSc Agricultural Science	1 year EIA (consulting) 3 years field survey 1 year vertebrate zoology/ ecology

4.3 Habitat Assessments and Mapping

Eighty-five habitat assessments were undertaken within the Study Area to define and delineate broad fauna habitats present and their suitability to species of significance (Figure 4.2). Habitat assessments were undertaken at all sampling locations and opportunistically where changes and/or variation in habitats occurred to ensure representative coverage of the whole Study Area. The assessments were conducted using methodology and

terminology prescribed by BHP WAIO (2023b). The characteristics recorded during the habitat assessments included:

- site information: location and photo, habitat, broad habitat type, landform, aspect, slope, soil type and availability, rocky outcropping presence and type;
- ground cover: rocky size, vegetation litter and woody debris;
- vegetation: broad vegetation type, structure and dominate species;
- microhabitat: rocky cracks/ crevices, burrowing suitability, hollow presence and abundance, water presence; and
- condition: time since last fire, disturbance, and overall habitat condition.

4.3.1 Cave Assessments

Targeted searches for caves focused on areas of habitat most suitable for cave formation (i.e. Gorge/ Gully). Information recorded during each cave assessment was consistent with those attributes required by BHP WAIO (2023b) and included:

- entrance location and photograph;
- entrance shape, dimensions, position in the landscape, aspect and level of sun exposure;
- presence of water either within the cave or near its entrance; and
- presence or signs of bat use (such as remains, scats and feeding signs).

Cave entry was not permitted during this survey and as such, no information regarding the internal characteristics of the cave or signs of bat use within each cave could be recorded. Subsequently, no categorisation was assigned to any caves found during targeted searches due to insufficient data.

4.3.2 Water Feature Assessment

Water feature assessments were conducted for any water features that were found within the Study Area. The assessments aimed to define and characterise the water features and identify their likelihood of supporting significant fauna species (i.e. critical habitat for Pilbara olive python or water sources for Pilbara leaf-nosed bat). Water feature assessments were conducted and attributes assessed using attribute terminology prescribed by BHP WAIO (2023b). The characteristics recorded during the habitat assessments were:

- site information: photo and location;
- dimensions: length, width and depth;
- water presence: above the surface, in the intermediate zone; and
- vegetation: obligate phreatophytes, emergent macrophytes.

Naturally occurring water features were assessed, and their persistence classified into three categories, comprising:

- permanent/ persistent – fed by ground water and/or surface drainage, persisting year-round;
- semi-persistent – fed by rainfall/ surface drainage following rainfall, persisting for long periods (i.e. several months, 2 –9 months) after rainfall; or
- ephemeral – fed by rainfall/ surface drainage following rainfall, persisting for short periods (i.e. weeks or less than three months) after rainfall.

The assessment of persistence was made at time of survey and is not based on long-term data, as such there is uncertainty in the categorisation of some water features as semi-persistent or ephemeral. Artificial water features were also recorded when present.

4.4 Targeted Searching and Sampling

Targeted searches were undertaken within areas considered to provide suitable habitat for significant fauna species (Figure 4.2). Sampling methods undertaken during the survey were specific to each targeted species and comprised of:

- targeted searches and/ or transect (including cave searches) for all significant fauna species recognised from desktop assessments, with a focus on the target MNES species (i.e. grey falcon and southern whiteface);
- nocturnal searches for Pilbara olive python;
- camera trap transects for northern quoll;
- bird census for significant bird species (i.e. southern whiteface)
- eDNA sampling for Pilbara olive python;
- ultrasonic recorders targeting Pilbara leaf-nosed bat and ghost bat; and
- acoustic recorders targeting night parrot and other significant birds (i.e. southern whiteface).

Detailed information on species-specific methods is provided in Section 6.

4.5 Opportunistic Fauna Records

Opportunistic fauna observations within the Study Area from primary (i.e. direct observation of species) or secondary (e.g. burrows, scratchings, diggings and scats) evidence were documented for all significant fauna species, rare species, other significant species or other fauna of interest.

4.6 Likelihood of Significant Species Occurrence

Significant fauna species identified by the desktop assessment were reassessed post survey for their likelihood of occurring within the Study Area using a decision matrix which

considers current survey records/ observations, the presence and suitability of habitat within the Study Area and the proximity of previous records (Table 4.3). Based on this decision matrix, each species was assigned to one of six categories of likelihood: Confirmed, Highly Likely, Likely, Possible, Unlikely and Highly Unlikely.

The decision matrix is intended to be an indicative guide only, and the way in which it is interpreted may vary between species, depending on a given species' habitat preferences and ability to disperse, as well as the reliability and availability of contextual information. For example, considering species which have been previously recorded close to the Study Area, a species with a limited dispersal capability will have reduced likelihood of occurring in the Study Area compared with a species with greater dispersal capability. It is also recognised that a lack of records in the vicinity of a Study Area may indicate limited sampling effort rather than species' absence, and that previous records may include historic or presumed erroneous information which may misrepresent a species' current distribution. Where the determination of a species' likelihood of occurrence within the Study Area deviates from the decision matrix, detailed justification for any variation is presented.

Table 4.3: Species likelihood of occurrence decision matrix

		Habitat Suitability of Study Area			
		Breeding habitat present	Foraging and dispersal habitat present	Marginally suitable habitat present	No suitable habitat present
Species Records¹	Recorded in Study Area	Confirmed	Confirmed	Confirmed	Confirmed
	Recorded within 10 km of Study Area	Highly Likely	Likely	Possible	Possible
	Recorded within 10-50 km of Study Area	Likely	Possible	Possible	Unlikely
	Recorded within 50-100 km of Study Area	Possible	Possible	Unlikely	Unlikely
	Recorded >100 km of Study Area	Possible	Unlikely	Unlikely	Highly Unlikely
	Species considered locally/regionally extinct	Unlikely	Unlikely	Highly Unlikely	Highly Unlikely

¹ Only records within the previous 50 years are considered.

4.7 Assessment of Significance

4.7.1 Fauna Habitats

For MNES species, habitats were categorised as either providing critical (foraging, breeding or roosting) habitat or supporting (foraging, roosting or dispersal) habitat, as per the DoE (2013b) and BHP WAIO (2023b) definitions. For non-MNES species, habitats were classified as

important (foraging, breeding or roosting) habitat for the species or supporting (foraging, breeding, roosting or dispersal) habitat. The presence or absence of habitat features, suitable connecting habitat (e.g. movement corridors), the influence of other habitats (i.e. caves, water features) occurring within and adjacent to the Study Area and species records were also considered.

4.7.2 Significances of Species Occurrence

For the target MNES species, an assessment was made on the significance of their occurrence based on the most relevant and prescriptive guidance documents relative to each species.

For northern quoll the significance of occurrence was based on definitions of the DoE (2016), specifically whether individuals present in the Study Area formed part of or contributed to “populations important for the long-term survival of the northern quoll”. These are populations that are (DoE, 2016):

- high density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present;
- occurring in habitat that is free of cane toads and unlikely to support cane toads upon arrival i.e. granite habitats in WA, populations surrounded by desert and without permanent water; and/ or
- subject to ongoing conservation or research actions i.e. populations being monitored by government agencies or universities or subject to reintroductions or translocation.

For the Pilbara leaf-nosed bat and ghost bat, the entire Pilbara is suggested to represent an ‘important population’ (Bat Call, 2021a, 2021b; TSSC, 2016b). Thus, the significance of occurrence was based on the presence of critical roosting habitat.

For the night parrot, the significance of occurrence was based on definitions by the DoE (2013a), specifically the presence of a ‘population’. A ‘population of a species’ is defined under the EPBC Act as an occurrence of the species in a particular area, including, but are not limited to:

- a geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

For the greater bilby, southern whiteface, grey falcon and Pilbara olive python (species listed as Vulnerable under the EPBC Act but with no specific criteria to assess significance of occurrence), the significance of occurrence was based on criteria defined by DoE (2013a), specifically whether their occurrence in the Study Area represented an ‘important population’. An ‘important population’ is a population that is necessary for a species’ long-

term survival and recovery; this may include populations identified as such in recovery plans, and/or that are (DoE, 2013a):

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

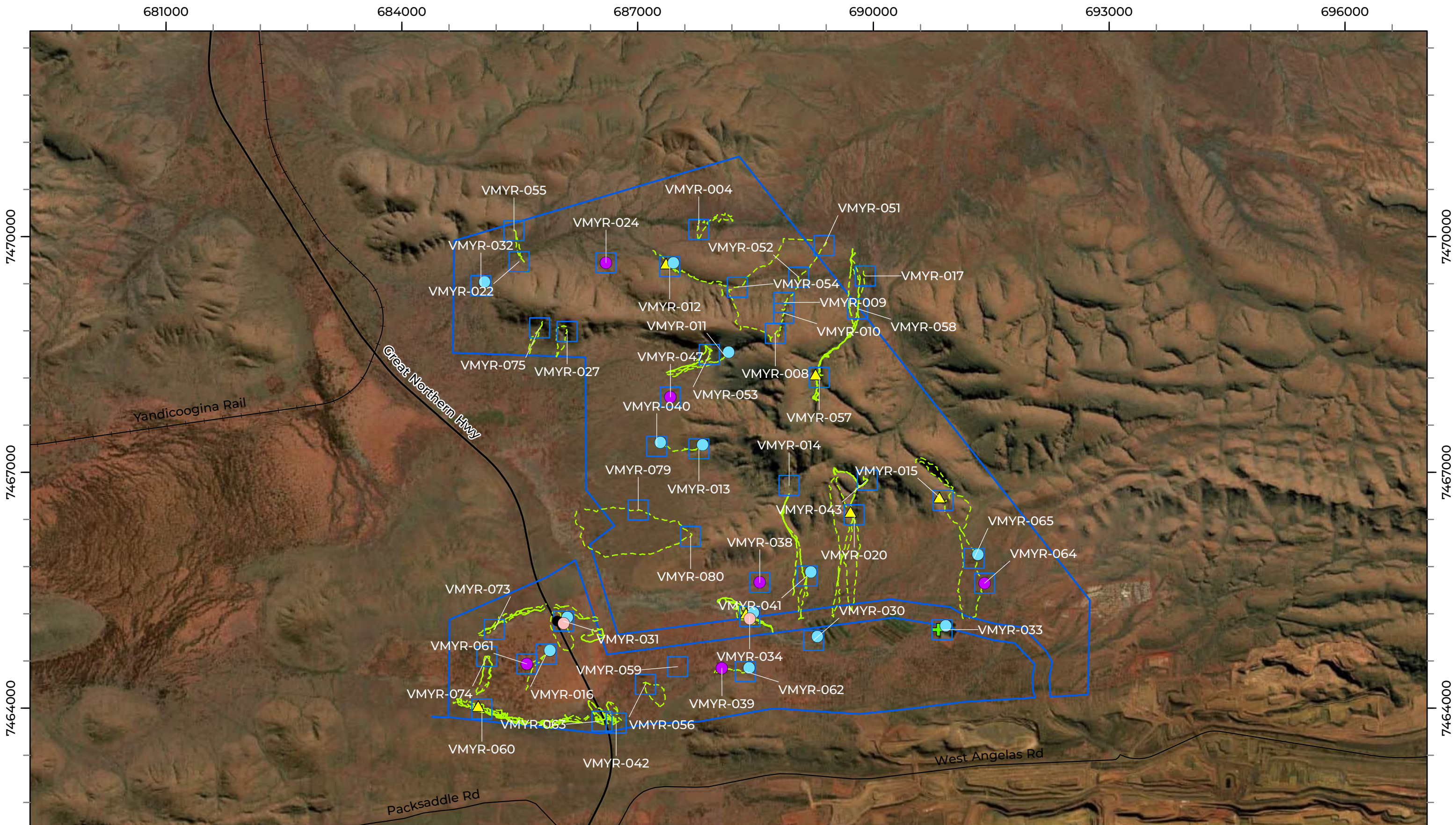
4.8 Constraints and Limitations

The (EPA, 2020) outlines several potential limitations to vertebrate fauna surveys. These aspects are assessed and discussed in Table 4.4. No major limitations or constraints were identified for the survey.

Table 4.4: Survey constraints and limitations

Potential limitation or constraint	Constraint	Applicability to this survey
Sources/availability of data and information (recent or historic) and availability of contextual information	No	A significant amount of survey work has been undertaken within the Study Area and in the surrounding region (e.g. MAC and South Flank), which provided context for the current surveys. All these known previous survey results were available for review. A total of 104 literature sources were reviewed, seven of which overlap with a portion of the Study Area.
Competency/experience of the survey team	No	The field personnel involved in the survey are experienced in undertaking fauna surveys of similar nature, including with the significant species targeted during the survey. Technical personnel with relevant expertise assisted with analysis of ultrasonic recordings (Bob Bullen) and acoustic recordings (Louis Maserai).
Scope (faunal groups sampled and whether any constraints affect this)	No	The scope was a targeted fauna survey and was conducted within that framework (EPA, 2020). Sampling for target species was undertaken in accordance with relevant guidelines and recommendations.
Timing, weather, and season	No	The targeted survey occurred following the Pilbara wet season which is considered an optimal period for sampling the target MNES species and other significant fauna species. Conditions were considered suitable for the scope of the survey.
Disturbances (e.g. fire or flood)	No	No disturbances were observed during the survey periods that may have impacted the outcomes of the survey.
Proportion of fauna identified	No	All fauna observed during the field surveys were identified to species level. Species identification of fauna recorded via camera traps, ultrasonic recorders and acoustic recordings were able to be accurately identified with the assistance of technical personnel with relevant expertise.
Adequacy of the survey intensity and proportion of the survey achieved	No	A targeted survey was undertaken across the Study Area to assist with decisions on future environmental approvals. The sampling methods and survey intensity was high and focussed on the species of interest.

Potential limitation or constraint	Constraint	Applicability to this survey
Remoteness or access issues	Minor	The majority of the Study Area was accessible either by vehicle or on foot; however, some areas in the NW of the Study Area (approximately 312ha, or 5.9% of the total study area) were restricted in sampling effort due to access constraints. As a result of this restriction, no sampling equipment was deployed in the area. Only targeted searches, eDNA sampling and habitat assessments were undertaken. Cave access restrictions also prevented the team from fully assessing and categorising the caves recorded within the Study Area. SM4s were not placed at the entrance to these caves at the time, as they were already deployed at other locations within the Study Area.
Problems with data and analysis, including sampling bias	No	No limitations with data collection and/or analysis were encountered during the field survey or during subsequent analysis.



LEGEND

Study Area

- Runaway Valley North
- Local Road
- State Road
- Rail

Site Type

- Acoustic recorder
- Avifauna census
- Camera trap
- Habitat assessment
- Nocturnal search
- Ultrasonic recorder
- eDNA sampling
- Targeted Search



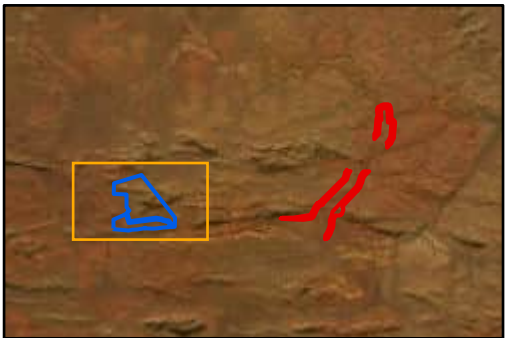
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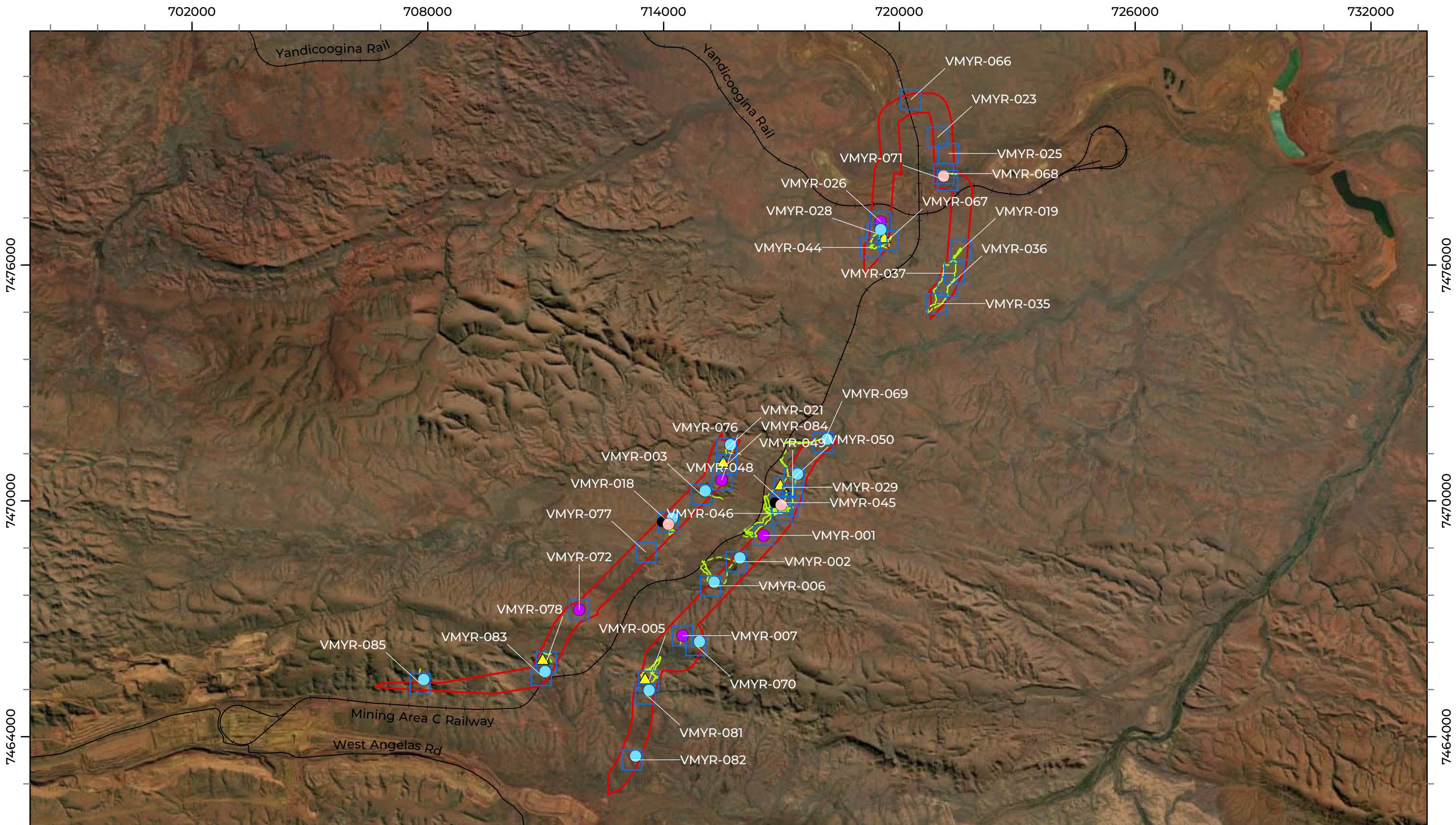
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Transverse Mercator Created: 24/09/2025



BHP WAI0
MAC to Yandi Corridor & Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 4.2a: Sample sites and traverses in the Study Area



LEGEND

Study Area

- MAC to Yandi Corridor
- Local Road
- Rail

Site Type

- Acoustic recorder
- Avifauna census
- Camera trap
- Habitat assessment

- Nocturnal search
- Ultrasonic recorder
- eDNA sampling
- Targeted Search



Biologic



Scale 1:90,000

0 1 2 3 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 4.2b: Sample sites and
traverses in the Study Area**

5 Habitats

5.1 Fauna Habitats of the Study Area

Twelve broad fauna habitat types were recorded and mapped across the Study Area, comprising in decreasing extent of occurrence:

- Stony Plain (28.59%, 1,508.65 ha);
- Hillcrest / Hillslope (25.57%, 1,349.70 ha);
- Undulating Low Hills (24.26 %, 1,280.06 ha);
- Gorge / Gully (5.67%, 299.40 ha);
- Drainage Area / Floodplain (5.14%, 271.09 ha);
- Hardpan Plain (2.76%, 145.72 ha);
- Minor Drainage Line (2.66%, 140.42 ha);
- Major Drainage Line (1.29%, 68.06 ha);
- Sand Plain (0.96%, 50.66 ha);
- Breakaway / Cliff (0.77%, 40.63 ha);
- Medium Drainage Line (0.40%, 21.12 ha);
- Artificial Wetlands (0.09%, 4.65 ha).

The remaining areas within the Study Area comprised Cleared/ Disturbed areas (97.26 ha, 1.84%). The condition of habitats within the Study Area was largely rated as 'Excellent' or 'Good'. The greatest disturbance was caused by access tracks/ exploration activity, invasive weeds, frequent fires and grazing by cattle (*Bos taurus*). Descriptions of the distinguishing characteristics and the occurrence within the Study Area for each of these habitat types are presented in Table 5.1, and the data from the habitat assessments are presented in Appendix C.

A total of ten habitats (Stony Plains, Major Drainage Line, Undulating Low Hills, Drainage Area/ Floodplain, Sand Plain, Hardpan Plain, Minor Drainage Line, Breakaway/ Cliff, Gorge/ Gully and Medium Drainage Line) within the Study Area provide critical habitat for various significant species (Table 5.1). Breakaway/ Cliff and Gorge/ Gully provide potential critical breeding (Pilbara olive python), denning (northern quoll), foraging and dispersal habitat (Pilbara olive python and northern quoll), particularly in areas with caves and overhangs and where pooling water remains for prolonged periods following rainfall events. Major Drainage Line, Medium Drainage Line and Drainage Area/ Floodplain habitats provide critical habitat breeding/nesting for southern whiteface and/ or grey falcon (Table 5.1). For ghost bats critical foraging and/ or dispersal habitat is provided by Stony Plain, Undulating Low Hills, Drainage Area/ Floodplain, Sand Plain, Hardpan Plain, Major Drainage Line, Minor Drainage Line and

Medium Drainage Line habitat that are within the 12 km buffer of significant roosts located outside the Study Area (Table 5.1).

Although critical and/or supporting habitat for numerous significant species was identified within the Study Area, the occurrence of suitable habitat does not necessarily indicate species presence. Many of the fauna habitats mapped that provide supporting habitat are broadly distributed and well-presented across the Pilbara bioregion and surrounding regions and therefore support fauna assemblages which are generally common and widespread.

More detailed discussions on the habitats and their usage by the target MNES significant species are discussed in Section 6.

Table 5.1: Broad fauna habitats occurring within the Study Area

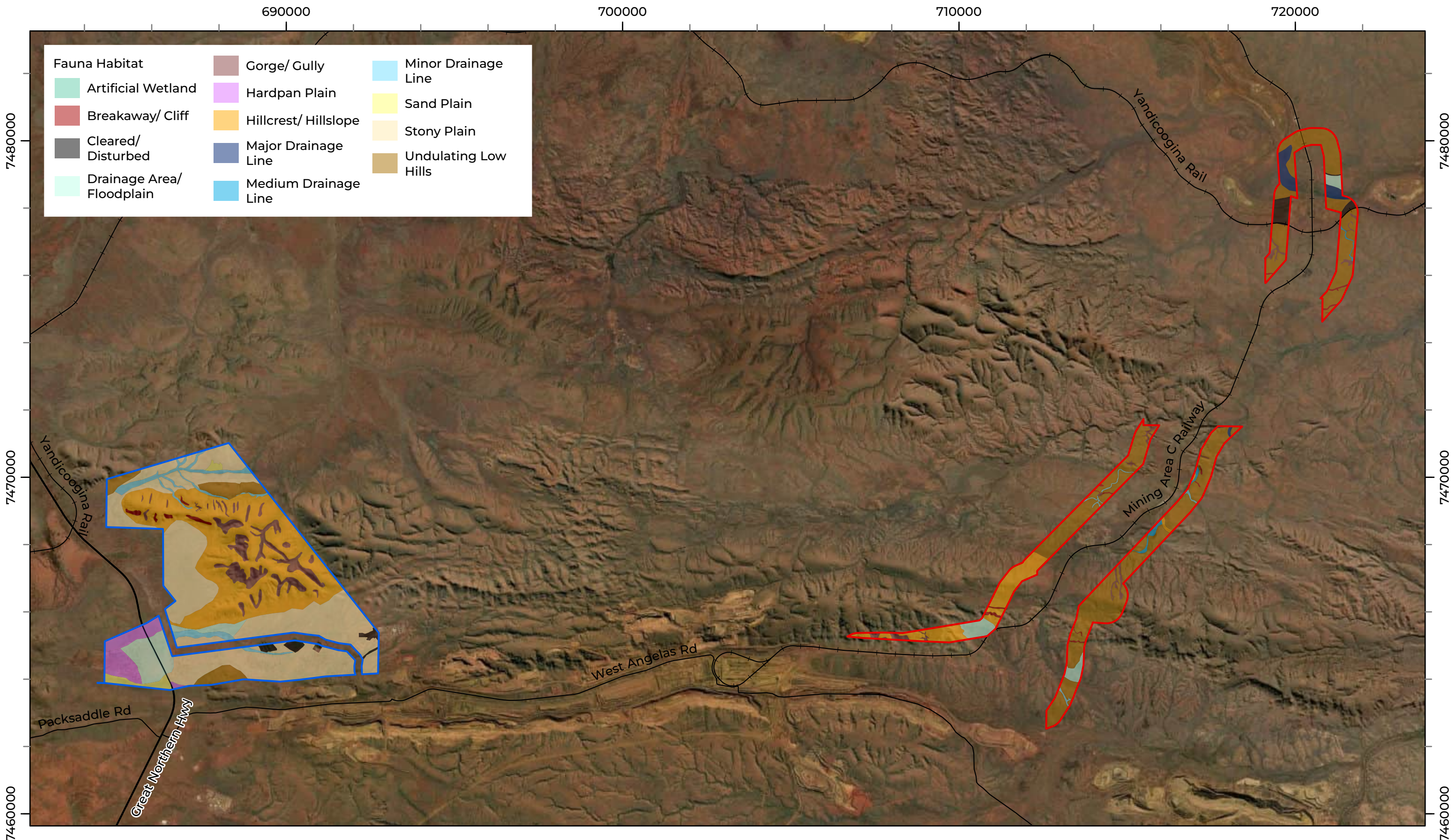
Habitat	Distinguishing habitat characteristics	Habitat for significant species	Photo
Stony Plain 1,508.65 ha 28.59%	Comprise low-lying open plains and the rolling hills below upland areas, with very slight to no gradient. The substrate consists of gravel and pebbles, with vegetation dominated by <i>Triodia</i>, although scattered trees also occur. Vegetation within this habitat varied in composition but was generally dominated by scattered Mulga and <i>Acacia</i> forming an over-storey, with patches of various small to medium shrub species. Scattered <i>Corymbia</i> and <i>Eucalyptus</i> are usually present.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR =2) night parrot – foraging, where <i>Triodia</i> is suitably sized southern whiteface – foraging and dispersal Important habitat for: western pebble-mound mouse - breeding, foraging and dispersal brush-tailed mulgara - breeding, foraging and dispersal Pilbara barking gecko - breeding, foraging and dispersal fork-tailed swift - foraging and dispersal northern short-tailed mouse - foraging and dispersal spotted ctenotus - breeding, foraging and dispersal	
Hillcrest/ Hillslope 1,349.70 ha 25.57%	Comprised a rocky substrate, often with exposed bedrock, on moderate to steep slopes leading into lower footslopes. This habitat was characterised by steep slopes with a high proportion of coarse fragments dominated by ironstone. These can contain cracks and crevices. Instances of Gorge/ Gully is contained within this habitat. This habitat is usually dominated by open <i>Eucalyptus</i> woodlands, <i>Acacia</i> and <i>Grevillea</i> scrublands and <i>Triodia</i> low hummock grasslands.	Supporting habitat for: ghost bat – All three caves recorded during this survey (CMAC-019, CMAC-020 and CMAC-021) occur within this habitat but the broader habitat itself is not considered supporting habitat northern quoll – foraging and dispersal habitat where proximal to breeding habitat Pilbara leaf-nosed bat – foraging and dispersal (HR=2) Pilbara olive python – foraging and dispersal Important habitat for: western pebble-mound mouse - breeding, foraging and dispersal Pilbara barking gecko - breeding, foraging and dispersal Gane's blind snake - breeding, foraging and dispersal peregrine falcon – foraging and dispersal spotted ctenotus - breeding, foraging and dispersal fork-tailed swift - foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Habitat for significant species	Photo
Undulating Low Hills 1,280.06 ha 24.26%	The Undulating Low Hills habitat comprises low hills and undulating stony plains of higher elevation than Stony Plain. The habitat supports hard spinifex with a mantle of gravel and larger rocks with occasional outcropping or minor breakaway. Vegetation is dominated by hard <i>Triodia</i> hummock grasslands with scattered <i>Eucalyptus</i> trees and <i>Acacia</i>, <i>Eremophila</i> and/or <i>Grevillea</i> shrubs.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=2) greater bilby - foraging and dispersal Important habitat for: western pebble-mound mouse – breeding, foraging and dispersal spotted ctenotus – breeding, foraging and dispersal fork-tailed swift - foraging and dispersal brush-tailed mulgara – breeding, foraging and dispersal Pilbara barking gecko - breeding, foraging and dispersal	
Gorge/ Gully 299.40 ha 5.67%	Characterised by rugged, steep-sided valleys incised into the surrounding landscape. Gorges tend to be deeply incised, with vertical cliff faces, while gullies are more open (but not as open as Minor Drainage Lines). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.	Critical habitat for: northern quoll – breeding, denning, foraging and dispersal Pilbara olive python – breeding, foraging and dispersal Supporting habitat for: ghost bat - foraging and dispersal Pilbara leaf-nosed bat – foraging and dispersal; supporting roosting habitat (HR=3) Important habitat for: peregrine falcon – marginal nesting, foraging Gane's blind snake - breeding, foraging and dispersal Pilbara barking gecko - breeding, foraging and dispersal fork-tailed swift - foraging and dispersal	
Drainage Area/ Floodplain 271.09 ha 5.14%	Lower lying plain often subjected to sheet flow following large rainfall events. Vegetation and substrates of this habitat was variable, often comprising scattered <i>Eucalyptus</i> over <i>Acacia</i> and/or <i>Grevillea</i> shrubs with an understory dominated by <i>Triodia</i> hummock grasses and/or mixed tussock grasses on alluvial substrates, often comprising heavy clays and gravel. Tussock grasses can be dominant within Drainage Area/ Floodplain habitat as a result of high rainfall events.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) southern whiteface – nesting/breeding, foraging and dispersal Supporting habitat for: northern quoll – foraging and dispersal Pilbara leaf-nosed bat – foraging and dispersal (HR=2) greater bilby - foraging and dispersal grey falcon – foraging and dispersal where proximal to breeding habitat Pilbara olive python – foraging and dispersal Important habitat for: brush-tailed mulgara – breeding, foraging and dispersal fork-tailed swift - foraging and dispersal northern short-tailed mouse - foraging and dispersal migratory bird species – foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Habitat for significant species	Photo
Hardpan Plain 145.72 ha 2.76%	Lower lying plain often sparsely vegetated with open or sparsely scattered Mulga over a sparse understory on heavy clay substrates with a stony or gravelly surface. Large areas often void of vegetation.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=2) southern whiteface – foraging and dispersal Important habitat for: fork-tailed swift - foraging and dispersal northern short-tailed mouse - foraging and dispersal	
Minor Drainage Line 140.42 ha 2.66%	Usually lacks a tall dense upper storey, but with a dense mid storey, including sparse <i>Eucalyptus</i> sp. and <i>Acacia</i> sp. over tussock grasses and <i>Triodia</i> sp. hummock grasses.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=2) northern quoll – foraging and dispersal where proximal to breeding habitat Pilbara olive python – foraging and dispersal where proximal to breeding habitat grey falcon – foraging and dispersal where proximal to breeding habitat southern whiteface – breeding, foraging and dispersal greater bilby - foraging and dispersal Important habitat for: Gane's blind snake - breeding, foraging and dispersal fork-tailed swift - foraging and dispersal migratory bird species – foraging and dispersal	
Major Drainage Line 68.06 ha 1.29%	Comprises scattered <i>Eucalyptus</i> and <i>Acacia</i>, or mulga woodland, with an understory dominated by tussock grasses. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. Vegetation condition often subject to heavy cattle grazing. This habitat type is prone to pooling and ponding in areas.	Critical habitat for: northern quoll – denning, foraging and dispersal ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Pilbara olive python – breeding, foraging, dispersal grey falcon – breeding, foraging and dispersal southern whiteface – nesting/ breeding, foraging and dispersal Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=3) greater bilby - foraging and dispersal Important habitat for: peregrine falcon – foraging Gane's blind snake – foraging and dispersal (when adjacent to rocky habitats) fork-tailed swift - foraging and dispersal migratory bird species – foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Habitat for significant species	Photo
Sand Plain 50.66 ha 0.96%	Low-lying or elevated sandy areas with accumulated loose sandy substrates. Often supporting an open vegetation cover, dominated by <i>Acacia</i> shrubs over <i>Triodia</i> hummock grasses of various life stages.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=2) southern whiteface – nesting/ breeding, foraging and dispersal greater bilby - foraging and dispersal Important habitat for: brush-tailed mulgara – breeding, foraging and dispersal fork-tailed swift - foraging and dispersal northern short-tailed mouse - foraging and dispersal	
Breakaway/ Cliff 40.63 ha 0.77%	Comprised a single sided rock face, within the steep mid-upper slope comprising bare rock outcrops or cliffs. Does not comprise the entire slope.	Critical habitat for: northern quoll – breeding, denning, foraging and dispersal Pilbara olive python – breeding, foraging and dispersal Supporting habitat for: ghost bat – dispersal Pilbara leaf-nosed bat – foraging and dispersal (HR=4) Important habitat for: peregrine falcon – marginal nesting and foraging Gane's blind snake - breeding, foraging and dispersal fork-tailed swift - foraging and dispersal	
Medium Drainage Line 21.12 ha 0.40%	Comprised scattered <i>Eucalyptus</i> and <i>Acacia</i> , or mulga woodland, with an understory dominated by tussock grasses. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. Vegetation condition often subject to heavy cattle grazing. This habitat type is prone to pooling and ponding in areas.	Critical habitat for: ghost bat – foraging and dispersal where proximal (~12 km) to significant roosts (located outside the Study Area) grey falcon – breeding, foraging and dispersal southern whiteface – nesting/breeding, foraging and dispersal Supporting habitat for: Pilbara leaf-nosed bat – foraging and dispersal (HR=2) northern quoll – breeding, denning, foraging and dispersal Pilbara olive python – breeding, foraging and dispersal greater bilby - foraging and dispersal Important habitat for: peregrine falcon – marginal nesting, foraging Gane's blind snake – breeding, foraging and dispersal fork-tailed swift - foraging and dispersal migratory bird species – foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Habitat for significant species	Photo
Cleared/ Disturbed 97.26 ha 1.84%	Cleared/ Disturbed areas include areas where the natural vegetation and microhabitats have been disrupted, usually devoid of native vegetation. This includes tracks, laydown areas, camps, major roads/ highways and historic, large-scale clearing.	N/A	
Artificial Wetlands 4.65 ha 0.09%	An artificial wetland with permanent/persistent water source all year round.	Supporting habitat for: • northern quoll – foraging and dispersal • ghost bat – foraging and dispersal • Pilbara leaf-nosed bat – foraging and dispersal (HR=4) • grey falcon – foraging and dispersal • Pilbara olive python – breeding, foraging and dispersal Important habitat for: • peregrine falcon – foraging • fork-tailed swift - foraging and dispersal • migratory bird species – foraging and dispersal	



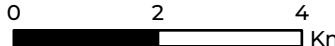
- | Fauna Habitat | | |
|---------------------------|----------------------|----------------------|
| Artificial Wetland | Gorge/ Gully | Minor Drainage Line |
| Breakaway/ Cliff | Hardpan Plain | Sand Plain |
| Cleared/ Disturbed | Hillcrest/ Hillslope | Stony Plain |
| Drainage Area/ Floodplain | Major Drainage Line | Undulating Low Hills |
| | Medium Drainage Line | |

- LEGEND**
- Study Area
- MAC to Yandi Corridor
 - Runaway Valley North
 - Local Road
 - State Road
 - Rail

**Biologic**

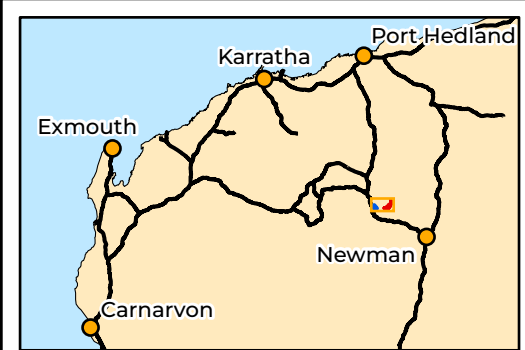


Scale 1:105,000



0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 5.1: Fauna habitats in the Study Area

5.2 Habitat Features of the Study Area

5.2.1 Caves

Three new caves were recorded in the Study Area (Table 5.2), all within Gorge/ Gully habitat. Due to cave entry restrictions, insufficient data was collected to categorise these caves for potential ghost bat or Pilbara leaf-nosed bat usage. One cave (AC-09) has been previously recorded within the study area and is monitored as part of the South Flank ghost bat monitoring program (Biologic, 2025). The cave characteristics recorded at each cave are provided in Appendix F.

Table 5.2: Summary of caves recorded in the Study Area

Cave ID	Coordinates		Habitat	Ghost Bat Significance	Pilbara Leaf-nosed Bat Significance	Ghost Bat Presence
	Latitude	Longitude				
CMAC-019	-22.8799	118.8313	Hillcrest/Hillslope	Unclassified	Unclassified	n/a
CMAC-020	-22.8748	118.8410	Hillcrest/Hillslope	Unclassified	Unclassified	n/a
CMAC-021	-22.8920	118.8304	Hillcrest/Hillslope	Unclassified	Unclassified	n/a
AC-09	-22.9068	119.0271	Hillcrest/Hillslope	HV*	Unclassified	n/a

*HV = "High Value"

5.2.2 Water Features

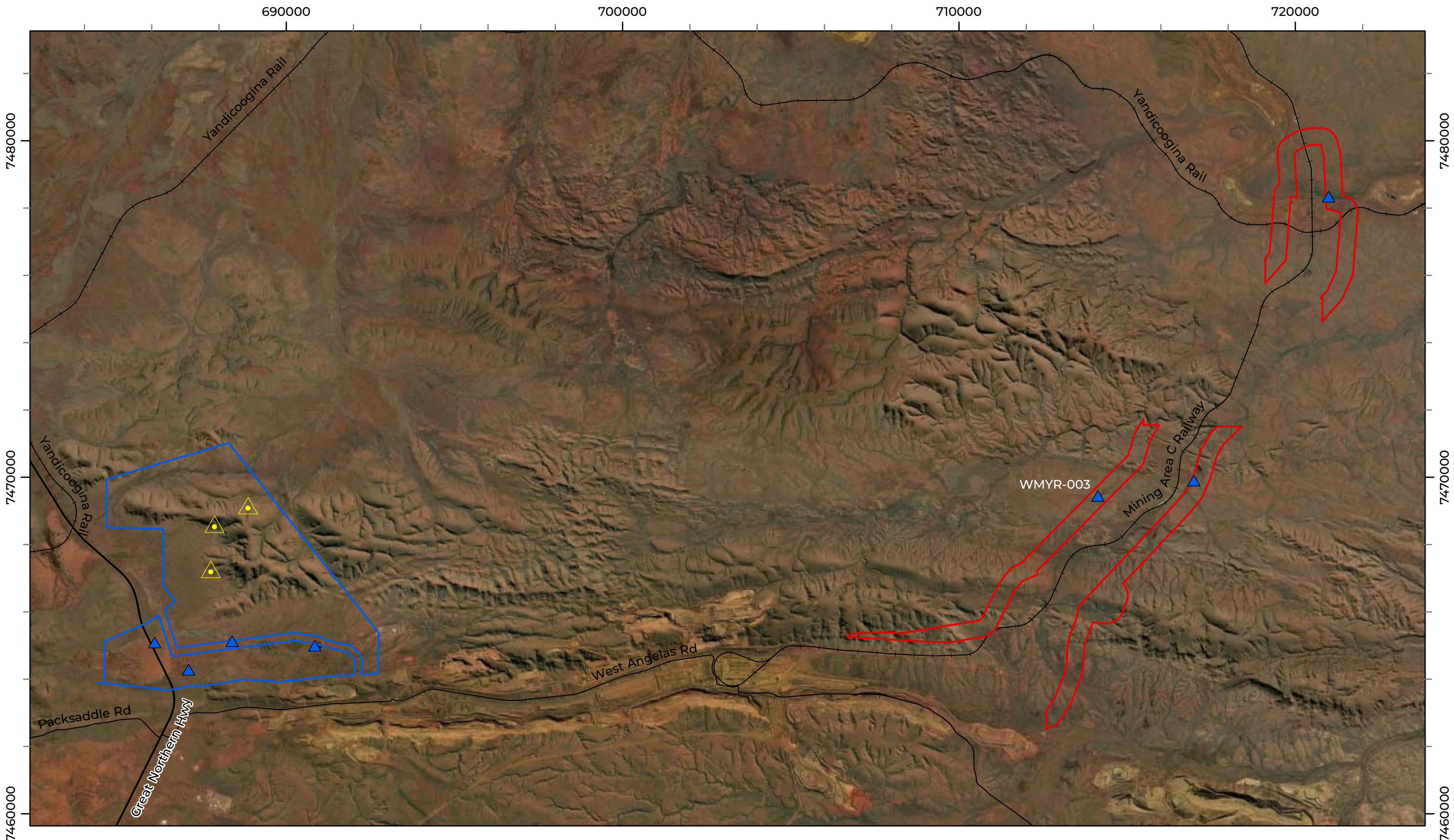
Seven water features were recorded in the Study Area (Table 5.3; Appendix E); two within Gorge/ Gully habitat, one within Medium Drainage Line habitat, one within Minor Drainage Line habitat, one within Drainage Area/ Floodplain habitat, one within Stony Plain habitat (an artificial dam), and one Artificial Wetland habitat (WMYR-001) (Table 5.3; Figure 5.2). Of the naturally occurring water sources, two were classified as ephemeral (WMYR-002 and WMYR-005), two were classified as semi-persistent (WMYR-003 and WMYR-006), and two were classified as persistent (WMYR-004 and WMYR-007). However, it should be noted that both WMYR-002 and WMYR-004 are fed from an artificial source.

All water features known from within the Study Area are considered to provide supporting foraging habitat for the northern quoll, Pilbara leaf-nosed bat, and Pilbara olive python. For northern quolls, they often represent areas of high productivity, and therefore may contain a relatively high abundance of feeding resources (Braithwaite & Griffiths, 1994; Oakwood, 2000), particularly when occurring within rocky habitats, and to a lesser degree, drainage lines. For Pilbara leaf-nosed bats permanent/ persistent water features can provide significant drinking and foraging sources, and are a key component to 'Gorges with Pools' being recognised as the priority foraging habitat for the species (TSSC, 2016b). Ephemeral and semi-persistent water features when available can provide supporting drinking and

foraging sources for Pilbara leaf-nosed bats. For Pilbara olive pythons, these water features can often act as primary foraging locations and for that reason the species is more associated with such features, particularly within rocky habitats, but also, to a lesser extent within drainage line habitats (Pearson, 1993). This occurrence is likely to be seasonal and irregular, dependent on the permanency of the water feature.

Table 5.3: Summary of water features recorded in the Study Area

Water Feature ID	Description	Coordinates		Habitat	Water Feature Category
		Latitude	Longitude		
WMYR-001	Artificial Ponds	-22.9120	118.8608	Artificial Wetlands	Persistent
WMYR-002	Floodplain	-22.9116	118.8144	Drainage Area/ Floodplain	Ephemeral (fed from artificial source)
WMYR-003	Waterhole	-22.8689	119.0871	Gorge/ Gully	Semi-persistent
WMYR-004	River Pool	-22.9110	118.8369	Minor Drainage Line	Persistent (artificially fed from same water source as WMYR-002)
WMYR-005	Artificial Dam	-22.919	118.8244	Stony Plain	Ephemeral
WMYR-006	River Pool	-22.8645	119.1148	Gorge/ Gully	Semi-persistent
WMYR-007	River Pool	-22.788	119.1526	Medium Drainage Line	Persistent



LEGEND

Study Area	—+— Rail	△ Cave
MAC to Yandi Corridor		▲ Water Feature
Runaway Valley North		
Local Road		
State Road		

**Biologic**

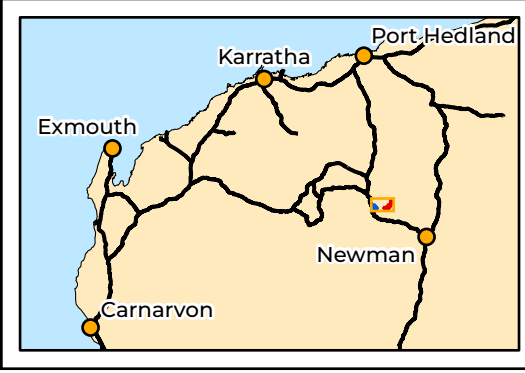


Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator

Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 5.2: Fauna habitat features in the Study Area

6 Likelihood of Occurrence

Desktop assessments identified 27 potentially occurring significant species, of which two have previously been recorded within the Study Area: ghost bat and Pilbara olive python (Table 6.1). During the survey, four significant fauna species were recorded: ghost bat, peregrine falcon, western pebble-mound mouse and brush-tailed mulgara (Table 6.1).

Two species are considered 'Highly Likely' to occur within the Study Area (northern quoll and Pilbara barking gecko), four species are considered 'Likely' to occur (Gane's blind snake, fork-tailed swift, grey falcon and Pilbara leaf-nosed bat), and eight are considered 'Possible' (common sandpiper, southern whiteface, red-necked stint, oriental plover, northern short-tailed mouse, common greenshank, spotted ctenotus and wood sandpiper) (Table 6.1). The remaining thirteen species are considered 'Unlikely' or 'Highly Unlikely' to occur primarily due to the absence of any critical and/or supporting habitats likely to be used by the species (Table 6.1).

Table 6.1: Significant species likelihood of occurrence assessment

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
MAMMALS																							
DASYURIDAE																							
brush-tailed mulgara (<i>Dasyercus blythi</i>)			P4		Can occur in a range of habitats across the Australian arid zone, often dominated by spinifex <i>Triodia</i> spp. grasslands on sandy or stony plains where suitable burrowing substrate is present (Pavey <i>et al.</i> , 2012; Woolley, 2006). Mature spinifex hummocks appear to be important for protection from introduced predators (Körtner <i>et al.</i> , 2007).	Yes	~14.9 km ENE (2014) (DBCA, 2025b) (Biologic, 2013b)			I	I	I								I	Confirmed	Resident	Recorded on 63 occasions during the survey through diggings, active and inactive burrows within the Study Area. Confirmed to occur as a resident in Stony Plain, Sand Plain, Drainage Area/ Floodplain and Undulating Low Hills habitats, particularly where suitable substrates permitting burrow excavation occur.
northern quoll (<i>Dasyurus hallucatus</i>)	EN	EN		EN	The species tends to inhabit rocky habitats which offer protection from predators and are generally more productive in terms of availability of resources (Braithwaite & Griffiths, 1994) (Oakwood, 2000). Other microhabitat features important to the species include rock cover, proximity to permanent water and time-since last fire (Woinarski <i>et al.</i> , 2008).	Yes	0.2 km N (2024) (Astron, 2025)	C	S		S		S	C	S	C	S				Highly Likely	Infrequent visitor, likely dispersing or foraging individuals only	Not recorded within the Study Area during the survey, but has been recorded through eDNA, scats, and camera traps within 50km of the Study Area (closest record 200 m from Study Area via camera trap). Critical denning/ shelter habitat within Study Area includes Gorge/ Gully, Major Drainage Line and Breakaway/ Cliff habitats. Supporting foraging/ dispersal habitat within Study Area includes Medium and Minor Drainage Lines, Hillcrest/ Hillslope, Artificial Wetland and Drainage/ Floodplain habitats.
MEGADERMATIDAE																							
ghost bat (<i>Macroderma gigas</i>)	VU	VU		VU	Ghost bats roost in deep, complex caves beneath bluffs of low, rounded hills, granite rock piles and abandoned mines (Armstrong & Anstee, 2000). These features	Yes	Within (2012) (DBCA, 2025b)	S	C	C	C	C	C	C		S	S	C		C	Confirmed	Resident	One scat and one call recorded during the survey. No critical roosts were identified within the Study Area. The critical foraging habitat is present within the Study Area in Stony Plain,

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
					often occur within habitats including gorge/gully, hill crest/ hill slope and low hills (Armstrong & Anstee, 2000). Forages broadly across habitats, particularly woodland and open woodland habitats, including eucalypt and mulga woodlands (Biologic, 2020; Richards <i>et al.</i> , 2008; Tidemann <i>et al.</i> , 1985; TSSC, 2016a).																		Drainage Area/ Floodplain, Major Drainage Line, Medium Drainage Line, Minor Drainage Line and Undulating Low Hills, within the 12 km critical foraging buffer of significant roosts located outside the Study Area.
MURIDAE																							
northern short-tailed mouse (<i>Leggadina lakedownensis</i>)			P4		The species occupies a diverse range of habitats from the monsoon tropical coast to semiarid climates, including spinifex and tussock grasslands, samphire and sedgelands, <i>Acacia</i> shrublands, tropical eucalypt and <i>Melaleuca</i> woodlands and stony ranges; however, the species is usually found in seasonally inundated habitats on red or white sandy-clay soils (Moro & Kutt, 2008).	Yes	8.9 km W (1997) (DBCA, 2025b)			I	I							I		I	Possible	Resident	Species may occur in Drainage Area/ Floodplain, Hardpan Plain, Stony Plain, and Sand Plains where sandy-clay soils are present; however, the Study Area does not contain cracking clays which is considered critical habitat for the species. Due to the species boom and bust nature, it may occur sporadically in the Study Area during the boom periods, particularly following large rainfall events.
western pebble-mound mouse (<i>Pseudomys chapmani</i>)			P4		This species occurs on the gentler slopes of rocky ranges where the ground is covered with a stony mantle and vegetated by hard spinifex, often with a sparse overstorey of eucalypts and scattered shrubs (Anstee, 1996; Start <i>et al.</i> , 2000).	Yes	0.07 km S (2024) (Astron, 2025)			I		I			I						Confirmed	Resident	Recorded during the current survey on 20 occasions (active, inactive, and recently inactive mounds). Species confirmed to occur as a resident within Stony Plain, Hillcrest/ Hillslope and Undulating Low Hills.
RHINONYCTERIDAE																							

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
Pilbara leaf-nosed bat (<i>Rhinonictis aurantia</i> 'Pilbara form')	VU	VU			Species roosts within caves and abandoned mines with high humidity (95%) and temperature (32°C) (Armstrong, 2001). Species forages in caves and along waterbodies with fringing vegetation (TSSC, 2016b).	Yes	0.8 km W (2013) (BHP WAIO, 2024)	S HR = 3	S HR = 2	S HR = 2	S HR = 2	S HR = 2	S HR = 2	S HR = 3	S HR = 2	S HR = 4	S HR = 4	S HR = 2		S HR = 2	Likely	Infrequent visitor (foraging/ dispersal)	Not recorded within the Study Area during current or previous surveys. No suitable roosting habitat present within the Study Area, and no known critical roosts (Category 1–3) within the Study Area. One known permanently occupied roost located approximately 40 km north of the Study Area. As cave entry was not permitted during the survey, caves were not able to be classified for PLNB suitability. Supporting foraging habitat (HR = 2, HR = 3 and HR = 4) within the Study Area includes all habitats (except Cleared/ Disturbed). Recorded water features will provide supporting habitat for the species.
THYLACOMYIDAE																							
greater bilby (<i>Macrotis lagotis</i>)	VU	VU		VU	Variety of habitats including spinifex hummock grassland and <i>Acacia</i> shrubland, on soft soils (Burrows <i>et al.</i> , 2012). In the Pilbara often associated with major drainage line sandy terraces (How <i>et al.</i> , 1991). Includes residual landforms (e.g. laterite rises), loamy or sandy soils associated with paleodrainage lines and perched drainage lines, sandplains and dunefields, habitat types where shrubs containing root dwelling larvae are common, and recently burnt habitat (within the last 1-3 years) (DBCA, 2017).	Yes	23 km SW (1984) (BHP WAIO, 2024)		S		S	S	S	S						S	Unlikely	N/A	Not recorded within the Study Area. Records within the vicinity of the Study Area are sparse and/or old/ unconfirmed records. Only marginally suitable habitat is present within the Study Area (Sand Plain, Drainage Area/ Floodplain, Undulating Low Hills, Major, Medium and Minor Drainage Lines).

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area												Likelihood of Occurrence	Occurrence	Comments	
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed				Sand Plain
BIRDS																							
ACANTHIZIDAE																							
southern whiteface <i>(Aphelocephala leucopsis)</i>	VU				Occupies a wide range of open woodlands and shrublands with grass and/or shrub dominated understory (DCCEEW, 2023). Vegetation is often dominated by <i>Acacia</i> or <i>Eucalyptus/ Corymbia</i> species on ranges, foothills and lowlands, and plains (DCCEEW, 2023). Forages almost exclusively on the ground, favouring areas with low tree density and herbaceous understory litter cover (DCCEEW, 2023).	Yes	18.83 km SE (2007) (ALA, 2025)		C	S	C		S	C				S		S	Possible	Resident	May occur within Major and Medium Drainage Lines and Drainage Area/ Floodplain habitats where suitable vegetation cover and structure are present, which provide breeding, foraging and dispersal habitat. May also utilise supporting habitats Minor Drainage Line, Hardpan Plain, Sand Plain and Stony Plain if in association with critical habitat.
ACCIPITRIDAE																							
letter-winged kite <i>(Elanus scriptus)</i>			P4	NT	Habitats for this species include grasslands with trees and tree-lined watercourses (Pizzey & Knight, 2007). Infrequently recorded in the Kimberley region. Irruptive species, often expanding and contracting in distribution in response to seasonal rainfall and resource availability (Mitchell <i>et al.</i> , 2019).	Yes	18.6 km SSE (2018) (BHP WAIO, 2024)		I		I		I	I			I				Unlikely	Infrequent visitor (foraging)	May occasionally occur within Drainage Area/ Floodplain, Artificial Wetland, and Major, Medium, and Minor Drainage Line habitats within the Study Area to forage, unlikely to land or nest within Study Area.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
eastern osprey (<i>Pandion haliaetus</i>)	MI	MI			Often occurs along coasts and inshore waters and tidal zones (Menkhorst <i>et al.</i> , 2017). Occasionally occurs further inland, particularly following cyclonic activity along the coast, where it is regularly associated with large permanent or long-standing waterbodies, often occurring along rivers and lakes. Found mainly in sheltered seas around islands, tidal creeks, estuaries and saltwork ponds, also large river pools (Johnstone & Storr, 1998b).	Yes	21.2 km ENE (2011) (BHP WAIO, 2024)		I		I		I	I			I				Unlikely	Infrequent visitor (foraging/ migration only)	Not recorded in the Study Area during the survey. Species may infrequently occur during migration within the Drainage Area/ Floodplain, Artificial Wetland, and Major, Medium, and Minor Drainage Line habitats to forage, however, usually occurs along the coast so would be an irregular visitor inland.
APODIDAE																							
fork-tailed swift (<i>Apus pacificus</i>)	MI	MI			Inhabits dry/open habitats, inclusive of riparian woodlands and tea-tree swamps, low scrub, heathland or saltmarsh, as well as treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes (Johnstone & Storr, 1998a). Aerial species, which forages high above the tree canopy and rarely lower (Johnstone & Storr, 1998b).	Yes	13.4 km E (2014) (DBCA, 2025b)	I	I	I	I	I	I	I	I	I	I	I		I	Likely	Infrequent visitor (foraging/ migration only)	Not recorded within the Study Area during the survey. May occasionally occur within the airspace above the Study Area to forage in all habitats, unlikely to land or nest within Study Area.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
CHARADRIIDAE																							
oriental plover (<i>Charadrius veredus</i>)	MI	MI			Variety of habitats, including coastal habitats, such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches as well as open inland environments such as, semi-arid or arid grasslands, where the grass is short and sparse (Johnstone & Storr, 2004).	Yes	14.5 km SSW (2019) (DBCA, 2025b)		I		I		I	I			I				Possible	Infrequent visitor (foraging/ migration only)	Not recorded during the survey within the Study Area. Species may infrequently occur to forage during migration within the Drainage Area/ Floodplain, Artificial Wetland, and Major, Medium, and Minor Drainage Line habitats within the Study Area.
FALCONIDAE																							
grey falcon (<i>Falco hypoleucos</i>)	VU	VU		VU	Timbered lowlands, particularly <i>Acacia</i> shrubland and along inland drainage systems. Also frequents spinifex and tussock grassland habitats to forage (Burbidge <i>et al.</i> , 2010; Olsen & Olsen, 1986). The species commonly nests in timbered areas, particularly tall trees along watercourses, or tall infrastructure (e.g. powerline towers) and forages in open or more sparsely vegetated habitats (Garnett <i>et al.</i> , 2011).	Yes	6.26 km WSW (2024) (DBCA, 2025b)		C		S		S	C			S				Likely	Infrequent visitor (foraging)	Not recorded during the survey. Species' occurrence is likely to be dependent on the proximity of nesting. Critical nesting habitat is found within Major and Medium Drainage Lines within the Study Area; however, no direct or indirect observations were recorded during the survey. May occasionally occur to forage within the Drainage Area/ Floodplain, Artificial Wetland, and Major, Medium, and Minor Drainage Line habitats within the Study Area. Frequency of occurrence likely to be occasional and dependent on proximity of nesting to the Study Area.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
peregrine falcon (<i>Falco peregrinus</i>)		OS			Arid areas and is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr, 1998a). It typically nests on rocky ledges occurring on tall, vertical cliff faces between 25 m and 50 m high (Olsen <i>et al.</i> , 2004; Olsen & Olsen, 1989). In general it nests on cliffs, granite outcrops, quarries and in the wheatbelt, old Raven and Whistling Kite nests (Johnstone & Storr, 1998b).	Yes	4.24 km W (2018) (DBCA, 2025b)	I	I					I	I	I	I				Confirmed	Resident	Recorded once within the Study Area during the survey. May occur infrequently within the Study Area to forage, particularly within Hillcrest/ Hillslope, Artificial Wetland, Major Drainage Line and Medium Drainage Line habitats and, to a lesser extent, other habitats more broadly. Frequency of visitation may vary depending on proximity of nesting sites in the vicinity of the Study Area. Suitable nesting habitat present in Breakaway/ Cliff habitat but are limited in extent.
LARIDAE																							
gull-billed tern (<i>Gelochelidon nilotica</i>)	MI	MI			Found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands (Johnstone & Storr, 1998a). In the interior, they are often associated with inundated saltlakes and claypans and watercourses (Johnstone & Storr, 1998a). Colonially breeds and nests on islets in partially filled saltlakes or saltmarshes in mid-western interior (Johnstone & Storr, 1998a).	Yes	34.7 km NNW (2012) (DBCA, 2025b)														Unlikely	n/a	There is no suitable habitat in the Study Area for the species.
bridled tern (<i>Onychoprion anaethetus</i>)	MI	MI			Occupy tropical and sub-tropical seas. Breeds on islands including vegetated coral cays, rock stacks and rocky continental islands (DoEE, 2020).	Yes	9 km N (2011) (ALA, 2025)														Unlikely	n/a	There is no suitable habitat in the Study Area for the species.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area												Likelihood of Occurrence	Occurrence	Comments	
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed				Sand Plain
PSITTACIDAE																							
night parrot <i>(Pezoporus occidentalis)</i>	CR	CR		CR	The night parrot prefers sandy/stony plain habitat with old-growth spinifex for roosting and nesting in conjunction with native grasses and herbs for foraging (DPaW, 2017).	Yes	32.4 km SW (2017) (DBCA, 2025b)			S											Unlikely	N/A	Three records approximately 32km from the Study Area, but preferred habitat not present. Stony Plain habitat may provide supporting habitat for the species within the Study Area; however, the species occurrence is still unlikely.
ROSTRATULIDAE																							
Australian painted snipe <i>(Rostratula australis)</i>	EN	EN		EN	Favours recently flooded areas in shallow lowland freshwater temporary or permanent wetlands. This includes swamps, marshes, reedbeds, overgrown rice fields, inundated grassland and saltmarsh, margins of pools, freshwater lakes, sewage pools, reservoirs and mudflats (BirdLife International, 2024).	Yes	55.3 km NE (2012) (ALA, 2025)														Highly Unlikely	N/A	No records in close proximity to the Study Area (closest record >50 km) and preferred habitat only occurs in small patches.
SCOLOPACIDAE																							
common sandpiper <i>(Actitis hypoleucos)</i>	MI	MI			Estuaries and deltas of streams, as well as banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans (Johnstone & Storr, 1998a).	Yes	15.8 km WNW (2022) (DBCA, 2025b)		I		I			I	I						Possible	Infrequent visitor (foraging/ migration only)	Species may infrequently occur during migration within the Drainage Area/ Floodplain, Major, Medium and Minor Drainage Lines, and Artificial Wetland habitats when water is present to forage.
red-necked stint <i>(Calidris ruficollis)</i>	MI	MI		NT	Lives in permanent or ephemeral wetlands of varying salinity, and regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In Western Australia they prefer freshwater to marine environments. The species usually forages in shallow water at the edge of wetlands	Yes	13.8 km NW (2016) (ALA, 2025)		I		I			I	I						Possible	Infrequent visitor (foraging/ migration only)	Species may infrequently occur during migration within the Drainage Area/ Floodplain, Major, Medium and Minor Drainage Lines, and Artificial Wetland habitats when water is present to forage.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area												Likelihood of Occurrence	Occurrence	Comments	
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed				Sand Plain
					and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998a).																		
wood sandpiper (<i>Tringa glareola</i>)	MI	MI			Species occurs as a non-breeding summer migrant which occurs throughout the region. Occurs mainly in river pools, sewage ponds, flooded claypans, freshwater lagoons and bore overflows (Johnstone <i>et al.</i> , 2013). Freshwater wetlands and occasional brackish intertidal mudflats (Geering <i>et al.</i> , 2007).	Yes	1.21 km N (2011) (ALA, 2025)	I			I			I	I			I			Possible	Infrequent visitor (foraging/ migration only)	Species may infrequently occur during migration within the Drainage Area/ Floodplain, Major, Medium and Minor Drainage Lines, and Artificial Wetland habitats when water is present to forage.
common greenshank (<i>Tringa nebularia</i>)	MI	MI			Species occurs as a non-breeding summer Migrant which occurs throughout the region. Occurs mainly in Tidal mudflats, mangrove creeks, flooded samphire flats, beaches, river pools, and saltwork and sewage ponds (Johnstone <i>et al.</i> , 2013).	Yes	18 km WNW (2011) (DBCA, 2025b)	I			I			I	I			I			Possible	Infrequent visitor (foraging/ migration only)	Species may infrequently occur during migration within the Drainage Area/ Floodplain, Major, Medium and Minor Drainage Lines, and Artificial Wetland habitats when water is present to forage.
REPTILES																							
CARPHODACTYLIDAE																							
Pilbara barking gecko (<i>Underwoodisaurus seorsus</i>)			P2		Little is known about the ecology of the Pilbara barking gecko, but the species is thought to prefer rocky areas, often associated with high elevation, with spinifex and low tree cover habitats (Chapple et al., 2019; Doughty & Oliver, 2011). Species shelters under rocks and other cover on arid rocky slopes and in gorges with	Yes	2.1 km W (2009) (DBCA, 2025b)	I			I					I					Highly Likely	Resident	Previously recorded adjacent to the Study Area. Likely to occur within rocky environments including Gorge/ Gully, Hillcrest/ Hillslopes, Undulating Low Hills and Stony Plain habitats.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
					sparse tree cover and <i>Triodia</i> as the dominant ground cover (Cogger, 2014).																		
PYTHONIDAE																							
Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	VU	VU			Associated with drainage systems, including areas with localised drainage and watercourses (Pearson, 1993). In the inland Pilbara the species is most often encountered near permanent waterholes in rocky ranges or among riverine vegetation (Pearson, 1993).	Yes	0.22 km (2010) (BHP WAIO, 2024)	C	S		S		S	C	S	C	S				Confirmed	Resident	Has been recorded within the Study Area on one occasion prior to the current survey. Critical breeding/ denning and foraging/ dispersal habitat includes Gorge/ Gully, Major Drainage Line and Breakaway/ Cliff habitats. Supporting foraging and dispersal habitat comprises, Drainage Area/ Floodplain, Medium Drainage Line, Minor Drainage Line, Artificial Wetlands and Hillcrest/ Hillslope habitats.
SCINCIDAE																							
spotted ctenotus (<i>Ctenotus uber</i> subsp. <i>johnstonei</i>)			P2		Within the Pilbara and Kimberly, the taxon is known from <i>Triodia</i> on hillslopes, <i>Acacia xiphophylla</i> over chenopods, and <i>Acacia xiphophylla</i> scattered tall shrubs to high open shrubland (Cogger, 2014).	Yes	2.6 km (2008) (Ecologia, 2008a)			I		I			I						Possible	Resident	May occur in Stony Plain, Undulating Low Hills and lower slopes of Hillcrest/ Hillslope habitats. Taxonomic status of the disjunct Pilbara population is unknown and may represent an undescribed taxon (P. Doughty, Western Australian Museum, pers. comm.).
great desert skink (<i>Liopholis kintorei</i>)	VU	VU		VU	Endemic to the Australian arid zone in the western deserts region, occurs on sand plain and sand dune habitats, often comprising vegetation dominated by hummock grassland (<i>Triodia basedowii</i> and <i>T. schinzii</i>) and open shrubland (<i>Eremophila forrestii</i> and <i>Acacia</i> species) on red sands, occasionally on gravelly undulating plain in some areas (Pearson et al., 2001). Preferred	Yes	~632 km NE (1968) (ALA, 2025)														Highly Unlikely	N/A	No records in close proximity to the Study Area. With no extensive Sand Plain habitat present within the Study Area, it is not considered suitable to support the species due to the absence of large undisturbed areas of the habitat.

Species	Conservation Status				Preferred Broad Habitats	Within Current Known Distribution	Nearest previous records to the Study Area	Potential Habitat within the Study Area													Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN				Gorge/ Gully	Medium Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Major Drainage Line	Hillcrest/ Hillslope	Breakaway/ Cliff	Artificial Wetland	Hardpan Plain	Cleared / Disturbed	Sand Plain			
					habitat appears to comprise at least 50% bare ground. prefers a mosaic landscape comprising different aged post-fire vegetation regeneration and inhabits sites that have been burnt in the previous three to fifteen years (DoEE, 2018a). Regenerating areas are considered to potentially provide ample food while unburnt patches provide shelter (Pearson <i>et al.</i> , 2001).																		
TYPHLOPIDAE																							
Gane's blind snake (<i>Anilius ganeii</i>)				P1	Little is known of the species' ecology, but it is often associated with moist soils and leaf litter within gorges and gullies (Wilson and Swan 2014), and potentially within a wide range of other stony habitats. The species has been recorded from numerous habitats but is most likely to be present in rocky terrain and along drainage lines (DBCA, 2019).	Yes	5.29 km SSW (2006) (BHP WAIO, 2024; DBCA, 2024b)	I	I				I	I	I	I					Likely	Resident	Not recorded within the Study Area. Likely to occur as a resident within Hillcrest/ Hillslope, Breakaway Cliff, Gorge/ Gully, and Major, Medium and Minor Drainage Lines (when adjacent to rocky habitats) habitats, particularly where moist substrates are present for prolonged periods.
C = Critical Habitat for Target Species S = Supporting Habitat for Target Species I = Important habitat HR = Habitat Rating																							

7 Target Species

7.1 Northern Quoll (*Dasyurus hallucatus*) – Endangered EPBC Act & BC Act

7.1.1 Species Profile

The northern quoll is listed as Endangered under the EPBC Act and BC Act. It was once widely distributed across northern Australia, however, it is now restricted to three isolated populations in the Pilbara, Kimberley and Northern Territory, and Queensland (DoE, 2016).

As a result of facultative die-off, the abundance of the species is cyclical, and the annual reproduction is highly synchronised (Oakwood *et al.*, 2001). In the Pilbara, abundance is lowest toward the end of winter into early spring after the mating season, as a significant proportion of adult males die off and young have not yet begun to forage independently (Braithwaite & Griffiths, 1994; Oakwood, 2000). Population density is thought to be highest in the summer months, prior to the mating season and when juveniles have begun foraging independently (Oakwood, 2000). Schmitt *et al.* (1989) reported relatively small home ranges in rugged habitat in the Kimberley (2.3 ha for females and 1.8 ha for males), whereas in the western Pilbara, minimum activity areas (often used as an estimator of home range) are 75–443 ha for females and 5–1,109 ha for males (King, 1989).

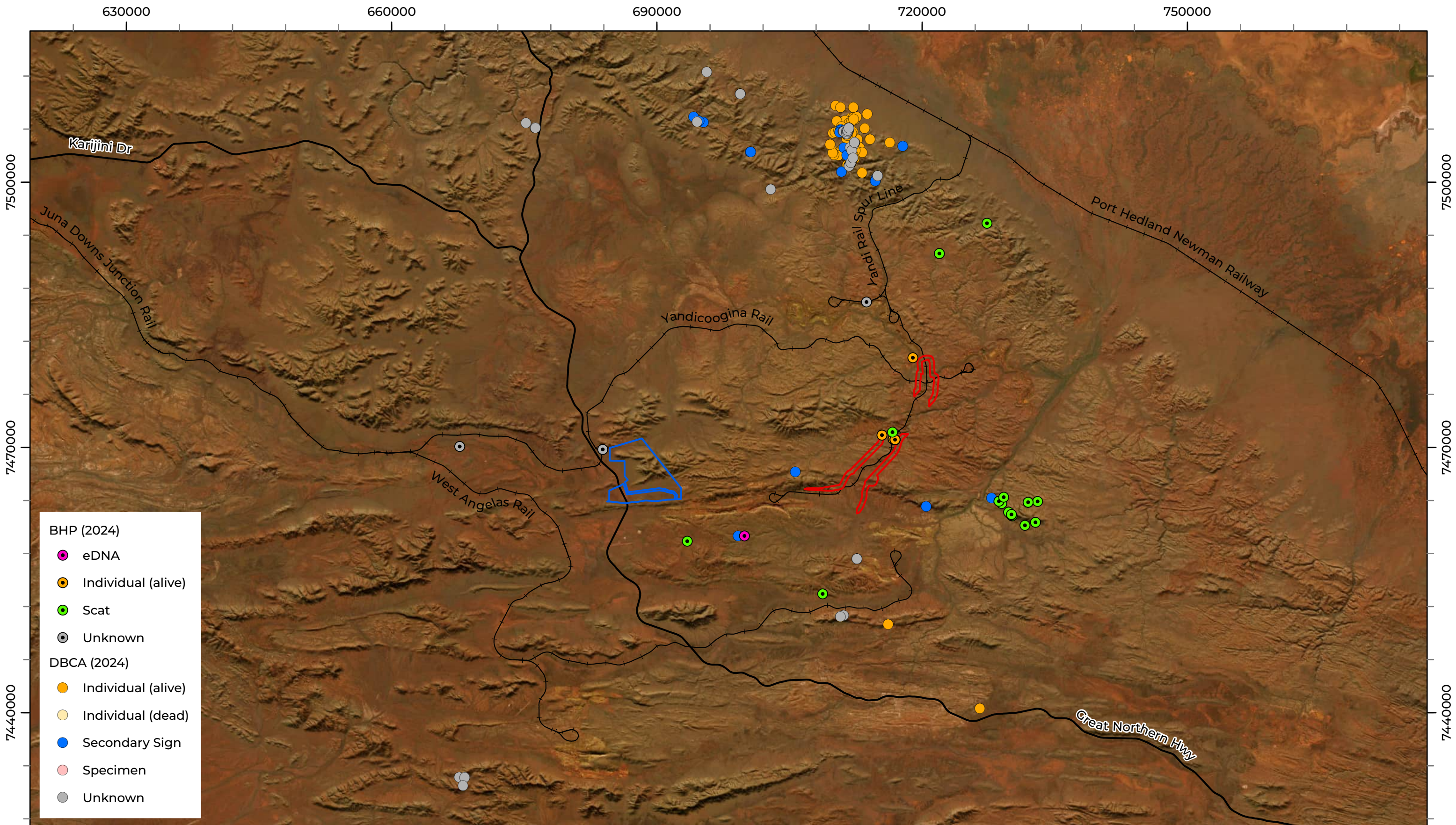
The northern quoll is both arboreal and terrestrial, inhabiting ironstone and sandstone ridges, scree slopes, granite boulders and outcrops, drainage lines, riverine habitats (Braithwaite & Griffiths, 1994; Oakwood, 2002), dissected rocky escarpments, open forest of lowland savannah and woodland (Oakwood, 2002, 2008). They are opportunistic omnivores, consuming a wide range of invertebrates and small vertebrates also in addition to fruit, nectar, carrion and human refuse (Dunlop *et al.*, 2017). Rocky habitats tend to support higher densities, as they offer protection from predators and are generally more productive in terms of availability of resources (Braithwaite & Griffiths, 1994; Oakwood, 2000). Other microhabitat features important to the species include rock cover, proximity to permanent water, and time-since last fire (Woinarski *et al.*, 2008). Dens occur in a wide range of habitat features, including rock overhangs, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings/ infrastructure, where individuals usually den alone (Oakwood, 2002; Woinarski *et al.*, 2008). At present, northern quolls are relatively common in the northern Pilbara region (generally within 150 km of the coast) but are much less common in southern and south-eastern parts of the region (Cramer *et al.*, 2016b).

Northern quolls have experienced a precipitous decline in most of its former range in northern Queensland and the Northern Territory, largely due to the presence of cane toad, *Rhinella marina* (Braithwaite & Griffiths, 1994; Fitzsimons *et al.*, 2010). Other threats include predation from foxes and cats, changed fire regimes, disease, habitat degradation and

destruction (Woinarski *et al.*, 2011). It is anticipated that cane toads will expand into the Pilbara within coming years, which will be the most significant threat to its presence here.

7.1.2 Previous Records

The Study Area falls within the current modelled distribution of the northern quoll (DoE, 2022a). There are no previous records of northern quoll within the Study Area. Within 50 km of the Study Area, there are approximately 552 northern quoll records (Astron, 2025; BHP WAIO, 2025; DBCA, 2025b) (Figure 7.1). The vast majority of these records occur in the vicinity of Rio Tinto's Gudai-Darri mine, approximately 30 km north-east of the Study Area (BHP WAIO, 2025; DBCA, 2025b). Evidence of the species within close proximity of the Study Area comprises northern quoll detected via motion cameras and scats in June 2024, each approximately 200m to 700m north of the study area (Astron, 2025). The species has also been detected via eDNA in March 2023, approximately 8 km east south-east from the Study Area (Biologic, 2023e), scats recorded on 15 occasions between 2010 and 2024, unknown observation type on eight occasions between 2010 and 2018, and live individuals (recorded via camera trap) between 2016 and 2019, with the closest recorded approximately 650 m west north-west of the Study Area. The general scarcity of records in the general vicinity of the Study Area, outside of Gudai-Darri, suggests that the species is patchily distributed and/or occurs at low abundance.



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- State Road
- Rail

Scale 1:400,000

0 5 10 15 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 20/10/2025

Exmouth, Carnarvon, Newman, Karratha, Port Hedland

BHP WAIO

MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.1: Previous northern quoll records in the Study Area and region

7.1.3 Survey Methods

7.1.3.1 Targeted Searches

Targeted searches for primary or secondary evidence were undertaken in suitable habitat for northern quoll along 29 transects, equating to approximately 64 person hours (Figure 7.2; Appendix G).

7.1.3.2 Camera Trap Transects

Ten camera trap transects were deployed in critical breeding, denning, foraging and dispersal habitat (e.g. Breakaway/ Cliff, Gorge/ Gully) or habitat directly adjacent to breeding/ shelter habitat (Table 7.1; Figure 7.2). Where possible, survey effort followed methods recommended by DoE (2016); however, due to the size of the Study Area, the number of cameras deployed at any given site were based on the extent of suitable habitat with an approximate spread of one camera every 50–100 m. Cameras were deployed for four to five consecutive nights, for a total of 402 camera trap sampling nights (Table 7.1).

Cameras were oriented to enable differentiation of individuals via spot patterning (following Hohnen *et al.*, 2012) and baited with universal bait mixture (comprising oats, peanut butter and sardines) contained within a non-reward receptacle (perforated and capped PVC pipe).

Table 7.1: Camera transects sampled for northern quoll within the Study Area

Site	Habitat	Deployment	Retrieval	Total Number of Cameras	Total Trap Nights
VMYR-005	Undulating Low Hills	23/05/2025	27/05/2025	10	40
VMYR-012	Minor Drainage Line	26/05/2025	30/05/2025	10	40
VMYR-015	Gorge/ Gully	24/05/2025	28/05/2025	10	40
VMYR-020	Gorge/ Gully	23/05/2025	27/05/2025	10	40
VMYR-029	Gorge/ Gully	23/05/2025	27/05/2025	10	40
VMYR-034	Minor Drainage Line	26/05/2025	30/05/2025	10	40
VMYR-057	Gorge/ Gully	22/05/2025	26/05/2025	10	40
VMYR-067	Gorge/ Gully	23/05/2025	27/05/2025	9	36
VMYR-078	Hillcrest/ Hillslope	23/05/2025	28/05/2025	10	50
VMYR-084	Gorge/ Gully	22/05/2025	26/05/2025	9	36
Total camera transects deployed					10
Total trap nights					402

7.1.4 Survey Results

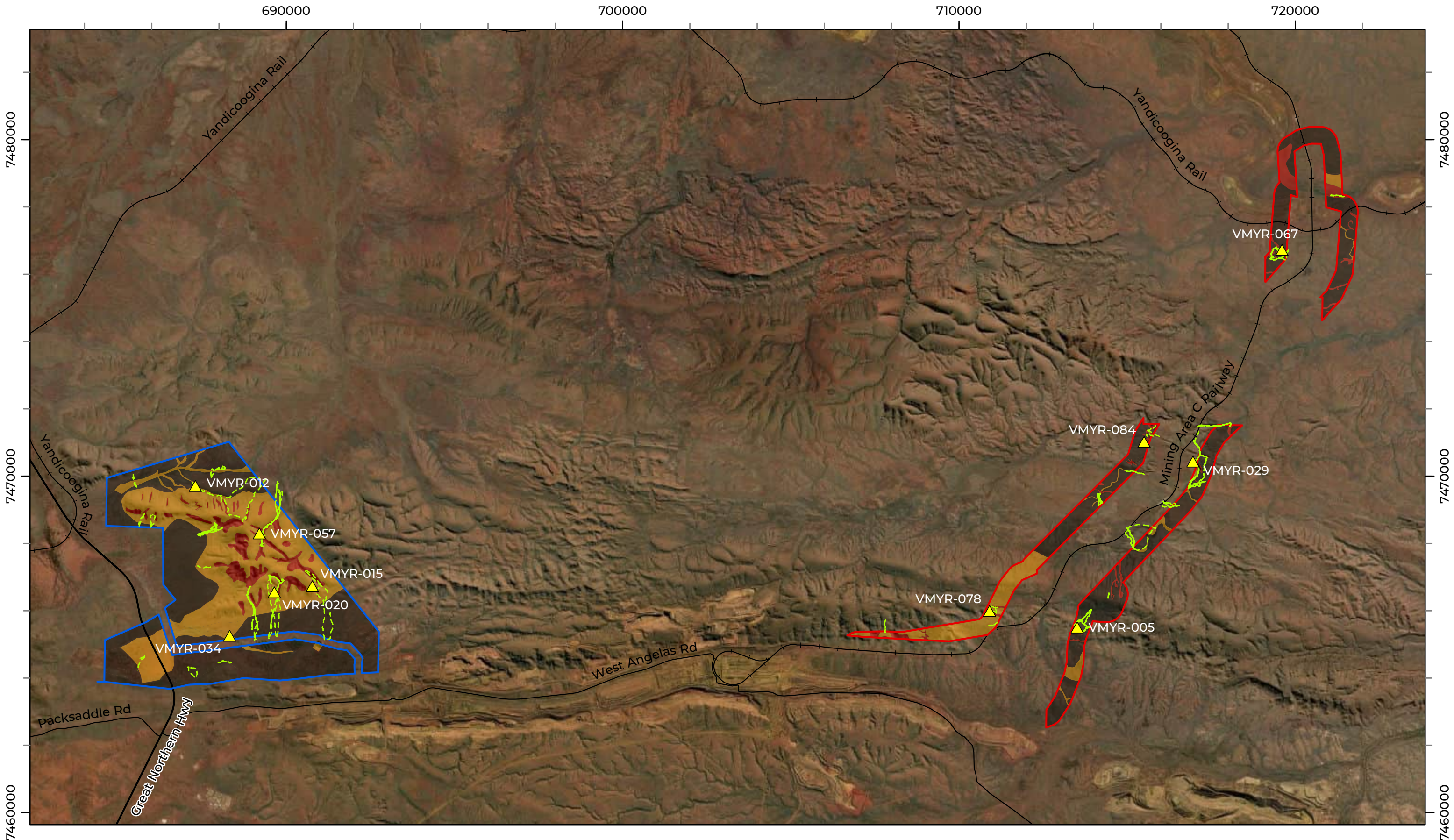
No evidence of northern quoll was recorded within the Study Area.

7.1.5 Discussion

No evidence of northern quoll was recorded during the survey. The six prior vertebrate fauna field surveys overlapping the Study Area also did not record evidence of the species despite survey methods suitable to sample for northern quoll. There are only a small number of records within 10 km of the Study Area, with the nearest record (live individual recorded via camera trap) for the species approximately 650 m northwest from the Study Area in 2018 (Biologic, 2023e) (refer to Section 7.1.2).

Within the Study Area, the Gorge/ Gully (5.67%, 299.40 ha), Major Drainage Line (1.29%, 68.06 ha) and Breakaway/ Cliff (0.77%, 40.63 ha) habitats meet the definition of critical habitat for northern quoll DoE (2016) (Figure 5.1; Figure 7.2). Potential supporting habitat for the northern quoll occurs in the Hillcrest/ Hillslope (25.57%, 1,349.70 ha), Minor Drainage Line (2.66%, 140.42 ha), Medium Drainage Line (0.40%, 21.12 ha), and Drainage Area/ Floodplain (5.14%, 271.09 ha) habitats, where located proximal to the Gorge/ Gully and Breakaway/ Cliff habitats.

It is highly likely that northern quolls occur in the Study Area; however, in very low densities, or when dispersing from larger populations to the east. The species is unlikely to be reliant on the habitats within the Study Area for long-term survival on a local or regional scale. Therefore, the Study Area is considered unlikely to contain a population important for the long-term survival of the species' (DoE (2013a, 2016).



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Rail

— Rail

Sampling Type

- Camera trap
- Targeted Search

Habitat

- Critical
- Supporting
- Nil

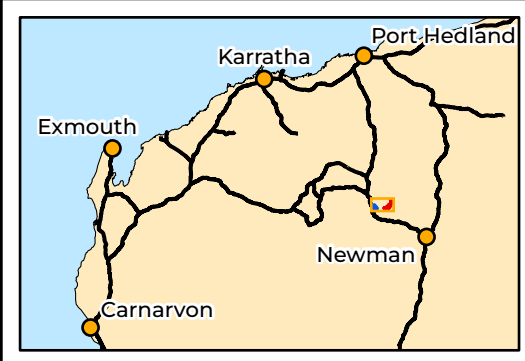


Biologic

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.2: Northern quoll sampling and habitat in the Study Area

7.2 Ghost Bat (*Macroderma gigas*) – Vulnerable EPBC Act & BC Act

7.2.1 Species Profile

The ghost bat is listed as Vulnerable under the EPBC Act and BC Act. It occurs in disjunct colonies across northern Australia (TSSC, 2016a) and in the Pilbara region, occurs in all four subregions. The Pilbara population is estimated to comprise between 1,300 and 2,000 individuals (TSSC, 2016a). The largest population occurs within the Chichester subregion (estimated at approximately 1,500 individuals) where known populations are largely restricted to disused mines (TSSC, 2016a).

The distribution of ghost bats in the Pilbara is determined by the presence of suitable roosting sites. Natural roosts generally comprise deep, complex caves beneath bluffs or low rounded hills (Armstrong & Anstee, 2000). Centralised breeding sites in the Pilbara are largely restricted to abandoned mines in the Chichester Ranges; however, there are also a number of smaller maternity roosts in the Chichester and Hamersley Ranges (Armstrong & Anstee, 2000). To date, breeding has been documented in natural caves at MAC (including South Flank), Mt Brockman and West Angeles in the Hamersley subregion, and at Callawa and Tambrey Station in the Chichester sub-region (Armstrong and Anstee, 2000; Biologic, 2013, 2015; M. O'Connell, pers. obs.). Ghost bats are known to move between a number of caves seasonally, or as dictated by weather conditions, and require a range of cave sites (Hutson *et al.*, 2001). Outside the breeding season, male bats are known to disperse widely, most likely during the wet season when conditions would allow bats to use caves that would otherwise not be suitable (Worthington-Wilmer *et al.*, 1994). Genetic studies indicate that females are likely to stay close to the maternity roosts (Worthington-Wilmer *et al.*, 1994).

Caves and roosts used by the species can be classified into four categories (Bat Call, 2021a):

- **Category 1** (maternity/ diurnal roost sites with permanent ghost bat occupancy): maternity/ diurnal roost caves with permanent ghost bat occupancy. There are several documented permanent roost caves and underground mines in northern Australia. These may be abandoned underground mines.
- **Category 2** (maternity/ diurnal roost caves with regular occupancy): maternity/ diurnal roost caves with regular (but not continuous) ghost bat occupancy that are capable of supporting one or more reproducing females. These may be abandoned underground mines.
- **Category 3** (diurnal roost caves with occasional occupancy): there are many caves and adits where one to a few ghost bats roost occasionally, or rarely.
- **Category 4** (nocturnal roost caves with opportunistic usage): shallow caves, shelters and deep overhangs that support opportunistic usage for resting and feeding.

Foraging habitat for ghost bats is classified as occurring within 12 km radius of these categorised caves (Bat Call, 2021a) or 1,200 ha of habitat surrounding each of these caves. Their habitat includes:

- productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* spp.) on sand or stony ground;
- isolated trees and trees on the edge of thin thickets on the plains;
- trees along the edges of watercourse woodlands; and
- gully or gorge system that opens onto a plain or riparian line.

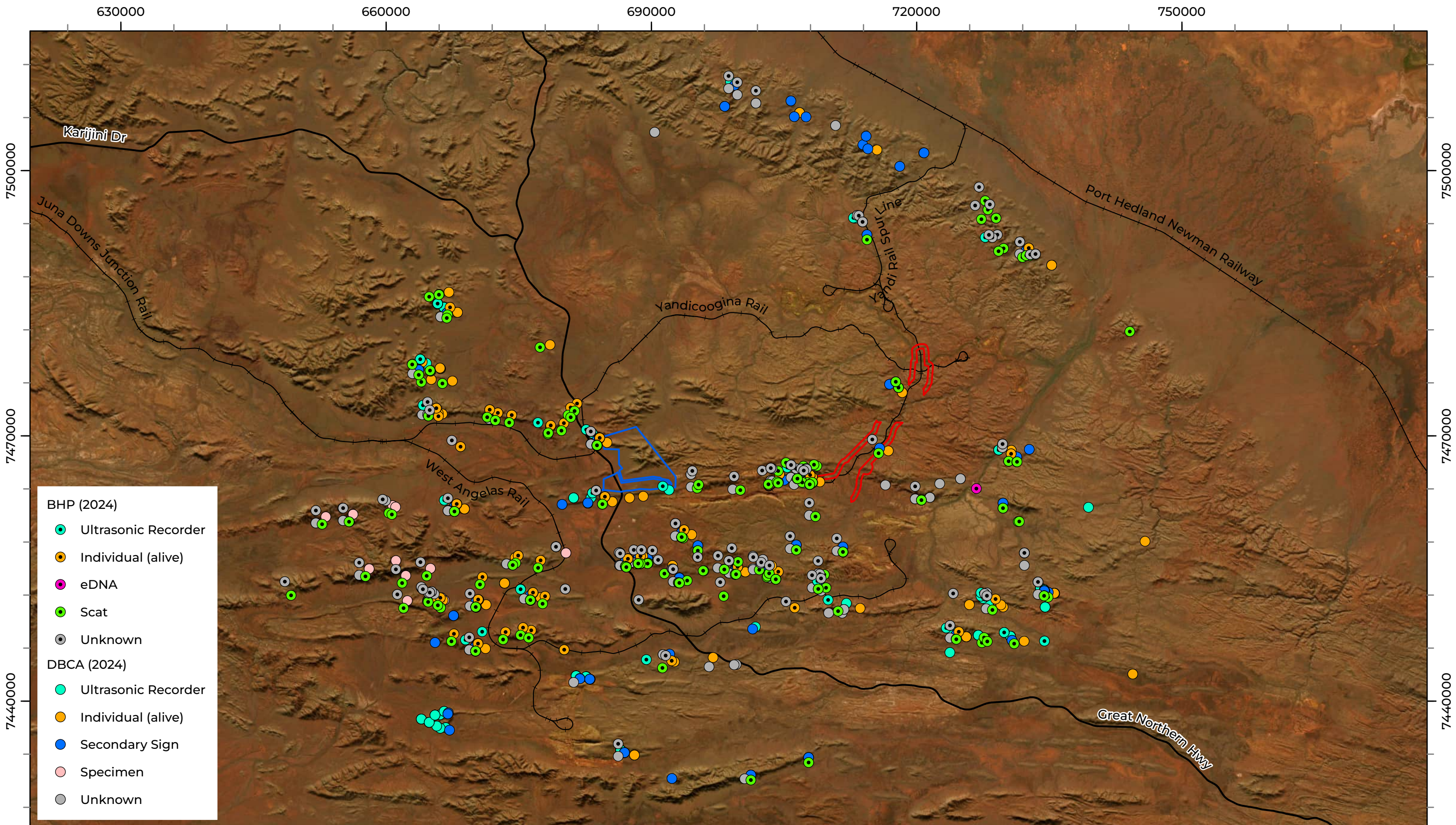
Historically, ghost bats were documented to have a short-range foraging strategy of up to 3 km (average 1.9 km), with vantage points changing approximately every 15 minutes, and average foraging areas of 61 ha having been recorded in the Northern Territory (Tidemann *et al.*, 1985). However, recent studies using VHF tracking and GPS/satellite tracking technologies show that ghost bats, both male and female, forage over much larger areas up to 12 km from their diurnal roost (Augusteyn *et al.*, 2018; Bat Call, 2021a). It also appears that bats generally return to the same area each night (Tidemann *et al.*, 1985), although it has been suggested that ghost bats in the arid zone are semi-transient through most areas and will readily travel large distances (>4 km) (Biologic, 2020). Ghost bats have a 'sit and inspect' foraging strategy; whereby they hang on a perch and visually inspect their surroundings for movement. Once their prey is detected it may be captured in the air, gleaned (i.e. taken from the surface of a substrate by a flying bat) from the ground or vegetation, or dropped on from a perch (Boles, 1999).

Recent studies at BHP WAIO's South Flank mine have physically observed a ghost bat exiting a cave and moving immediately towards broad drainage plains, comprising of Mulga Woodland and Major Drainage Line (Biologic, 2020). Such areas are often highly productive and contain an abundance of foraging structures (Biologic, 2020).

7.2.2 Previous Records

The Study Area falls within the current distribution of the ghost bat, whereby the species or species' habitat is likely to occur (DoE, 2022d). In Western Australia, the species has experienced a significant north-westward distribution contraction, presumably associated with increasing aridity (TSSC, 2016a).

From the desktop search, 1,164 records of ghost bat occur within 50 km of the Study Area (Figure 7.3), with 470 of the records being within 12 km of the Study Area (classified foraging range), seven of which occur within the Study Area at cave AC09 (monitored as part of the Central Pilbara Hub Ghost Bat Monitoring Program) (Biologic, in prep.-a). This comprises of two records of individuals observed, three scat records and two records listed as “Unknown” (BHP WAIO, 2022, 2024, 2025; DBCA, 2022b, 2024b, 2025b). There are also 64 currently known caves within 12 km of the Study Area that are subject to ongoing ghost bat monitoring as part of the Central Pilbara Ghost Bat Monitoring Project (Biologic, in prep.-a), of which 23 are listed as High Value or Retained High Value. An additional 14 caves (One category 2, two category 3, Seven category 4 and three category 5 caves) were recorded within 12km during the Ministers North Consolidated Targeted Significant Vertebrate Fauna Surveys undertaken by Astron in 2024 (Astron, 2025). Another 26 caves are known to be located within 12 km of the Study Area, based on cave locations compiled for the Power 2030 Ghost Bat Tracking Project (Biologic, in prep.-b), however, no value ratings have been listed for these caves.



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- State Road
- Rail

Scale 1:400,000

0 5 10 15 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 20/10/2025

BHP WAIO

MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.3: Previous ghost bat records in the Study Area and region

7.2.3 Survey Methods

7.2.3.1 Targeted Searches

Targeted searches were undertaken at 26 locations across the Study Area. The searches were conducted on foot to determine the presence of caves likely to be used by ghost bats and/or Pilbara leaf-nosed bats (Figure 7.4; Appendix G). Where potentially suitable caves or overhangs were located, external assessments were undertaken to search for evidence of occurrence and determine whether the cave should be revisited with a geotechnical engineer for a more detailed assessment. Approximately 65 person hours of search effort was undertaken (Figure 7.4; Appendix G).

7.2.3.2 Ultrasonic Recorders

Overnight recordings of bat echolocation calls were undertaken with Song Meter 4 (SM4; Wildlife Acoustics Inc.) ultrasonic bat recorders at 28 sites (Figure 7.4; Appendix H). Detectors were placed in potential habitat near water features and foraging/ dispersal corridors. Recorders were deployed for three to four consecutive nights at each site, resulting in a total of 85 recording nights (Appendix H).

The audio settings used for the SM4 units followed the manufacturer's recommendations (Wildlife Acoustics, 2011, 2017) and were set to account for all species known to occur within the region (McKenzie & Bullen, 2009). All recordings were analysed by Robert Bullen of Bat Call WA for the presence of ghost bat and Pilbara leaf-nosed bat calls only.

7.2.4 Survey Results

Ghost bats were recorded on two occasions during the survey; once from secondary evidence (one scat) during a targeted search at VMYR-035 (in Breakaway/ Cliff habitat), and once via ultrasonic recorder at VMYR-070 (23 May at 18:51 in Hillcrest/ Hillslope habitat) (Figure 7.4). Based on the timing of the call, it is likely that this individual was foraging. No individual ghost bats were recorded.

Cave entry was not permitted during this survey. As such, the three caves recorded and visited during the survey remain unclassified, as the exterior observations were deemed insufficient to classify these caves (Figure 5.2; Table 5.2).

7.2.5 Discussion

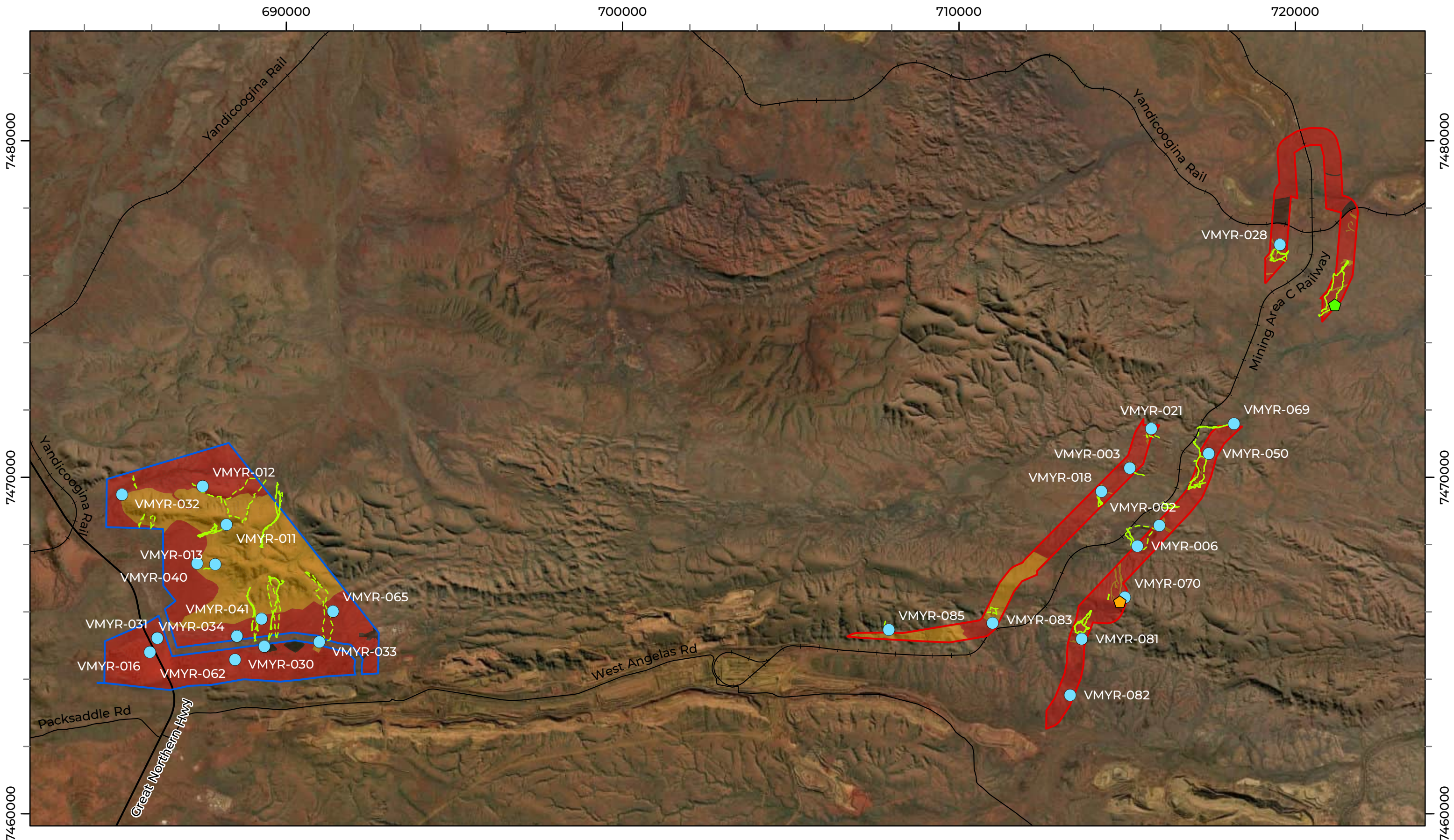
Ghost bats were recorded on two occasions during the survey, comprising one call recorded via ultrasonic recorder and one scat. No individual ghost bats were recorded. With ultrasonic recorders detecting ghost bat at only one site, it should be noted that ghost bat detectability via ultrasonic recorders, particularly foraging individuals, can be difficult. Unlike the majority of microbats, ghost bats are proficient in navigating and hunting visually without needing to constantly echolocate (Strahan, 2004). For this reason, it is not uncommon to not record

ghost bats via ultrasonic recorders in areas where their presence is observed. Furthermore, environmental conditions are known to limit the effectiveness of ultrasonic recorders, with detection rates affected by higher levels of clutter (Broders *et al.*, 2004), environmental noise (Weller & Zabel, 2002) and relative humidity (de Framond *et al.*, 2023).

No critical roosts were identified within the Study Area, although none of the three caves identified were able to be classified due to cave entry restrictions. One cave (AC09) has been previously recorded within the Study Area and is monitored as part of the Central Pilbara Hub Ghost Bat Monitoring Program (Biologic, in prep.-a). This cave is classed as High Value (Category 1 or 2 roost). There are 64 caves within 12 km of the Study Area that are subject to ongoing ghost bat monitoring as part of the Central Pilbara Ghost Bat Monitoring Project (Biologic, in prep.-a), of which 23 are listed as High Value or Retained High Value (i.e. critical roosts), defined as a feeding roost, potential day roost, potential maternity roost or confirmed maternity roost; represented by Category 1 and 2 caves (BHP, 2020). An additional 31 caves are known to be located within 12 km of the Study Area, based on cave locations compiled for the Power 2030 Ghost Bat Tracking Project (Biologic, in prep.-b). No value ratings have been listed for these caves.

Critical foraging and dispersal habitat (62.34%) within the Study Area is provided by Stony Plains (28.59%, 1,508.65 ha), Undulating Low Hills (24.26%, 1,280.06 ha), Drainage Area/Floodplain (5.14%, 271.09 ha), Hardpan Plain (2.76%, 145.72ha), Minor Drainage Line (2.66%, 140.42 ha), Medium Drainage Line (0.40%, 21.12 ha), Major Drainage Line (1.29%, 68.06 ha) and Sand Plain (0.96%, 50.66ha), when proximal (<12 km) to critical roosts located outside the Study Area. As suggested by Bat Call (2021a) these habitats represent “productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* spp.) on sand or stony ground” and/or contain “isolated trees and trees on the edge of thin thickets on the plains” and “trees along the edges of watercourse woodlands”. Supporting dispersal (and foraging) habitat within the Study Area is provided by Breakaway/ Cliff (0.77%, 40.63 ha), Artificial Wetland (0.09%, 4.65ha) and Gorge/ Gully (5.67%, 299.40 ha) habitats.

Whilst ghost bat was only recorded on two occasions during this survey, based on the 64 caves within 12 km of the Study Area that are subject to ongoing ghost bat monitoring, the presence of foraging habitat, and the seven previous ghost bat records within the Study Area, it is likely that the ghost bat occurs as a resident within the Study Area and frequently utilises the foraging habitats within.



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Sampling Type

- Ultrasonic recorder
- Targeted Search

Rail

- Rail

Habitat

- Critical
- Supporting
- Nil

Record

- Ultrasonic Call
- Scat



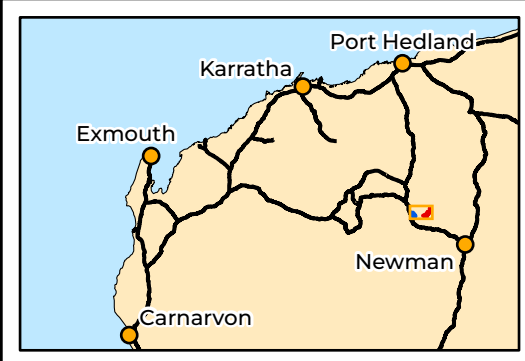
Biologic

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator

Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.4: Ghost bat sampling, habitat and records in the Study Area

7.3 Greater Bilby (*Macrotis lagotis*) – Vulnerable EPBC Act & BC Act

7.3.1 Species Profile

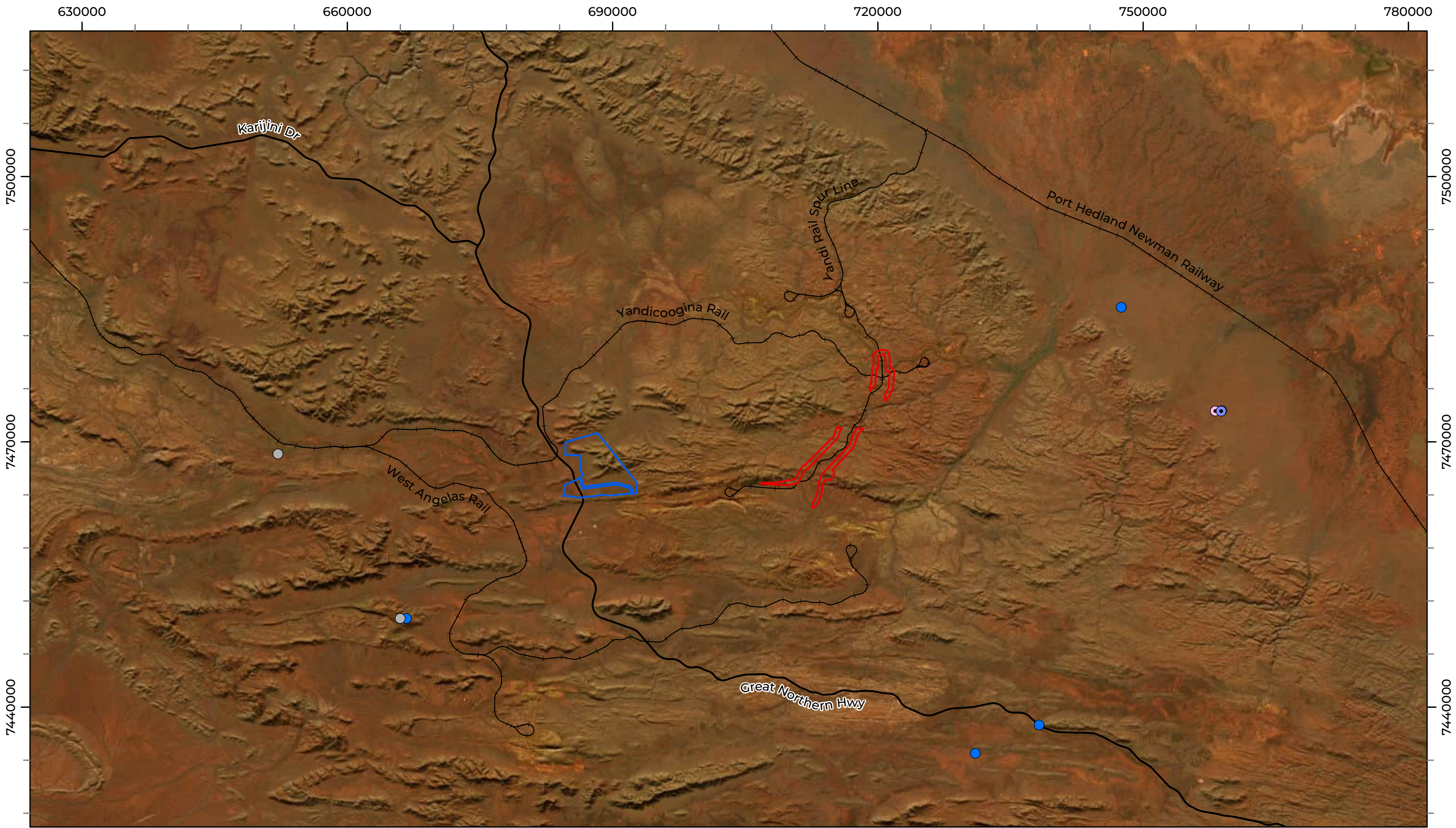
The greater bilby is listed as Vulnerable under the EPBC Act and BC Act. It is one of many Australian arid zone marsupial species that are within a 'critical weight range' (35 grams (g) to 5,500 g) considered significant based on the high risk of predation by introduced foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) (Johnson & Isaac, 2009). Greater bilbies are semi-fossorial and nocturnal, remaining in their burrows during the day and intermittently during the night for rest and refuge. Greater bilby populations naturally occur as scattered solitary individuals or small groups (Smythe & Philpott, 1968; Southgate, 1990a). They are regarded as having low site fidelity and high mobility (Southgate *et al.*, 2007); males regularly move three to five kilometres between burrows on consecutive days and have been recorded moving up to 15 km in a few weeks (Southgate & Possingham, 1995). This high mobility, together with low population density, ensures that the area of occupancy is often far less than the extent of occurrence. As greater bilbies are solitary in nature, lack territoriality and have large home ranges, it is likely that males adopt a roving strategy to find receptive females, consistent with an overlapping promiscuous mating system (Miller *et al.*, 2010).

Populations of greater bilby exist in the Pilbara bioregion, particularly within the Chichester subregion, along the Fortescue River and north-east to Goldsworthy and Shay Gap, in the Dampier bioregion (along 80 Mile Beach north to Beagle Bay) and in the Central Kimberley and Ord-Victoria Plains bioregions south of the Fitzroy and Margaret Rivers (Southgate, 1990a). The species' distribution within the Pilbara region is highly fragmented (Cramer *et al.*, 2017).

Greater bilbies occupy three major vegetation types: open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas (Southgate, 1990b). Laterite and rock feature substrates are an important part of their habitat as they support shrub species, such as *Acacia kempeana*, *A. hilliana* and *A. rhodophloia*, which have root-dwelling larvae that supports a constant food source (Dziminski & Carpenter, 2017; Southgate *et al.*, 2007). These habitats also contain spinifex hummocks, which are quite uniform and discrete, providing runways between hummocks and enabling easier movement and foraging (Southgate *et al.*, 2007). Minimal ground cover is a common feature in greater bilby habitats, as it allows easy foraging (Dawson *et al.*, 2018). Habitat within the Pilbara bioregion seems to consist mostly of spinifex sandplain associated with major drainage line sandy terraces. In general, the distribution of greater bilbies can be limited by the availability of suitable burrowing habitat, such as dunes where burrow excavation is easier (Moseby & O'Donnell, 2003), and are not found in predominantly rocky areas or mountains where they would be unable to dig suitable burrow systems or dig for food.

7.3.2 Previous Records

The Study Area falls within the western extent of the current distribution of the greater bilby, whereby the species or species' habitat is likely to occur (DoE, 2022b). The desktop assessment identified nine records of the species within 50 km of the Study Area, five of which are historical records of secondary evidence from 1983 and 1984, two diggings and an inactive burrow from 2020 and one which is listed as “secondary sign” from 2024 (BHP WAIO, 2025; DBCA, 2025b) (Figure 7.5).



LEGEND

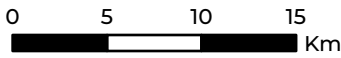
- | | | |
|---|---|--|
| Study Area | BHP (2024) | DBCA (2024) |
|  MAC to Yandi Corridor |  Burrow (inactive) |  Secondary Sign |
|  Runaway Valley North |  Digging |  Unknown |
|  State Road | | |
|  Rail | | |



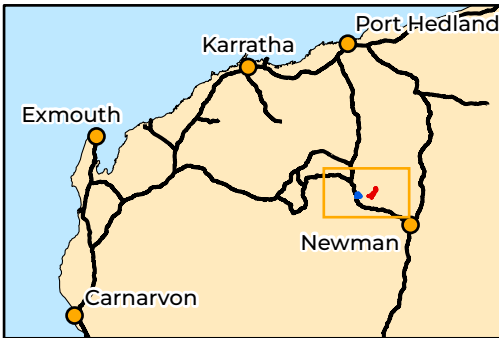
Biologic



Scale 1:400,000



Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO

MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 7.5: Previous greater
bilby records in the Study
Area and region

7.3.3 Survey Methods

7.3.3.1 Targeted Searches

Targeted searches for greater bilby were undertaken at five locations within the Study Area within areas considered to be most suitable as habitat, in accordance with survey guidelines for the species (DBCA, 2017). Searches focussed on identifying signs of greater bilby such as burrows, diggings, tracks and scats. Approximately 15.5 person hours of search effort was undertaken (Figure 7.6; Appendix G).

7.3.4 Survey Results

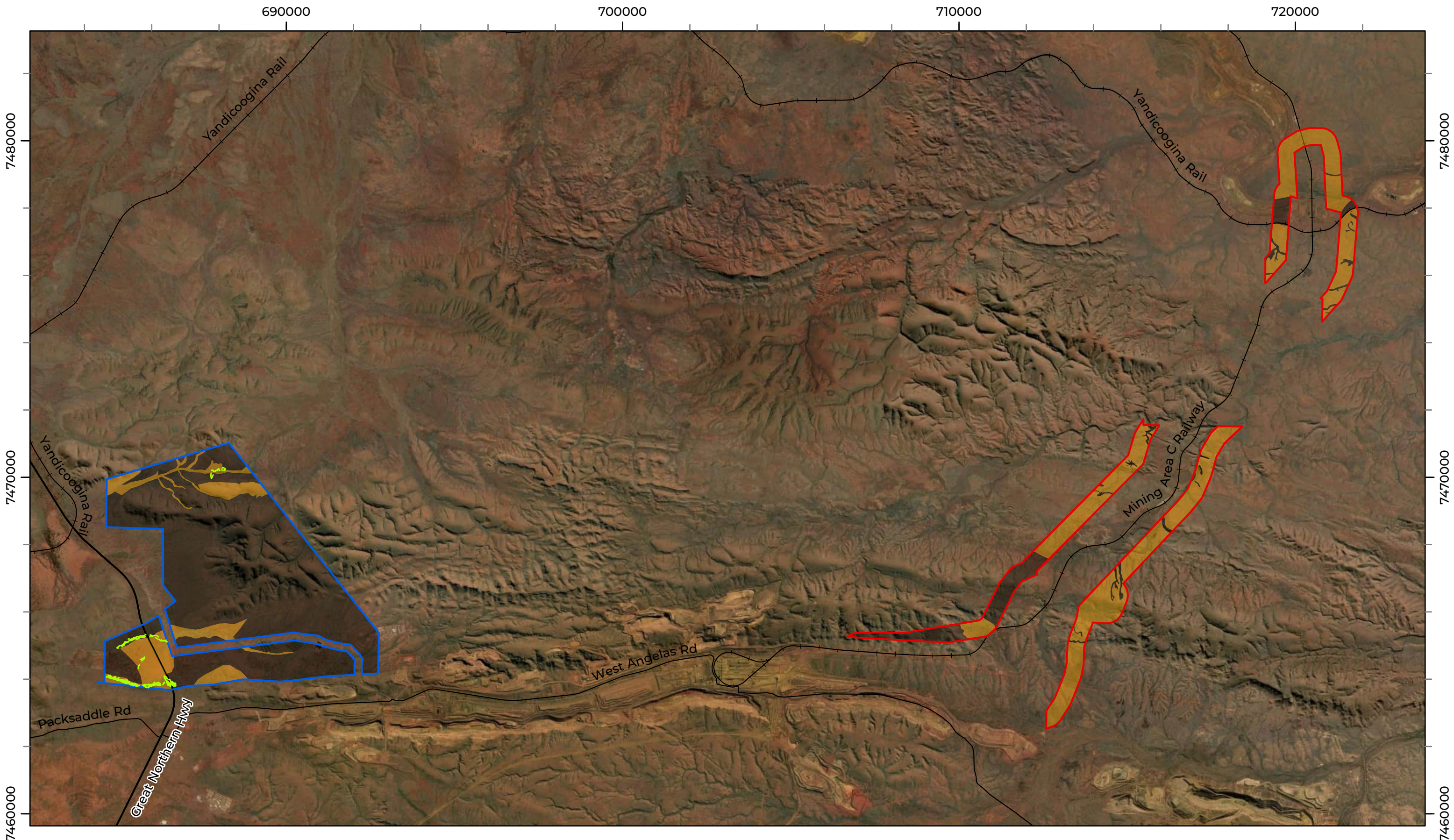
No evidence of greater bilby was recorded within the Study Area.

7.3.5 Discussion

Although the Study Area is located within the western extent of the current distribution of the greater bilby (DoE, 2022b), no evidence of their presence was recorded. There is only one recent record 26 km east north-east of the Study Area.

Within the Pilbara region, the species is often recorded within spinifex sandplains associated with paleo-drainage lines and perched drainage lines where the substrate of sand, soil, sandy clay, or sandy gravel is suitable for burrowing (Dziminski & Carpenter, 2017). Within these sandplain habitats, there is also an association with particular *Acacia* spp. containing root dwelling larvae that the species use for food resources (Dziminski & Carpenter, 2017).

Habitat within the Study Area is considered marginal for the greater bilby with minimal isolated spinifex sandplain habitat located within Drainage Area/ Floodplain, Sand Plain and the three drainage line habitats. It is considered unlikely that the greater bilby occurs within the Study Area due to the lack of extensive critical (e.g. sandplains) habitat and only marginally suitable supporting habitat present. This is supported by the lack of contemporary records in the vicinity of the Study Area. The Study Area is considered unlikely to support an 'important population' of greater bilby, as defined by DoE (2013a).



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Site Type

- Targeted Search

Habitat

- Critical
- Supporting
- Nil

Rail

- Rail

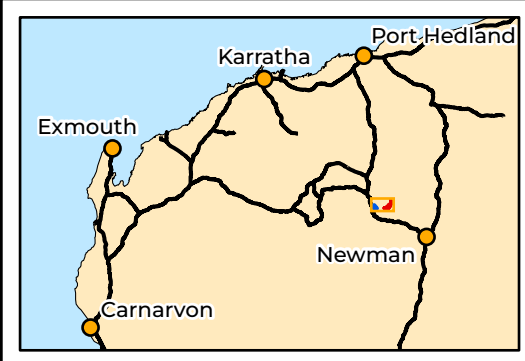


Biologic

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 20/10/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North
Targeted Vertebrate MNES Fauna Survey

Figure 7.6: Greater bilby sampling and habitat in the Study Area

7.4 Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* Pilbara form) – Vulnerable EBPC Act & BC Act

7.4.1 Species Profile

The Pilbara leaf-nosed bat is listed as Vulnerable under the EPBC Act and the BC Act. The Pilbara form is recognised as a geographically isolated population of the orange leaf-nosed bat, which is distributed across northern Australia and separated from the Pilbara population by approximately 400 km of the Great Sandy Desert (Armstrong, 2001). The Pilbara leaf-nosed bat is regarded as a single interbreeding population comprising multiple colonies (TSSC, 2016b; Umbrello *et al.*, 2022). Currently, there are 48 confirmed permanent diurnal Category 1 and 2 roost sites (17 of known location and 31 yet to be found) throughout the Pilbara region (Bat Call, 2021b).

Pilbara leaf-nosed bats typically roost in undisturbed caves, deep fissures or abandoned mine shafts (Armstrong, 2000, 2001). Its limited ability to conserve heat and water (Baudinette *et al.*, 2000) means they require warm (28–32°C) and very humid (85–100%) roost sites to persist in arid and semi-arid climates (Armstrong, 2001; Churchill, 1991). Roost sites with such attributes are relatively uncommon in the Pilbara and are the limiting factor of the species' distribution (Armstrong, 2001). During the dry season (June to November), individuals are believed to aggregate in roosts that provide a suitably warm, humid microclimates (Armstrong, 2000, 2001; Bullen & McKenzie, 2011). In the wet season (December to May), when conditions are generally wetter and more humid, individuals typically disperse, roosting in seasonally suitable features (Armstrong, 2000, 2001; Bullen & McKenzie, 2011). Bat Call (2021b) categorised underground refuges used by the species into four categories:

- **Permanent diurnal (Categories 1 and 2) roosts** – critical habitat that is essential for the daily and long-term survival of the Pilbara leaf-nosed bat. Category 1 are maternity roosts where seasonal presence of young is proven. Category 2 are occupied year-round but without the proven presence of young.
- **Semi-permanent diurnal (Category 3) roosts** – critical habitat that is essential for the long-term survival of the Pilbara leaf-nosed bat. Used diurnally during some part of the year but not occupied year-round. May be used during the breeding cycle and may facilitate long distance dispersal in the region, particularly in autumn. Often associated with nearby Category 1 or 2 permanent roost as a 'satellite' roost, that together make up a colony.
- **Nocturnal refuge (Category 4)** – not considered critical but important for persistence in the local area. Are occupied or entered at night for resting, feeding or other purposes, with perching not a requirement. Includes most moderately deep caves and shallow abandoned mines.

Foraging habitat was classified according to Bat Call (2021b) habitat ratings:

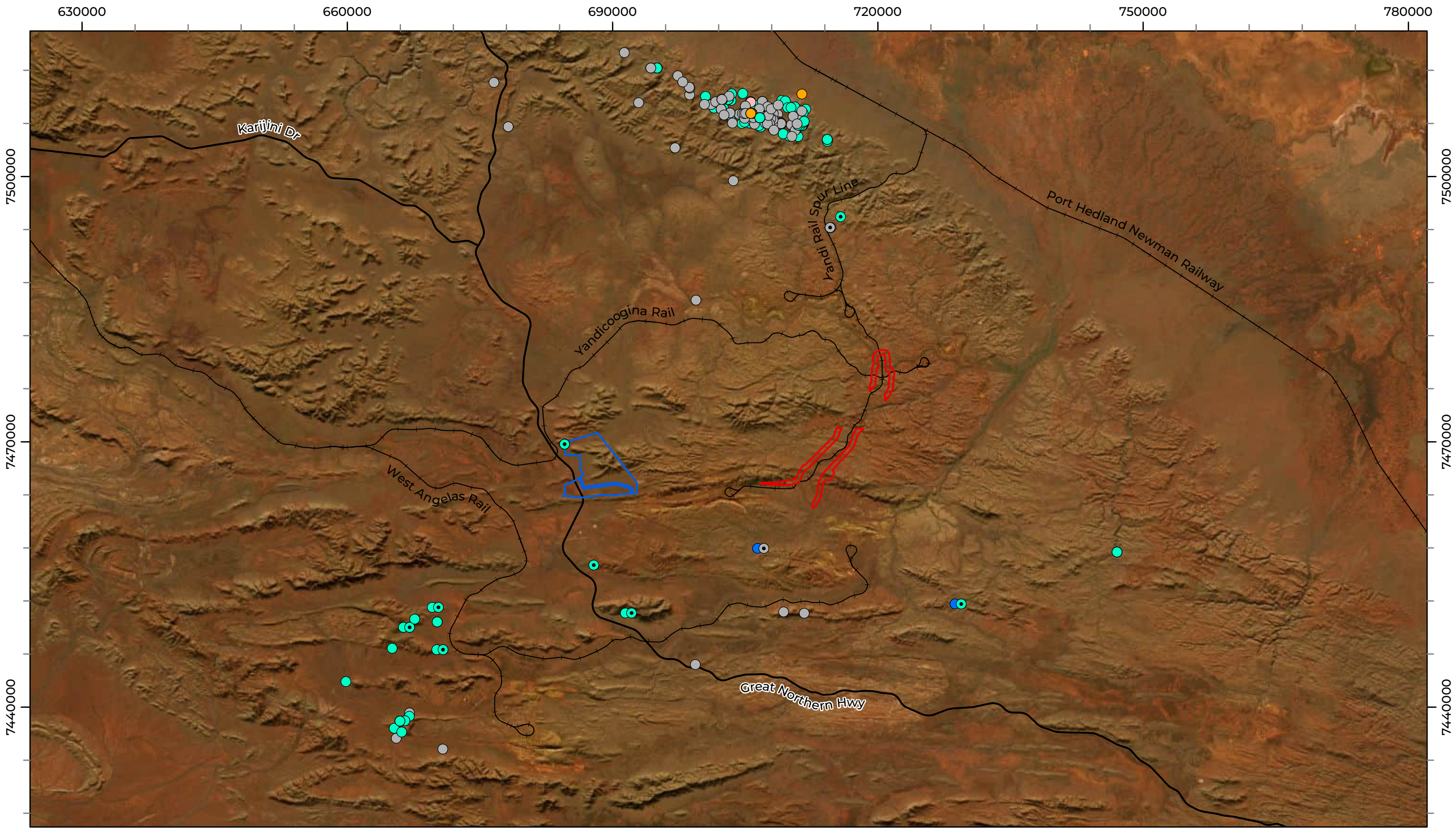
- **Habitat Rating 5 (outside a diurnal roost)** – Pilbara leaf-nosed bats are present permanently and will be detected nightly. Areas immediately outside a diurnal roost entrance.
- **Habitat Rating 4 (very high)** – Pilbara leaf-nosed bats are very likely to forage and/or drink if in range of a roost. Includes deep gorges.
- **Habitat Rating 3 (high)** – Pilbara leaf-nosed bats are likely to forage if in range of a roost. May be detected passing along creek lines, vegetation lines, rock faces or foraging in the most productive areas. Includes deep gorges.
- **Habitat Rating 2 (moderate)** – Pilbara leaf-nosed bats may occasionally forage due to presence of suitable vegetation, seasonal water and may also use areas as a flyway.
- **Habitat Rating 1 (low)** – Pilbara leaf-nosed bats are unlikely to forage but may traverse while crossing to more productive areas.
- **Habitat Rating 0 (poor)** – Pilbara leaf-nosed bats are unlikely to be detected. Includes bare open ground (e.g. salt and clay pans without vegetation and bare mesa and ridgeline tops).

Foraging sites surrounding known or suspected roosts can be critical to the survival of the species as the species forages within the vicinity of roost caves and more broadly along waterbodies with suitable fringing vegetation supporting prey species (TSSC, 2016b). It is predicted to travel up to 20 km from roost caves during nightly foraging in the dry season (Cramer *et al.*, 2016a) and up to 50 km during the wet season (Bullen, 2013), with one individual being recorded travelling 170 km from the Ratty Spring Roost near Paraburdoo to the Gudai-Darri roost (Bullen & Reiffer, 2019). The Study Area is located at the eastern extent of the current distribution of the Pilbara leaf-nosed bat, whereby the species or species' habitat may occur (DoE, 2022d).

7.4.2 Previous Records

The database search identified 1,627 records within 50 km of the Study Area (Figure 7.7). Only nine of these records occur within 15 km of the Study Area (with records from 2006, 2011, 2018 and 2022) (BHP WAIO, 2022; DBCA, 2022b). None of these records were recorded within the Study Area. The nearest is from a call recorded in 2011, approximately 800 m west of the Study Area.

The nearest known permanently occupied roost is the Gudai-Darri Adit, located approximately 40 km north of the Study Area; however, additional unknown and/or unlocated roost sites may occur closer to the Study Area.



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- State Road
- Rail

BHP (2024)

- Ultrasonic Recorder
- Unknown

DBCA (2024)

- Ultrasonic Recorder
- Individual (alive)
- Secondary Sign
- Specimen

Unknown



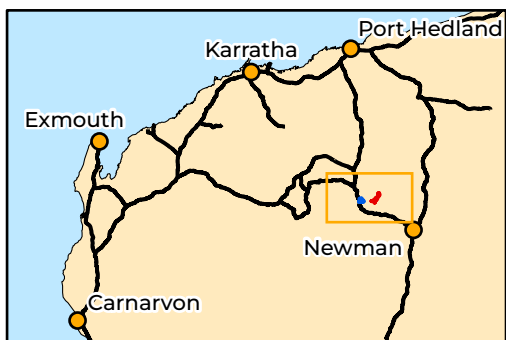
Biologic



Scale 1:400,000

0 5 10 15 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO

MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 7.7: Previous Pilbara
leaf-nosed bat records in the
Study Area and region

7.4.3 Survey Methods

7.4.3.1 Targeted Searches

Targeted searches were undertaken at 26 locations across the Study Area. The searches were conducted on foot to determine the presence of caves likely to be used by ghost bats and/or Pilbara leaf-nosed bats (Figure 7.8; Appendix G). Where potentially suitable caves or overhangs were located, external assessments were undertaken to search for evidence of occurrence and determine whether the cave should be revisited with a geotechnical engineer for a more detailed assessment. Approximately 65 person hours of search effort was undertaken (Figure 7.8; Appendix G).

7.4.3.2 Ultrasonic Recorders

Overnight recordings of bat echolocation calls were undertaken with Song Meter (SM4; Wildlife Acoustics Inc.) ultrasonic bat recorders at 28 sites (Figure 7.8; Appendix H). Detectors were placed near suitable habitat features, such as water holes, caves or foraging and dispersal corridors in Drainage Area/ Floodplain, Undulating Low Hills, Medium Drainage Line, Minor Drainage Line, Stony Plain, Gorge/ Gully, Breakaway/ Cliff and Artificial Wetland habitats. Recorders were deployed for three to four consecutive nights at each site, resulting in a total of 85 recording nights (Appendix H).

The audio settings used for the SM4 units followed the manufacturer's recommendations (Wildlife Acoustics, 2011, 2017) and were set to account for all species known to occur within the region (McKenzie & Bullen, 2009). All recordings were analysed by Robert Bullen of Bat Call WA for the presence of Pilbara leaf-nosed bat and ghost bat calls only.

7.4.4 Survey Results

Cave entry was not permitted during this survey. As such, the three caves recorded and visited during the survey remain unclassified, as the exterior observations were deemed insufficient to classify these caves (Figure 5.2; Table 5.2).

No calls from Pilbara leaf-nosed bats were recorded by ultrasonic recorders during the current survey.

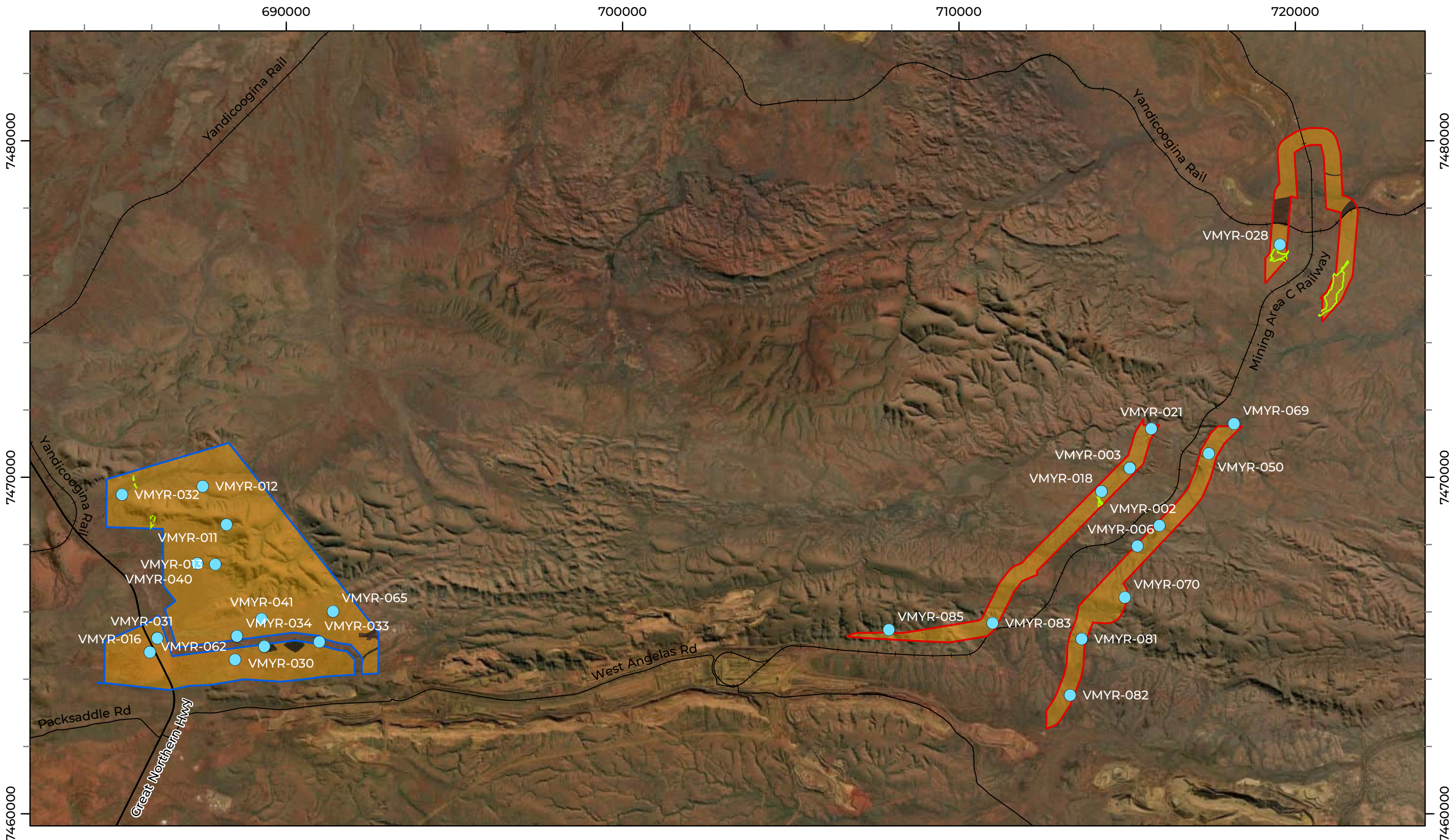
7.4.5 Discussion

No Pilbara leaf-nosed bats records and no caves deemed to be critical habitat for the species were found within the Study Area. The nearest known permanently occupied roost is the Gudai-Darri Adit, located approximately 30 km north of the Study Area; however, additional unknown and/or unlocated roost sites may occur closer to the Study Area.

No habitat within the Study Area is considered critical for the Pilbara leaf-nosed bat, as it is not within <20 km of any known diurnal (i.e. Category 1, 2 or 3) roosts (Bat Call, 2021b). All habitats within the Study Area provide supporting habitat for the Pilbara leaf-nosed bat

except for Cleared/ Disturbed areas (1.84%, 4.65ha) (Figure 7.8). The Breakaway/ Cliff (0.77%, 40.63 ha) and Artificial Wetland (0.09%, 4.65 ha) habitats are classified as Habitat Rating 4 (Very High), Gorge/ Gully (5.67%, 299.40 ha) and Major Drainage Line habitat (1.29%, 68.06 ha) are classified as Habitat Rating 3 (High), and Stony Plain (28.59%, 1,508.65 ha), Undulating Low Hills (24.26%, 1,280.06 ha), Hillcrest/Hillslope (25.57%, 1,349.70 ha), Drainage Area/ Floodplain (5.14%, 271.09 ha), Minor Drainage Line (2.66%, 140.42 ha), and Medium Drainage Line (0.40%, 21.12 ha) habitats provide supporting foraging and dispersal habitat and are classified as Habitat Rating 2 (Moderate) (Bat Call, 2021b). The Study Area also contains water features likely to provide supporting foraging habitat for the Pilbara leaf-nosed bat (Figure 5.2; Table 5.3).

The Pilbara population is regarded as a single interbreeding population (TSSC, 2016b; Umbrello *et al.*, 2022), and therefore, the entire population of Pilbara leaf-nosed bat present is classified as an 'important population'. The Study Area is considered unlikely to represent a significant area for Pilbara leaf-nosed bats based on the absence of Category 1, 2 and 3 roosts, as stipulated by (Bat Call, 2021b). It is considered likely that the Pilbara leaf-nosed bat may occur within the Study Area as an infrequent visitor (during foraging/ dispersal).



LEGEND

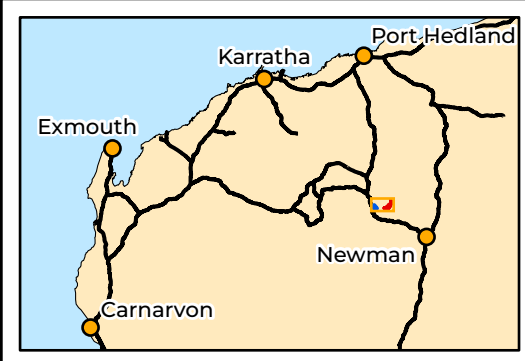
Study Area	Rail	Site Type	Habitat
MAC to Yandi Corridor	Ultrasonic recorder	Supporting	Nil
Runaway Valley North	Targeted Search		
Local Road			
State Road			

Biologic

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 7.8: Pilbara leaf-nosed bat sampling and habitat in the Study Area

7.5 Night Parrot (*Pezoporus occidentalis*) – Critically Endangered EPBC Act & Critically Endangered BC Act

7.5.1 Species Profile

The night parrot is an elusive, nocturnal ground dwelling parrot listed as Critically Endangered under the EPBC Act and Critically Endangered under the BC Act. The species inhabits arid and semi-arid areas that contain dense, low vegetation (DBCA, 2024a). Based on accepted records the species' habitat consists of *Triodia* grasslands in stony or sandy environments (McGilp, 1931; North, 1898; Whitlock, 1924; Wilson, 1937), samphire and chenopod shrublands, including genera such as *Atriplex*, *Bassia* and *Maireana*, on floodplains and claypans, as well as on the margins of salt lakes, creeks or other sources of water (McGilp, 1931; Wilson, 1937). The current guidelines for preliminary surveys of night parrot in Western Australia suggest the species requires old-growth spinifex (*Triodia*) (often more than 50 years' unburnt) for roosting and nesting (DBCA, 2024a).

Although little is known about foraging sites, habitats that comprise various grasses and herbs are thought to be suitable (DBCA, 2024a; Murphy *et al.*, 2017). Foraging habitat is not necessarily within or adjacent to roosting habitat as the night parrot has been known to fly up to 10 km or further in a single night to forage (Murphy *et al.*, 2017). It is assumed that the species may fly cumulative distances of up to 100 km per night during productive seasons and considerably greater than 100 km per night during drought conditions (Night Parrot Recovery Team, 2017). *Triodia* is likely to provide a good seasonal food resource, particularly in times of mass flowering and seeding. *Sclerolaena* and other succulent chenopods also provide a source of food and moisture throughout the year, and are also likely to provide significant habitat (DBCA, 2024a). Foraging habitat is likely to be more important when it occurs adjacent to or within approximately 10 km of suitable roosting habitat (DBCA, 2024a).

The distribution of the night parrot is very poorly understood. The small number of confirmed/ verifiable records prevents the population size from being assessed with high accuracy; however, the effective population size has been recently estimated at 100 individuals across the two extant populations in southwest Queensland and the northern interior of Western Australia (Yeap *et al.*, 2025). The largest known population, occurring in the Great Sandy Desert region of Western Australia, has been tentatively estimated to consist of 40 to 50 birds (Ngururpa Rangers *et al.*, 2024).

7.5.2 Previous Records

The database search identified three records within 50 km, all recorded by acoustic recorder approximately 32 km south-west of the Study Area in 2017. The most recent nearby night parrot record was recorded approximately 50 km north-east of the Study Area, was recorded from FMG's Cloudbreak mine in 2021 (FMG, 2021) (Table 7.2). This was the first record to demonstrate night parrot persisting in suitable habitat areas adjacent to active mining

operations. The species was previously recorded in the vicinity of Cloudbreak mine (Minga Well) in 2005, prior to the mine's construction (Davis & Metcalf, 2008) (Table 7.2). The 2005 record is from an artificial water source from a pastoral bore that was heavily degraded by cattle and lacking an understory; however, larger patches of old-growth *Triodia* grasslands were noted to occur in the vicinity near the Fortescue Marsh and chenopod shrublands occur within the marsh itself. More recent records (2020-2023) are from further east in the Great Sandy Desert region, where 10 roosting areas were identified on the Ngururrpa Indigenous Protected Area (IPA), and a population of at least 40-50 night parrots was estimated (Ngururrpa Rangers *et al.*, 2024). However, it is important to consider that the night parrot is especially cryptic and rare in occurrence and therefore records to date may underestimate the occurrence of the species.

Table 7.2: Previous records of night parrot within Western Australia

Location	Date of Observation	Source	Distance from Study Area	Recorded Habitat Type/ Comments
~10km WSW of West Angeles camp	13/08/2017, 14/08/2017 and 15/08/2017	(DBCA, 2025b)	~32km SW	3 records of acoustic recordings on 3 consecutive nights
Minga Well, south of Cloudbreak mine site	12/04/2005	Davis and Metcalf (2008)	~50 km NE	Mulga woodland. No understorey Artificial water source from a pastoral bore. 3 individuals observed at dusk in a targeted survey
Adjacent to Cloudbreak mine	~2021 (exact date not given)	(FMG, 2021)	~50 km NE	Not noted but located near Fortescue Marsh Adjacent to mining operations
Moojarri Well	~2005 (exact date not noted)	Biota (2005b)	~55 km NE	Not noted Unconfirmed Biota record between Fortescue Marsh and FMG phase B Rail Corridor
Vacant crown land	15/07/1970	DBCA (2022a)	Undisclosed location	Spinifex grassland (Spinifex and scattered gums), crest/summit Four individuals observed
Martu country (Great Sandy and Little Sandy Deserts)	~2020 (exact date not provided)	Michelmores and Birch (2020)	Undisclosed location	Salt Lake system Acoustic recording
Matuwa (Lorna Glen)	24/11/2009 05/12/2009	Hamilton <i>et al.</i> (2017)	~400 km SE	Lake system-native and introduced grasses, samphire, sedges, chenopods; thick <i>Eremophila</i> , Mulga and grasses One individual each night
East Murchison	March 2017	Night Parrot Recovery Team (2017), Jackett <i>et al.</i> (2017)	Undisclosed location	Spinifex hummock grassland on sandy substrate, encompassed by mulga woodland and a breakaway, separated from the <i>Triodia</i> by an open plain of samphire Living individuals and an active nest
Winu Project, Martu country	July 2024	JYAC (2025)	~350 km NE	Old growth spinifex; located at a potential regional borefield site southeast of the Winu deposit

Location	Date of Observation	Source	Distance from Study Area	Recorded Habitat Type/ Comments
Telfer area, Great Sandy Desert	Oct–Nov 2020 April–May 2021 (exact date not given)	Biologic (2021a)	~340 km NE	Spinifex hummock grassland on sandy loam substrate, with scattered <i>Acacia</i> shrubs and eucalypts. Acoustic recordings (two confirmed and one unconfirmed)
Ngururrpa IPA, Great Sandy Desert	2020 -2023	Ngururrpa Rangers <i>et al.</i> (2024)	~900 km E	Spinifex hummock grass on ironstone or laterite gibber plains; trees generally absent from roosting habitat but occasional <i>Acacia</i> shrubs Detected at 17 of 31 sites, with the population estimated at least 40-50 individuals

7.5.3 Survey Methods

7.5.3.1 Acoustic Recorders

Song Meter (SM4; Wildlife Acoustics Inc.) acoustic recorders were deployed at 11 sites within the Study Area (Table 7.3; Figure 7.9). Units were placed within habitat considered most suitable for roosting and nesting as recommended by DBCA (2024a). Acoustic recorders were deployed for between six and eight consecutive nights each, for a total of 77 recording nights, and data was analysed for night parrot calls by specialist Louis Maserai (Malu Fauna).

7.5.3.2 Targeted Searches

Targeted searches were undertaken at one location (VMYR-079) within the Study Area. The search was conducted on foot to determine the presence of suitably sized spinifex patches likely to be used by night parrots. Approximately three person hours of search effort was undertaken (Figure 7.9; Appendix G).

Table 7.3: Acoustic sampling for night parrot within the Study Area

Site	Habitat	Deployment	Retrieval	Sampling Nights
VMYR-061	Drainage Area/ Floodplain	21/05/2025	28/05/2025	7
VMYR-039	Stony Plain	21/05/2025	28/05/2025	7
VMYR-064	Stony Plain	21/05/2025	28/05/2025	7
VMYR-072	Hillcrest/ Hillslope	22/05/2025	29/05/2025	7
VMYR-001	Undulating Low Hills	22/05/2025	29/05/2025	7
VMYR-007	Gorge/ Gully	22/05/2025	29/05/2025	7
VMYR-026	Undulating Low Hills	22/05/2025	29/05/2025	7
VMYR-024	Stony Plain	22/05/2025	29/05/2025	7
VMYR-047	Stony Plain	22/05/2025	30/05/2025	8

VMYR-076	Gorge/ Gully	22/05/2025	29/05/2025	7
VMYR-038	Drainage Area/ Floodplain	23/05/2025	29/05/2025	6
Total acoustic recorders deployed				11
Total trap nights				77

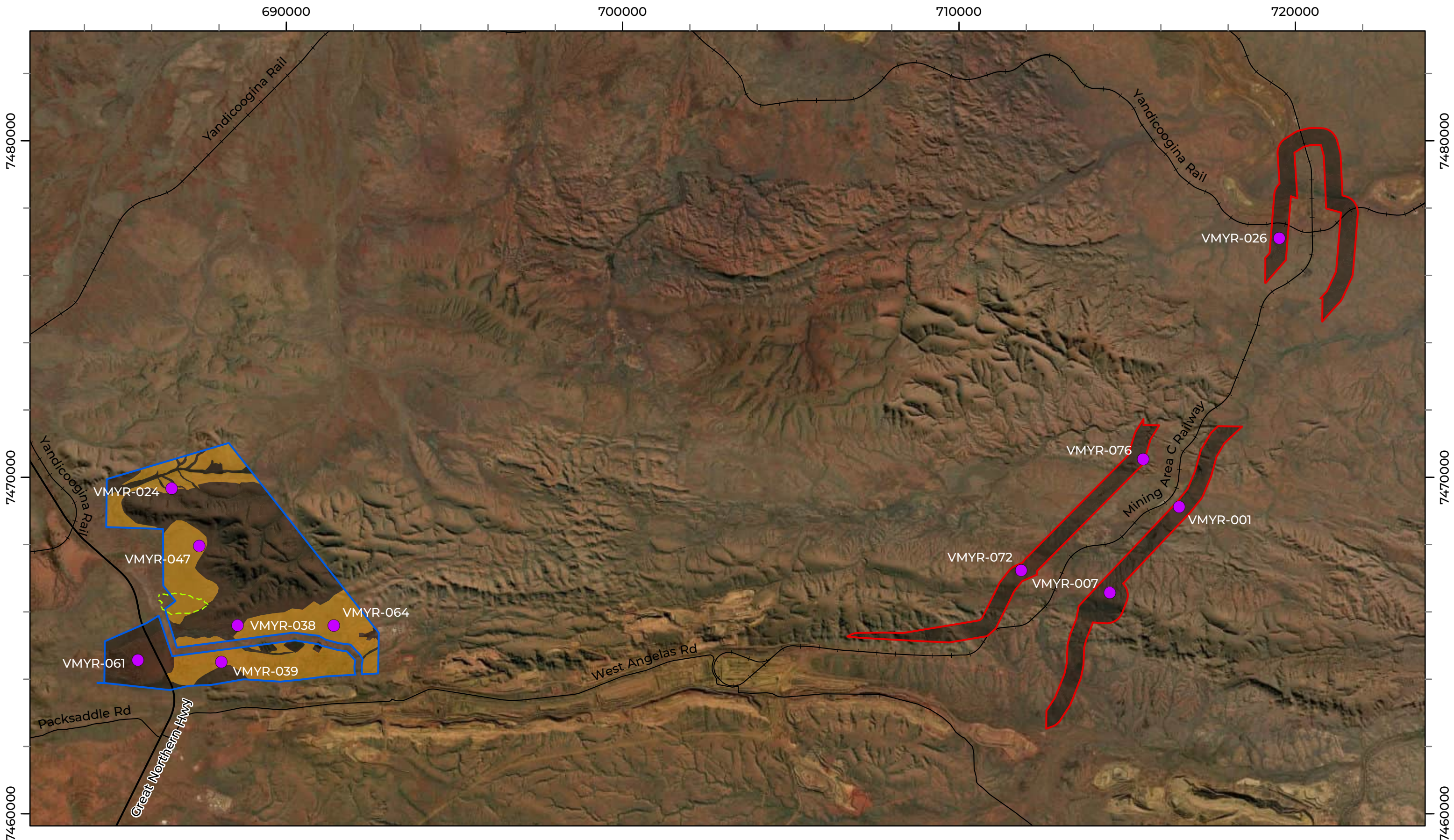
7.5.4 Survey Results

No evidence of night parrot was recorded.

7.5.5 Discussion

The distribution of the night parrot is poorly understood in Western Australia; however, the Study Area occurs within the species' potential distribution, as currently mapped by (DoEE, 2018b). No evidence of occurrence of night parrot was recorded within the Study Area during the survey, including from targeted searches and acoustic recorders deployed in areas of marginally suitable habitat. Potential supporting habitat within the Study Area is provided by Stony Plain (28.59%, 1,508.65 ha), however, habitat within the Study Area was considered sub-optimal for the species, with the lack of large *Triodia* grasslands, long-unburnt hummocks and the absence of any chenopod shrubland habitat.

There is still a lot to be known about the habitat preferences and occurrence of the night parrot within the Pilbara region, particularly with the extent of which habitats may still provide refuge for the species. With the most recent record occurring 32 km from the Study Area and with the absence of any habitat that is considered to be of significance to the species, it is unlikely that night parrots would occur as a resident or infrequent visitor during foraging and/ or dispersal.



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Rail

Site Type

- Acoustic recorder
- Targeted Search

Habitat

- Supporting
- Nil



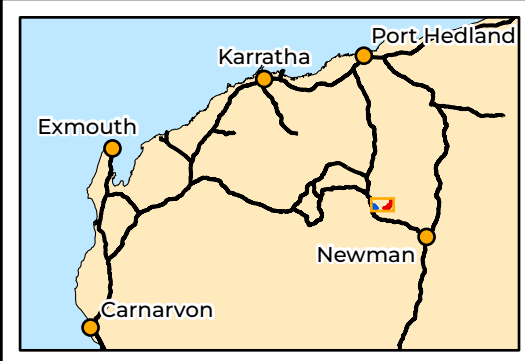
Biologic

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Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator

Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 7.9: Night parrot
sampling locations and
habitat in the Study Area**

7.6 Grey Falcon (*Falco hypoleucos*) – Vulnerable EPBC Act & BC Act

7.6.1 Species Profile

The grey falcon is listed as Vulnerable under the EPBC Act and the BC Act and is widely distributed over the northern parts of Australia's arid and semi-arid zone (Mullin *et al.*, 2020). Climate characteristics appear to play a crucial role in this species' distribution (Schoenjahn *et al.*, 2019), perhaps because these birds rely on low levels of relative humidity for efficient evaporative cooling (Schoenjahn *et al.*, 2022). Recent studies suggest the grey falcon comprises a single, widely distributed interbreeding population (although there may be weak population structure between breeding grounds in the east and west of Australia) with around 1,415 females (Mullin *et al.*, 2020). The Pilbara is thought to potentially be a stronghold (Sutton, 2010).

Grey falcons do not appear to be associated with particular vegetation types (Schoenjahn *et al.*, 2019); they often sit motionless in the canopies of trees or dead branches of eucalypts (Falkenberg, 2010). It tends to prefer sparsely-treed, open plains and creek lines for hunting (Olsen & Olsen, 1986).

Breeding takes place between mid to late winter and the end of spring (Schoenjahn *et al.*, 2019). Breeding habitat comprises riparian vegetation as well as other productive 'oases' within arid environments, though not necessarily immediately adjacent to waterholes (Sutton, 2010). Nesting often occurs in the abandoned nest of a raptor or corvid in trees or tall infrastructure such as power line towers or communications towers (Olsen & Olsen, 1986; Schoenjahn *et al.*, 2019). Within the Pilbara, nests (made using disused stick nests of crows) were observed in two riparian eucalypts (*Eucalyptus coolabah* and *E. camaldulensis*; 23 km apart) on a dry river bed (Sutton, 2010). Ten years later, the area had a lot of scrubby regrowth and the grey falcons were absent (Sutton, 2010). Above-average rainfall in the first half of the year may encourage breeding if summer rainfall triggers growth of seed grasses which in turn increases abundance of granivorous birds which the species prey on (Sutton, 2010).

Grey falcons have an almost exclusive diet of birds, especially budgerigars (*Melopsittacus undulatus*), pigeons, doves and zebra finches (*Taeniopygia castanotis*) but can, under unusual circumstances, include small non-avian species (Schoenjahn, 2013). Whether they scavenge carrion has been disputed, although they do have a tendency to consume their prey on the ground, sometimes by the side of roads and tracks (Schoenjahn, 2018).

Modelling by Runge *et al.* (2014) estimated the minimum range size as 882,558 km². Recent research has shown that it is a 'reluctant nomad'; only if conditions become a risk to their survival are they likely to move on and then, when they do, they move no further than necessary (Schoenjahn, 2018). The grey falcon tends to stay and forego breeding rather than search for more favourable conditions (Schoenjahn, 2018). In general, it tends to keep physical activity levels low (Schoenjahn *et al.*, 2022).

7.6.2 Previous Records

The desktop assessment returned six records of grey falcon within 50 km of the Study Area (Figure 7.10) (BHP WAIO, 2025; DBCA, 2025b). Of the six records, one occurred in 2024 (two individuals observed) approximately 6 km west south-west of the Study Area, one occurred in 2014 approximately 27 km west north-west of the Study Area, three occurred in 2008 approximately 10 km from the Study Area and one occurred in 1997 approximately 23 km south south-west of the Study Area.

7.6.3 Survey Methods

7.6.3.1 Targeted Searches

A total of seven targeted searches were undertaken within the Study Area, focusing on the Major Drainage Line, Medium Drainage Line, Drainage Area/ Floodplain, Undulating Low Hills, Hillcrest/ Hillslope, Hardpan Plain and Stony Plain habitat (Figure 7.11; Appendix G). Grey falcon is largely an opportunistically recorded species. Given that there was limited preferred habitat for the species, most of the targeted searches were undertaken alongside targeted searches for other species, including ghost bat, Pilbara leaf-nosed bat, Pilbara olive python, and southern whiteface. A total of 15 person hours were undertaken (Appendix G). Opportunistic searches were also undertaken whilst undertaking sampling for other target species and traversing the Study Area.

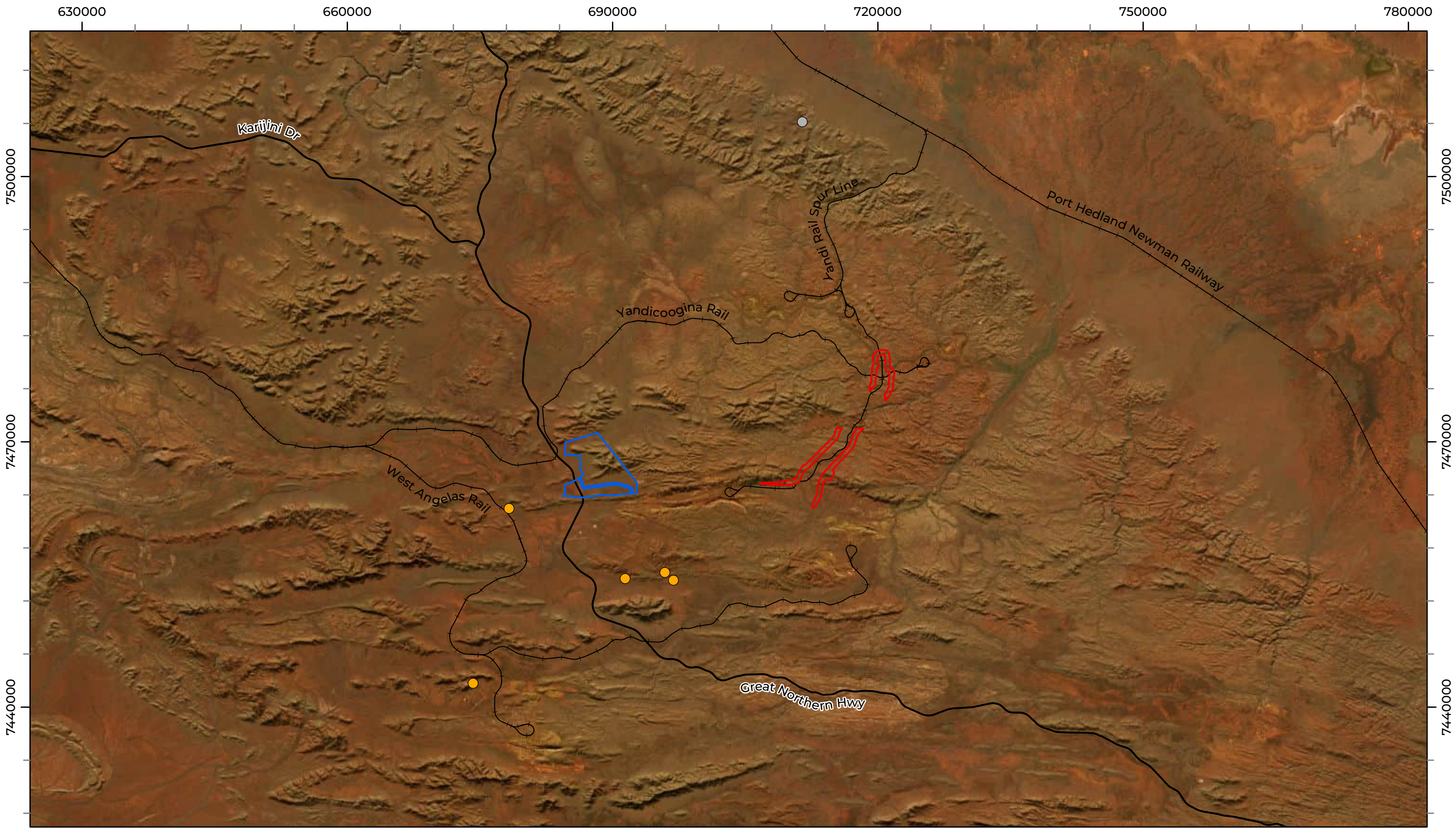
7.6.4 Survey Results

No evidence of grey falcon was recorded.

7.6.5 Discussion

The grey falcon comprises a single interbreeding population within the Pilbara (Mullin *et al.*, 2020). The Pilbara is thought to provide a key environment for the species survival and thus, any grey falcon present in the Pilbara is considered to be part of an 'important population' (Sutton, 2010).

Major Drainage Line (1.29%, 68.06 ha) and Medium Drainage Line habitats (0.40%, 21.12 ha) recorded within the Study Area are considered potential critical habitat for the species where suitable tall trees for nesting are present, however, no evidence of nests were recorded. The Drainage Area/ Floodplain (5.14%, 271.09 ha), Artificial Wetland (0.09%, 4.65 ha) and Minor Drainage Line (2.66%, 140.42 ha) may provide supporting habitat for foraging and dispersal for the species. This species is likely to only occur transiently within the Study Area and is unlikely to be reliant on habitats within the Study Area for long-term survival on a local or regional scale unless breeding occurs.



LEGEND

- Study Area

 - MAC to Yandi Corridor
 - Runaway Valley North
- DBCA (2024)

 - Individual (alive)
 - Unknown
- State Road
- Rail

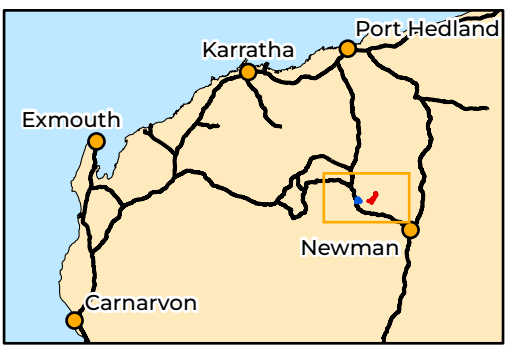


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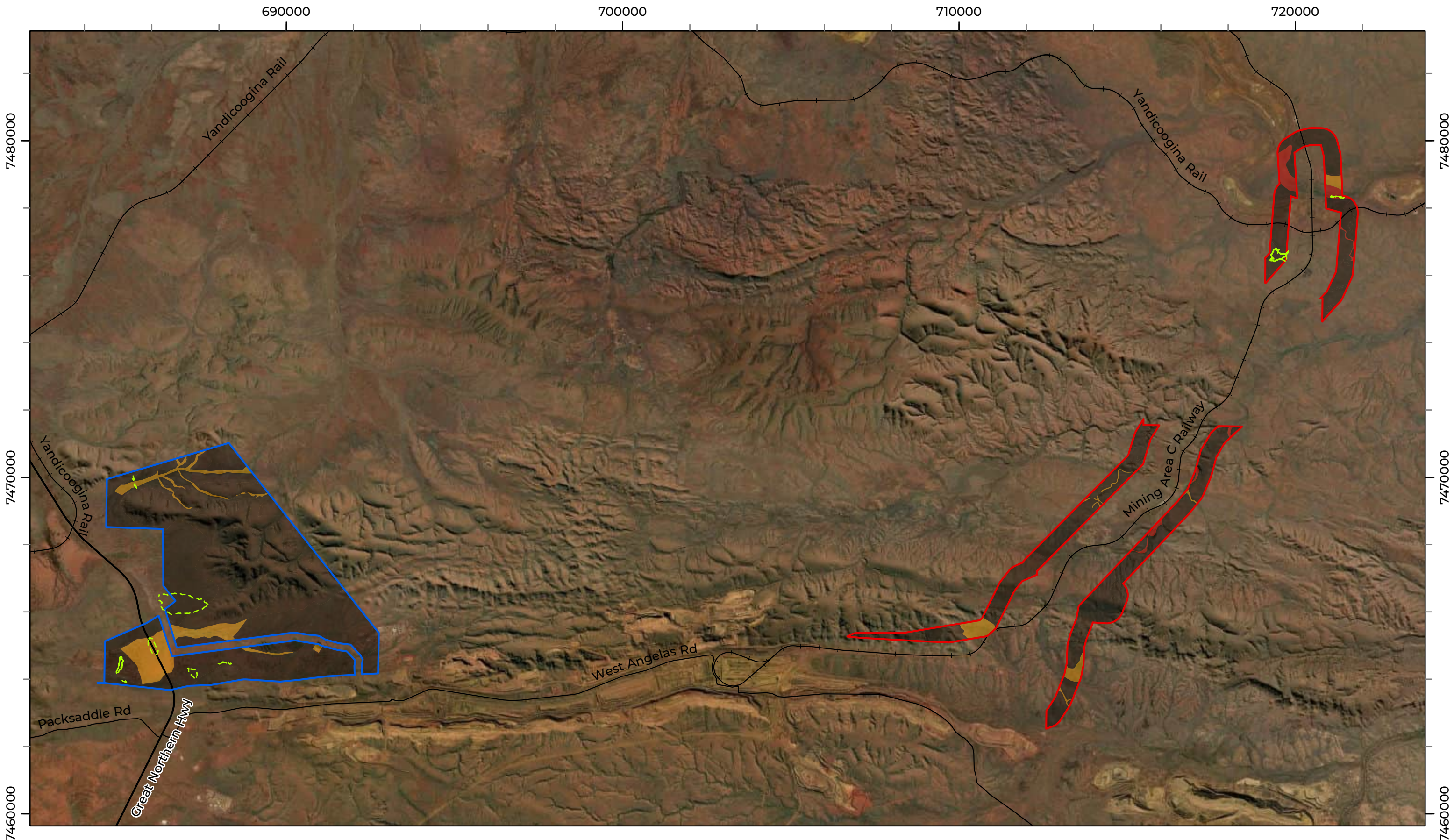
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BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

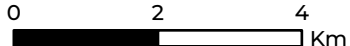
Figure 7.10: Previous grey falcon records in the Study Area and region



LEGEND

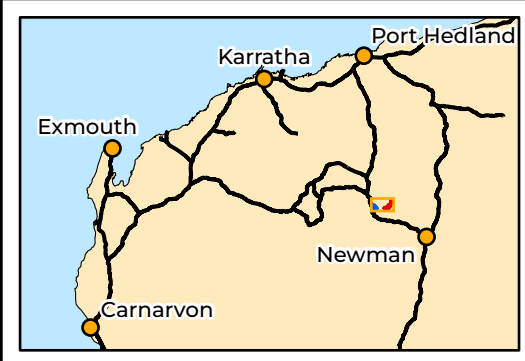
Study Area	Rail	Site Type	Habitat
MAC to Yandi Corridor	Targeted Search	Critical	
Runaway Valley North		Supporting	
Local Road		Nil	
State Road			

**Biologic**



Scale 1:105,000

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 7.11: Grey falcon
sampling locations and
habitat in the Survey Area**

7.7 Southern Whiteface (*Aphelocephala leucopsis*) – Vulnerable EPBC Act

7.7.1 Species Profile

The southern whiteface is distributed across the majority of mainland Australia, inhabiting a variety of open woodlands and shrublands containing an understorey of grasses or shrubs, or both (Higgins & Peter, 2002). The distribution within the Pilbara is largely outside the “known” mapped distribution, with the Study Area mapped as the “species or species habitat may occur” (DCCEEW, 2023). Typically these woodlands are dominated by acacias or eucalyptus on ranges, foothills and lowlands and plains (Higgins & Peter, 2002). The species is considered to be sedentary; however, records suggest that individuals move to wetter areas outside their normal range during drought conditions (Higgins & Peter, 2002). Southern whiteface primarily forage on the ground, preferring areas with sparse tree cover and an herbaceous understory litter cover, primarily feeding on insects, spiders, and seeds (DCCEEW, 2023; Higgins & Peter, 2002). The species commonly forages in small groups of two to eight individuals, however, may flock in larger foraging parties during the winter months with as many as 70 individuals previously recorded (Higgins & Peter, 2002).

Breeding takes place between July to October, however exact timing in arid regions through the species range can be impacted by rainfall; individuals may breed outside of the known range following sufficient rainfall events, or not at all during periods of drought (Higgins & Peter, 2002). Nesting often occurs in a hollow or crevice, and less frequently in low bushes, where nests are made of a combination of grass, bark and roots forming a large, dome-like shape (Higgins & Peter, 2002). Southern whiteface are typically observed to nest in pairs, however little is known about the species’ social organisation (DCCEEW, 2023). Cooperative breeding has been recorded, with multiple instances of up to four adults participating in chick rearing (Higgins & Peter, 2002).

7.7.2 Previous Records

The species has been recorded on two occasions, 18.1 km south-east and 39.7 km north-west of the Study Area from 2007 and 2008 (ALA, 2025). These are the only records of the species within 40 km of the Study Area (Figure 7.12). The most recent records of the species from 2022 and 2023 occur on the northwest edge of Jigalong Aboriginal Reserve, 142 km south-east of the Study Area (ALA, 2024).

The scarcity of southern whiteface records in the broader vicinity of the Study Area may be attributed to the Study Area’s occurrence in the north-western peripheral of the species distribution, whereby the species may naturally occur at a lower abundance which has resulted in fewer records of the species. Additionally, the species’ EPBC Act status has only recently been updated to Vulnerable, which could also be a contributing factor (i.e. less/no specific consideration during previous surveys in the vicinity of the Study Area).

7.7.3 Survey Methods

7.7.3.1 Avifauna Census

Avifauna sampling was undertaken whilst undertaking targeted searches in suitable habitat throughout the Study Area; sampling was undertaken during periods of likely activity, with a focus on recording either direct observation, calls and/or secondary evidence (e.g. nests, feathers and/or tracks) (Figure 7.13; Appendix G).

7.7.4 Survey Results

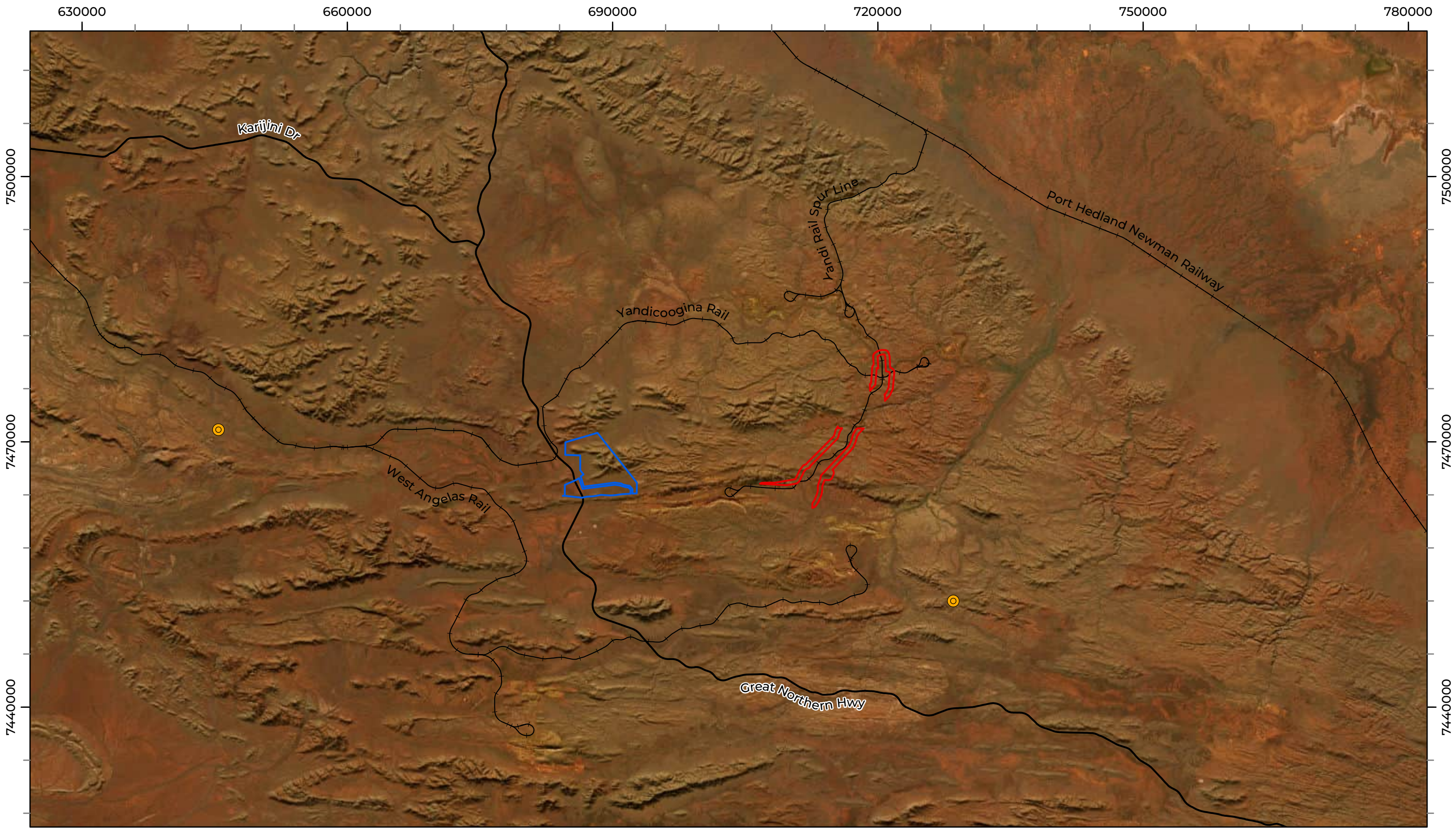
No southern whiteface or evidence of the species' occurrence was recorded during the survey.

7.7.5 Discussion

The Study Area is outside the modelled distribution for which the species or species habitat is known or likely to occur; however, the Study Area is located within the modelled distribution for which the species or species habitat may occur (DCCEEW, 2023). Drainage Area/ Floodplain (5.14%, 271.09 ha), Major Drainage Line (1.29%, 68.06 ha) and Medium Drainage Line (0.40 %, 21.12 ha) habitats within the Study Area are likely to provide potential critical nesting/ breeding, foraging and dispersal for southern whiteface where the habitat contains more suitable vegetation characteristics (i.e. open woodland/ shrubland with good understorey of grasses/ shrubs crating crevices for nesting) over the other habitats in the Study Area. Stony Plain (28.59%, 1,508.65 ha), Sand Plain (0.96%, 50.66 ha), Hardpan Plain (2.76%, 145.72 ha) and Minor Drainage Line (2.66%, 140.42 ha) habitats provide suitable foraging and dispersal habitat for the species. Suitability of these habitats within the Study Area is variable, depending on particular habitat characteristics, including the presence of an understorey of grasses or shrubs, or both, with low tree densities and an herbaceous understorey litter cover (DCCEEW, 2023). The species may also forage and disperse more broadly across other habitats where suitable vegetation cover is present.

No southern whiteface records were made during the survey and there is a scarcity of records in the broader vicinity. However, the species conservation status has only recently been updated to Vulnerable under the EPBC Act, and as such may not have been previously subjected to the same targeted search effort in the region as other significant fauna during historic surveys (which predominantly targeted significant species or were basic surveys), and other records may be present. The Study Area occurs on the north-western periphery of the species distribution (DCCEEW, 2023), and as such any records present may represent part of or contribute to an important population of the species, with the habitats within the Study Area potentially relied upon for individuals for persistence at a local and/or regional scale. However, there is a level of uncertainty due to the species distribution only extending into the southern edges of the Pilbara, with its core range in the Gascoyne and Murchison

(DCCEEW, 2023). Given these factors and the presence of suitable habitats the species is considered possible to occur within the Study Area.



LEGEND

- Study Area

 - MAC to Yandi Corridor
 - Runaway Valley North
- ALA (2024)

 - Individual (alive)
- State Road
- Rail

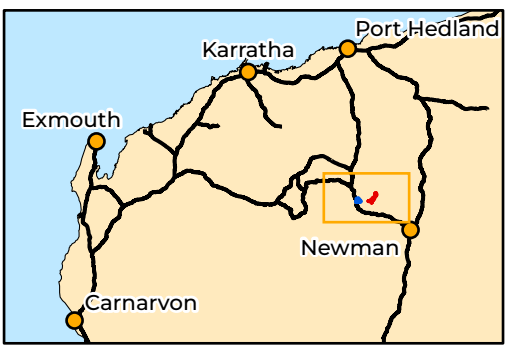


Biologic

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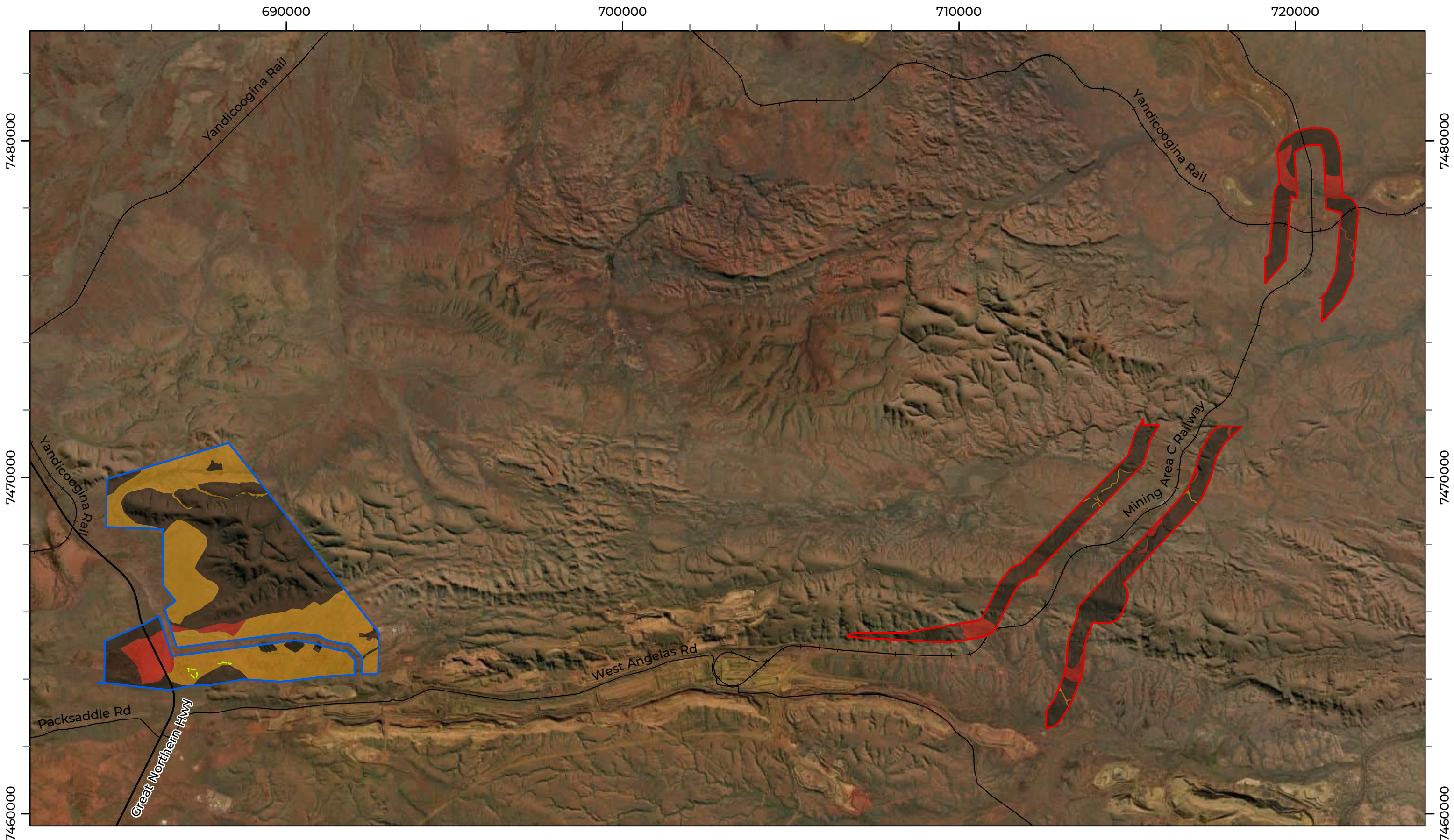
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Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 7.12: Previous
southern whiteface records
in the Study Area and region

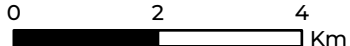


LEGEND

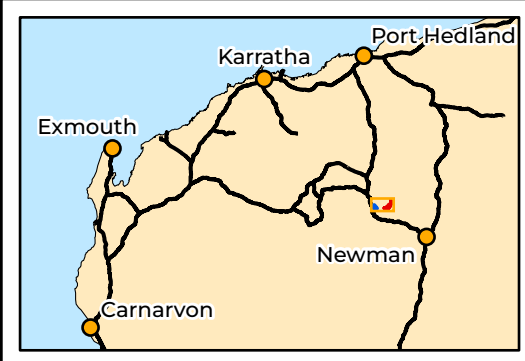
Study Area	Rail	Site Type	Habitat
MAC to Yandi Corridor	Targeted Search	Critical	
Runaway Valley North		Supporting	
Local Road		Nil	
State Road			

**Biologic**



Scale 1:105,000
 0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

Figure 7.13: Southern whiteface
and princess parrot sampling
locations within the Survey Area

7.8 Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) – Vulnerable EPBC Act & BC Act

7.8.1 Species Profile

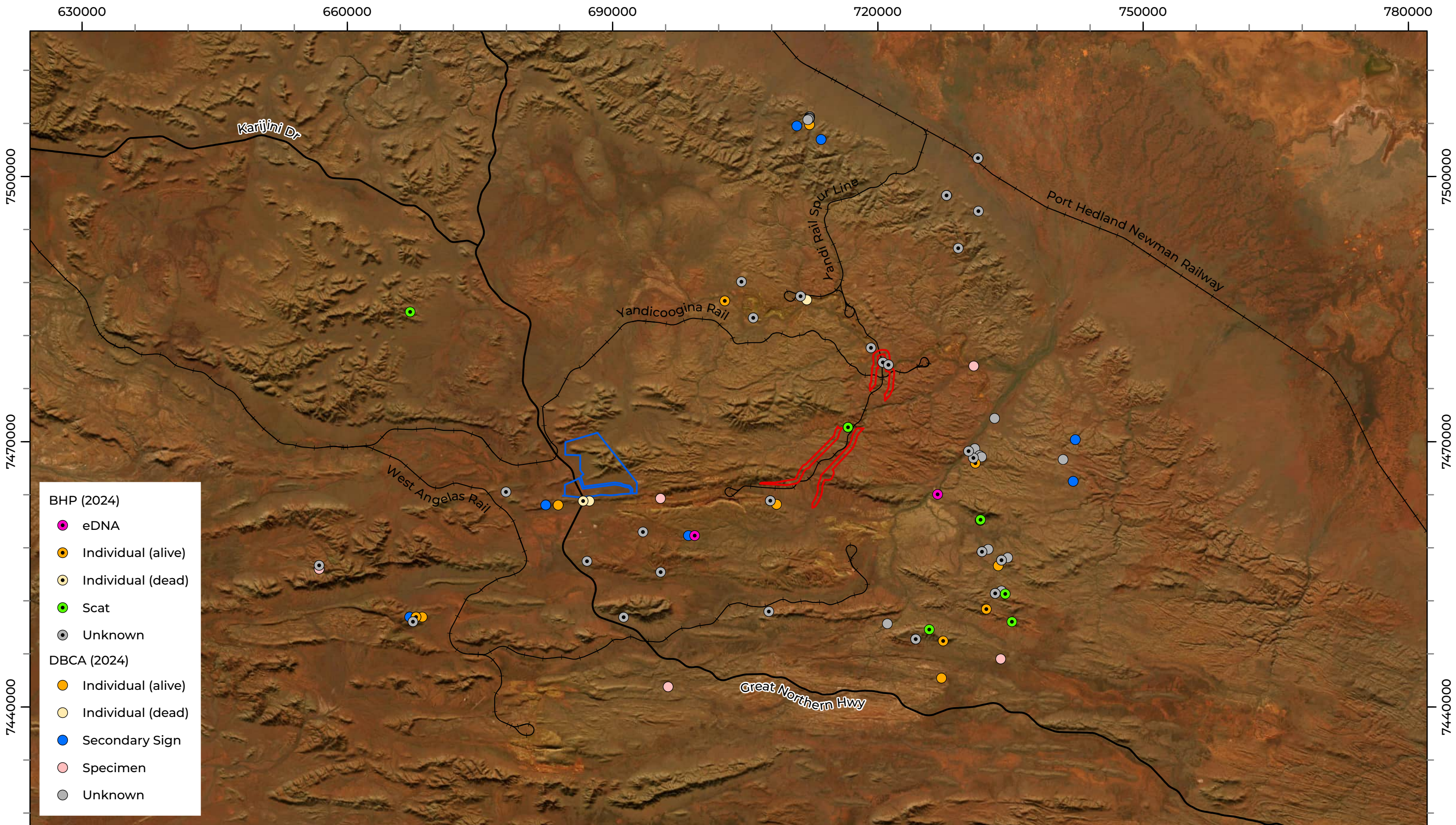
The Pilbara olive python is listed as Vulnerable under the EPBC Act and the BC Act. It is Western Australia's largest snake, averaging 2.5 metres (m) in length, with records up to 4.5 m (Bush & Maryan, 2011; Cogger, 2014). It has a dull olive-brown upper surface and is pale cream below (Burbidge, 2004; Cogger, 2014). It is endemic to the Pilbara and northern parts of the Gascoyne bioregions, distributed from Burrup Peninsula, Ord Ranges and Meentheena south to Nanutarra and Newman in the Pilbara, with an isolated population occurring at Mt Augustus in the Gascoyne region (Bush & Maryan, 2011; Storr *et al.*, 2002).

It is primarily nocturnal and tends to shelter amongst rocky habitats, in small caves or under vegetation during the day. During summer months they will emerge from daytime shelters soon after dark and continue to move until the early hours of the morning (DSEWPaC, 2011b). In the winter months, it is primarily nocturnal, although adult pythons can sometimes be found basking in the morning sun (DSEWPaC, 2011b). The breeding season takes place in the cooler months, which extends from June to August, and males will travel up to 3 km in search of a mate (DSEWPaC, 2011b). It is a well-adapted opportunistic ambush predator and common prey items include rock-wallabies, small euros, fruit bats, waterbirds, doves/pigeons (Ellis, 2013; Ellis & Johnstone, 2016; Pearson, 2007; Pearson, 2003; TSSC, 2008).

It commonly inhabits moist areas such as gorges, rivers, pools and surrounding hills, but can be found in a range of habitats (Burbidge, 2004; DSEWPaC, 2011b). In the Hamersley region, it is most often encountered in the vicinity of permanent waterholes in rocky ranges or among riverine vegetation (DSEWPaC, 2011b; Pearson, 1993). It is likely to be attracted to these areas due to the productivity and abundance of suitably-sized prey (Pearson, 2003).

7.8.2 Previous Records

The Study Area is located within the current distribution of the Pilbara olive python, whereby the species or species' habitat is likely to occur (DoE, 2022c). The desktop assessment returned 90 records of the species, 19 of which were recorded within 10 km of the Study Area, and one of which (live individual) was recorded in Major Drainage Line habitat within the Study Area in 2011 (Figure 7.14) (BHP WAI0, 2025; DBCA, 2025b).



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North

State Road

Rail

Scale 1:400,000

0 5 10 15 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 20/10/2025

BHP WAIO

MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.14: Previous Pilbara olive python records in the Study Area and region

7.8.3 Survey Methods

7.8.3.1 Targeted Searches

Diurnal searches were conducted along 33 transects within suitable habitat (Figure 7.15; Appendix G). Additional nocturnal searches were also completed at three locations (Table 7.4). Searches focused on observing active individuals and/or secondary evidence such as scats, sloughs or remains. Seventy-six person hours of targeted diurnal searches and 14 person hours of nocturnal searches were undertaken (Table 7.4).

Table 7.4: Nocturnal Searches Sampling Effort

Site	Habitat	Person Hours
VMYR-018	Gorge/ Gully	2
VMYR-031	Drainage Area/ Floodplain	6
VMYR-045	Gorge/ Gully	6
Total Nocturnal Search Person Hours		14

7.8.3.2 eDNA

To help detect the presence of Pilbara olive python, eDNA samples were collected from water sources within the Study Area. Five water samples were collected from WMYR-002, WMYR-003, WMYR-004, WMYR-006 and WMYR-007 (Figure 7.15).

7.8.4 Survey Results

No individuals were observed during targeted surveys. All five eDNA samples tested negative for the presence of Pilbara olive python. It should however be noted that eDNA sampling may not detect the presence of Pilbara olive python 100% of the time, due to constraints such as varying DNA degradation rates (due to UV exposure and water temperature), distribution of target DNA (sampling may have been conducted upstream from an individual, water flow may distribute DNA further downstream) and potential contamination of the sample.

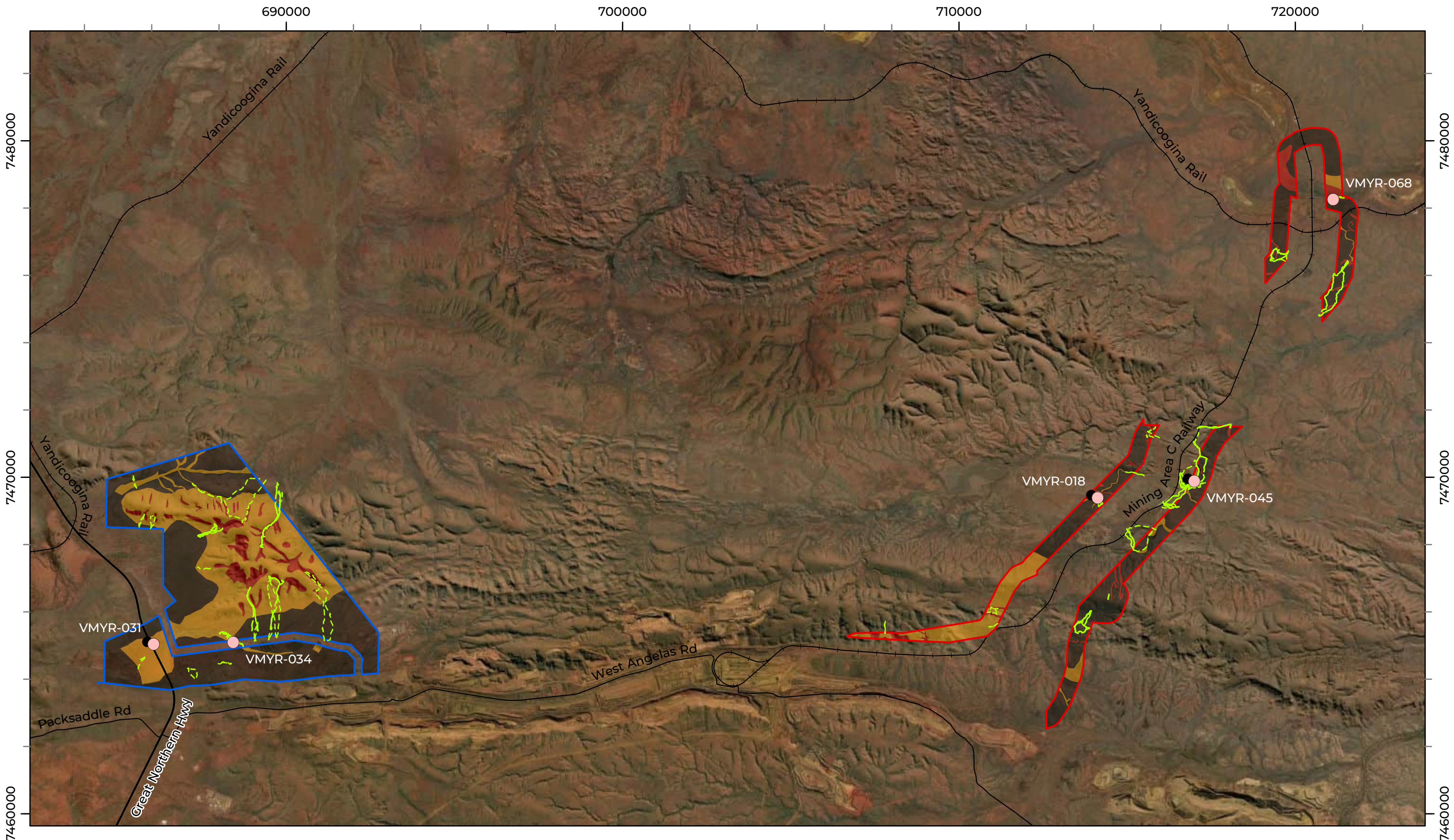
7.8.5 Discussion

Seven water features were recorded in the Study Area during the survey (Figure 5.2; Table 5.3; Appendix E). Three water features (WMYR-001, WMYR-004 and WMYR-007) are classified as persistent (will persist all year, most years), two water features (WMYR-003 and WMYR-006) are classified as semi-persistent (will persist for 3 – 9 months of the year, most years), and two water features are classified as ephemeral (will persist for <3 months). For Pilbara olive pythons, these water features often act as critical foraging locations in association with rocky habitats. The semi-persistent and ephemeral pools in Medium Drainage Line, Minor

Drainage Line and Gorge/ Gully habitats are considered supporting habitat and may play a critical role allowing connectivity between waters sources seasonally.

Overall, the Gorge/ Gully (5.67%, 299.40 ha), Major Drainage Line (1.29%, 68.06 ha) and Breakaway/ Cliff (0.77%, 40.63 ha) habitats provide critical habitat within the Study Area (Figure 7.14). Artificial Wetland (0.09%, 4.65ha), Medium Drainage Line (0.40%, 21.12 ha) and areas with Minor Drainage Line (2.66%, 140.42 ha) that do not contain permanent water features are classified as supporting habitat, particularly in areas where they connect between areas of critical habitat (i.e. Gorge/ Gully), however these areas may become more valuable to the species seasonally when water is more abundant following rainfall events. Drainage Area/ Floodplain (5.14%, 271.09 ha) and Hillcrest/ Hillslopes (25.57%, 1,349.70 ha) are considered supporting habitats where in the home range of critical habitat and where important microhabitats are present (Figure 7.15).

The Pilbara olive python was not recorded during the current survey but has been confirmed as a potential resident species based on previous records within and surrounding the Study Area, and the Study Area containing both critical and supporting habitat. The population would be considered part of an 'important population' as defined by DoE (2013).



LEGEND

Study Area

- MAC to Yandi Corridor
- Runaway Valley North
- Local Road
- State Road

Rail

Site Type

- Nocturnal Search
- eDNA sampling
- Targeted Search

Habitat

- Critical
- Supporting
- Nil

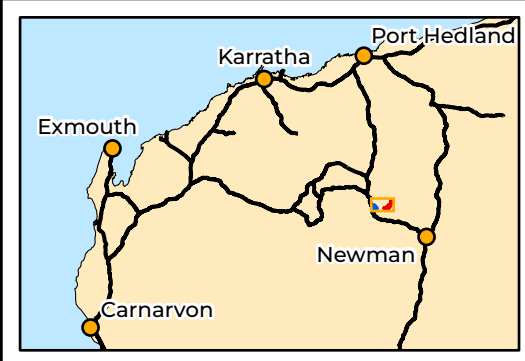


Biologic

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor &
Runaway Valley North
Targeted Vertebrate
MNES Fauna Survey

**Figure 7.15: Pilbara olive
python sampling, habitat and
records in the Study Area**

7.9 Other Fauna of Significance

In addition to the target MNES species, other fauna species of significance were also searched for and recorded throughout the Study Area.

Three non-target (non-MNES) significant species were recorded in the Study Area during the survey; peregrine falcon (*Falco peregrinus*) – OS (BC Act), western pebble-mound mouse (*Pseudomys chapmani*) – Priority 4 (DBCA) and brush-tailed mulgara (*Dasycercus blythi*) – Priority 4 (DBCA) (Figure 7.16).

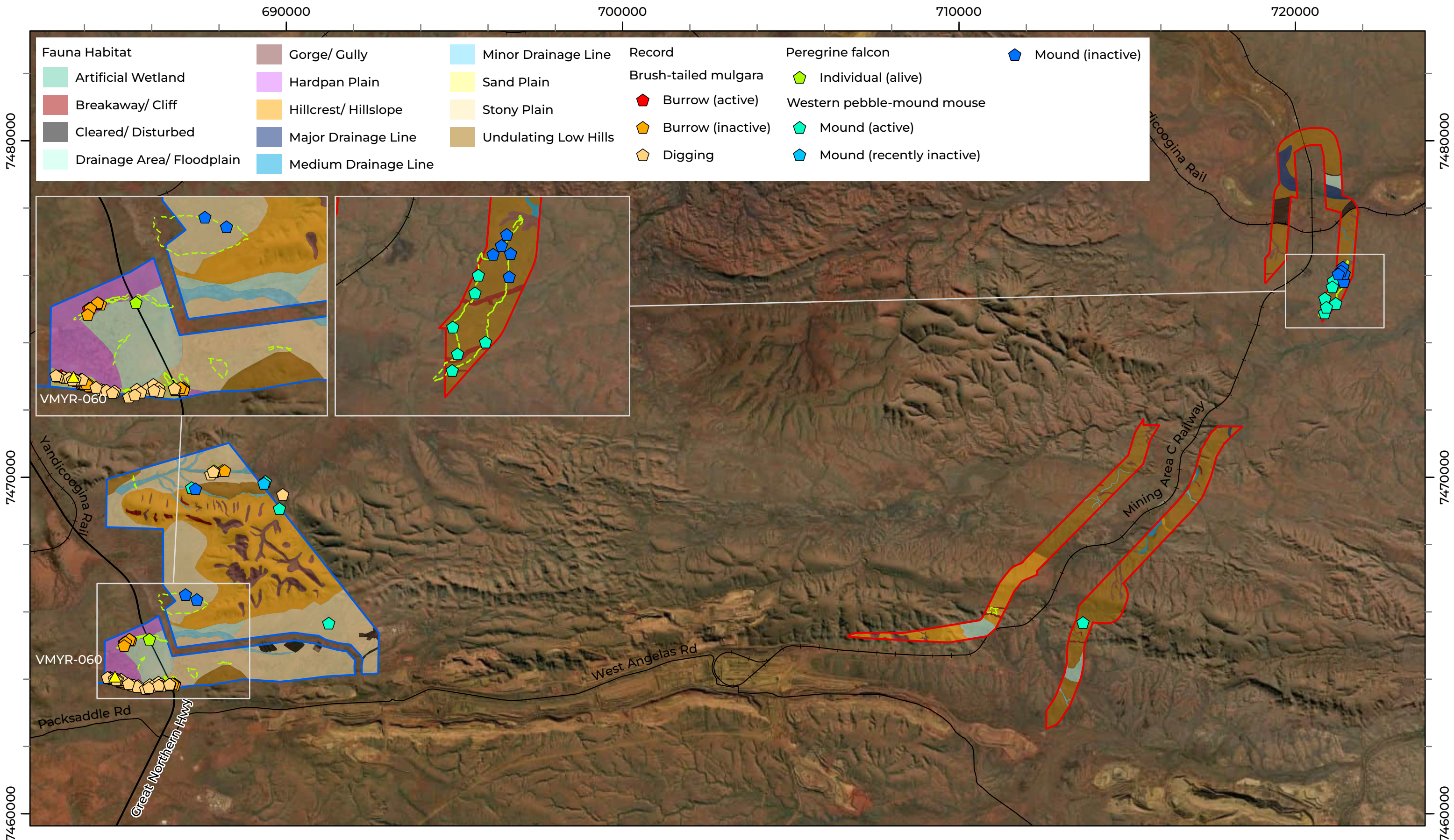
Twenty western pebble-mound mouse mounds were recorded during the survey within the Study Area. Eleven active mounds were recorded in Stony Plain, Hillcrest/ Hillslope, Undulating Low Hills and Minor Drainage Line habitat. Eight inactive mounds were recorded in Hillcrest/ Hillslope, Gorge/ Gully and Minor Drainage Line habitat, and one recently inactive mound was found in a Stony Plain habitat. The western pebble-mound mouse has previously been recorded on 941 occasions within 50 km of the Study Area and none of these records were within the Study Area. It is most frequently recorded within the Hillcrest/ Hillslope, Minor Drainage Line, and Stony Plain habitats.

Twenty-seven brush-tailed mulgara burrows and 36 diggings were recorded. Nine active burrows were recorded in Sand Plain habitat, 18 inactive burrows were recorded in Sand Plain, Hardpan Plain and Stony Plain habitat. The 36 diggings were recorded in Sand Plain and Stony Plain habitat. The brush-tailed mulgara has previously been recorded on nine occasions within 50 km of the Study Area and none of these records were within the Study Area.

One individual peregrine falcon was recorded within Drainage Area/ Floodplain habitat during the survey. The peregrine falcon has previously been recorded on 22 occasions within 50 km of the Study Area and none of these records were within the Study Area. It is confirmed to occur as an infrequent visitor within the Study Area to forage within all board of occurring habitats, however, the frequency of occurrence is likely to be dependent on the proximity of nesting within or in the vicinity to the Study Area. Suitable nesting habitat for the species may occur within Medium Drainage Line (0.40%, 21.12 ha) and Breakaway/ Cliff (0.77%, 40.63 ha) habitat and instances of elevation breakaway within Hillcrest/ Hillslope (25.57%, 1,349.70 ha) and Gorge/ Gully (5.67%, 299.40 ha) habitats.

Two other significant species have previously been recorded within and adjacent to the Study Area: Pilbara barking gecko (within 2.1 km) and Gane's blind snake (within 5.3 km) (BHP WAIO, 2025; DBCA, 2025b), and considered Highly Likely or Likely to occur in the Study Area. Gane's blind snake is considered Likely to occur as a resident potentially within Gorge/ Gully (5.67%, 299.40 ha), Major Drainage Line (1.29%, 68.06 ha), Medium Drainage Line (0.40%, 21.12 ha), Minor Drainage Line (2.66%, 140.42 ha), Hillcrest/ Hillslope (25.57%, 1,349.70ha) and Breakaway/ Cliff (0.77%, 40.63 ha) habitats within the Study Area, particularly in areas where

leaf litter accumulate, and moisture is retained in leaf litter substrates. Pilbara barking gecko is considered Highly Likely to occur as a resident within Gorge/ Gully (5.67%, 299.40 ha), Stony Plain (28.59%, 1,508.65 ha), Undulating Low Hills (2426 %, 1,280.06 ha) and Hillcrest/ Hillslope (25.57%, 1,349.70 ha) habitats within the Study Area that contains rock crevices and loose-leaf litter.



- | | | | | | |
|---------------------------|----------------------|----------------------|----------------------|----------------------------|------------------|
| Fauna Habitat | Gorge/ Gully | Minor Drainage Line | Record | Peregrine falcon | Mound (inactive) |
| Artificial Wetland | Hardpan Plain | Sand Plain | Brush-tailed mulgara | Individual (alive) | |
| Breakaway/ Cliff | Hillcrest/ Hillslope | Stony Plain | Burrow (active) | Western pebble-mound mouse | |
| Cleared/ Disturbed | Major Drainage Line | Undulating Low Hills | Burrow (inactive) | Mound (active) | |
| Drainage Area/ Floodplain | Medium Drainage Line | | Digging | Mound (recently inactive) | |

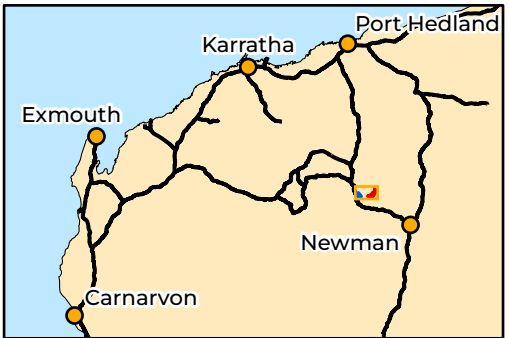
- LEGEND**
- | | | |
|-----------------------|--------|------------------|
| Study Area | — Rail | Site Type |
| MAC to Yandi Corridor | | Camera trap |
| Runaway Valley North | | Targeted Search |
| Local Road | | |
| State Road | | |

 **Biologic**

Scale 1:105,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 24/09/2025



BHP WAIO
MAC to Yandi Corridor & Runaway Valley North Targeted Vertebrate MNES Fauna Survey

Figure 7.16: Other significant species records, sampling and habitat in the Study Area

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Appendix A: Summary of the Literature Review

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
1. Astron (2025) Ministers North Consolidated Targeted Significant Vertebrate Fauna Surveys	<u>Project:</u> Ministers North Consolidated Targeted Significant Vertebrate Fauna Surveys <u>Client:</u> BHP <u>Survey date:</u> 13 – 22 April 2023 7 – 18 June 2024 <u>Survey type:</u> Consolidated targeted vertebrate fauna surveys <u>Experience:</u> Senior zoologists x3 Zoologists x3	Within Study Area	- Targeted searching - Audio recordings for birds and amphibians - Bat echolocation recording - Plot searches - Motion sensitive cameras - Nocturnal searching - eDNA sampling	- Hillcrest/ Hillslope - Gorge/ Gully - Drainage Area/ Floodplain - Minor Drainage Line - Breakaway/ Cliff - Undulating Low Hills - Major Drainage Line - Boulders/ Rockpiles - Medium Drainage Line	<u>111 vertebrate species</u> 18 native mammals 3 introduced mammals 64 birds 25 reptiles 1 amphibian	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) - Northern Quoll (<i>Dasyurus hallucatus</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No major limitations or constraints were identified during this survey
2. Biologic (2024) Mining Area C Targeted MNES Vertebrate Fauna Survey	<u>Project:</u> Mining Area C Targeted MNES Vertebrate Fauna Survey <u>Client:</u> BHP <u>Survey date:</u> 3-13 May 2024 <u>Survey type:</u> Single targeted vertebrate fauna survey <u>Experience:</u> Senior zoologists x2 Zoologists x4	Within Study Area	- Active searching - Targeted searching - Motion sensitive cameras – quadrats - Plot searches - Bat echolocation recording - Audio recordings for birds and amphibians	- Stony Plains - Mulga Association - Undulating Low Hills - Drainage Area/ Floodplain - Minor Drainage Lines - Medium Drainage Lines - Breakaway/ Cliff - Gorge/ Gully - Hillcrest/ Hillslope	<u>29 vertebrate species</u> 8 native mammals 2 introduced mammals 12 birds 7 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Grey falcon (<i>Falco hypoleucos</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No major limitations or constraints were identified during this survey
3. Biologic (2011a) Area C and Surrounds Vertebrate Fauna Survey.	<u>Project:</u> Area C and Surrounds Vertebrate Fauna Survey. 1008 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 5–18 October 2009 Phase 2: 20 March – 1 April 2010 <u>Survey type:</u> Two phase detailed survey <u>Experience:</u> Principal Zoologist Senior Zoologist x 3 Herpetologist	Within Study Area	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Hair trap - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Opportunistic observations - Secondary evidence	- Mulga Association - Major Drainage Line - Gorge/ Gully - Hillcrest/slope - Valley	<u>166 vertebrate species</u> 22 native mammals 4 introduced mammals 76 birds 60 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind snake (<i>Anilius ganei</i>) - Pilbara barking gecko (<i>Underwoodisaurus seorsus</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
4. Biologic (2013e) South Flank Targeted Northern Quoll Survey	<u>Project</u> South Flank Targeted Northern Quoll Survey <u>Client:</u> BHP <u>Survey date:</u> 24 June – 6 July 2012 13-25 July 2012 <u>Survey type:</u> Targeted Fauna Survey <u>Experience:</u> Senior Zoologist x4	Within Study Area	- Cage and Elliot trapping - Targeted searches - Camera trap - Opportunistic observation - Secondary evidence	- Gorge/ Gully - Major Drainage Line	<u>12 vertebrate species</u> 8 native mammals 1 introduced mammal 1 bird 2 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
5. Biologic (2016c) South Flank Targeted Fauna Survey	<u>Project</u> South Flank Targeted Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 19-22 November 2015 15-17 December 2015 <u>Survey type:</u> Targeted Fauna Survey <u>Experience:</u> Senior Zoologists x 2	Within Study Area	• Camera traps • Targeted searches • Secondary evidence • Opportunistic observation	• Gorge/ Gully • Major Drainage Line	<u>14 vertebrate species</u> • 4 native mammal • 3 introduced mammals • 4 birds • 3 reptiles		Fire occurred during the survey period affecting 30-40% of trapping area possibly reducing fauna movement.
6. Biologic (2011b) Area C to Yandi Fauna Survey	<u>Project:</u> Area C to Yandi Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 13–20 September 2011 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Principal Zoologist	Within Study Area	• Active searching • Targeted searching – transects • Avifauna census • Bat echolocation recording • Motion sensitive cameras • Opportunistic observations • Secondary Evidence	• Gorge/ Gully • Hillcrest/Slope • Minor Drainage Line • Major Drainage Line • Valley	<u>74 vertebrate species</u> • 13 native mammals • 3 introduced mammals • 47 birds • 10 reptiles • 1 amphibian	<u>Threatened:</u> • Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> • Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
7. Biologic and Bat Call WA (2014) Pilbara Regional Ghost Bat Review	<u>Project</u> Pilbara Regional Ghost Bat Review <u>Client:</u> BHP <u>Survey type:</u> Literature review <u>Experience:</u> Principal Zoologist Senior Zoologist Specialist Bat Ecologist	Within Study Area	• Literature review	•		<u>Threatened:</u> • Ghost bat (<i>Macroderma gigas</i>)	
8. Biologic (2019a) MAC4 Pipeline Level 1 Vertebrate Fauna Assessment	<u>Project</u> MAC4 Pipeline Level 1 Vertebrate Fauna Assessment <u>Client:</u> BHP <u>Survey date:</u> 20-22 November 2018 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Principal Ecologist Senior Botanist	Within Study Area	• Habitat assessment • Targeted searches • Opportunistic observation • Secondary evidence	• Gorge/ Gully • Drainage Area/ Floodplain	<u>11 vertebrate species</u> • 1 native mammal • 8 birds • 2 reptiles	<u>Priority:</u> • Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
9. Onshore and Biologic (2011) Camp Hill Exploration Leases Level 2 Flora & Vegetation Survey and Level 1 Fauna Assessment.	<u>Project:</u> Camp Hill Exploration Leases Level 2 Flora & Vegetation Survey and Level 1 Fauna Assessment. 381 <u>Client:</u> BHP <u>Survey date:</u> 2–15 August 2010 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Zoologist	0.82 km	- Active searching - Targeted transects - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Medium Drainage Area - Gorge/ Gully - Hillcrest/Slope - Basalt Plain - Sand/ Stony Plain	<u>89 vertebrate species</u> 13 native mammals 4 introduced mammals 60 birds 12 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Cooler temperatures and continuing dry conditions may have inhibited reptile and amphibian activity.
10. Biota (2012c) South Flank to Jinidi Level 2 Fauna Survey.	<u>Project:</u> South Flank to Jinidi Level 2 Fauna Survey. 1093 <u>Client:</u> BHP <u>Survey date:</u> Phase 1:11–20 April 2011 Phase 2: 2–11 November 2011 Phase 3: 31 January – 3 February 2012 <u>Survey type:</u> Three phase Detailed fauna survey <u>Experience:</u> Senior Zoologist x3 Zoologist x8	1 km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott, funnel - Avifauna census - Bat echolocation recording - Harp trapping - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Hilly Areas - Calcrete Plain - Creeks with Shrubland/Hummock grasslands - Mulga Plains - Stony/Loamy Plains - Major Creeks - Gorge and Breakaway	<u>173 vertebrate species</u> 24 native mammals 2 introduced mammals 79 birds 63 reptiles 5 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Parts of the Study Area were inaccessible by vehicle and were surveyed on foot only.
11. Astron (2019) Hope Downs 2 Proposal Fauna Survey March 2019.	<u>Project:</u> Hope Downs 2 Proposal Fauna Survey March 2019 <u>Client:</u> RITO <u>Survey date:</u> Phase 1: 21 November to 2 December 2017 Phase 2: 18–27 May 2018 Phase 3: 8–18 March 2019 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> All technical survey personnel have over five years of experience conducting Level 2 vertebrate fauna surveys	1 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott - Avifauna census - Motion sensitive cameras - Bat echolocation recording - Night parrot survey - Targeted searches - Nocturnal spotlighting	- Minor Drainage Line - Gorge/ Gully - Breakaway - Rocky Hill - Low Hill and Slopes - Alluvial Plain - Mulga Woodland - Stony Plain	<u>174 vertebrate species</u> 26 native mammals 7 introduced mammals 84 birds 55 reptiles 2 amphibians	<u>Threatened:</u> - Northern quoll (<i>Dasyurus hallucatus</i>) - Ghost bat (<i>Macroderma gigas</i>) - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - North-western free-tailed bat (<i>Ozimops cobourgianus</i>) - Letter-winged kite (<i>Elanus scriptus</i>) <i>Lerista macropisthopus remota</i>	Rainfall in the three months preceding phase 2 and phase 3 was below average, this led to potentially dry unfavourable conditions for vertebrate fauna sampling.
12. ENV (2010b) Jinayri Access Road Vertebrate Fauna Survey.	<u>Project:</u> Jinayri Access Road vertebrate fauna survey 499. <u>Client:</u> BHP <u>Survey date:</u> 20–30 May 2009 <u>Survey type:</u> Detailed fauna survey	1 km	- Systematic trapping – pitfall, Elliott, funnel, cage - Active searching - Avifauna census - Targeted searches - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Riverine - Gorge/ Gully - Hillcrest/slope - Minor Drainage Line - Breakaway/ Cliff - Alluvial Plain	<u>92 vertebrate species</u> 12 native mammals 3 introduced mammals 47 birds 28 reptiles 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Assess to the northern part of the Study Area was restricted due to lack of access tracks.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	<u>Experience:</u> Senior Zoologist Zoologist x3 Field Assistant						
13. GHD (2021b) Ministers North Fauna Survey Level 2	<u>Project:</u> Ministers North Fauna Survey Level 2 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 9 – 20 September 2019 Phase 2: 19 – 27 March 2020 <u>Survey type:</u> Two phase detailed survey <u>Experience:</u> Principal Zoologist Senior Zoologist Ecologist x 2	1 km	- Active searching - Targeted searching – transects - Trapping – small and large Elliott - Avifauna census - Bat echolocation recording - Acoustic recording - Motion sensitive cameras - Opportunistic observations - Secondary Evidence - eDNA sampling	- Gorge/ Gully - Hillcrest/Slope - Minor Drainage Line - Major Drainage Line	<u>122 vertebrate species</u> 19 native mammals 55 birds 44 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Gane's blind snake (<i>Anilius ganei</i>)	Moderate limitation due to access restrictions.
14. Ecologia (2004a) Area C: Deposits D, E and F Biological Survey.	<u>Project:</u> Area C: Deposits D, E and F Biological Survey. 348 <u>Client:</u> BHP <u>Survey date:</u> 21 May – 24 th May 2004 28 May – 7 June 2004 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x 4 Biologist Research assistant	1.28 km	- Active searching - Systematic trapping – pitfall, funnel, Elliott - Avifauna census - Nocturnal surveys - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope - Mulga Woodland - Mallee Woodland	<u>104 vertebrate species</u> 16 native mammals 1 introduced mammal 55 birds 32 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
15. Biologic (2017b) Ministers North to Yandi Corridor Single Phase Flora, Vegetation and Fauna Survey	<u>Project:</u> Ministers North to Yandi Corridor Single Phase Flora, Vegetation and Fauna Survey <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 9–13 October 2017 <u>Survey type:</u> Level 2 fauna survey <u>Experience:</u> Unknown	1.5 km	- Camera traps - Ultrasonic bat detectors - Acoustic recorders - Bird census - Opportunistic observation - Secondary evidence	Hillcrest/ Hillslope	<u>59 vertebrate species</u> 13 native mammals 1 introduced mammals 35 birds 10 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
16. Rapallo (2012) Level 2 Fauna Survey and Targeted Northern Quoll Survey of the Lamb Creek	<u>Project:</u> Level 2 Fauna Survey and Targeted Northern Quoll Survey of the Lamb Creek. <u>Client:</u> Process Minerals International Pty Ltd. <u>Survey date:</u> Phase 1: 19–20 March 2012 Phase 2: 26–12 April 2012 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Ecologist Ecologist x5 Field assistant x2	1.5 km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott, funnel, cage - Bat echolocation recording - Harp trapping - Motion sensitive cameras - Avifauna census - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Gorge/ Gully - Hillcrest/Slope - Minor Drainage Line - Alluvial/Flood Plain - Stony/Sandy Plain	<u>158 vertebrate species</u> 19 native mammals 3 introduced mammals 76 birds 58 reptiles 2 amphibians	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) - Ghost bat (<i>Macroderma gigas</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	
17. Biota (2022) MAC Phase 4 Marillana Creek Targeted MNES Survey	<u>Project:</u> Two-phase Targeted MNES Survey of the MAC Phase 4 Study Area for Marillana Creek. <u>Client:</u> BHP WAI0. <u>Survey date:</u> Phase 1: 17–24 November 2020 Phase 2: 25–31 March 2021 <u>Survey type:</u> Two Phase Targeted MNES Fauna Survey <u>Experience:</u> Senior Biologist Senior Zoologist Zoologist	1.5 km	- Bat echolocation recording - Motion cameras - Acoustic (bird call) recorders - Targeted searches - Habitat assessments - Nocturnal searches - Opportunistic observations - Secondary evidence	- Major Drainage Line - Breakaway - Gorge/ Gully - Hillcrest/ Hillslope - Drainage Area/ Flood Plain	<u>1 vertebrate species</u> 1 reptile	<u>Threatened:</u> Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	Potential limitation due to bat recorder faults and loss of ability to identify species.
18. Outback Ecology (2008) Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Terrestrial Vertebrate Fauna Assessment.	<u>Project:</u> Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Terrestrial Vertebrate Fauna Assessment. 344 <u>Client:</u> BHP <u>Survey date:</u> 17–31 March 2008 <u>Survey type:</u> Detailed Fauna survey <u>Experience:</u> Zoologist x 3	1.79 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Nocturnal survey - Avifauna census - Opportunistic observations - Secondary evidence	- Major Drainage Line - Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope	<u>100 vertebrate species</u> 8 native mammals 3 introduced mammals 61 birds 26 reptiles 2 amphibians	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	
19. Specialised Zoological (2008a) Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Bat Survey and Assessment	<u>Project:</u> Area C Mining Operation Environmental Management Plan (Revision 4) A, D, P1 and P3 Deposits: Bat Survey and Assessment	1.79 km	- Targeted searches for caves - Acoustic monitoring for bats - Harp trapping/ cloth baffles	- Ridgelines - Gullies	<u>6 vertebrate species</u> 6 native mammals		

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	<u>Client:</u> BHP <u>Survey date:</u> 17-24 April 2008 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Unknown						
20. Biota (2010) Yandicoogina Junction South West and Oxbow Fauna Survey.	<u>Project:</u> Yandicoogina Junction South West and Oxbow Fauna Survey. 1187 <u>Client:</u> RITO <u>Survey date:</u> 5-12 July 2008 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Principal Zoologist Senior Zoologist Zoologist	1.90 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Major Drainage Line - Minor Drainage Line - Hillcrest/Slope - Stony Plain and Valley Floors - Rocky Breakaways and Screes	<u>72 vertebrate species</u> 10 native mammals 2 introduced mammals 46 birds 14 reptiles 0 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Single season survey. Sections of site inaccessible by car however, fauna habitats surrounding still representative of the area as a whole. No nocturnal surveys.
21. Biologic (2017a) Ministers North level 2 vertebrate fauna survey.	<u>Project:</u> Ministers North level 2 vertebrate fauna survey. 10082 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 15-26 October 2016 Phase 2: 3-13 April 2017 <u>Survey type:</u> Two phase detailed survey <u>Experience:</u> Principal Zoologist Senior Zoologist x 3	2.07 km	- Active searching - Targeted transects - Targeted trapping – pitfall, funnel, Elliott, cage - Nocturnal surveys - Bat echolocation recording - Motion sensitive cameras - Opportunistic observations - Secondary evidence	- Major Drainage Line - Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope	<u>119 vertebrate species</u> 15 native mammals 2 introduced mammals 54 birds 45 reptiles 3 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Heavy rainfall during phase two survey resulted in site access issues and three sites (1,2,7) were changed (bringing the total number of sites to 10).
22. Ecologia (2006c) Ministers North Biological Survey.	<u>Project:</u> Ministers North Biological Survey. <u>Client:</u> BHP <u>Survey date:</u> 10-14 May 2006 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Zoologist	2.75 km	- Active searching - Avifauna census - Bat echolocation recording - Night survey - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope	<u>71 vertebrate species</u> 10 native mammals 0 introduced mammals 42 birds 18 reptiles 1 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No trapping done.
23. GHD (2021a) Ministers North Fauna Survey level 1.	<u>Project:</u> Ministers North Fauna Survey level 1.	3 km	- Targeted searches - Bird acoustic recorders - Camera traps - Bat echolocation recorders - Opportunistic observations - Secondary evidence - Habitat assessment/ mapping	- Gorge/ Gully - Breakaway/ Cliff - Minor Drainage Line - Major Drainage Line	<u>67 vertebrate species</u> 19 native mammals 40 birds 8 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	<u>Client:</u> BHP <u>Survey date:</u> 9-20 September 2019 <u>Survey type:</u> Level 1 <u>Experience:</u> Principal Zoologist Zoologist Ecologists x 2						
24. Biologic (2018) Ministers North to Yandi Corridor Two phase Targeted Fauna Survey.	<u>Project:</u> Ministers North to Yandi Corridor Two Phase Targeted Fauna Survey. 10140 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 9–13 October 2017 Phase 2: 15–23 June 2018 <u>Survey type:</u> Two phase targeted fauna survey <u>Experience:</u> Senior Zoologist x3 Zoologist	3.5 km	- Active searching - Targeted searching – transects - Trapping – small and large Elliott - Avifauna census - Bat echolocation recording - Acoustic recording - Motion sensitive cameras - Opportunistic observations - Secondary Evidence	- Basalt Outcrop - Breakaway/ Cliff - Gorge/ Gully - Hillcrest/Slope - Minor Drainage Line - Major Drainage Line - Drainage Area/ Floodplain	<u>94 vertebrate species</u> 15 native mammals 2 introduced mammals 54 birds 23 reptiles	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
25. Biologic (2015b) Central Pilbara Ghost Bat Population and Roost Assessment: 2014	<u>Project</u> Central Pilbara Ghost Bat Population and Roost Assessment: 2014 <u>Client:</u> BHP <u>Survey date:</u> August 2014 November 2014 <u>Survey type:</u> Targeted Fauna Survey <u>Experience:</u> Principal Ecologist Senior Zoologist Bat Specialist	5 km	- Cave assessments and 3D mapping - Opportunistic observations - Secondary evidence - Scat collection and analysis - Echolocation and acoustic recording	Caves	<u>1 vertebrate species</u> 1 native mammal	<u>Threatened:</u> Ghost bat (<i>Macroderma gigas</i>)	Minor limitations due to restricted access to some caves due to safety and or tenure.
26. Biologic (2023a) Central Pilbara Ghost Bat Monitoring: 2020 – 2021.	<u>Project:</u> Central Pilbara Ghost Bat Monitoring: 2020 – 2021 <u>Client:</u> BHP <u>Survey date:</u> Trip 1: October 2020 Trip 2: February 2021 Trip 3: May 2021 <u>Survey type:</u> Annual monitoring survey <u>Experience:</u> Principal Zoologist x1 Zoologist x3	6 km	- Targeted searches - Cave assessments - Secondary evidence - DNA analysis - Hormone analysis	Caves (categories 2, 3 & 4)	<u>1 vertebrate species</u> 1 native mammal	<u>Threatened:</u> Ghost bat (<i>Macroderma gigas</i>)	No sampling was completed between December 2019 – October 2020 due to administrative, safety and covid related concerns. Additionally genotyping success rate was low, possible due to a decline in scat deposition rate.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
27. Biologic (2023b) Central Pilbara Ghost Bat Monitoring: 2021 – 2022.	<u>Project:</u> Central Pilbara Ghost Bat Monitoring: 2021 – 2022 <u>Client:</u> BHP <u>Survey date:</u> Trip 1: July 2021 Trip 2: September 2021 Trip 3: January 2022 Trip 4: March 2022 Trip 5: May 2022 <u>Survey type:</u> Annual monitoring survey <u>Experience:</u> Principal Zoologist x1 Senior Zoologist x2 Zoologist x3	6 km	- Targeted searches - Cave assessments - Secondary evidence - DNA analysis - Hormone analysis	Caves (categories 2, 3 & 4)	<u>1 vertebrate species</u> 1 native mammal	<u>Threatened:</u> Ghost bat (<i>Macroderma gigas</i>)	Genotyping success rate was low.
28. Biologic (2023c) Central Pilbara Ghost Bat Monitoring: 2022 – 2023.	<u>Project:</u> Central Pilbara Ghost Bat Monitoring: 2022 – 2023 <u>Client:</u> BHP <u>Survey date:</u> Trip 1: July 2022 Trip 2: September 2022 Trip 3: January 2023 Trip 4: March 2023 Trip 5: May 2023 <u>Survey type:</u> Annual monitoring survey <u>Experience:</u> Principal Zoologist x2 Senior Zoologist x3 Zoologist x3	6 km	- Targeted searches - Cave assessments - Secondary evidence - DNA analysis - Hormone analysis	Caves (categories 2, 3 & 4)	<u>1 vertebrate species</u> 1 native mammal	<u>Threatened:</u> Ghost bat (<i>Macroderma gigas</i>)	Temperature and HR was not recorded at several of the caves during the monitoring period, due to technical issues.
29. Biologic (2025) Central Pilbara Ghost Bat Monitoring: 2023 – 2024.	<u>Project:</u> Central Pilbara Ghost Bat Monitoring: 2023 – 2024 <u>Client:</u> BHP <u>Survey date:</u> Trip 1: July 2023 Trip 2: September 2023 Trip 3: January 2024 Trip 4: March 2024 Trip 5: May 2024	6 km	- Targeted searches - Secondary evidence - DNA analysis - Hormone analysis	Caves (categories 2, 3, & 4)	<u>1 vertebrate species</u> 1 native mammal	<u>Threatened:</u> Ghost bat (<i>Macroderma gigas</i>)	Loss of data due to technical issues was experienced in several caves, although not considered to have a huge impact on the outcomes of the current reporting period.
30. Biologic (2023d) Targeted Pilbara Olive Python Survey: South Flank and Mining Area C.	<u>Project:</u> Targeted Pilbara Olive Python Survey: South Flank and Mining Area C <u>Client:</u> BHP <u>Survey date:</u> 7–14 March 2023 21–31 March 2023 <u>Survey type:</u> Targeted Fauna Survey	6 km	- Targeted searches - Nocturnal Surveys - eDNA sampling - Opportunistic observations - Secondary evidence	- Gorge/ Gully - Major Drainage Line - Medium Drainage Line - Drainage Area/ Floodplain	<u>26 vertebrate species</u> 4 native mammals 2 introduced mammals 4 birds 14 reptiles 2 amphibians	<u>Threatened:</u> - Northern Quoll (<i>Dasyurus hallucatus</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	Restricted access to the Study Area, due to lack of access tracks, heritage exclusion zones and minoring operations resulted in a reduced survey effort.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	<u>Experience:</u> Senior Zoologist x4 Zoologist x2						
31. Biologic (2010) East Packsaddle Level 1 Vertebrate Fauna Study.	<u>Project:</u> East Packsaddle Level 1 Vertebrate Fauna Study. 350 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 5–18 October 2009 Phase 2: 20 March – 1 April 2009 <u>Survey type:</u> Two phase targeted fauna survey <u>Experience:</u> Senior Zoologist x3 Principal Zoologist Herpetologist	6 km	- Active searching - Targeted searching – transects - Trapping – not specified - Hair trap - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Opportunistic observations - Secondary Evidence	- Mulga Association - Gorge/ Gully - Hillcrest/slope - Major Drainage Line - Valley	<u>110 vertebrate species</u> 17 native mammals 2 introduced mammals 48 birds 39 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Eastern osprey (<i>Pandion haliaetus</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
32. Ecologia (1997) Hope Downs Biological Survey	<u>Project:</u> Hope Downs Biological Survey. <u>Client:</u> Hancock Prospecting Pty Ltd. <u>Survey date:</u> Phase 1: 18 August – 10 September 1993 Phase Two: 19–30 April 1994 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x4 Research assistant	6.09 km	- Active searching - Systematic trapping – pitfall, Elliott - Avifauna census - Nocturnal surveys - Avifauna census - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/slope/ridges - Major Creek Lines - Outwash Plains/ Valley Plains	<u>158 vertebrate species</u> 20 native mammals 4 introduced mammals 88 birds 45 reptiles 1 amphibian	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	Pre bat echolocation and motion sensitive cameras
33. Ecologia (2004b) Packsaddle Range Biological Survey.	<u>Project:</u> Packsaddle Range Biological Survey. 357 <u>Client:</u> BHP <u>Survey date:</u> 5–10 May 2004 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Herpetologist Zoologist Research assistant	6.17 km	- Active searching - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Medium drainage line - Gorge/ Gully - Mulga Woodland - Eucalypt Woodland - Valley Plain	<u>88 vertebrate species</u> 10 native mammals 1 introduced mammals 56 birds 20 reptiles	<u>Threatened:</u> - Grey falcon (<i>Falco hypoleucos</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No trapping or motion sensitive camera use.
34. ENV (2007a) Area C R-Deposit Fauna Assessment.	<u>Project:</u> Area C R-Deposit Fauna Assessment. 349 <u>Client:</u> BHP <u>Survey date:</u> 22–27 November 2006 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u>	6.35 km	- Active searching - Systematic trapping – pitfall, funnel, Elliott, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope - Ridges/Range Crests - Riverine Areas - Breakaways - Flood Plains/ Valley Plains	<u>182 vertebrate species</u> 28 native mammals 0 introduced mammals 89 birds 64 reptiles 1 amphibian	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>)	Fire swept through sampling sites on the 24 th of November, damaging traps, reducing site access and reducing length of survey time.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	Senior Biologist/Ornithologist Ornithologist Herpetologist Biologist Taxonomist						
35. HGM (1999) Marillana Creek Western Access Corridor - Biological Assessment.	<u>Project:</u> Marillana Creek Western Access Corridor - Biological Assessment. <u>Client:</u> BHP <u>Survey date:</u> 23–30 April 1999 <u>Survey type:</u> Opportunistic fauna survey <u>Experience:</u> Unknown	6.91 km	- Active searching - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Riverine - Alluvial Plains - Hillcrest/Slope - Mulga Woodland	<u>50 vertebrate species</u> 5 native mammals 1 introduced mammals 42 birds 1 reptile 1 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Opportunistic survey only.
36. Astron (2023) Yandi 45C Targeted Significant Vertebrate Fauna Survey.	<u>Project:</u> Yandi 45C – Targeted Significant Vertebrate Fauna Survey. <u>Client:</u> BHPWAIO <u>Survey date:</u> 23 September – 2 October 2022 <u>Survey type:</u> Targeted fauna assessment <u>Experience:</u> Senior Zoologist <u>Zoologist</u>	7 km	- Active searching - Motion sensitive cameras - Bat echolocation recording - Acoustic recordings - Bilby plot search - Habitat assessments - Opportunistic observations - Secondary evidence	- Wetland - Breakaway/ Cliff - Major Drainage Line - Medium Drainage Line	<u>91 vertebrate species</u> 14 native mammals 4 introduced mammals 66 birds 7 reptiles	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Common sandpiper (<i>Actitis hypoleucos</i>)	
37. Ecologia (1998a) Mining Area C Biological Survey.	<u>Project:</u> Mining Area C Biological Survey. 336 <u>Client:</u> BHP <u>Survey date:</u> 14–30 April 1997 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x 4 Research assistant	7.25 km	- Active searching - Systematic trapping – pitfall, Elliott - Avifauna census - Nocturnal surveys - Mist netting - Opportunistic observations - Secondary evidence	- Medium Drainage Line - Gorge/ Gully - Hillcrest/Slope - Mulga Woodland - Acacia Shrubland	<u>143 vertebrate species</u> 17 native mammals 4 introduced mammals 78 birds 43 reptiles 2 amphibians	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	Pre bat echolocation and motion sensitive camera use.
38. Biologic (2011f) Yandi Vertebrate Fauna Review	<u>Project:</u> Yandi Vertebrate Fauna Review. <u>Client:</u> BHP <u>Survey date:</u> 9–17 December 2010 <u>Survey type:</u> Basic survey and targeted <u>Experience:</u> Senior Ecologist Senior Zoologist	7.81 km	- Targeted searching – transects and caves - Active searching - Motion sensitive cameras - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Mulga Woodland - Major Drainage Line - Hill Crests and Slopes - Boulder Piles - Sandplain	<u>75 vertebrate species</u> 7 native mammals 1 introduced mammal 53 birds 12 reptiles 2 amphibians	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
39. Maunsell Australia and Bamford Consulting (2003) Yandi Life of Mine Fauna and Flora	<u>Project:</u> Yandi Life of Mine Fauna and Flora <u>Client:</u> BHP <u>Survey date:</u> 23–28 September 2003 <u>Survey type:</u> Basic survey <u>Experience:</u> Ecologist x2	8.39 km	- Opportunistic observations - Nocturnal surveys - Bat echolocation recording	- Creek Line - Low Hills and Mesas - Mulga Woodland - Major Drainage Line	<u>80 vertebrate species</u> 2 native mammals 2 introduced mammal 69 birds 7 reptiles	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
40. Biologic (2011e) Southern Flank Vertebrate Fauna Study.	<u>Project:</u> Southern Flank Vertebrate Fauna Study. 1021 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 7–19 April 2010 Phase 2: 23 August – 4 September 2010 <u>Survey type:</u> Two phase detailed fauna survey <u>Experience:</u> Principal Zoologist Senior Ecologist Senior Zoologist x 2 Herpetologist	8.39 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Motion sensitive cameras - Hair traps - Bat echolocation recording - Nocturnal surveys - Avifauna census - Opportunistic observations - Secondary evidence	- Major Drainage Line - Mulga - Gorge/ Gully - Hillcrest/slope - Coolabah-Lignum	<u>161 vertebrate species</u> 26 native mammals 7 introduced mammals 68 birds 58 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>) - Pilbara barking gecko (<i>Underwoodisaurus seorsus</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
41. Ecologia (2004c) Yandi Overland Conveyor and Stockyard Fauna and Flora Assessment	<u>Project:</u> Yandi Overland Conveyor and Stockyard Fauna and Flora Assessment. <u>Client:</u> BHP <u>Survey date:</u> 18–19 October 2004 <u>Survey type:</u> Flora survey with fauna desktop survey <u>Experience:</u> Biologist	8.70 km	Opportunistic observations	- Creek Line - Drainage Line - Acacia Shrubland - Rocky Hillslope	<u>1 vertebrate species</u> 1 native mammal	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Survey conducted to target rare and priority flora and weed species with opportunistic fauna sighting recorded only, no active fauna field component. Three active pebble mounds were recorded in the Yandi Stockyard Study Area.
42. Astron (2010) West Packsaddle Flora and Fauna Assessment.	<u>Project:</u> Packsaddle West Flora and Fauna Assessment <u>Client:</u> BHP <u>Survey date:</u> 10–19 April 2010 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Principal Zoologist	9.04 km	- Active searching - Targeted transects - Avifauna census - Motion sensitive cameras - Opportunistic observations - Secondary evidence	- Gorge/ Gully - Rocky Ridges/Cliff Faces	<u>87 vertebrate species</u> 13 native mammals 60 birds 14 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Northern brushtail possum (<i>Trichosurus vulpecula</i> subsp. <i>arnhemensis</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
43. Biologic (2013a) Area C West Vertebrate Fauna Survey.	<u>Project:</u> Area C West Vertebrate Fauna Survey. 1086 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 18 April – 1 May; 8–21 May 2011 Phase 2: 12–25 September; 3–14 October 2011 Nocturnal survey: 19–22 January 2012 <u>Survey type:</u> Two phase detailed baseline fauna surveys <u>Experience:</u> Principal Zoologist Senior Ecologist Senior Zoologist x 4 Zoologist	9.35 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Motion sensitive cameras - Bat echolocation recording - Avifauna census - Nocturnal survey - Opportunistic observations - Secondary evidence	- Major drainage line - Minor drainage line - Gorge/ Gully - Hillcrest/slope - Basalt Gilgi rocky plain - Mulga - Drainage Area - Coolibah-Lignum - Basalt Low Hills	<u>213 vertebrate species</u> 26 native mammals 5 introduced mammals 100 birds 79 reptiles 3 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Northern short-tailed mouse (<i>Leggadina lakedownensis</i>) <u>Migratory:</u> - Wood sandpiper (<i>Tringa glareola</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
44. Onshore and Biologic (2009) Biological Survey South Parmelia Exploration Leases.	<u>Project:</u> Biological Survey South Parmelia Exploration Leases. <u>Client:</u> BHP <u>Survey date:</u> 15-25 January 2009 <u>Survey type:</u> Level 1 <u>Experience:</u> Senior Zoologist x4 Zoologist x7	9.5km	- Active searching - Targeted searching - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	Major Drainage Line	<u>70 vertebrate species</u> 11 native mammals 49 birds 9 reptiles 1 amphibian	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Study Area recently burnt potentially resulting in limiting species within the area during the survey.
45. Biota (2009) Yandicoogina Targeted Northern Quoll survey.	<u>Project:</u> Yandicoogina Targeted Northern Quoll survey <u>Client:</u> RITO <u>Survey date:</u> 6–12 October 2009 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Unknown	9.5 km	- Active searching - Targeted searching – transects			<u>None</u>	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
46. Ecologia (1995) Yandi stage II Iron Ore Project: Biological Assessment Survey	<u>Project:</u> Yandi phase II Iron Ore Project: Biological Assessment Survey. <u>Client:</u> BHP <u>Survey date:</u> 14 May – 8 June 1995 <u>Survey type:</u> Single phase detailed survey <u>Experience:</u> Senior Zoologist x 2 Zoologist Research Assistant Field Assistant	9.64 km	- Active searching - Systematic trapping – pitfall, Elliott - Avifauna census - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Riverine - Drainage Gully - Colluvial Flat - Outwash Flat - Scree Slope - Mesa Top	<u>154 vertebrate species</u> 16 native mammals 4 introduced mammals 81 birds 47 reptiles 3 amphibians	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	No cage or funnel trapping. Pre bat echolocation recording.
47. Ecologia (1998b) Weeli Wolli Creek Biological Assessment Survey.	<u>Project:</u> Weeli Wolli Creek Biological Assessment Survey. 101 <u>Client:</u> BHP <u>Survey date:</u> 9–16 August 1999 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist x2 Zoologist x3 Ecologist	9.68 km	- Active searching - Systematic trapping – pitfall, Elliott - Avifauna census - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Colluvial Flats - Melaleuca Forest - Creek Line - Acacia Thicket - Calcrete Gully - Shrub Steppe	<u>135 vertebrate species</u> 14 native mammals 3 introduced mammals 85 birds 30 reptiles 3 amphibians	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	Pre bat echolocation use and motion sensitive cameras.
48. ENV (2008a) Area C Southern Flank Deposit Fauna Assessment.	<u>Project:</u> Area C Southern Flank Deposit Fauna Assessment. <u>Client:</u> BHP <u>Survey date:</u> 30 January – 6 February 2007 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior zoologist Zoologist	9.73 km	- Active searching - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope - Alluvial Plain	<u>100 vertebrate species</u> 13 native mammals 4 introduced mammals 56 birds 23 reptiles 4 amphibians	<u>Threatened:</u> - Grey falcon (<i>Falco hypoleucos</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
49. Biota (2013a) Area C West to Yandi level 2 Vertebrate Fauna Survey.	<u>Project:</u> Area C West to Yandi level 2 Vertebrate Fauna Survey. 1070 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 25 May – 2 June 2011 Phase 2: 7–15 September 2011 Phase 3: 5–8 February 2012 <u>Survey type:</u> Three phase detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist Ecologist	9.87 km	- Active searching - Targeted searching - Systematic trapping – pitfall, funnel, Elliott - Avifauna census - Bat echolocation recording - Harp trapping - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Gorge/Gullies - Stony and Loamy Plains - Major Creeks - Minor Creeks - Hillcrest/slopes - Calcrete Plain - Mulga Plain	<u>172 vertebrate species</u> 24 native mammals 4 introduced mammals 84 birds 57 reptiles 3 amphibians	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinonictis aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Common greenshank (<i>Tringa nebularia</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	No motion sensitive cameras.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
50. Ecologia (1996) Yandi Stage II Iron Ore Project - Pebble-mound Mouse <i>Pseudomys chapmani</i> - site survey	<u>Project:</u> Yandi Stage II Iron Ore Project - Pebble-mound Mouse <i>Pseudomys chapmani</i> - site survey <u>Client:</u> BHP <u>Survey date:</u> 19–21 December 1995 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> unknown	10 km	Targeted searching		<u>1 vertebrate species</u> 1 native mammal	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
51. Biota (2013b) South Parmelia Level 2 Vertebrate Fauna Survey.	<u>Project:</u> South Parmelia Vertebrate Fauna Survey. 1224 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 11–20 April 2011 Phase 2: 2–11 November 2011 Nocturnal Survey: 1– 4 February 2012 <u>Survey type:</u> Two phase detailed fauna survey <u>Experience:</u> Senior Zoologist x4 Zoologist x7	10 km	- Active searching - Targeted searching - Targeted trapping – pitfall, funnel, Elliott - Avifauna census - Bat echolocation recording - Harp trapping - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Undulating Low Hills - Flood and Colluvial Plains - Minor Drainage - Rocky Gorges/Gullies - Calcrete Plains - Major Drainage Line	<u>138 vertebrate species</u> 20 native mammals 1 introduced mammals 71 birds 43 reptiles\4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
52. Biologic (2011c) Barimunya Camp Vertebrate Fauna Survey	<u>Project:</u> Barimunya Camp Vertebrate Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 29 April 2011 <u>Survey type:</u> Basic baseline fauna survey <u>Experience:</u> Senior Ecologist Zoologist	11.37 km	- Active searching - Targeted searching - Opportunistic observations - Secondary Evidence	- Drainage Line - Alluvial Slope - HillcrestSslope	<u>21 vertebrate species</u> 1 native mammals 0 introduced mammal 17 birds 3 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
53. Specialised Zoological (2008b) Survey for conservation significant bats between Kurrajura siding and the Yandi WYE.	<u>Project:</u> Survey for conservation significant bats between Kurrajura siding and the Yandi WYE. <u>Client:</u> BHP <u>Survey date:</u> 2–8 October 2008 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Zoologist x2	12 km	- Targeted searching - Nocturnal surveys - Bat echolocation recording - Opportunistic observations - Secondary Evidence	- Gorge/ Gully - Major Drainage Line - Medium Drainage Line - Breakaway/ Cliff - Hillcrest/Slope	<u>6 vertebrate species</u> 6 native mammals	None	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
54. Ecologia (2008b) Marillana Creek (Yandi) Iron Ore Mine Modification.	<u>Project:</u> Marillana Creek (Yandi) Iron Ore Mine Modification. 122 <u>Client:</u> Kellogg, Brown and Root Pty Ltd <u>Survey date:</u> 19–30 March 2008 <u>Survey type:</u> Single phase detailed survey <u>Experience:</u> Senior Zoologist Zoologist x3	12.15 km	- Systematic trapping – pitfall, Elliott, cage, funnel - Active searching - Targeted searching - Avifauna census - Bat echolocation recording - Nocturnal survey - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Hillslope - Stony Plain - Creek Line - Outwash and Valley Plain	<u>116 vertebrate species</u> 16 native mammals 3 introduced mammals 60 birds 37 reptiles 3 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Single phase survey. Reduced ANABAT usage due to rain.
55. ENV (2010a) Area C West NVCP Flora, Vegetation and Fauna Assessment.	<u>Project:</u> Area C West NVCP Flora, Vegetation and Fauna Assessment. 374 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 22 – 31 March 2010 Phase 2: 15 August – 4 September 2007 <u>Survey type:</u> 2010 - Basic fauna assessment 2007 – Detailed fauna survey <u>Experience:</u> Senior biologist x2 Biologist x2 Field assistant	12.63 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Avifauna census - Opportunistic observations - Secondary evidence	- Minor Drainage line - Gorge/ Gully - Hillcrest/Slope - Breakaway - Stony Plain - Alluvial Plain	2007 <u>113 vertebrate species</u> 18 native mammals 0 introduced mammals 72 birds 32 reptiles 1 amphibian 2010 <u>72 vertebrate species</u> 9 native mammals 0 introduced mammals 46 birds 17 reptiles 0 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
56. Ecologia (2008a) Area A and Additional Areas Level 2 Terrestrial Fauna Survey.	<u>Project:</u> Area A and Additional Areas Level 2 Terrestrial Fauna Survey. <u>Client:</u> United Minerals Corporation <u>Survey date:</u> Phase 1: 22 May – 3 June 2008 Phase 2: 29 September – 10 October 2008 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x 4	12.94 km	- Active searching - Targeted searching - Systematic trapping – pitfall, funnel, Elliott, cage - Avifauna census - Nocturnal surveys - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Degraded Mulga Woodland - Spinifex Plain - Spinifex Hillslope - Mulga Woodland - Acacia Shrubland - Cracking Clay	<u>135 vertebrate species</u> 19 native mammals 3 introduced mammals 70 birds 41 reptiles 1 amphibian	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
57. Biologic (2013b) Marillana and Surrounds Targeted Mulgara Survey	<u>Project</u> Marillana and Surrounds Targeted Mulgara Survey. <u>Client:</u> BHP <u>Survey date:</u> 6-16 June 2012 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Unknown	13.5 km	- Elliot traps - Targeted searches - Camera traps	- Sandplain - Dune		<u>Priority:</u> Brush-tailed mulgara (<i>Dasycercus blythi</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
58. Eco Logical (2012) Level 1 Flora and Fauna Surveys along the Great Northern Highway for Jimblebar Mine Module Transport.	<u>Project:</u> Level 1 Flora and Fauna Surveys along the Great Northern Highway for Jimblebar Mine Module Transport <u>Client:</u> BHP <u>Survey date:</u> 18-19 August 2011 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Principal Zoologist	14 km (site 3)	- Opportunistic observations - Secondary Evidence	- Drainage Line - Stony Plain	<u>14 vertebrate species</u> 2 native mammals 1 introduced mammals 9 birds 2 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
59. Outback Ecology (2010) Area C to Jinayri to Mount Newman Railway Terrestrial Vertebrate Fauna Survey.	<u>Project:</u> Area C to Jinayri to Mount Newman Railway Terrestrial Vertebrate Fauna Survey. 366 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 20 October – 1 November 2008 Phase 2: 5–29 March 2009 Recon: 8–12 October 2008 <u>Survey type:</u> Two phase Detailed fauna survey and reconnaissance survey <u>Experience:</u> Senior Zoologist Zoologist x6 Biologist	14.44 km	- Active searching - Systematic trapping – pitfall, funnel, Elliott, cage - Targeted survey - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Drainage Line - Gorge/ Gully - Hillcrest/Slope - Riverine - Sand and Stony Plain - Alluvial Plain - Mulga Woodland	<u>204 vertebrate species</u> 20 native mammals 6 introduced mammals 95 birds 76 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>) <u>Migratory:</u> - Eastern osprey (<i>Pandion haliaetus</i>)	
60. Biota (2014a) Yandi Billiards phase 1 Seasonal Fauna Survey	<u>Project:</u> Yandi Billiards phase 1 Seasonal Fauna Survey. <u>Client:</u> RTIO <u>Survey date:</u> Phase 1: 8–18 March 2014 <u>Survey type:</u> Two phase detailed fauna survey <u>Experience:</u> Zoologist	19km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott, funnel - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Nocturnal surveys - Audio recordings for birds and amphibians - Opportunistic observations - Secondary evidence	- Alluvial Plain - Floodplain - Hillcrest/Slopes - Major Drainage Line - Minor Alluvial Fans - Mulga Woodlands - Pediment Slope	<u>155 vertebrate species</u> 19 native mammals 2 introduced mammals 78 birds 54 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Brush-tailed mulgara (<i>Dasyercus blythi</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	
61. Biologic (2024) Jinidi Targeted Fauna Survey.	<u>Project:</u> Jinidi Targeted Fauna Survey <u>Client:</u> BHP <u>Survey date:</u> Trip 1: 21-31 March 2023 Trip 2: 11-19 May 2023 Trip 3: 2 September – 3 October 2023 <u>Survey type:</u>	15 km	- Active searching - Targeted searching - Plot searches - Audio recordings for birds and amphibians - Bat echolocation recording - eDNA sampling - Motion-sensitive cameras	- Drainage Area/ Floodplain - Stony Plain - Mulga Association - Gorge/ Gully - Minor Drainage Line - Major Drainage Line - Breakaway/ Cliff	<u>84 vertebrate species</u> 11 native mammals 4 introduced mammals 49 birds 15 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) <u>Priority:</u>	Access restrictions were experienced due to heritage exclusion areas around the Northeast corner and some areas of Jinidi. Due to safety limitations, no nocturnal searches were conducted and several low-value caves from database searches could not be

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	<u>Targeted Experience:</u> Principal zoologist x1 Senior zoologist x2 Zoologists x5					- Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Brush-tailed mulgara (<i>Dasyercus blythi</i>)	located or were in habitats unsuitable to support the caves such as low Hillcrest/ Hillslope.
62. Biologic (2013d) Mudlark Vertebrate Fauna Survey	<u>Project:</u> Mudlark Vertebrate Fauna Survey. 1080 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 12–19 May and 31 May – 11 June 2011 Phase 2: 6–15 October 2011 and 18 – 28 May 2012 Phase 3: 19–22 January 2012 <u>Survey type:</u> Three phase Detailed fauna survey <u>Experience:</u> Senior Zoologist x5 Principal Zoologist x2 Zoologist	15 km	- Active searching - Targeted searches - Targeted trapping – pitfall, funnel, Elliott, cage - Nocturnal Surveys - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Opportunistic observations - Secondary evidence	- Hillcrest/slope - Gorge/ Gully - Major drainage line - Stony plain - Mulga woodland	<u>178 vertebrate species</u> 21 native mammals 4 introduced mammals 80 birds 70 reptiles 3 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
63. Biota (2014b) Yandi Billiards Targeted Northern Quoll Survey	<u>Project:</u> Yandi Billiards Targeted Northern Quoll Survey <u>Client:</u> RTIO <u>Survey date:</u> 5–13 August 2014 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Zoologist x2	15 km	- Targeted searching - Systematic trapping – cage and large Elliott - Motion sensitive cameras - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Alluvial and Flood Plain - Hillcrest/Slopes - Major Drainage Line - Minor Drainage Line - Cave/Overhang	<u>10 vertebrate species</u> 5 native mammals 1 introduced mammals 3 birds 1 reptile	None	Unconfirmed northern quoll scat found (Molecular results inconclusive)
64. Biologic (2019b) Marillana Tenement and Infrastructure Corridor Targeted Vertebrate Fauna Survey	<u>Project</u> Marillana Tenement and Infrastructure Corridor Targeted Vertebrate Fauna Survey <u>Client:</u> BHP <u>Survey date:</u> 16- 28 April and 29 May to 2 June 2018 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Zoologists x 5	15 km	- Habitat assessment - Targeted searches - Opportunistic observation - Secondary evidence - Bat echolocation recording - Camera traps	- Gorge/ Gully - Major Drainage Line		<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
65. ENV (2008b) Area C West Fauna Assessment.	<u>Project:</u> Area C West Fauna Assessment. 372 <u>Client:</u> BHP <u>Survey date:</u> 15 August – 4 September 2007 <u>Survey type:</u>	15.50 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott, cage - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope - Breakaway - Stony Plain	<u>126 vertebrate species</u> 17 native mammals 2 introduced mammals 72 birds 34 reptiles 1 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
	Detailed fauna survey <u>Experience:</u> N/A						
66. Biologic (2016b) Marillana targeted vertebrate fauna survey	<u>Project:</u> Marillana targeted vertebrate fauna survey <u>Client:</u> RTIO <u>Survey date:</u> 17–21 January 2016 <u>Survey type:</u> Targeted fauna survey <u>Experience:</u> Zoologist x2	16 km	- Targeted searching - Motion sensitive cameras - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Gorge/ Gully - Hillcrest/Slopes - Sand Plain - Stony Plain - Mulga Woodland - Sand Dunes - Minor Drainage Line - Major Drainage Line - Drainage Area/Floodplain	<u>3 vertebrate species</u> 1 native mammals 1 birds 1 reptiles	<u>Threatened:</u> - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
67. Biologic (2013c) Marillana Vertebrate Fauna Survey.	<u>Project:</u> Marillana Vertebrate Fauna Survey. 1077 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 7–20 March 2011 Phase 2: 1–14 August 2011 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Zoologist x4 Principal Zoologist Herpetologist	16.66 km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Gorge/ Gully - Hillcrest/Slope - Sandy Areas - Sand Dunes - Mulga Woodland - Minor Drainage Line - Major Drainage Line	<u>175 vertebrate species</u> 25 native mammals 5 introduced mammal 77 birds 66 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) - Northern quoll (<i>Dasyurus hallucatus</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind snake (<i>Anilius ganei</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>) <u>Other significant:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	
68. Ecologia (2005b) Mudlark Well Exploration Project Biological Survey.	<u>Project:</u> Mudlark Well Exploration Project Biological Survey. 421 <u>Client:</u> BHP <u>Survey date:</u> 18–23 August 2005 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x2	17.01 km	- Active searching - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Medium Drainage Area - Gorge/ Gully - Hillcrest/Slope - Sand/ Stony Plain	<u>57 vertebrate species</u> 7 native mammals 1 introduced mammals 30 birds 19 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No nocturnal surveying undertaken due to low temperatures.
69. Ecologia (2008c) RGP5 fauna survey Kurrajura Siding to Yandi WYE including Yandi repeater	<u>Project:</u> RGP5 fauna survey Kurrajura Siding to Yandi WYE including Yandi repeater. <u>Client:</u> BHP <u>Survey date:</u> 9 May – 13 May 2008 <u>Survey type:</u> Basic fauna survey <u>Experience:</u>	18 km	- Active searching - Targeted searching - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Hillcrest/Slope - Open Woodland - Gorge/ Gully - Breakaway/ Cliff	<u>75 vertebrate species</u> 12 native mammals 0 introduced mammals 52 birds 9 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara leaf-nosed bat (<i>Rhinonictis aurantia</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Access was restricted due to the rail corridor and the presence of heritage exclusion zones.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
70. ENV (2010c) Jinayri Mining Lease Vertebrate Fauna Survey	Zoologists x2 <u>Project:</u> Jinayri Mining Lease Vertebrate Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 5–18 March 2008 <u>Survey type:</u> Detailed survey <u>Experience:</u> Senior Zoologist Zoologist x3 Ornithologist x2 Biologist Field Assistant x3	18.40 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Minor Drainage Line - Breakaways - Alluvial Plains - Hillcrest/slope	149 vertebrate species 22 native mammals 4 introduced mammals 65 birds 57 reptiles 1 amphibian	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinonictis aurantia</i>) - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>)	
71. Ecologia (1999) West Angelas Iron Ore Project Mine Access Road Corridor Vertebrate Fauna Assessment Survey	<u>Project:</u> West Angelas Iron Ore Project Mine Access Road Corridor Vertebrate Fauna Assessment Survey <u>Client:</u> Robe River <u>Survey date:</u> 3-9 August 1999 <u>Survey type:</u> Detailed survey <u>Experience:</u> Zoologist(s)	19.11 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Mist netting - Nocturnal surveys - Opportunistic observations - Secondary Evidence	Eucalypt Steppe	82 vertebrate species 8 native mammals 1 introduced mammals 51 birds 22 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
72. ENV (2008c) Jinayri Vertebrate Fauna Assessment.	<u>Project:</u> Jinayri Vertebrate Fauna Assessment. 1010 <u>Client:</u> BHP <u>Survey date:</u> 5–18 March 2008 <u>Survey type:</u> Detailed survey <u>Experience:</u> Zoologist(s)	19.18 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Minor Drainage Line - Gorge - Breakaways - Alluvial Plains - Hill Top - Scree Slope	153 vertebrate species 22 native mammals 5 introduced mammals 65 birds 60 reptiles 1 amphibian	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinonictis aurantia</i>) - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind-snake (<i>Anilius ganei</i>)	
73. Biologic (2019c) Pineapple Hill Detailed Vertebrate Fauna Survey.	<u>Project:</u> Pineapple Hill Detailed Vertebrate Fauna Survey. 10216 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 26 April – 6 May 2019 Phase 2: 28 August – 9 September 2019 <u>Survey type:</u> Two phase Detailed survey <u>Experience:</u> Senior Zoologist x 4 Ecologist	20 km	- Active searching - Targeted searches - Targeted trapping – pitfall, funnel, Elliott, cage - Nocturnal Surveys - Bat echolocation recording - Acoustic recording - Motion sensitive cameras - Cave assessments - Remotely piloted aircraft searches - Opportunistic observations - Secondary evidence	- Stony Plain - Drainage Area/Floodplain - Hillcrest/Slope - Gorge/ Gully - Major Drainage Line - Mulga Woodland - Minor Drainage Line	129 vertebrate species 19 native mammals 4 introduced mammals 73 birds 33 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
74. Onshore (2017) Reconnaissance Flora and Vegetation Survey and Fauna Assessment Newman to Mining Area C Powerline Corridor	<u>Project:</u> Reconnaissance Flora and Vegetation Survey and Fauna Assessment Newman to Mining Area C Powerline Corridor <u>Client:</u> BHP <u>Survey date:</u> 25–30 July 2017 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Zoologist	20 km	- Targeted Searches - Habitat Assessments - Opportunistic Observations - Secondary Evidence	Major Drainage Line	<u>22 vertebrate species</u> 7 mammals 9 birds 6 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
75. Ecologia (2005c) Survey for conservation significant bats between Kurrajura Sid Upper Marillana Exploration Project Biological Survey.	<u>Project:</u> Upper Marillana Exploration Project Biological Survey. 115 <u>Client:</u> BHP <u>Survey date:</u> 13–20 April 2005 <u>Survey type:</u> Basic survey <u>Experience:</u> Senior Zoologist Zoologist x2	20 km	- Active searching - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Stony Plain - Low Ridge Line - Mulga Sandplain - Drainage Line	<u>69 vertebrate species</u> 11 native mammals 5 introduced mammals 37 birds 16 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Ghost bat recorded adjacent to Study Area at Marillana Creek waterhole.
76. Biologic (2016a) Marillana Infrastructure Corridor Level 1 Vertebrate Fauna Survey	<u>Project:</u> Marillana Infrastructure Corridor Level 1 Vertebrate Fauna Survey <u>Client:</u> BHP <u>Survey date:</u> 15–20 January 2016 Camera and audio recorders left in situ to 10 March 2016 <u>Survey type:</u> Basic fauna assessment <u>Experience:</u> Principal Zoologist Senior Zoologist Bat Call Specialist	20 km	- Bat echolocation recording - Camera traps - Targeted transects - Opportunistic observations - Secondary evidence - Habitat assessments	- Gorge/ Gully - Major Drainage Line	<u>37 vertebrate species</u> 4 native mammals 22 birds 8 reptiles 1 fish 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
77. Ecologia (2006b) Marillana Terrestrial Vertebrate Fauna Survey.	<u>Project:</u> Marillana Terrestrial Vertebrate Fauna Survey. 408 <u>Client:</u> Brockman Resources Ltd. <u>Survey date:</u> Phase 1: 2–9 October 2005 Phase 2: 10–17 March 2006 <u>Survey type:</u> Two phase Detailed survey <u>Experience:</u> Senior Zoologist x3 Zoologist	20 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Ridge Top and Scree Slope - Minor Drainage Gully - Stony Plain - Alluvial Plain - Mesa Top	<u>118 vertebrate species</u> 18 native mammals 2 introduced mammals 56 birds 42 reptiles 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Access restriction phase one. Reduced reptile activity due to rain during phase two.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
78. Biologic (2011d) Jinidi Vertebrate Fauna Survey	<u>Project:</u> Jinidi Vertebrate Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 14–20 March 2011 6–10 April 2011 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Zoologist x2	14.5km	- Active searching - Targeted searching – transects - Bat echolocation recording - Opportunistic observations - Secondary Evidence	- Gorge/ Gully - Hillcrest/Slope - Drainage Area - Calcrete Plain - Mulga - Major Drainage Line	<u>92 vertebrate species</u> 12 native mammals 3 introduced mammals 59 birds 16 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	
79. 360 Environmental (2017) Upper Marillana and Munjina Baseline Vertebrate Fauna survey.	<u>Project:</u> Upper Marillana and Munjina Baseline Vertebrate Fauna survey. 10084 <u>Client:</u> BHP <u>Survey date:</u> 30 March – 9 April 2017 <u>Survey type:</u> Detailed survey <u>Experience:</u> Unknown	20.48 km	- Systematic trapping – pitfall, Elliott, funnel, cage - Active searching - Avifauna census - Motion sensitive cameras - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Mulga Woodland - Drainage Line - Hill Crest/ Slope - Stony Plain	<u>126 vertebrate species</u> 15 native mammals 4 introduced mammals 77 birds 28 reptiles 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
80. ENV (2009a) Munjina and Ministers North (Yandi Hub) Fauna Assessment.	<u>Project:</u> Munjina and Ministers North (Yandi Hub) Fauna Assessment. 423 <u>Client:</u> BHP <u>Survey date:</u> 21 November – 2 December 2007 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist/Ornithologist Zoologist x4 Taxonomist	20.77 km	- Active searching - Systematic trapping – pitfall, funnel, Elliott, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope - Riverine - Breakaway - Alluvial Plain	<u>134 vertebrate species</u> 15 native mammals 6 introduced mammals 66 birds 45 reptiles 1 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Fires just prior to the field survey reduced survey efforts in the Minister's North site.
81. Ecologia (2006a) Jirridi Terrestrial Vertebrate Fauna Survey.	<u>Project:</u> Jirridi Terrestrial Vertebrate Fauna Survey. 497 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 17–31 October 2005 Phase 2: 27 March – 5 April 2006 <u>Survey type:</u> Two phase detailed survey <u>Experience:</u> Senior Zoologist x 3 Zoologist x3	21.22 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Ridge Top and Scree Slope - Minor Drainage Gully - Stony Plain - Alluvial Plain - Rocky Scree Slope - Mesa Top	<u>142 vertebrate species</u> 18 native mammals 4 introduced mammals 70 birds 48 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
82. ENV (2009c) Rapid Growth Project 5: Yandi Flora Survey and Assessment of Barimunya Airport and a Potential Borrow Area	<u>Project:</u> Rapid Growth Project 5: Yandi Flora Survey and Assessment of Barimunya Airport and a Potential Borrow Area <u>Client:</u> Fast JV <u>Survey date:</u> 24–27 November 2008 <u>Survey type:</u> Targeted western pebble-mound mouse survey <u>Experience:</u> Zoologist	21.3 km Borrow area: 22km Barimunya airport : 27.3km	- Desktop search for previous pebble mouse records and mounds - Active searching	- Low Hills - Floodplain - Drainage line	<u>1 vertebrate species</u>	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	137 mounds recorded. 99 (22 active, 31 recently active and 46 inactive) recorded in the potential borrow area. 38 mounds in the Barimunya airport area (14 active, 15 recently active, 9 inactive).
83. Biota (2012a) Jinidi to Mindy Level 1 Fauna Survey	<u>Project:</u> Jinidi to Mindy Level 1 Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 11–13 March 2011 <u>Survey type:</u> Basic fauna assessment <u>Experience:</u> Zoologist Botanist	22 km	- Desktop and literature review - Habitat assessment - Active searching - Opportunistic observations - Vegetation mapping	- Stony Plains/ Stony Hills - Sandy Plains - Minor Flowlines - Moderate Creeklines and Floodplains - Mulga and Acacia Shrublands - Gorge/ Gully	<u>6 vertebrate species</u> 1 native mammals 2 introduced mammals 3 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
84. Biologic (2012) Jinidi to Mainline Vertebrate Fauna Survey.	<u>Project:</u> Jinidi to Mainline Vertebrate Fauna Survey. 1065 <u>Client:</u> BHP <u>Survey date:</u> Phase 1: 28 March – 10 April 2011 Phase 2: 22 August – 3 September 2011 <u>Survey type:</u> Two phase detailed fauna survey <u>Experience:</u> Zoologists	23.27 km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Motion sensitive cameras - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Gorge/ Gully - Hillcrest/Slope - Drainage Area - Dune - Sandplain - Grassland - Mulga Woodland - Major Drainage Line	<u>197 vertebrate species</u> 27 native mammals 4 introduced mammals 89 birds 73 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
85. Biota (2012b) Koodaideri Southern Infrastructure Corridor Fauna Survey	<u>Project:</u> Koodaideri Southern Infrastructure Corridor Fauna Survey. <u>Client:</u> RTIO <u>Survey date:</u> Phase 1: 3–13 May 2011 Phase 2: 15–25 November 2011 Phase 3: 2–10 May 2012 <u>Survey type:</u> Three phase detailed fauna survey <u>Experience:</u> Zoologist x12	25 km	- Active searching - Targeted searching - Systematic trapping – pitfall, funnel, Elliott - Bat echolocation recording - Harp trapping - Avifauna census - Motion sensitive cameras - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Gorge/ Gully - Hillcrest/Slopes - Drainage Lines - Alluvial Plains	<u>166 vertebrate species</u> 23 native mammals 4 introduced mammals 76 birds 61 reptiles 2 amphibians	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Blind snake (<i>Anilius ganei</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
86. Biologic (2015a) Karijini Tenements Environmental Risk Assessment	<u>Project:</u> Karijini Tenements Environmental Risk Assessment. <u>Client:</u> BHP <u>Survey date:</u> 17-18 November 2014 <u>Survey type:</u> Basic Fauna Survey <u>Experience:</u> Principal Ecologist	25 km	- Literature Review - Helicopter reconnaissance	- Gorge/ Gully - Major Drainage Line - Crest/ Slope - Stony Plain - Gilgai	<u>2 vertebrate species</u> 2 native mammals	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
87. GHD (2010) Coondewanna Exploration Tenement Level 2 Flora and Level 1 Fauna Report.	<u>Project:</u> Coondewanna Exploration Tenement Level 2 Flora and Level 1 Fauna Report. <u>Client:</u> BHP <u>Survey date:</u> 27-31 May 2010 <u>Survey type:</u> Basic fauna assessment <u>Experience:</u> Zoologist x 1	25 km	- Active searching - Avifauna census - Targeted searches - Opportunistic observations - Secondary evidence	- Hillcrest/Slope - Gorge/ Gully - Hillcrest/Slope - Breakaway/ Cliff - Stony Plain - Minor Drainage Line	<u>63 vertebrate species</u> 5 native mammals 5 introduced mammals 39 birds 14 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	The survey was restricted to a reconnaissance survey during a single field season and therefore is not representative of all species that may occupy with the Study Area. Assess within the Study Area was also limited due to lack of suitable tracks.
88. ENV (2008d) RGP5 Jimblebar Junction to Yandi Junction Railway Reserve and Repeaters 6, 7 and 8 Fauna Assessment	<u>Project:</u> RGP5 Jimblebar Junction to Yandi Junction Railway Reserve and Repeaters 6, 7 and 8 Fauna Assessment. <u>Client:</u> Calibre Engenium for BHP <u>Survey date:</u> 21-28 May 2008 <u>Survey type:</u> Level 1 fauna survey <u>Experience:</u> Senior Zoologist Zoologist x 2	25 km	- Habitat assessments - Diurnal searches - Bird census - Nocturnal searches - Opportunistic observation	- Major Drainage Line - Minor Drainage Line - Floodplain	<u>73 vertebrate species</u> 4 native mammals 53 birds 16 reptiles	<u>Threatened:</u> Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	
89. ENV (2011) Upper Marillana and Munjina Flora, Vegetation and Fauna Assessment	<u>Project:</u> Upper Marillana and Munjina Flora, Vegetation and Fauna Assessment. <u>Client:</u> BHP <u>Survey date:</u> 31 August – 10 September 2010 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Ornithologist Zoologist Biologist	26.22 km	- Active searching - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Hillcrest/Slope - Riverine - Stony Plain - Alluvial Plain	<u>134 vertebrate species</u> 2 native mammals 4 introduced mammals 35 birds 5 reptiles 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No trapping, bat echolocation recording, or motion sensitive cameras used.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
90. ENV (2007c) Upper Marillana Exploration Lease Fauna Assessment	<u>Project:</u> Upper Marillana Exploration Lease Fauna Assessment. <u>Client:</u> BHP <u>Survey date:</u> 5–11 May 2007 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Ornithologist Taxonomist Biologist	26.82 km	- Active searching - Bat echolocation recording - Avifauna census - Nocturnal survey - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Hillcrest/Slope - Sand Plain - Flood Plain	<u>118 vertebrate species</u> 14 native mammals 5 introduced mammals 79 birds 18 reptile 2 amphibians	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No motion sensitive cameras used.
91. Ecologia (1998c) West Angelas Iron Ore Project Vertebrate Fauna Assessment Survey	<u>Project:</u> West Angelas Iron Ore Project Vertebrate Fauna Assessment Survey. <u>Client:</u> Robe River Mining Company <u>Survey date:</u> Phase 1: 10 June – 10 July 1997 Phase Two: 18–30 October 1997 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Not listed	26.97 km	- Active searching - Systematic trapping – pitfall, Elliott - Avifauna census - Nocturnal surveys - Mist netting - Opportunistic observations - Secondary evidence	- Minor Drainage Line - Gorge/ Gully - Hillcrest/Slope/Ridges - Major Creek Line - Valley Floor/Outwash Valley - Mulga Woodland - Eucalyptus Woodland - Acacia Shrubland - Spinifex Steppe	<u>West Angelas mine area:</u> <u>119 vertebrate species</u> 19 native mammals 2 introduced mammals 70 birds 27 reptiles 1 amphibian <u>Rail Corridor:</u> <u>195 vertebrate species</u> 19 native mammals 4 introduced mammals 108 birds 60 reptiles 4 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Grey falcon (<i>Falco hypoleucos</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Lined soil-crevice skink (<i>Notoscincus butleri</i>)	Pre bat echolocation and motion sensitive cameras
92. Ecologia (2005a) Mindy-Coondiner Exploration Project Biological Survey	<u>Project:</u> Mindy-Coondiner Exploration Project Biological Survey <u>Client:</u> BHP <u>Survey date:</u> 7–11 November 2005 <u>Survey type:</u> Basic fauna assessment <u>Experience:</u> Natural Scientists x 2	27 km	- Active searching - Avifauna census - Opportunistic observations - Secondary evidence	- Mulga Sandplain - Minor Drainage	<u>39 vertebrate species</u> 5 native mammals 29 birds 5 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
93. Biota (2004) Fauna Habitats and Fauna Assemblage of the Proposed FMG phase A Rail Corridor	<u>Project:</u> Fauna Habitats and Fauna Assemblage of the Proposed FMG phase A Rail Corridor. <u>Client:</u> FMG <u>Survey date:</u> 20 March – 7 April 2004 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist	27.36 km	- Active searching - Targeted searching - Systematic trapping – pitfall, Elliott - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Stony Plain - Sandy Plain - Mulga Woodland - Drainage Line - Creekline - Hilcrest/Slope	<u>178 vertebrate species</u> 25 native mammals 5 introduced mammals 84 birds 58 reptiles 6 amphibians	<u>Priority:</u> - Northern short-tailed mouse (<i>Leggadina lakedownensis</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	Rainfall events during the survey resulted in some trap sites being closed early, and limited access to sites.

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
94. ENV (2007b) Mindy North Exploration Fauna Assessment	<u>Project:</u> Mindy North Exploration Fauna Assessment <u>Client:</u> BHP <u>Survey date:</u> 18-24 April 2007 Supplementary trapping: 13–20 April 2007 <u>Survey type:</u> Level 2 Detailed survey <u>Experience:</u> Biologist Ornithologist Taxonomist	27.46 km	- Active searching - Targeted searching - Targeted trapping - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Riverine - Minor Drainage Line	<u>80 vertebrate species</u> 3 native mammals 1 introduced mammals 57 birds 19 reptiles		
95. Biologic (2021c) West Angelas Beyond 2020; Level 2 Vertebrate and SRE Invertebrate Fauna Assessment Phase 1 & 2	<u>Project</u> West Angelas Beyond 2020; Level 2 Vertebrate and SRE Invertebrate Fauna Assessment Phase 1 & 2 <u>Client:</u> RTIO <u>Survey date:</u> Phase 1: 10– 22 October 2018 Phase Two: 11–22 March 2019 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x4	28.02 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat ultrasonic echolocation recording - Acoustic recording - Camera traps - Scat collection sheets - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Gorge/ Gully - Drainage Line	<u>158 vertebrate species</u> 26 native mammals 4 introduced mammals 67 birds 59 reptiles 2 amphibians	<u>Threatened:</u> - Northern quoll (<i>Dasyurus hallucatus</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Pilbara flat-headed blind snake (<i>Anilius ganei</i>) - Pilbara barking gecko (<i>Underwoodisaurus seorsus</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	
96. Ecologia (2014) Greater West Angelas Terrestrial Fauna Assessment	<u>Project:</u> Greater West Angelas Terrestrial Fauna Assessment. <u>Client:</u> RTIO <u>Survey date:</u> Phase 1: 26 September – 6th October 2012 Phase Two: 18–27 March 2013 <u>Survey type:</u> Two phase Detailed fauna survey <u>Experience:</u> Senior Zoologist Zoologist x4 Research assistant	29.41 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Nocturnal surveys - Bat echolocation recording - Motion sensitive cameras - Opportunistic observations - Secondary evidence	- Major Drainage Line - Gorge/ Gully - Hillcrest/Slope/Ridges - Mixed Acacia Woodland - Mesa Top - Cracking Clay - Foot Slope or Plain	<u>169 vertebrate species</u> 23 native mammals 2 introduced mammals 80 birds 64 reptiles	<u>Threatened:</u> - Pilbara leaf-nosed bat (<i>Rhinionicteris aurantia</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) - Pilbara barking gecko (<i>Underwoodisaurus seorsus</i>) <u>Migratory:</u> - Fork-tailed swift (<i>Apus pacificus</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
97. Biota (2005a) Fauna Habitats and Fauna Assemblage of Deposits E and F at West Angelas Survey	<u>Project:</u> Fauna Habitats and Fauna Assemblage of Deposits E and F at West Angelas Survey. <u>Client:</u> Robe River Iron Associates <u>Survey date:</u> 4–12 May 2004 <u>Survey type:</u> Detailed fauna survey <u>Experience:</u> Zoologist x3 Ecologist x1	30.18 km	- Active searching - Targeted trapping – pitfall, funnel, Elliott - Avifauna census - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Broad Colluvial Valleys dominated by Acacia - Hillcrest/Slope - Stony Plain and Valley floors - Incised Gullies and Creeks	<u>98 vertebrate species</u> 12 native mammals 2 introduced mammals 47 birds 37 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	No motion sensitive cameras.
98. Biologic (2013f) Targeted conservation significant fauna survey- Karijini tenement E47/17	<u>Project:</u> Targeted conservation significant fauna survey- Karijini tenement E47/17. <u>Client:</u> BHP <u>Survey date:</u> 17–25 June 2013 <u>Survey type:</u> Basic targeted fauna assessment <u>Experience:</u> Senior Zoologist x 5	30.51 km	- Active searching - Motion sensitive cameras - Bat echolocation recording - Opportunistic observations - Secondary evidence	- Major Drainage Line - Drainage Area - Gorge/ Gully - Hillcrest/Slope - Stony Plain	<u>23 vertebrate species</u> 6 native mammals 0 introduced mammals 13 birds 4 reptiles	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other significant:</u> Peregrine falcon (<i>Falco peregrinus</i>)	Four days of rainfall and lower than long-term average temperatures disrupted survey period.
99. ENV (2009b) Newman to Yandi Transmission Line Terrestrial Vertebrate Fauna Assessment.	<u>Project:</u> Newman to Yandi Transmission Line Terrestrial Vertebrate Fauna Assessment. <u>Client:</u> Worley Parsons and BHP <u>Survey date:</u> 7–16 May 2009 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Zoologist	32.81 km	- Active searching - Avifauna census - Nocturnal surveys - Opportunistic observations - Secondary Evidence	- Minor Drainage Line - Riverine - Alluvial Plain - Hillcrest/Slope - Stony Plain - Gorge/ Gully	<u>78 vertebrate species</u> 8 native mammals 2 introduced mammal 59 birds 9 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
100. Bamford Consulting (2012) Vertebrate Fauna Assessment of the Iron Valley Project Area	<u>Project:</u> Vertebrate Fauna Assessment of the Iron Valley Project Area. <u>Client:</u> Iron Ore Holdings Ltd. <u>Survey date:</u> Phase 1: 9–19 May 2011 Phase 2: 29–30 September 2011 <u>Survey type:</u> Two phase Detailed targeted fauna survey <u>Experience:</u> Senior Zoologist x3 Zoologist x8	36 km	- Active searching - Targeted searching - Elliott trapping - Bat echolocation recording - Motion sensitive cameras - Nocturnal surveys - Opportunistic observations - Secondary evidence	- Alluvial and Flood Plain - Rocky Hillcrest/Slopes - Drainage Line - Stony Plain	<u>97 vertebrate species</u> 11 native mammals 2 introduced mammals 58 birds 25 reptiles 1 amphibian	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
101. Ecologia (2007) Rapid Growth Project 5 Kurrajura to Cowra Fauna Survey.	<u>Project:</u> Rapid Growth Project 5 Kurrajura to Cowra Fauna Survey. <u>Client:</u> BHP <u>Survey date:</u> 29 September – 2 October 2007 <u>Survey type:</u> Basic fauna survey <u>Experience:</u> Senior Zoologist Zoologist	36 km	- Targeted searching - Nocturnal surveys - Bird census - Bat echolocation recording - Opportunistic observations - Secondary Evidence	- Floodplain - Open Plain - Range Footslope - Rocky Gully	<u>61 vertebrate species</u> 11 native mammals 2 introduced mammals 41 birds 7 reptiles	<u>Priority:</u> Spotted ctenotus (<i>Ctenotus uber subsp. johnstonei</i>)	Fire had impacted a portion of the Study Area potentially reducing the occurrence of fauna in that area. Survey did not include the Cowra siding area, however vegetation noted in the area suggests it was similar to other areas surveyed.
102. Integrated Environmental (1980) An Ecological Appreciation of the West Angelas Environment, Western Australia 1979	<u>Project:</u> An Ecological Appreciation of the West Angelas Environment, Western Australia 1979. <u>Client:</u> Cliffs International Inc. <u>Survey date:</u> 1978/79 <u>Survey type:</u> Detailed fauna surveys <u>Experience:</u> Senior Ecologist Zoologist	36.34 km	- Active searching - Systematic trapping – pitfall, funnel, Elliott and break back traps - Avifauna census - Nocturnal surveys - Mist netting - Opportunistic observations - Secondary evidence	- Major Drainage Line - Gorge/ Gully - Hillcrest/Slope/Ridges - Mulga Woodland - Eucalyptus Woodland - Stony Plain	<u>125 vertebrate species</u> 18 native mammals 3 introduced mammals 64 birds 48 reptiles 2 amphibians	<u>Threatened:</u> - Ghost bat (<i>Macroderma gigas</i>) - Grey falcon (<i>Falco hypoleucos</i>) - Pilbara olive python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>) <u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	Western pebble-mound mouse (<i>Pseudomys chapmani</i>) first described from this survey.
103. ENV (2010d) Ophthalmia Flora, Vegetation and Fauna Assessment	<u>Project:</u> Ophthalmia Flora, Vegetation and Fauna Assessment <u>Client:</u> BHP <u>Survey date:</u> 12-17 May 2010 <u>Survey type:</u> Level 1 fauna survey <u>Experience:</u> Unknown	42 km	- Targeted searching - Bird census - Bat echolocation recording - Opportunistic observations - Secondary Evidence	- Riverine - Minor Drainage Line - Alluvial Plain - Stony Plain	<u>27 vertebrate species</u> 4 native mammals 5 introduced mammals 47 birds 17 reptiles	<u>Priority:</u> Western pebble-mound mouse (<i>Pseudomys chapmani</i>)	
104. GHD (2020) Fortescue Valley Targeted Bilby Survey	<u>Project:</u> Fortescue Valley Targeted Bilby Survey <u>Client:</u> BHP <u>Survey date:</u> 17–23 February 2020 <u>Survey type:</u> Targeted bilby survey <u>Experience:</u> Principle Zoologist Senior Zoologist x 2	45 km	- Drone survey - Targeted survey – plot searches - Habitat assessment/ mapping - Opportunistic observations - Secondary evidence	- Sandy/ Stony Plain - Mulga Woodland - Hillslope	<u>1 mammal</u>	<u>Threatened:</u> Greater bilby (<i>Macrotis lagotis</i>)	

Reference	Survey details	Proximity to Study Area	Survey methods	Significant species habitat	Vertebrate fauna assemblage found (summary of species richness)	Significant species	Survey limitations/ notes
105. Ninox (2009) A Fauna Survey of the Proposed Hope Downs 4 Mining Area, Near Newman, Western Australia.	<u>Project:</u> A Vertebrate Fauna Survey of the Proposed Hope Downs 4 Mining Area, Near Newman, Western Australia. 1243 <u>Client:</u> Mattiske Consulting Pty Ltd. <u>Survey date:</u> Phase 1: 6–13 May 2008 Phase 2: 12–18 September 2008 <u>Survey type:</u> Two phase Detailed survey <u>Experience:</u> Senior Zoologist x2 Zoologist	50 km	- Active searching - Systematic trapping – pitfall, Elliott, funnel, cage - Avifauna census - Bat echolocation recording - Harp trapping - Opportunistic observations - Secondary evidence	- Ridge and Range - Rocky Hill/Gully - Creekline - Spinifex with Eucalyptus - Mulga Groves - Stony Plain	<u>112 vertebrate species</u> 16 native mammals 1 introduced mammal 66 birds 29 reptiles	<u>Priority:</u> - Western pebble-mound mouse (<i>Pseudomys chapmani</i>) <u>Other specially protected:</u> - Peregrine falcon (<i>Falco peregrinus</i>)	

Appendix B: Significant Vertebrate Fauna Recorded in the Desktop Assessment

Note: Due to the size of the desktop assessment, only the 30 nearest and most relevant reports are included below.

Species		Conservation status				Database review						Literature review																																
Scientific Name	Common Name	EPBC Act	BC Act	DBCA	IUCN	NatureMap	EPBC Protected Matters	DBCA Priority and Threatened	ALA	Birdlife	BHP	Astron (2025)	Biologic (2025b)	Biologic (2011a)	Biologic (2013e)	Biologic (2016c)	Biologic (2019b)	Biota (2012c)	Astron (2019)	ENV (2010b)	GHD (2021b)	Ecologia (2004a)	Biologic (2017c)	Rapallo (2012)	Biota (2022)	Outback Ecology (2006a)	Specialised Technical	Biota (2010)	Biologic (2017a)	Biologic (2018)	Biologic (2025a)	Biologic (2023e)	ENV (2007a)	Astron (2023)	Biologic (2011f)	Biologic (2011e)	Astron (2010b)	Biologic (2013a)	Biota (2009)	Biota (2013a)	Biota (2013b)			
DASYURIDAE																																												
Dasyercus blythi	Brush-tailed mulgara			P4		x		x			X																																	
Dasyurus hallucatus	Northern quoll	EN	EN		EN	x	x	x			X	X							X						X							X				X		X						
MEGADERMATIDAE																																												
Macroderma gigas	Ghost bat	VU	VU		VU	x	x	x	x		X	X	X	X				X	X		X				X							x					X	X	X				X	
MURIDAE																																												
Leggadina lakedownensis	Northern short-tailed mouse			P4		x		x	x		X																													X				
Pseudomys chapmani	Western pebble-mound mouse			P4		x		x	x		X	X	X	X			X	X	X	X	X	X	X	x	X	x	X		X	X	X			X	x	X	X		X		X	X	X	
RHINONYCTERIDAE																																												
Rhinonictis aurantia	Pilbara leaf-nosed bat	VU	VU			x	x	x			X								X														X			X					X			
THYLACOMYIDAE																																												
Macrotis lagotis	Greater bilby	VU	VU		VU	x	x	x			X																																	
ACANTHIZIDAE																																												
Aphelocephala leucopsis	Southern whiteface	VU				x	x		x																																			
ACCIPITRIDAE																																												
Elanus scriptus	Letter-winged kite			P4	NT	x		x											X																									
Pandion haliaetus	Eastern osprey	MI	MI			x		x			X																																	
APODIDAE																																												
Apus pacificus	Fork-tailed swift	MI	MI			x	x	x	x		X			X											X		X									X								
CHARADRIIDAE																																												

[illegible]

Appendix C: Vertebrate Fauna Habitat Assessments

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-001	-22.8718	119.1107	22/05/2025	Undulating Low Hills	Undulating Low Hills	North	Low	Silty Loam	Few Small Patches	Moderate Outcropping	BIF	Large Rocks (21-60cm)	Few Small Patches	Spinifex Hummock Grassland, Tussock Grassland, Scattered Eucalypts, Scattered Shrubs	Low	Moderate	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	
VMYR-002	-22.8779	119.104	24/05/2025	Medium Drainage Line	Medium Drainage Line	North	Flat	Clay Loam	Evenly Spread	Moderate Outcropping	BIF	Pebbles (5-10cm)	Many Large Patches	Scattered Shrubs, Spinifex Hummock Grassland, Scattered Eucalypts	High	Moderate	20	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	
VMYR-003	-22.8626	119.0952	24/05/2025	Gorge/ Gully	Gully	South	Flat	Silty Loam	Few Small Patches	Moderate Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Tussock Grassland, Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	Moderate	Moderate	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-004	-22.8665	118.8303	24/05/2025	Stony Plain	Sandy/ Stony Plain	West	Low	Sand y Clay Loam	Evenly Spread	Limited Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Moderate	0	None	Good	Road/ Access Track	Moderate (3 to 5 yr)	
VMYR-005	-22.9056	119.0827	23/05/2025	Undulating Low Hills	Hillslope	North	Moderate	Clay Loam	Evenly Spread	Moderate Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Shrubs, Spinifex Hummock Grassland	Moderate	Low	20	None	Good	Mining Exploration	Old (6+ yr)	
VMYR-006	-22.8836	119.0977	24/05/2025	Minor Drainage Line	Minor Drainage Line	West	Low	Clay Loam	Many Small Patches	Major Outcropping	BIF	Pebbles (5-10cm)	Many Small Patches	Shrubland, Scattered Eucalypts, Spinifex Hummock Grassland	Moderate	Low	0	None	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-007	-22.8951	119.091	22/05/2025	Gorge/ Gully	Gully	North	Moderate	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Tussock Grassland, Scattered Eucalypts, Scattered Shrubs	Very High	Nil	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-008	-22.8783	118.84	25/05/2025	Hillcrest/ Hillslope	Hillslope	East	Steep	Clay Loam	Few Small Patches	Extensive Outcropping	BIF	Small Rocks (11-20cm)	Many Small Patches	Scattered Eucalypts, Spinifex Hummock Grassland	Very High	Nil	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-009	-22.8748	118.841	25/05/2025	Gorge/ Gully	Gorge	East	Steep	Clay Loam	Many Small Patches	Extensive Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Scattered Eucalypts, Spinifex Hummock Grassland	Very High	Nil	0	None	Excellent	None Discernible	Old (6+ yr)	

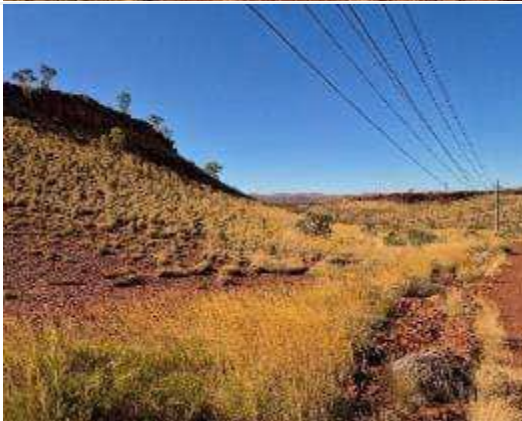
Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-010	-22.876	118.841	25/05/2025	Gorge/ Gully	Gorge	North	Low	Sand y Clay Loam	Many Small Patche s	Extens ive Outcro pping	BIF	Large Rocks (21-60cm)	Many Large Patches	Scattered Shrubs, Tussock Grassland	Very High	Nil	0	Prone to Pooling	Excellen t	None Discernibl e	Old (6+ yr)	
VMYR-011	-22.881	118.8338	27/05/2025	Gorge/ Gully	Gully	South / West	Moderat e	Silty Loam	Many Small Patche s	Major Outcro pping	BIF	Boulders (>61cm)	Many Small Patches	Tussock Grassland, Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	Moderat e	Low	0	Prone to Pooling	Very Good	None Discernibl e	Old (6+ yr)	
VMYR-012	-22.8708	118.8268	26/05/2025	Minor Drainage Line	Stony Plain	Flat	Flat	Clay Loam	Many Large Patche s	Minor Outcro pping	BIF	Pebbles (5-10cm)	Many Small Patches	Shrubland, Scattered Eucalypts, Spinifex Hummock Grassland	Low	Low	0	None	Excellen t	None Discernibl e	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-013	-22.8917	118.8306	21/05/2025	Gorge/ Gully	Gully	South / West	Moderate	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Shrubs, Eucalypt Woodland	High	Low	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-014	-22.8958	118.8419	29/05/2025	Gorge/ Gully	Gorge	South / West	Very Steep	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Shrubs, Scattered Eucalypts	High	Low	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-015	-22.8973	118.861	24/05/2025	Gorge/ Gully	Gully	South	Very Steep	Silty Loam	Few Small Patches	Major Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs, Tussock Grassland	High	Nil	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-016	-22.9155	118.812	21/05/2025	Drainage Area/ Floodplain	Drainage Area/ Floodplain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Negligible	Few Small Patches	Mulga Woodland, Tussock Grassland	Nil	High	0	None	Good	None Discernible	Old (6+ yr)	
VMYR-017	-22.8716	118.851	26/05/2025	Sand Plain	Sandy/ Stony Plain	Flat	Flat	Sandy Clay Loam	Evenly Spread	Negligible		Negligible	Many Large Patches	Scattered Shrubs, Mulga Woodland, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Very High	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-018	-22.869	119.0871	24/05/2025	Gorge/ Gully	Gorge	North	Low	Sandy Clay Loam	Few Small Patches	Extensive Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Eucalypt Woodland, Scattered Eucalypts, Tussock Grassland	Very High	Nil	0	Prone to Pooling	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-019	-22.8055	119.1586	25/05/2025	Gorge/ Gully	Gully	East	Steep	Clay Loam	Scarce	Extensive Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Tussock Grassland, Spinifex Hummock Grassland	Very High	Low	0	Prone to Pooling	Excellent	None Discernible	Old (6+ yr)	
VMYR-020	-22.8991	118.85	23/05/2025	Gorge/ Gully	Gully	South	Very Steep	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Shrubs, Scattered Eucalypts	High	Low	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-021	-22.852	119.1013	24/05/2025	Gorge/ Gully	Gully	South	Moderate	Silty Loam	Few Small Patches	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Tussock Grassland, Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	High	Moderate	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-022	-22.8705	118.8081	24/05/2025	Stony Plain	Stony Plain	West	Low	Clay Loam	Evenly Spread	Limited Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Moderate	0	None	Very Good	Road/ Access Track	Old (6+ yr)	
VMYR-023	-22.7798	119.1523	22/05/2025	Undulating Low Hills	Undulating Low Hills	South	Low	Clay Loam	Many Large Patches	Limited Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Scattered Shrubs, Spinifex Hummock Grassland	Low	Low	0	None	Poor	Frequent Fire	Recent (0 to 2 yr)	
VMYR-024	-22.8705	118.8189	22/05/2025	Stony Plain	Hillslope	North	Low	Clay Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Shrubs	Low	Low	0	None	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-025	-22.7835	119.1552	22/05/2025	Drainage Area/ Floodplain	Sandy/ Stony Plain	Flat	Flat	Sand y Clay Loa m	Evenly Spread	Negligi ble		Pebbles (5- 10cm)	Many Small Patches	Shrubland, Spinifex Hummock Grassland	Nil	Moderat e	0	Prone to Flooding	Good	Road/ Access Track	Old (6+ yr)	
VMYR-026	-22.7993	119.1386	22/05/2025	Undulating Low Hills	Hillslope	North	Low	Clay Loa m	Evenly Spread	Moder ate Outcro pping	BIF	Pebbles (5- 10cm)	Scarce	Spinifex Hummock Grassland	Moderat e	Moderat e	0	None	Very Good	Road/ Access Track	Old (6+ yr)	
VMYR-027	-22.8784	118.8141	25/05/2025	Breakaway/ Cliff	Breakaway	South	Very Steep	Clay Loa m	Few Small Patche s	Extens ive Outcro pping	BIF	Large Rocks (21- 60cm)	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Tussock Grassland	Very High	Nil	0	None	Very Good	None Discernibl e	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-028	-22.8021	119.1377	23/05/2025	Gorge/ Gully	Gully	East	Moderate	Clay Loam	Few Small Patches	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	High	Low	1	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-029	-22.8607	119.1156	23/05/2025	Gorge/ Gully	Gorge	Flat	Flat	Clay Loam	Few Large Patches	Extensive Outcropping	BIF	Boulders (>61cm)	Many Large Patches	Shrubland, Eucalypt Woodland, Tussock Grassland	Very High	Moderate	5	Prone to Pooling	Excellent	None Discernible	Old (6+ yr)	
VMYR-030	-22.9136	118.8452	21/05/2025	Cleared/ Disturbed	Disturbed	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Many Small Patches	Shrubland, Spinifex Hummock Grassland	Nil	High	0	None	Poor	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-031	-22.9117	118.8141	22/05/2025	Drainage Area/ Floodplain	Drainage Area/ Floodplain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Negligible	Scarce	Mulga Woodland, Tussock Grassland	Low	Low	0	Prone to Flooding	Good	Road/ Access Track	Old (6+ yr)	
VMYR-032	-22.8733	118.8034	24/05/2025	Stony Plain	Stony Plain	Flat	Flat	Clay Loam	Evenly Spread	Limited Outcropping	BIF	Gravel (1-4cm)	Many Small Patches	Scattered Shrubs, Mulga Woodland, Scattered Eucalypts, Spinifex Hummock Grassland, Tussock Grassland	Nil	Moderate	0	None	Very Good	Road/ Access Track	Old (6+ yr)	
VMYR-033	-22.9121	118.8611	21/05/2025	Artificial wetlands	Stony Plain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Few Small Patches	Scattered Shrubs, Tussock Grassland, Mulga Woodland	Low	Nil	0	Permanent	Good	Artificial Water Source	Old (6+ yr)	

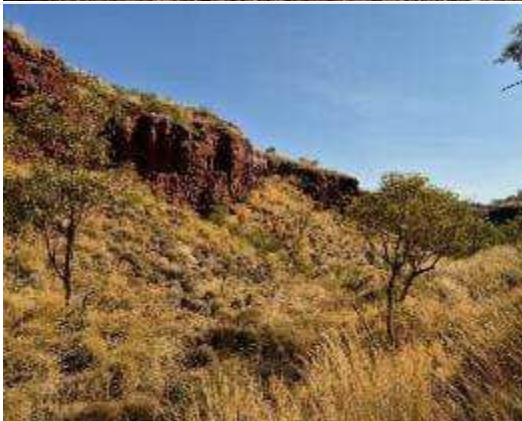
Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-034	-22.9109	118.8372	23/05/2025	Minor Drainage Line	Minor Drainage Line	Flat	Flat	Sand y Clay Loam	Many Small Patches	Negligible		Pebbles (5-10cm)	Few Small Patches	Acacia Shrubland, Tussock Grassland	Nil	Moderate	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	
VMYR-035	-22.818	119.1528	25/05/2025	Breakaway/ Cliff	Undulating Low Hills	South	Steep	Clay Loam	Few Large Patches	Major Outcropping	BIF	Gravel (1-4cm)	Scarce	Spinifex Hummock Grassland, Scattered Eucalypts	High	Nil	0	None	Excellent	Mining Exploration	Old (6+ yr)	
VMYR-036	-22.8141	119.1554	25/05/2025	Breakaway/ Cliff	Undulating Low Hills	North	Moderate	Clay Loam	Few Large Patches	Minor Outcropping	BIF	Gravel (1-4cm)	Scarce	Spinifex Hummock Grassland, Scattered Eucalypts	High	Nil	0	None	Excellent	Mining Exploration	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-037	-22.8109	119.1571	25/05/2025	Hillcrest/Hillslope	Undulating Low Hills	Flat	Flat	Clay Loam	Few Large Patches	Minor Outcropping	BIF	Gravel (1-4cm)	Scarce	Spinifex Hummock Grassland, Scattered Eucalypts	High	Nil	0	None	Very Good	None Discernible	Old (6+ yr)	
VMYR-038	-22.907	118.8384	23/05/2025	Drainage Area/Floodplain	Drainage Area/Floodplain	South	Flat	Silty Loam	Few Small Patches	Negligible		Small Rocks (11-20cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Eucalypt Woodland	Nil	Nil	0	Prone to Flooding	Very Good	Road/Access Track	Old (6+ yr)	
VMYR-039	-22.9169	118.8338	21/05/2025	Stony Plain	Drainage Area/Floodplain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Pebbles (5-10cm)	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	High	0	None	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-040	-22.8915	118.8254	21/05/2025	Hillcrest/Hillslope	Hillslope	West	Low	Silty Clay Loam	Scarce	Negligible		Small Rocks (11-20cm)	Scarce	Spinifex Hummock Grassland, Scattered Shrubs	Nil	Low	0	None	Good	None Discernible	Moderate (3 to 5 yr)	
VMYR-041	-22.9062	118.8443	21/05/2025	Stony Plain	Stony Plain	South	Flat	Clay Loam	Evenly Spread	Negligible		Pebbles (5-10cm)	Few Large Patches	Spinifex Hummock Grassland, Scattered Shrubs, Mulga Woodland	Low	Low	10	None	Good	Proximity to Mining - Dust	Old (6+ yr)	
VMYR-042	-22.9233	118.8208	26/05/2025	Hardpan Plain	Hardpan Plain	Flat	Flat	Clay Loam Sandy	Evenly Spread	Negligible		Negligible	Scarce	Spinifex Hummock Grassland	Nil	High	0	None	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-043	-22.8951	118.8516	27/05/2025	Gorge/ Gully	Gorge	South	Very Steep	Clay Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Shrubs, Scattered Eucalypts	High	Low	0	Prone to Pooling	Excellent	None Discernible	Old (6+ yr)	
VMYR-044	-22.8053	119.1361	23/05/2025	Undulating Low Hills	Minor Drainage Line	West	Low	Clay Loam	Few Large Patches	Moderate Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	High	Low	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-045	-22.8642	119.115	23/05/2025	Gorge/ Gully	Gorge	Flat	Flat	Sandy Loam	Many Large Patches	Minor Outcropping	BIF	Negligible	Many Large Patches	Eucalypt Woodland, Tussock Grassland	Low	High	0	Prone to Pooling	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-046	-22.8667	119.1152	23/05/2025	Undulating Low Hills	Undulating Low Hills	East	Low	Clay Loam	Many Large Patches	Moderate Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Moderate	Low	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-047	-22.8658	118.827	22/05/2025	Stony Plain	Stony Plain	West	Low	Clay Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Few Small Patches	Spinifex Hummock Grassland, Eucalypt Woodland	Nil	Low	15	None	Very Good	Mining Exploration	Old (6+ yr)	
VMYR-048	-22.8649	119.1166	23/05/2025	Undulating Low Hills	Undulating Low Hills	East	Low	Clay Loam	Many Large Patches	Moderate Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Moderate	Low	0	None	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-049	-22.8625	119.1177	23/05/2025	Undulating Low Hills	Undulating Low Hills	Flat	Flat	Clay Loam	Many Large Patches	Limited Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Low	Low	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-050	-22.8585	119.118	23/05/2025	Gorge/ Gully	Gully	North	Low	Clay Loam	Few Large Patches	Major Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	High	Low	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-051	-22.8682	118.8459	25/05/2025	Stony Plain	Stony Plain	North / East	Low	Clay Loam	Many Large Patches	Limited Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Scattered Eucalypts, Spinifex Hummock Grassland	Low	Moderate	0	None	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-052	-22.8719	118.8428	25/05/2025	Stony Plain	Minor Drainage Line	Flat	Flat	Clay Loam	Many Large Patches	Negligible		Pebbles (5-10cm)	Many Small Patches	Shrubland, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Moderate	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-053	-22.8809	118.8318	26/05/2025	Gorge/ Gully	Gully	South	Steep	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	High	Low	0	None	Very Good	None Discernible	Old (6+ yr)	
VMYR-054	-22.8731	118.8352	25/05/2025	Undulating Low Hills	Undulating Low Hills	West	Moderate	Clay Loam	Few Small Patches	Extensive Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Scattered Eucalypts, Spinifex Hummock Grassland	Very High	Nil	0	None	Excellent	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-055	-22.8669	118.8074	25/05/2025	Undulating Low Hills	Undulating Low Hills	North / East	Low	Clay Loam	Few Small Patches	Moderate Outcropping	BIF	Pebbles (5-10cm)	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	High	Low	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-056	-22.9189	118.8244	27/05/2025	Stony Plain	Drainage Area/ Floodplain	Flat	Flat	Sandy Clay Loam	Evenly Spread	Negligible	BIF	Gravel (1-4cm)	Many Small Patches	Mulga Woodland, Tussock Grassland	Nil	Very High	0	Prone to Flooding	Very Good	Artificial Water Source	Old (6+ yr)	
VMYR-057	-22.8833	118.8455	22/05/2025	Gorge/ Gully	Gully	North / East	Steep	Clay Loam	Few Large Patches	Major Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Shrubs	High	Low	2	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-058	-22.8754	118.8501	26/05/2025	Stony Plain	Minor Drainage Line	Flat	Flat	Clay Loam	Evenly Spread	Limited Outcropping	BIF	Gravel (1-4cm)	Many Small Patches	Shrubland, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Moderate	0	None	Excellent	None Discernible	Old (6+ yr)	
VMYR-059	-22.9168	118.8284	28/05/2025	Stony Plain	Sandy/ Stony Plain	Flat	Flat	Sandy Clay Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Many Small Patches	Mulga Woodland, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	High	0	Prone to Flooding	Good	Road/ Access Track	Old (6+ yr)	
VMYR-060	-22.9219	118.8041	25/05/2025	Sand Plain	Sand Plain	Flat	Flat	Sandy Loam	Evenly Spread	Negligible		Negligible	Scarce	Spinifex Hummock Grassland	Nil	Very High	0	None	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-061	-22.9167	118.8096	21/05/2025	Drainage Area/ Floodplain	Drainage Area/ Floodplain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Negligible	Many Small Patches	Scattered Shrubs, Mulga Woodland, Tussock Grassland	Nil	High	0	None	Good	None Discernible	Old (6+ yr)	
VMYR-062	-22.9172	118.8368	21/05/2025	Stony Plain	Drainage Area/ Floodplain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Pebbles (5-10cm)	Many Small Patches	Shrubland, Spinifex Hummock Grassland, Scattered Eucalypts	Nil	Moderate	0	Prone to Flooding	Good	Weed Invasion	Moderate (3 to 5 yr)	
VMYR-063	-22.9231	118.819	25/05/2025	Sand Plain	Sand Plain	Flat	Flat	Sandy Loam	Evenly Spread	Negligible		Negligible	Scarce	Spinifex Hummock Grassland	Nil	Very High	0	None	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-064	-22.9067	118.8663	21/05/2025	Stony Plain	Stony Plain	South	Flat	Clay Loam	Evenly Spread	Negligible		Pebbles (5-10cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Shrubs	Low	Low	0	None	Good	Proximity to Mining - Dust	Old (6+ yr)	
VMYR-065	-22.9039	118.8649	21/05/2025	Stony Plain	Stony Plain	South	Flat	Clay Loam	Evenly Spread	Negligible		Pebbles (5-10cm)	Few Large Patches	Spinifex Hummock Grassland, Scattered Shrubs, Mulga Woodland	Low	Low	10	None	Good	Proximity to Mining - Dust	Old (6+ yr)	
VMYR-066	-22.7712	119.1456	22/05/2025	Undulating Low Hills	Undulating Low Hills	West	Low	Clay Loam	Many Large Patches	Major Outcropping	BIF	Small Rocks (11-20cm)	Scarce	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Low	Low	0	None	Poor	Frequent Fire	Recent (0 to 2 yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-067	-22.8036	119.1405	23/05/2025	Gorge/ Gully	Gully	East	Moderate	Clay Loam	Few Small Patches	Major Outcropping	BIF	Boulders (>61cm)	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	High	Low	1	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	
VMYR-068	-22.7881	119.154	22/05/2025	Medium Drainage Line	Medium Drainage Line	Flat	Flat	Clay Loam	Many Small Patches	Negligible		Negligible	Many Large Patches	Eucalypt Woodland, Scattered Shrubs, Tussock Grassland	Nil	Low	5	Permanent	Good	Mining Exploration	Moderate (3 to 5 yr)	
VMYR-069	-22.8503	119.1252	24/05/2025	Major Drainage Line	Major Drainage Line	North / West	Flat	Clay Loam	Evenly Spread	Extensive Outcropping	BIF	Small Rocks (11-20cm)	Few Large Patches	Tussock Grassland, Scattered Shrubs	Very High	Moderate	0	Prone to Flooding	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-070	-22.8973	119.0943	22/05/2025	Hillcrest/Hillslope	Hillslope	North	Steep	Silty Loam	Few Small Patches	Major Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	High	Low	0	None	Very Good	None Discernible	Old (6+ yr)	
VMYR-071	-22.7897	119.155	22/05/2025	Undulating Low Hills	Stony Plain	West	Low	Clay Loam	Evenly Spread	Limited Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Nil	Moderate	0	None	Degraded	Mining Exploration	Moderate (3 to 5 yr)	
VMYR-072	-22.8895	119.0653	22/05/2025	Hillcrest/Hillslope	Hillslope	North	Low	Silty Loam	Scarce	Limited Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	Low	Nil	0	None	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-073	-22.9128	118.8056	26/05/2025	Hardpan Plain	Hardpan Plain	Flat	Flat	Silty Loam	Evenly Spread	Negligible		Gravel (1-4cm)	Few Small Patches	Spinifex Hummock Grassland, Tussock Grassland, Scattered Eucalypts, Scattered Shrubs	Nil	Moderate	0	None	Very Good	None Discernible	Old (6+ yr)	
VMYR-074	-22.9159	118.8047	26/05/2025	Hardpan Plain	Hardpan Plain	Flat	Flat	Clay Loam	Evenly Spread	Negligible		Negligible	Many Small Patches	Scattered Shrubs, Scattered Eucalypts, Tussock Grassland	Nil	Low	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	
VMYR-075	-22.878	118.8107	26/05/2025	Gorge/ Gully	Gully	South	Steep	Silty Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Scattered Shrubs, Spinifex Hummock Grassland, Scattered Eucalypts	High	Low	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-076	-22.8592	119.1001	22/05/2025	Gorge/ Gully	Gully	North / East	Moderate	Silty Loam	Scarce	Minor Outcropping	BIF	Small Rocks (11-20cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland, Tussock Grassland	Low	Low	0	None	Very Good	None Discernible	Old (6+ yr)	
VMYR-077	-22.8761	119.0816	24/05/2025	Undulating Low Hills	Undulating Low Hills	South	Low	Clay Loam	Many Large Patches	Limited Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Shrubs, Scattered Eucalypts, Spinifex Hummock Grassland	Low	Low	0	None	Very Good	Road/ Access Track	Old (6+ yr)	
VMYR-078	-22.9016	119.0573	23/05/2025	Hillcrest/ Hillslope	Hillslope	South	Steep	Clay Loam	Few Large Patches	Major Outcropping	BIF	Gravel (1-4cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts	Moderate	Nil	0	None	Good	Mining Exploration	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-079	-22.8988	118.8232	28/05/2025	Hillcrest/Hillslope	Hillcrest/Upper Hillslope	West	Low	Silty Loam	Scarce	Negligible		Small Rocks (11-20cm)	Scarce	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	Nil	Low	0	None	Good	None Discernible	Old (6+ yr)	
VMYR-080	-22.9018	118.8298	28/05/2025	Hillcrest/Hillslope	Hillslope	North / West	Moderate	Silty Loam	Scarce	Moderate Outcropping	BIF	Large Rocks (21-60cm)	Scarce	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	Moderate	Nil	0	None	Good	None Discernible	Old (6+ yr)	
VMYR-081	-22.9086	119.082	24/05/2025	Undulating Low Hills	Hillslope	South	Moderate	Clay Loam	Evenly Spread	Moderate Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Shrubs, Spinifex Hummock Grassland	Moderate	Low	5	None	Good	Mining Exploration	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-082	-22.9238	119.0788	24/05/2025	Undulating Low Hills	Undulating Low Hills	South	Low	Clay Loam	Evenly Spread	Limited Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Eucalypts, Spinifex Hummock Grassland, Scattered Shrubs	Nil	Moderate	3	None	Good	Mining Exploration	Moderate (3 to 5 yr)	
VMYR-083	-22.9047	119.0561	24/05/2025	Drainage Area/ Floodplain	Drainage Area/ Floodplain	South	Flat	Silty Loam	Few Small Patches	Negligible		Small Rocks (11-20cm)	Many Small Patches	Spinifex Hummock Grassland, Scattered Shrubs, Scattered Eucalypts, Tussock Grassland	Nil	Low	0	Prone to Flooding	Very Good	None Discernible	Old (6+ yr)	
VMYR-084	-22.8556	119.1013	22/05/2025	Gorge/ Gully	Gully	North / West	Moderate	Silty Loam	Scarce	Moderate Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts, Scattered Shrubs	High	Low	0	Prone to Pooling	Very Good	None Discernible	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Landform	Aspect	Slope	Soil		Outcropping		Ground Cover			Rocky Cracks / Crevices	Burrowing Suitability	Hollow count	Water presence	Habitat condition	Disturbances	Time since last fire (years)	Photo
	Latitude	Longitude						Type	Availability	Extent	Rock type	Rock Size	Veg. Litter	Veg. Type								
VMYR-085	-22.9069	119.026	23/05/2025	Hillcrest/Hillslope	Hillslope	East	Steep	Silty Loam	Few Large Patches	Major Outcropping	BIF	Large Rocks (21-60cm)	Few Small Patches	Spinifex Hummock Grassland, Scattered Eucalypts	High	Nil	0	None	Good	Mining Exploration	Old (6+ yr)	

Appendix D: Fauna Species Recorded During the Survey

Scientific Name	Common Name	Ultrasonic	Bird Census	Camera Trap	Acoustic	Opportunistic	Targeted Search
MAMMALS							
CANIDAE							
<i>Canis familiaris</i>	*Dingo			•			
DASYURIDAE							
<i>Dasyurus blythi</i>	Brush-tailed mulgara						•
<i>Ningauia timealeyi</i>	Pilbara ningauia			•			
<i>Pseudantechinus woolleyae</i>	Woolley's pseudantechinus			•			
<i>Sminthopsis macroura</i>	Stripe-faced dunnart			•			
FELIDAE							
<i>Felis catus</i>	*Domestic cat			•		•	
MACROPODIDAE							
<i>Osphranter robustus subsp. erubescens</i>	Euro			•			
<i>Petrogale rothschildi</i>	Rothschild's rock-wallaby			•			
MEGADERMATIDAE							
<i>Macroderma gigas</i>	Ghost bat	•	•				•
MURIDAE							
<i>Pseudomys chapmani</i>	Western pebble-mound mouse					•	•
<i>Zyzomys argurus</i>	Common rock rat			•			
BIRDS							
ACANTHIZIDAE							
<i>Acanthiza uropygialis</i>	Chestnut-rumped thornbill				•		
<i>Gerygone fusca</i>	Western gerygone				•		
<i>Smicrornis brevirostris</i>	Weebill				•		
ACCIPITRIDAE							
<i>Accipiter fasciatus</i>	Brown goshawk			•			

Scientific Name	Common Name	Ultrasonic	Bird Census	Camera Trap	Acoustic	Opportunistic	Targeted Search
<i>Circus approximans</i>	Swamp harrier		•				
<i>Haliastur sphenurus</i>	Whistling kite		•	•			
AEGOTHELIDAE							
<i>Aegotheles cristatus</i>	Australian owl-nightjar				•		
ALCEDINIDAE							
<i>Dacelo leachii subsp. leachii</i>	Blue-winged kookaburra				•		
ANATIDAE							
<i>Anas gracilis</i>	Grey teal		•				
<i>Anas superciliosa</i>	Pacific black duck		•				
<i>Aythya australis</i>	Hardhead		•				
<i>Chenonetta jubata</i>	Australian wood duck		•				
<i>Dendrocygna eytoni</i>	Plumed whistling duck		•				
ARTAMIDAE							
<i>Artamus cinereus</i>	Black-faced woodswallow				•		
<i>Artamus personatus</i>	Masked woodswallow		•		•		
<i>Artamus superciliosus</i>	White-browed woodswallow						•
<i>Cracticus nigrogularis</i>	Pied butcherbird			•	•		•
<i>Cracticus tibicen</i>	Australian magpie				•		
CACATUIDAE							
<i>Nymphicus hollandicus</i>	Cockatiel				•		
CAMPEPHAGIDAE							
<i>Coracina novaehollandiae</i>	Black-faced cuckooshrike				•		
CHARADRIIDAE							
<i>Vanellus tricolor</i>	Banded lapwing				•		
COLUMBIDAE							

Scientific Name	Common Name	Ultrasonic	Bird Census	Camera Trap	Acoustic	Opportunistic	Targeted Search
<i>Geopelia cuneata</i>	Diamond dove				•		
<i>Geophaps plumifera subsp. ferruginea</i>	Spinifex pigeon			•			
<i>Ocyphaps lophotes</i>	Crested pigeon				•		
CORVIDAE							
<i>Corvus orru subsp. ceciliae</i>	Torresian crow			•	•		
CUCULIDAE							
<i>Chrysococcyx basalus</i>	Horsfield's bronze cuckoo				•		
<i>Heteroscenes pallidus</i>	Pallid cuckoo				•		
ESTRILDIDAE							
<i>Taeniopygia castanotis</i>	Zebra finch		•	•	•		
FALCONIDAE							
<i>Falco berigora</i>	Brown falcon				•		
<i>Falco longipennis</i>	Australian hobby		•				
<i>Falco peregrinus</i>	Peregrine falcon						•
LOCUSTELLIDAE							
<i>Cincloramphus mathewsi</i>	Rufous songlark		•				
<i>Eremiornis carteri</i>	Spinifex bird				•		
MALURIDAE							
<i>Malurus assimilis subsp. assimilis</i>	Purple-backed fairywren				•		•
<i>Malurus leucopterus subsp. leuconotus</i>	White-winged fairywren		•		•		
MELIPHAGIDAE							
<i>Acanthagenys rufogularis</i>	Spiny-cheeked honeyeater				•		
<i>Epthianura tricolor</i>	Crimson chat		•		•		
<i>Gavicalis virescens</i>	Inland singing honeyeater		•		•		
<i>Lichmera indistincta</i>	Brown honeyeater				•		

Scientific Name	Common Name	Ultrasonic	Bird Census	Camera Trap	Acoustic	Opportunistic	Targeted Search
<i>Manorina flavigula</i>	Yellow-throated miner				•		
<i>Ptilotula keartlandi</i>	Grey-headed Honeyeater			•	•		
<i>Ptilotula penicillata</i>	White-plumed honeyeater				•		
MONARCHIDAE							
<i>Grallina cyanoleuca</i>	Magpie-lark		•		•		
OREOICIDAE							
<i>Oreoica gutturalis</i>	Crested bellbird				•		
OTIDIDAE							
<i>Ardeotis australis</i>	Australian bustard		•			•	
PACHYCEPHALIDAE							
<i>Colluricincla harmonica</i>	Grey shrike thrush			•	•		
<i>Pachycephala rufiventris subsp. rufiventris</i>	Rufous whistler				•		
PETROICIDAE							
<i>Melanodryas cucullata</i>	Hooded robin				•		
PODICIPEDIDAE							
<i>Poliocephalus poliocephalus</i>	Hoary-headed grebe		•				
<i>Tachybaptus novaehollandiae</i>	Australasian grebe		•				
POMATOSTOMIDAE							
<i>Pomatostomus temporalis subsp. rubeculus</i>	Grey-crowned babbler			•	•		
PSITTACIDAE							
<i>Barnardius zonarius subsp. zonarius</i>	Australian ringneck parrot				•		
PSITTACULIDAE							
<i>Melopsittacus undulatus</i>	Budgerigar		•				
PTILINORHYNCHIDAE							
<i>Ptilonorhynchus maculatus subsp. guttatus</i>	Western bowerbird			•			

Scientific Name	Common Name	Ultrasonic	Bird Census	Camera Trap	Acoustic	Opportunistic	Targeted Search
RECURVIROSTRIDAE							
<i>Himantopus himantopus</i>	Black-winged stilt		•				
RHIPIDURIDAE							
<i>Rhipidura leucophrys subsp. leucophrys</i>	Willie wagtail		•	•	•		•
THRESKIORNITHIDAE							
<i>Threskiornis spinicollis</i>	Straw-necked ibis		•				
TURNICIDAE							
<i>Turnix velox</i>	Little button quail			•			
Reptiles							
AGAMIDAE							
<i>Ctenophorus caudicinctus</i>	Ring-tailed dragon						•
DIPLODACTYLIDAE							
<i>Diplodactylus savagei</i>	Southern pilbara beak-faced gecko						•
PYTHONIDAE							
<i>Antaresia childreni</i>	Children's python						•
SCINCIDAE							
<i>Ctenotus rubicundus</i>	Ruddy ctenotus			•			
VARANIDAE							
<i>Varanus gouldii</i>	Bungarra						•
<i>Varanus tristis subsp. tristis</i>	Racehorse goanna			•			
Amphibians							
PELODRYADIDAE							
<i>Cyclorana maini</i>	Sheep frog						•
Total		1	23	22	37	3	13

Appendix E: Water Features Recorded in the Study Area

Water ID	Site ID	Latitude	Longitude	Date Assessed	Length (m)	Width (m)	Water Present Above Surface	Water Depth (m)	Artificial or Natural	Water Present Intermediate Zone	Permanency	Water Feature Photo
WMYR-001	VMYR-033	-22.9120	118.8608	21/05/2025	50	50	Yes	1	artificial	No	Persistent	
WMYR-002	VMYR-031	-22.9116	118.8144	22/05/2025	700	500	Yes	0.05	natural	No	Temporary (will persist for <3 months)	
WMYR-003	VMYR-018	-22.8689	119.0871	24/05/2025	2	1	Yes	0.3	natural	Yes	Semi-persistent (will persist 3 - 9 month of year, most years)	

Water ID	Site ID	Latitude	Longitude	Date Assessed	Length (m)	Width (m)	Water Present Above Surface	Water Depth (m)	Artificial or Natural	Water Present Intermediate Zone	Permanency	Water Feature Photo
WMYR-004	VMYR-034	-22.9110	118.8369	27/05/2025	3000	100	Yes	0.5	artificial	Yes	Persistent/ Groundwater Fed	
WMYR-005	VMYR-056	-22.9188	118.8244	28/05/2025	15	15	No	0	artificial	No	Temporary (will persist for <3 months)	
WMYR-006	VMYR-045	-22.8645	119.1148	23/05/2025	300	3	Yes	0.5	natural	Yes	Semi-persistent (will persist 3 - 9 month of year, most years)	

Water ID	Site ID	Latitude	Longitude	Date Assessed	Length (m)	Width (m)	Water Present Above Surface	Water Depth (m)	Artificial or Natural	Water Present Intermediate Zone	Permanency	Water Feature Photo
WMYR-007	VMYR-068	-22.7878	119.1526	22/05/2025	1200	15	Yes	4	natural	Yes	Persistent/ Groundwater Fed	

Appendix F: Caves Recorded in the Study Area

Cave ID	Latitude	Longitude	Date Assessed	Cave Position	Entrance Bearing	Entrance Exposure	Entrance Shape	Entrance Width (m)	Entrance Height (m)	Cave Depth (m)	Number of Chambers	Height of First Chamber (m)	Ghost Bat Present	Ghost Bat Scat	GB Roost Category	PLNB Roost Category	Other Bat Species	Cave Entrance Photo
CMAC-021	-22.892	118.8304	24/05/2025	Mid Slope	North	Semi Exposed	Horizontal	2	0.8	unknown	1	1	unknown	unknown	unclassified	unclassified	unknown	
CMAC-020	-22.8748	118.841	25/05/2025	Upper Slope	East	Semi Exposed	Horizontal	10	5	unknown	unknown	unknown	unknown	unknown	unclassified	unclassified	unknown	
CMAC-019	-22.8799	118.8313	26/05/2025	Mid Slope	South-East	Semi Exposed	Round/Oval	4	4	unknown	unknown	unknown	unknown	unknown	unclassified	unclassified	unknown	

Appendix G: Targeted Searches Undertaken

Transect ID	Sampling Site ID	Date	Total Person Hours	Targeted Species									Habitat/s
				Northern quoll	Ghost bat	Pilbara leaf-nosed bat	Pilbara olive python	Greater bilby	Grey falcon	Night parrot	Southern whiteface	Other	
TMYP-001	VMYP-001	22/05/2025	2	x	x	x	x					western pebble-mound mouse	Undulating Low Hills
TMYP-002	VMYP-002	24/05/2025	2.5	x	x	x	x					western pebble-mound mouse	Medium Drainage Line
TMYP-003	VMYP-003	24/05/2025	1	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-004	VMYP-004	24/05/2025	2	x				x				western pebble-mound mouse, brush-tailed mulgara	Stony Plain
TMYP-005	VMYP-005	23/05/2025	4	x	x	x	x					western pebble-mound mouse	Undulating Low Hills
TMYP-006	VMYP-006	24/05/2025	1.5	x	x	x	x					western pebble-mound mouse	Minor Drainage Line
TMYP-007	VMYP-007	22/05/2025	1	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-009	VMYP-009	25/05/2025	6	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-011	VMYP-011	27/05/2025	1.5	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-012	VMYP-012	26/05/2025	2.5	x	x	x	x					western pebble-mound mouse	Minor Drainage Line
TMYP-013	VMYP-013	21/05/2025	1	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-015	VMYP-015	24/05/2025	4	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-016	VMYP-016	21/05/2025	1	x			x	x				brush-tailed mulgara	Drainage Area/ Floodplain
TMYP-018	VMYP-018	24/05/2025	1	x	x	x	x						Gorge/ Gully
TMYP-020	VMYP-020	23/05/2025	4.5	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-021	VMYP-021	24/05/2025	1.5	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-027	VMYP-027	25/05/2025	1.5	x	x	x	x						Breakaway/ Cliff
TMYP-031	VMYP-031	22/05/2025	2									migratory bird species	Drainage Area/ Floodplain
TMYP-032	VMYP-032	25/05/2025	2						x			migratory bird species	Drainage Area/ Floodplain
TMYP-034	VMYP-034	23/05/2025	4				x						Minor Drainage Line

Transect ID	Sampling Site ID	Date	Total Person Hours	Targeted Species									Habitat/s
				Northern quoll	Ghost bat	Pilbara leaf-nosed bat	Pilbara olive python	Greater bilby	Grey falcon	Night parrot	Southern whiteface	Other	
TMYP-035	VMYP-035	25/05/2025	6		x	x	x					western pebble-mound mouse	Breakaway/ Cliff
TMYP-041	VMYP-041	21/05/2025	3.5	x	x	x	x					western pebble-mound mouse	Stony Plain
TMYP-042	VMYP-042	26/05/2025	0.5									brush-tailed mulgara	Hardpan Plain
TMYP-044	VMYP-044	23/05/2025	4	x	x	x	x		x				Undulating Low Hills
TMYP-045	VMYP-045	25/05/2025	2				x						Gorge/ Gully
TMYP-048	VMYP-048	23/05/2025	2.5	x	x	x	x					western pebble-mound mouse	Undulating Low Hills
TMYP-053	VMYP-053	26/05/2025	1	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-055	VMYP-055	25/05/2025	1	x	x	x	x					brush-tailed mulgara	Undulating Low Hills
TMYP-056	VMYP-056	28/05/2025	1	x			x		x		x	western pebble-mound mouse, brush-tailed mulgara	Stony Plain
TMYP-057	VMYP-057	22/05/2025	4.5	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-060	VMYP-060	25/05/2025	8					x				brush-tailed mulgara	Sand Plain
TMYP-062	VMYP-062	21/05/2025	1	x			x		x		x	western pebble-mound mouse, brush-tailed mulgara	Stony Plain
TMYP-063	VMYP-063	26/05/2025	2					x				brush-tailed mulgara	Sand Plain
TMYP-068	VMYP-068	22/05/2025	1	x			x		x				Medium Drainage Line
TMYP-069	VMYP-069	24/05/2025	3	x	x	x	x						Major Drainage Line
TMYP-073	VMYP-073	26/05/2025	2.5					x				brush-tailed mulgara	Hardpan Plain
TMYP-074	VMYP-074	26/05/2025	3						x				Hardpan Plain
TMYP-075	VMYP-075	26/05/2025	1	x	x	x	x					western pebble-mound mouse	Gorge/ Gully
TMYP-078	VMYP-078	23/05/2025	2	x	x	x	x					western pebble-mound mouse	Hillcrest/ Hillslope
TMYP-079	VMYP-079	28/05/2025	3						x	x		western pebble-mound mouse	Hillcrest/ Hillslope

Transect ID	Sampling Site ID	Date	Total Person Hours	Targeted Species									Habitat/s
				Northern quoll	Ghost bat	Pilbara leaf-nosed bat	Pilbara olive python	Greater bilby	Grey falcon	Night parrot	Southern whiteface	Other	
TMYR-083	VMYR-083	24/05/2025	1	x	x	x	x					western pebble-mound mouse	Drainage Area/ Floodplain
TMYR-085	VMYR-085	27/05/2025	1	x	x	x	x					western pebble-mound mouse	Hillcrest/ Hillslope

Appendix H: Ultrasonic SM4 Locations in the Study Area

Site	Habitat	Deployment Date	Retrieval Date	Total Deployment Nights
VMYR-002	Medium Drainage Line	24/05/2025	27/05/2025	3
VMYR-003	Gorge/ Gully	24/05/2025	27/05/2025	3
VMYR-006	Minor Drainage Line	24/05/2025	27/05/2025	3
VMYR-011	Gorge/ Gully	27/05/2025	30/05/2025	3
VMYR-012	Minor Drainage Line	27/05/2025	30/05/2025	3
VMYR-013	Gorge/ Gully	21/05/2025	24/05/2025	3
VMYR-016	Drainage Area/ Floodplain	21/05/2025	24/05/2025	3
VMYR-018	Gorge/ Gully	25/05/2025	28/05/2025	3
VMYR-021	Gorge/ Gully	24/05/2025	27/05/2025	3
VMYR-028	Gorge/ Gully	23/05/2025	27/05/2025	4
VMYR-030	Cleared/ Disturbed	21/05/2025	24/05/2025	3
VMYR-031	Drainage Area/ Floodplain	27/05/2025	30/05/2025	3
VMYR-031	Drainage Area/ Floodplain	27/05/2025	30/05/2025	3
VMYR-032	Stony Plain	27/05/2025	30/05/2025	3
VMYR-033	Artificial Water Source	21/05/2025	24/05/2025	3
VMYR-034	Minor Drainage Line	27/05/2025	30/05/2025	3
VMYR-034	Minor Drainage Line	27/05/2025	30/05/2025	3
VMYR-040	Hillcrest/ Hillslope	21/05/2025	24/05/2025	3
VMYR-041	Stony Plain	21/05/2025	24/05/2025	3
VMYR-050	Gorge/ Gully	27/05/2025	30/05/2025	3
VMYR-062	Stony Plain	21/05/2025	24/05/2025	3
VMYR-065	Stony Plain	21/05/2025	24/05/2025	3
VMYR-069	Major Drainage Line	24/05/2025	27/05/2025	3
VMYR-070	Hillcrest/ Hillslope	22/05/2025	25/05/2025	3
VMYR-081	Undulating Low Hills	24/05/2025	27/05/2025	3
VMYR-082	Undulating Low Hills	24/05/2025	27/05/2025	3
VMYR-083	Drainage Area/ Floodplain	24/05/2025	27/05/2025	3
VMYR-085	Hillcrest/ Hillslope	27/05/2025	30/05/2025	3
Total Number of units deployed		28		
Total Number of deployment nights		85		