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Perth WA 6004
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24 April 2025

Emma de Mamiel
Specialist Biodiversity
BHP WAIO Iron Ore
125 St Georges Terrace
Perth WA 6000

Dear Emma,

Please find below a memo summarising the additional targeted significant vertebrate fauna species survey within the Eastern Ridge OB25 West Project Area. A targeted survey for significant vertebrate fauna species, specifically Matters of National Environmental Significance (MNES) was previously conducted over the Study Area in April 2024 (Biologic, 2024). It was noted as a potential limitation of this survey that not all caves and water features may have been identified within the Study Area. Therefore, the following scope of works was undertaken:

- Targeted searches within significant habitats to identify occurrence of MNES species and habitat features of significance (i.e. caves and water features), with searches focussed on rocky habitats and major drainage lines where targeted searches were not completed during the previous survey.
- Fauna habitat assessments undertaken throughout the Study Area to further refine and delineate broad fauna habitat mapping previously undertaken for the Study Area.
- Documentation of any opportunistic observations of significant vertebrate fauna species made during the survey while traversing the Study Area and/or undertaking other sampling methods.

The current survey was undertaken from 11–14 February 2025 by Principal Zoologist Jessica Johnston and Zoologist Sam Ronan. The survey targeted remaining areas of suitable habitat within the Study Area and identified one additional cave (CER-12). This cave was rated as a Category 4 ghost bat roost (nocturnal roost caves with opportunistic usage) and Category 4 Pilbara leaf-nosed bat roost (nocturnal refuge) based on assessment from the entrance of the cave (as it could not be entered at the time of survey). No evidence of ghost bat usage was observed from the entrance of CER-12 but the cave does have suitable internal characteristics to support a nocturnal roost. A total of seven caves have now been identified within the Study Area. No water features were recorded during the current or recent

Biologic (2024) survey, and only one water feature has been previously recorded within the Study Area.

Previous habitat mapping of the Study Area was refined slightly with additional areas of Breakaway/ Cliff and Gorge/ Gully habitats mapped following targeted searches within these areas. No additional records of significant vertebrate fauna species were made during the current survey.

Thank you for giving Biologic the opportunity to undertake this work. If you have any queries, please do not hesitate to get in contact.

Yours sincerely

JESSICA JOHNSTON
Principal Zoologist
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0412 512 043

1 Introduction

BHP Western Australian Iron Ore (BHP WAIO) commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a targeted vertebrate fauna survey of the Eastern Ridge OB25 West Project Area (herein the Study Area). The Study Area is located approximately 3–8 kilometres (km) northeast of Newman and covers an area of approximately 819.16 hectares (ha) (Figure 1.1).

A targeted survey for significant vertebrate fauna species was previously conducted over the Study Area in April 2024 (Biologic, 2024). It was noted as a potential limitation of this survey that not all caves and water features may have been identified within the Study Area. Therefore, Biologic was commissioned by BHP WAIO to undertake an additional targeted survey within areas of the Study Area not previously surveyed, specifically focussing on Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The following scope of works was undertaken:

- Sampling consistent with previous surveys of the area, comprising targeted searches within significant habitats to identify occurrence of MNES species and habitat features of significance (i.e. caves and water features), with searches focussed on rocky habitats and major drainage lines where targeted searches were not completed during the April 2024 targeted surveys.
- Fauna habitat assessments undertaken throughout the Study Area to further refine and delineate broad fauna habitat mapping previously undertaken for the Study Area.
- Documentation of any opportunistic observations of significant vertebrate fauna species made during the survey while traversing the Study Area and/or undertaking other sampling methods.

This assessment was carried out in accordance with the guidelines and recommendations developed by the relevant state and federal regulatory bodies, relevant survey-specific license conditions and, where relevant, BHP WAIO procedures (as detailed in Biologic, 2024).

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IBRA Region
Pilbara
IBRA Subregion
Chichester
Fortescue
Hamersley
Roebourne
Port Hedland
Karratha
Newman

Ore Body 24
Port Hedland Newman Railway
Great Northern Hwy
Colley Rd
Port Hedland Newman Railway

LEGEND
Study Area
Target Area 1
Target Area 2
Local Road
State Road
Rail

Biologic

Scale 1:20,000
0 0.25 0.5 0.75 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 17/03/2025

Karratha
Port Hedland
Newman

BHP WAIO
Eastern Ridge (OB25W)
Additional Targeted
Vertebrate Fauna Survey

Figure 1.1: Study Area and regional context

2 Methods

2.1 Survey Timing and Weather

A single-season targeted field survey was undertaken from 11–14 February 2025. Observed weather conditions prior to and during the survey are shown in Table 2.1 and Figure 2.1. Current and long-term climatic data is available from the Bureau of Meteorology (BoM) weather station at Newman Aero (Station 007176), located approximately 9 km south-west of the Study Area (BoM, 2025). In the six months prior to the field survey (April 2024), minimum and maximum temperatures recorded at Newman Aero were higher than long-term averages for most months, except for March 2024 (Figure 2.1). Maximum temperatures during the survey were lower than the long-term maximum averages for three of the four days, with minimum temperatures being slightly higher than long-term minimum averages.

Rainfall received in the 12 months prior to the survey (313.4 mm) was similar to the long-term average (LTA) of 319.7 mm. Rainfall for the six months prior to the survey (259.6 mm) was 92.7% higher than the LTA of 134.7 mm. This was largely due to substantially higher than average rainfall in the months of November and December (Figure 2.1).

Table 2.1: Climatic conditions recorded at Newman Aero (BoM, 2025) during the field survey

Date	Min. temp (°C)	Max. temp (°C)	Rainfall (mm)
11/02/2025	26.2	41.7	0
12/02/2025	28.2	31.4	0
13/02/2025	24.0	29.4	0
14/02/2025	22.2	25.5	0

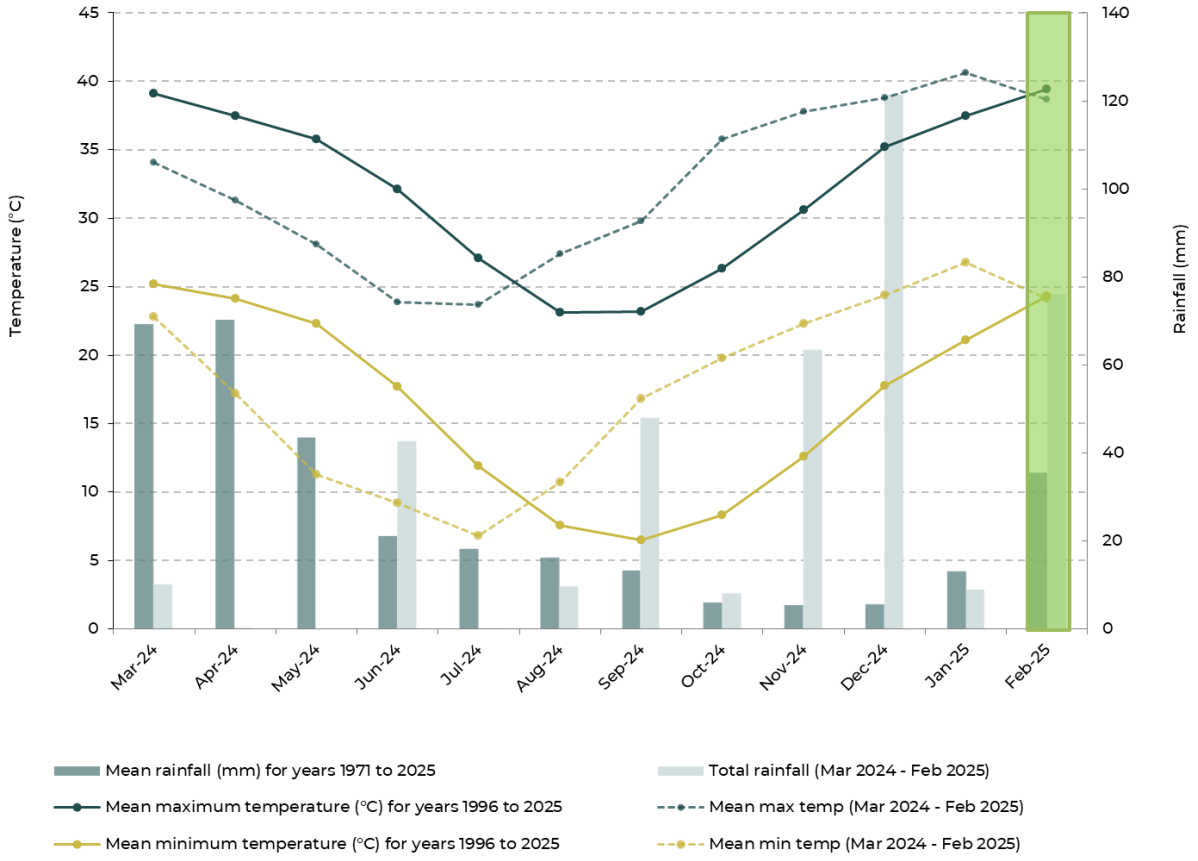

Figure 2.1: Current and long-term climatic data for Newman Airport (BoM, 2025) with approximate survey timing shown in green shaded box

2.2 Personnel and Licences

The field survey was completed by zoologists with extensive experience undertaking vertebrate fauna surveys in the Pilbara region (Table 2.2). The survey was conducted under the following licences and permits; Department of Primary Industries and Regional Development (DPIRD) *Animal Welfare Act 2002's* Licence to use animals for scientific purposes (Licence No. U244/2025-2027); Department of Biodiversity, Conservation and Attractions (DBCA) Regulation 27 "Fauna Taking (Biological Assessment) Licence", issued to Chris Knuckey (licence number BA27001212); DBCA "Authorisation to Take or Disturbed Threatened Species" issued to Chris Knuckey (authorisation number TFA 2425-0157); and Murdoch University Animal Ethics Committee permit RW3354/21.

Table 2.2: Survey personnel and experience

Name	Qualification	Experience
Jessica Johnston (Principal Zoologist)	BSc Zoology/ Botany (Hons) PhD Zoology	25 years zoology 25 years field survey 20 years environmental impact assessment (EIA) (consulting)
Sam Ronan (Zoologist)	BSc Environmental Biology	5 years zoology 7 years field survey 5 years EIA (consulting)

2.3 Habitat Assessments

A total of 11 habitat assessments were undertaken across the Study Area (Figure 2.2; Appendix B). These habitat assessments were undertaken during the targeted searches (with the exception of two sites; NEBA-008 and NEBA-009) and in areas that were not targeted as part of the previous survey (Biologic, 2024). The sites sampled during the previous surveys (Biologic, 2024, 2025) are also shown in Figure 2.2. 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: rock size, vegetation litter and woody debris;
- vegetation: broad vegetation type, structure and dominant species;
- microhabitat: rocky cracks/ crevices, burrowing suitability, hollow presence and abundance, water presence; and
- condition: time since fire, disturbance, and overall habitat condition.

Fauna habitats were previously mapped for the Study Area as part of the previous survey (Biologic, 2024) at a scale of approximately 1:10,000 using data collected from the habitat assessments, previously completed fauna habitat and vegetation mapping within and adjacent to the Study Area, disturbance and rehabilitation mapping (provided by BHP WAIO), and high-resolution aerial imagery, vegetation, topographical, geology and soil mapping as relevant. Some refinements were made to this existing mapping based on the fauna habitat assessments and ground-truthing completed during the current survey.

2.4 Targeted Searches

Nine targeted searches were undertaken within areas considered to provide suitable habitat that had not previously been searched for significant fauna species, particularly Pilbara leaf-nosed bat (*Rhinonicteris aurantia* 'Pilbara form') and ghost bat (*Macroderma gigas*), both of which are listed as Vulnerable under the EPBC Act and *Biodiversity Conservation Act 2016* (BC Act) (Figure 2.2). This is in addition to 12 targeted searches undertaken during the previous survey (Biologic, 2024, 2025), which are also shown in Figure 2.2.

2.4.1 Cave assessments

Cave searching survey effort focussed on areas of rocky habitat (i.e. Gorge/ Gully) most suitable for cave formation. Information recorded during each cave assessment was consistent with those attributes required by BHP WAIO (2023a) and BHP WAIO (2023b), and included:

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

Each cave was categorised based on data from the cave assessments, including the presence of any target bat species via primary (i.e. direct observation) or secondary evidence (i.e. calls, scats and individual remains). Cave utilisation and roost classifications followed those described by Bat Call (2021b) for Pilbara leaf-nosed bats, and Bat Call (2021a) for ghost bats.

2.4.2 Water feature assessments

Water feature searching survey effort focussed on areas of habitat (i.e. Gorge/ Gully and Major Drainage Line) most suitable for water feature formation. The assessments were 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). No water features were found during the current survey so no assessments were completed.

2.5 Opportunistic Fauna Records

Opportunistic fauna observations from direct observation or secondary evidence (e.g. burrows, tracks, diggings, and scats) were documented for all significant fauna species.

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NEBA-010
NEBA-001
VPWR-020
VNEB-012
VPWR-038
NEBA-002
VNEB-017
VNEB-004
VNEB-014
VNEB-016
NEBA-011
VNEB-008
VNEB-006
NEBA-003
NEBA-006
VPWR-052
VNEB-001
NEBA-004
NEBA-007
NEBA-005
NEBA-009
VNEB-005
VNEB-015
NEBA-008
Ore Body 24
Port Hedland Newman Railway
Colley Rd
Great Northern Hwy

Current Sampling
- Traverse
- Habitat Assessment
- Targeted Search

Previous Sampling
- Traverse
- Camera Trap
- Habitat Assessment
- Targeted Search
- Ultrasonic Recorder

LEGEND
- Study Area
- Conditional Access Areas
- Local Road
- State Road
- Rail

Biologic

Scale 1:20,000
0 0.25 0.5 0.75 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 16/04/2025

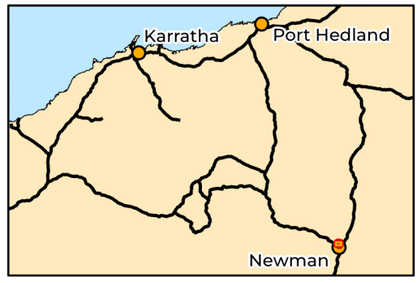

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Figure 2.2: Sampling effort in the Study Area

2.6 Constraints and Limitations

The EPA (2020) outlines several potential limitations to vertebrate fauna surveys. These aspects are assessed and discussed in Table 2.3 below. No major limitations or constraints were identified during the survey.

Table 2.3: 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 surrounding region (e.g. Eastern Ridge hub and Jimblebar hub) which provided contextual data for the current survey and was summarised in Biologic (2024).
Competency/ experience of the survey team	No	The field personnel involved in the survey and analyses are experienced in undertaking fauna surveys in the Pilbara (combined 30 years of experience), including with the significant species targeted during the survey.
Scope (faunal groups sampled and whether any constraints affect this)	Minor	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. The cave found during the survey could not be entered at the time and therefore, could not be fully assessed.
Timing, weather, and season	No	The field survey occurred over appropriate or optimal periods for sampling the target species. The field survey was demobilised early due to Tropical Cyclone Zelia; however, the scope of the survey was completed prior to demobilisation.
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	Survey was a targeted fauna survey for significant species. No evidence of species of significance were identified during the survey.
Adequacy of the survey intensity and proportion of the survey achieved	No	The sampling methods and survey intensity was high and focussed on the species of interest.
Remoteness or access issues	No	The majority of the Study Area was accessible either by vehicle or on foot. Conditional access areas shown in Figure 2.2 were restricted and unable to be accessed. However, these comprised only very small sections of the Study Area and was not considered a limiting factor.
Problems with data and analysis, including sampling bias	No	No limitations with data collection and/or analysis were encountered during the field survey.

3 Results and Discussion

3.1 Fauna Habitats

A total of nine broad fauna habitat types were recorded and mapped across the Study Area, comprising, in decreasing extent (Table 3.1; Figure 3.1):

- Hillcrest/ Hillslope (331.01 ha, 40.41%);
- Sand Plain (45.45 ha, 5.55%);
- Undulating Low Hills (21.72 ha, 2.65%);
- Drainage Area/ Floodplain (20.38 ha, 2.49%);
- Minor Drainage Line (19.59 ha, 2.39%);
- Gorge/ Gully (7.78 ha, 0.95%);
- Stony Plain (5.23 ha, 0.64%);
- Breakaway/ Cliff (2.09 ha, 0.26%); and
- Major Drainage Line (0.06 ha, 0.01%).

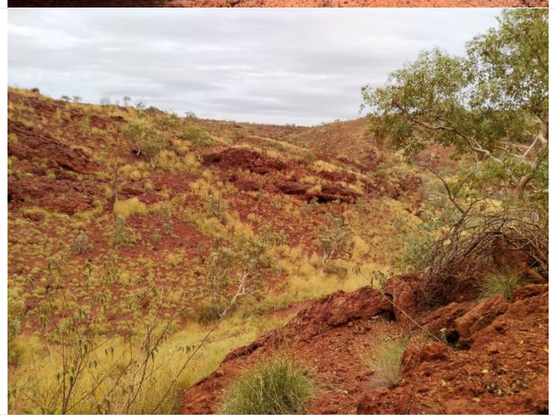
The remaining 44.66% (365.85 ha) of the Study Area comprised Cleared/ Disturbed areas. Some refinement of previous habitat mapping conducted in Biologic (2024) was made, with additional areas of Breakaway/ Cliff and Gorge/ Gully habitats mapped. Descriptions of the distinguishing characteristics and the occurrence within the Study Area for each of habitat type is presented in Table 3.1. Data from on-site habitat assessments is presented in Appendix B.

The habitat suitability assessment for MNES and other significant species did not change following the current survey and is the same as that previously reported within Biologic (2024) for a wider Study Area (summarised in Table 3.1 below). A total of five habitats (Breakaway/ Cliff, Gorge/ Gully, Major Drainage Line, Drainage Area/ Floodplain and Sand Plain) within the Study Area provide critical habitat for various significant species (Table 3.1). Breakaway/ Cliff, Gorge/ Gully and Major Drainage Line 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 (i.e. Gorge/ Gully and Breakaway/ Cliff) (Table 3.1). Major Drainage Line and Drainage Area/ Floodplain provides critical breeding/ nesting habitat for grey falcon and southern whiteface, respectively (Table 3.1). Sand Plain habitat provides potential critical breeding, foraging and dispersal habitat for the greater bilby, although the Sand Plain habitat within the Study Area is marginal, disturbed and highly fragmented. The remaining habitats, Hillcrest/ Hillslope, Stony Plain, Undulating Low Hills and Minor Drainage Line, provide various levels of supporting habitat for certain significant species (Table 3.1).

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 represented across the Pilbara bioregion and surrounding regions and therefore support fauna assemblages which are generally common and widespread.

Table 3.1: Broad fauna habitats within the Study Area

Habitat	Distinguishing habitat characteristics	Extent of habitat	Habitat for target MNES and other significant species	Photo
Hillcrest/ Hillslope 331.01 ha 40.41%	The Hillcrest/ Hillslope habitat comprised a rocky substrate, often with exposed bedrock, on moderate to steep slopes as well as flat-top crests leading into lower foot slopes. 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 *Eucalyptus* woodlands, *Acacia* and *Grevillea* scrublands and *Triodia* low hummock grasslands.	Hillcrest/ Hillslope habitat dominates most of the Study Area. Much of the habitat has been or is currently disturbed with large portions of what would have also been Hillcrest/ Hillslope habitat, now being categorised as Cleared/ Disturbed. Within the Study Area and greater Pilbara region, Hillcrest/ Hillslope habitat is common and widespread. The vegetation and substrate which make up this habitat type are characteristic features of the region.	**Supporting habitat for:** • **ghost bat** – roosting habitat only, Category 4 cave CER-11 occurs within this habitat in the Study Area. • **Pilbara leaf-nosed bat** – foraging and dispersal • **Pilbara olive python** – foraging and dispersal **Important habitat for:** • **western pebble-mound mouse** – breeding, foraging and dispersal	
Sand Plain 45.45 ha 5.55%	Low-lying or elevated sandy areas with accumulated loose sandy substrates. Often supporting an open vegetation cover, dominated by *Acacia* shrubs and/or eucalypt trees over *Triodia* hummock grasses of various life stages.	Sand Plain habitat occurs alongside Drainage Area/ Floodplain habitat in the southern portion of the Study Area. The extent of this band of habitat stops where it is replaced by Cleared/ Disturbed habitat due to mining-related activity extending to the east. The habitat has a reasonable amount of linear disturbance from roads and tracks throughout. Sand Plain is common and widespread habitat throughout the Pilbara region.	**Supporting habitat for:** • **ghost bat** – foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat** – foraging and dispersal **Important habitat for:** • **brush-tailed mulgara** – breeding, foraging and dispersal	
Undulating Low Hills 21.72 ha 2.65%	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 *Triodia* hummock grasslands with scattered *Eucalyptus* trees and *Acacia*, *Eremophila* and/or *Grevillea* shrubs.	Undulating Low Hills habitat occurs in two locations within the Study Area in the northern portion and a small section on the western boundary. The northern occurrence of this habitat is highly fragmented via disturbance and clearing. Undulating Low Hills habitat is a characteristic habitat type of the Pilbara region. Its occurrence throughout the region is widespread and common.	**Supporting habitat for:** • **ghost bat** – foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat** – foraging and dispersal **Important habitat for:** • **western pebble-mound mouse** – breeding, foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Extent of habitat	Habitat for target MNES and other significant species	Photo
Drainage Area/ Floodplain 20.38 ha 2.49%	Lower lying plain often subjected to sheet flow following large rainfall events. Vegetation and substrates of this habitat was variable, often comprising scattered *Eucalyptus* over *Acacia* and/or *Grevillea* shrubs with an understory dominated by *Triodia* hummock grasses and/or mixed tussock grasses on alluvial substrates, often with heavy clays and gravel. Tussock grasses can be dominant within Drainage Area/ Floodplain habitat as a result of high rainfall events.	Drainage Area/ Floodplain habitat extends along the southern boundary of the Study Area, flanking the Major Drainage Line habitat and intermixed with Sand Plain habitat. This fauna habitat is common throughout the Pilbara bioregion. Across the region its structure and condition are variable because of rainfall events and disturbance (i.e. fire and cattle grazing).	**Supporting habitat for:** • **ghost bat –** foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat –** foraging and dispersal **Important habitat for:** • **brush-tailed mulgara –** breeding, foraging, and dispersal	
Minor Drainage Line 19.59 ha 2.39%	Usually lacks a tall dense upper storey, but with a dense mid storey, including sparse *Eucalyptus* and *Acacia* species over tussock grasses and *Triodia* hummock grasses.	Within the Study Area Minor Drainage Line habitat occurs throughout the Study Area, surrounding areas of higher elevation, particularly the Hillcrest/ Hillslope habitat. It is widespread throughout the Pilbara bioregion, though its structure and condition are variable as a result of rainfall events and susceptible to degradation from cattle grazing.	**Supporting habitat for:** • **ghost bat –** foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat –** foraging and dispersal • **Pilbara olive python –** foraging and dispersal habitat where proximal to breeding habitat	
Gorge/ Gully 7.78 ha 0.95%	Characterised by rugged, steep-sided valleys incised into the surrounding landscape. Gorges are deeply incised with vertical cliff faces, while gullies are more open (but not as open or shallow 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.	Gorge/ Gully habitat occurs centrally within the Study Area within Hillcrest/ Hillslope habitat. Eight occurrences of this specific habitat are located within the Study Area and are therefore considered limited within the Study Area itself as well as surrounding region. A reasonably common habitat in the Pilbara, usually associated with ranges; however, because this habitat type is narrow and linear, they only represent a small proportion of the total land area.	**Critical habitat for:** • **Pilbara olive python –** breeding, foraging and dispersal **Supporting habitat for:** • **ghost bat –** dispersal and roosting habitat (one Category 3 cave and other Category 4 caves) • **Pilbara leaf-nosed bat –** foraging and dispersal; no roosting habitat recorded	

Habitat	Distinguishing habitat characteristics	Extent of habitat	Habitat for target MNES and other significant species	Photo
Stony Plain 5.23 ha 0.64%	Comprises 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 *Triodia* and scattered Mulga, eucalypt and *Acacia* trees, with patches of various small to medium shrub species.	Stony Plain habitat occurs in a few small areas throughout the Study Area, often occurring as the intervening area between Minor Drainage Line and Hillcrest/ Hillslope habitats. Stony Plain is one of the most common and widespread habitat types within the Pilbara region. The vegetation and substrate which make up this habitat type are characteristic features of the region.	**Supporting habitat for:** • **ghost bat –** foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat –** foraging and dispersal **Important habitat for:** • **western pebble-mound mouse** - breeding, foraging and dispersal • **brush-tailed mulgara -** foraging and dispersal	
Breakaway/ Cliff 2.09 ha 0.26%	Comprises single sided rock faces within steep mid-upper slopes with bare rock outcrops or cliffs (not the entire slope).	Breakaway/ Cliff habitat occurs in small, isolated patches within Hillcrest/ Hillslope habitat in the northern portion and centre of the Study Area. A common habitat in the Pilbara, usually associated with ranges; however, because this habitat is narrow and linear, they only represent a small proportion of the total land area.	**Critical habitat for:** • **Pilbara olive python –** breeding, foraging and dispersal **Supporting habitat for:** • **ghost bat –** dispersal and roosting habitat (one Category 3 cave and other Category 4 caves) • **Pilbara leaf-nosed bat –** foraging and dispersal; no roosting habitat recorded	
Major Drainage Line 0.06 ha 0.01%	Comprises scattered *Eucalyptus* and *Acacia,* 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.	Within the Study Area, a very small portion of Major Drainage Line habitat occurs on the western boundary of the Study Area, associated with Homestead Creek. It is highly fragmented and disturbed by roads and tracks at this section. This fauna habitat is widespread throughout the Pilbara bioregion, though its structure and condition are variable as a result of rainfall events and susceptible to degradation from cattle grazing.	**Critical habitat for:** • **Pilbara olive python –** breeding, foraging, dispersal **Supporting habitat for:** • **ghost bat –** foraging and dispersal where proximal to roosting habitat • **Pilbara leaf-nosed bat –** foraging and dispersal	

Habitat	Distinguishing habitat characteristics	Extent of habitat	Habitat for target MNES and other significant species	Photo
Cleared/ Disturbed 365.85 ha 44.66%	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.	A large proportion of the Study Area is mapped as Cleared/ Disturbed, associated with large scale mining activities including drill pad arrays and pit mining activities associated with the Eastern Ridge hub. Several linear corridors, including road, rail and access tracks dissect the many other fauna habitats occurring throughout the Study Area.	N/A	No photo

781500
783000
784500
786000
7419000
7417500
Ore Body 24
Port Hedland Newman Railway
Port Hedland Newman Railway

LEGEND

Study Area
Rail

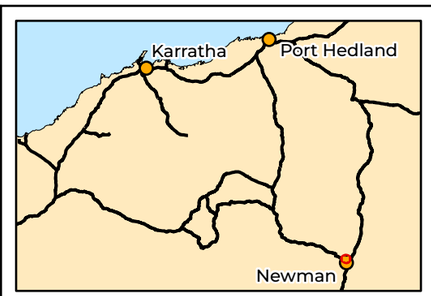
Fauna Habitat

Breakaway/ Cliff
Cleared/ Disturbed
Drainage Area/ Floodplain
Gorge/ Gully
Hillcrest/ Hillslope
Major Drainage Line
Minor Drainage Line
Sand Plain
Stony Plain
Undulating Low Hills

Biologic

Scale 1:15,000
0 0.25 0.5 Km

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 17/03/2025



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Eastern Ridge (OB25W) Additional Targeted Vertebrate Fauna Survey

Figure 3.1: Fauna habitats in the Study Area

3.1.1 Habitat features

3.1.1.1 Caves

Six caves (CER-06, CER-07, CER-08, CER-09, CER-10 and CER-11) were previously recorded and assessed within the Study Area (Biologic, 2024), with an additional cave (CER-12) recorded during the current survey. One cave (CER-11) was recorded within Hillcrest/ Hillslope habitat, two within Breakaway/ Cliff habitat (CER-06 and CER-08), and the remaining four (CER-07, CER-09, CER-10 and CER-12) were recorded within Gorge/ Gully habitat within the Study Area (Figure 3.2; Appendix C).

Of the seven caves occurring within the Study Area, one was classified as a Category 3 ghost bat roost (diurnal roost caves with occasional occupancy; CER-06) and is currently part of the Eastern Pilbara threatened bat monitoring program. The remaining six caves (although CER-12 could not be entered to assess) were classified as Category 4 ghost bat roosts (nocturnal roost caves with opportunistic usage) (Figure 3.2). All seven caves were classified as Category 4 Pilbara leaf-nosed bat roosts (nocturnal refuge).

3.1.1.2 Water features

Only one water feature has been previously recorded within Gorge/ Gully habitat in the Study Area (Biologic, 2014). No water features have been recorded in the Study Area during the recent (Biologic, 2024) or current survey. Temporary pools within the Study Area may occur after significant rainfall but are unlikely to persist for prolonged periods. Water features are considered to provide supporting foraging habitat for the northern quoll, Pilbara leaf-nosed bat and Pilbara olive python.

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CER-06
CER-07
CER-08
CER-09
CER-10
CER-11
CER-12
Ore Body 24
Port Hedland Newman Railway
Port Hedland Newman Railway

LEGEND

Study Area
Rail

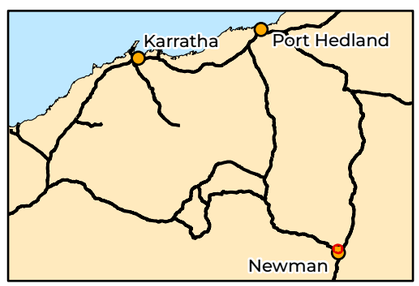
Cave
Current Survey
Category 4 ghost bat roost

Cave
Previous Survey
Category 3 ghost bat roost
Category 4 ghost bat roost

Biologic

Scale 1:15,000
0 0.25 0.5 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 17/03/2025



BHP WAIO
Eastern Ridge (OB25W)
Additional Targeted
Vertebrate Fauna Survey

Figure 3.2: Habitat features in the Study Area

3.2 Significant Fauna Species

Three significant species were recorded recently within the Study Area (Biologic, 2024): ghost bat (*Macroderma gigas*) and Pilbara olive python (*Liasis olivaceus barroni*) listed as Vulnerable under the EPBC Act and BC Act, and western pebble-mound mouse (*Pseudomys chapmani*), listed by DBCA as a Priority 4 species.

The ghost bat was recorded via the presence of scats within cave CER-06, comprising a large scat pile of approximately 1,000 recent (1–6 month old) scats. Evidence of Pilbara olive python was also recorded within cave CER-06 via a shed/ slough. One inactive western pebble-mound mouse mound was recorded during a targeted search in Hillcrest/ Hillslope habitat.

With the exception of the ghost bat (recorded) and the Pilbara leaf-nosed bat (considered Likely), the MNES species considered Likely or Possible to occur are unlikely to represent an important population (as defined by DoE (2013, 2016)) within the Study Area. The ghost bat and Pilbara leaf-nosed bat are likely to occur as resident (ghost bat) and/ or utilise habitats within the Study Area for foraging (ghost bat and Pilbara leaf-nosed bat), and the individuals present within the Study Area contribute to an important population as defined by DoE (2013).

No additional records of significant species were recorded during the current survey. The likelihood of occurrence assessment conducted as part of the recent Biologic (2024) survey of a wider Study Area has not changed following this additional targeted survey (Appendix D). Two species were considered Likely to occur (brush-tailed mulgara (*Dasycercus blythi*) – DBCA Priority 4, and Pilbara leaf-nosed bat), 10 species as Possible (long-tailed dunnart (*Antechinomys longicaudatus*) – DBCA Priority 4, northern quoll (*Dasyurus hallucatus*) – Endangered, northern short-tailed mouse (*Leggadina lakedownensis*) – DBCA Priority 4, greater bilby (*Macrotis lagotis*) - Vulnerable, grey falcon (*Falco hypoleucos*) – Vulnerable, peregrine falcon (*Falco peregrinus*) – Other Specially Protected under BC Act, southern whiteface (*Aphelocephala leucopsis*) – Vulnerable, fork-tailed swift (*Apus pacificus*) – Migratory, spotted ctenotus (northeast) (*Ctenotus uber johnstonei*) – DBCA Priority 2 and Gane's blind snake (*Anilios ganei*) – DBCA Priority 1), and 28 species were considered Unlikely or Highly Unlikely to occur, primarily due to the absence of any habitats found in the Study Area likely to be used by the species.

4 Conclusions

The primary objective of the survey was to locate any ghost bat and Pilbara leaf-nosed bat roosts and water features that have not previously been identified during the recent Biologic (2024) vertebrate fauna survey undertaken within the Study Area. The current survey targeted remaining areas of suitable habitat within the Study Area and identified one additional cave (CER-12). This cave could not be entered to be assessed but was provisionally rated as a Category 4 ghost bat roost (nocturnal roost caves with opportunistic usage), resulting in a total of seven caves (one Category 3 ghost bat roost and six Category 4 ghost bat roosts) identified within the Study Area. All caves were considered potential Category 4 Pilbara leaf-nosed bat roosts (nocturnal refuge). No water features were recorded during the current or recent survey (Biologic, 2024) and only one water feature has been previously recorded within the Study Area.

Previous habitat mapping of the Study Area was refined with additional areas of Breakaway/ Cliff and Gorge/ Gully habitats mapped following targeted searches of these areas. No additional records of significant vertebrate fauna species were made during the current survey.

The MNES species considered Likely or Possible to occur are unlikely to represent an important population (as defined by DoE (2013, 2016)) within the Study Area, with the exception of the two bat species. The ghost bat and Pilbara leaf-nosed bat are likely to occur as resident (ghost bat) and/ or utilise habitats within the Study Area for foraging (ghost bat and Pilbara leaf-nosed bat), and the individuals present within the Study Area contribute to an important population as defined by DoE (2013). The other significant species recorded or potentially occurring are unlikely to be reliant upon the Study Area, or habitat within, for the long-term persistence of the species at a local or regional scale.

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Appendix A: Important Note

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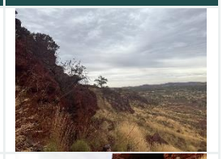
Appendix B: Habitat Assessments

Site ID	Biologic Site ID	Location		Date	Habitat Type	Landform	Aspect	Slope	Soil		Outcropping			Veg. Litter	Dominant Veg. Types	Rocky Cracks / Crevices	Water Presence	Habitat Condition	Disturbances	Time Since Fire	Photo
		Latitude	Longitude						Type	Availability	Extent	Rock Type	Rock Size								
NEBA-01	VERT-001	-23.3216	119.7655	11/02/2025	Breakaway / Cliff	Breakaway	North/ West	Steep	Sandy Loam	Scarce	Major Outcropping	BIF	Small Rocks (11-20cm)	Scarce	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland	Very High	None	1	None	Old (6+ yr)	
NEBA-02	VERT-002	-23.3203	119.7891	12/02/2025	Breakaway / Cliff	Breakaway	North	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Small Rocks (11-20cm)	Scarce	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland	High	Scarce	1	None	Old (6+ yr)	
NEBA-03	VERT-003	-23.3234	119.7761	12/02/2025	Gorge/ Gully	Gully	North/ East	Moderate	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Large Rocks (21-60cm)	Few Large Patches	Scattered Eucalypts, Spinifex Hummock Grassland, Tussock Grassland	Moderate	Prone to Pooling	0.8	Weed Invasion	Old (6+ yr)	
NEBA-04	VERT-004	-23.3258	119.7773	12/02/2025	Breakaway / Cliff	Breakaway	North/ West	Moderate	Sandy Clay Loam	Scarce	Moderate Outcropping	BIF	Large Rocks (21-60cm)	Scarce	Scattered Eucalypts, Spinifex Hummock Grassland	Moderate	None	1	None	Moderate (3 to 5 yr)	
NEBA-05	VERT-005	-23.3286	119.7724	12/02/2025	Hillcrest/ Hillslope	Gorge	North	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Large Rocks (21-60cm)	Scarce	Scattered Eucalypts, Spinifex Hummock Grassland	High	None	1	None	Old (6+ yr)	
NEBA-06	VERT-006	-23.3241	119.7820	13/02/2025	Gorge/ Gully	Gorge	North	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Boulders (>61cm)	Few Small Patches	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland, Tussock Grassland	Moderate	Prone to Pooling	1	None	Old (6+ yr)	
NEBA-07	VERT-007	-23.3269	119.7826	13/02/2025	Gorge/ Gully	Gorge	East	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Small Rocks (11-20cm)	Scarce	Scattered Eucalypts, Spinifex Hummock Grassland, Tussock Grassland	High	None	0.8	Mining Exploration	Old (6+ yr)	
NEBA-08	VERT-008	-23.3326	119.7726	13/02/2025	Drainage Area/ Floodplain	Drainage Area/ Floodplain	North	Flat	Sandy Clay Loam	Scarce	Limited Outcropping	BIF	Pebbles (5-10cm)	Few Small Patches	Scattered Eucalypts, Shrubland, Spinifex Hummock Grassland	Nil	None	0.8	Road/ Access Track	Moderate (3 to 5 yr)	

Site ID	Biologic Site ID	Location		Date	Habitat Type	Landform	Aspect	Slope	Soil		Outcropping			Veg. Litter	Dominant Veg. Types	Rocky Cracks / Crevices	Water Presence	Habitat Condition	Disturbances	Time Since Fire	Photo
		Latitude	Longitude						Type	Availability	Extent	Rock Type	Rock Size								
NEBA-09	VERT-009	-23.3291	119.7648	13/02/2025	Sand Plain	Sand Plain	West	Flat	Sandy Clay Loam	Few Small Patches	Minor Outcropping	BIF	Gravel (1-4cm)	Scarce	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland	Nil	None	0.8	Mining Exploration	Moderate (3 to 5 yr)	
NEBA-10	VERT-010	-23.3193	119.7742	13/02/2025	Gorge/ Gully	Gorge	North	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Pebbles (5-10cm)	Scarce	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland	High	Prone to Pooling	1	None	Old (6+ yr)	
NEBA-11	VERT-011	-23.3217	119.7800	13/02/2025	Gorge/ Gully	Gorge	North/ East	Steep	Sandy Clay Loam	Scarce	Major Outcropping	BIF	Large Rocks (21-60cm)	Few Small Patches	Scattered Eucalypts, Scattered Shrubs, Spinifex Hummock Grassland, Tussock Grassland	High	None	1	None	Old (6+ yr)	

Appendix C: Cave Assessments

Cave ID	Location		Habitat	Cave position	Entrance						Floor slope	Cave depth	Number of chambers	Chamber height	Ghost bat significance	Pilbara leaf-nosed bat significance	Photo	Ghost bat evidence
	Latitude	Longitude			Bearing	Sun exposure	Type	Shape	Width	Height								
CER-06	-23.3028	119.7693	Breakaway / Cliff	Upper slope	North/ West	Sheltered	Cavern	Round/ oval	2.5 m	1.1 m	Incline	18.2 m	2	1.62 m	Category 3	Category 4		1,000 (recent 1 to 6 mths) ghost bat scats recorded on 17 April 2024
CER-07	-23.3232	119.7770	Gorge/ Gully	Lower slope	West	Sheltered	Cavern	Round/ oval	5.1 m	2.5 m	Incline	22.8 m	1	2 m	Category 4	Category 4		None
CER-08[1]	-23.3233	119.7904	Breakaway / Cliff	Upper slope	West	Semi-exposed	Cavern	Round/ oval	2 m	3 m	Incline	-	-	-	Category 4	Category 4		None
CER-09	-23.3215	119.7808	Gorge/ Gully	Upper slope	East	Sheltered	Cavern	Round/ oval	3.3 m	1.5 m	Flat	8.6 m	1	2.1 m	Category 4	Category 4		None
CER-10	-23.3212	119.7812	Gorge/ Gully	Upper slope	South/ East	Exposed	Overhang	Horizontal	6.6 m	3.4 m	Flat	11.8 m	2	4.7 m	Category 4	Category 4		None

[1] Unable to access cave due to constriction

Cave ID	Location		Habitat	Cave position	Entrance						Floor slope	Cave depth	Number of chambers	Chamber height	Ghost bat significance	Pilbara leaf-nosed bat significance	Photo	Ghost bat evidence
	Latitude	Longitude			Bearing	Sun exposure	Type	Shape	Width	Height								
CER-11	-23.3188	119.7845	Hillcrest/ Hillslope	Upper slope	North/ West	Exposed	Overhang	Round/ oval	9.8 m	2.4 m	Incline	9.5 m	1	2.5 m	Category 4	Category 4		None
CER-12[2]	-23.3268	119.7825	Gorge/ Gully	Upper slope	East	Semi-exposed	Cavity	Horizontal	2.7 m	1.0 m	Incline	5.0 m	1	2.0 m	Category 4	Category 4		None

[2] Unable to access cave due to cave entry restrictions, assessed from entrance

Appendix D: Likelihood of Occurrence Table (from Biologic (2024))

Species	Conservation Status			Preferred Broad Habitats	Within Current Known Distribution	Nearest Records to the Study Area	Potential Habitat within the Study Area										Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
MAMMALS																			
DASYURIDAE																			
long-tailed dunnart (*Antechinomys longicaudatus*)			P4	Typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes (Burbidge *et al.*, 2008). Once considered rare but now shown to be relatively common and widespread in rocky habitats (Burbidge *et al.*, 2008).	Yes	9.9 km WSW (1997) (DBCA, 2024)	•								•		Possible	Resident	May occur as a resident in Breakaway/ Cliff and Hillcrest/ Hillslope habitats within the Study Area.
brush-tailed mulgara (*Dasycercus blythi*)			P4	Prefers spinifex *Triodia* spp. grasslands on sand plains and the swales between low dunes (Pavey *et al.*, 2012; Woolley, 2006). Mature spinifex hummocks appear to be important for protection from introduced predators (Körtner *et al.*, 2007).	Yes	3.1 km NE (2013) (BHP, 2023)				•	•			•			Likely	Resident	May occur in Sand Plain, Stony Plain and Drainage Area/ Floodplain habitats, particularly where suitable substrates permitting burrow excavation occur.
northern quoll (*Dasyurus hallucatus*)	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 *et al.*, 2008).	Yes	5.1 km SW (2007) (BHP, 2023)	C	C	C				S		S		Possible	Resident (infrequent visitor, likely dispersing or foraging individuals)	Potential critical denning/ shelter habitat within Study Area includes Gorge/ Gully, Breakaway/ Cliff and Major Drainage Line habitats. May occur in Hillcrest/ Hillslope habitat of the Study Area to forage and/or for dispersal, particularly when occurring near suitable denning/shelter habitat. Major Drainage Line and Minor Drainage Line habitats may provide dispersal corridors. The extent of these habitats within the Study Area is limited; however, they form part of larger continuations of the habitat beyond the extent of the Study Area, therefore, may potentially act as foraging and/or dispersal corridors where connectivity to other areas of critical habitat is provided.
MACROPODIDAE																			
spectacled hare-wallaby (*Lagorchestes conspicillatus leichardti*)			P4	Inhabits spinifex hummock grasslands and *Acacia* shrublands (van Dyck & Strahan, 2008; Woinarski *et al.*, 2014).	Yes	41.7 km ESE (undated) (DBCA, 2024)											Highly Unlikely	N/A	Has declined drastically in the Pilbara and Great Sandy Desert and is now a rare species. Marginally suitable habitat occurs within the Study Area, however there are a lack of

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
																			contemporary records nearby with the closest record 'undated' so there is uncertainty as to when the record was made, however likely it is very old as it was a vouchered specimen.
black-flanked rock-wallaby (*Petrogale lateralis subsp. lateralis*)	EN	EN		Rocky habitats, including gorges and gullies or outcrops with sufficient shelter habitat. Often vegetated with *Acacia* thickets and open low eucalypt woodlands with an understory of grasses and low shrubs (Willers *et al.*, 2011).	No	10.1 km NNE (1975) (DBCA, 2024)											Highly Unlikely	N/A	There is a lack of contemporary records nearby with the closest records being 49 years old. The Study Area is not within the species' current distribution, which questions the accuracy of the historic previous records.
MEGADERMATIDAE																			
ghost bat (*Macroderma gigas*)	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 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 *et al.*, 2008; Tidemann *et al.*, 1985; TSSC, 2016a)	Yes	Recorded within the Study Area (2006) (BHP, 2023; DBCA, 2024)	S	S	S	S	S	S	S	S	S		Confirmed	Resident	Ghost bat was recorded from ~1,000 recent scats within cave CER-06 during current survey. Previously recorded on seven occasions within the Study Area from two locations. No critical (roosting or foraging) habitat is present within the Study Area. However, supporting roosting habitat is present in the form of seven caves (one Category 3 and six Category 4). Supporting foraging habitat within the Study Area includes Stony Plain, Sand Plain, Major Drainage Line, Minor Drainage Line, Drainage Area/ Floodplain, Mulga Woodland and Undulating Low Hills, and supporting dispersal habitat includes Gorge/ Gully and Breakaway/ Cliff when proximal to roosting habitat.
MURIDAE																			
northern short-tailed mouse (*Leggadina lakedownensis*)			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, *Acacia* shrublands, tropical eucalypt and *Melaleuca* woodlands and stony ranges; however, the species is usually found in	Yes	~74.3 km NE (2004) (ALA, 2024)				•	•			•			Possible	Resident	Species is possible to occur in Drainage Area/ Floodplain, Sand Plain, and Stony Plain and habitat 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

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
				seasonally inundated habitats on red or white sandy-clay soils (Moro & Kutt, 2008).															boom periods, particularly following large rainfall events.
western pebble-mound mouse (*Pseudomys chapmani*)			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 *et al.*, 2000).	Yes	Recorded within the Study Area (2015) (BHP, 2023)				•		•			•		Confirmed	Resident	Recorded during the current survey on one occasion of an inactive mound. Species likely to occur as a resident within Stony Plain, Hillcrest/ Hillslope and Undulating Low Hills.
RHINONYCTERIDAE																			
Pilbara leaf-nosed bat (*Rhinonicteris aurantia* '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	2.3 km NNW (2013) (BHP, 2023)	S HR=4	S HR=3	S HR=3	S HR=2	S HR=2	S HR=2	S HR=2	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. Seven caves recorded during the current survey are identified as nocturnal refuges (Category 4) for the species. A critical Category 2 roost occurs within 12 km of Study Area (CNIN-12). Supporting foraging within the Study Area includes all habitats (except Cleared/ Disturbed).
THYLACOMYIDAE																			
greater bilby (*Macrotis lagotis*)	VU	VU		Variety of habitats including spinifex hummock grassland and *Acacia* shrubland, on soft soils (Burrows *et al.*, 2012). In the Pilbara often associated with major drainage line sandy terraces (How *et al.*, 1991).	Yes	5.8 km S (1979) (DBCA, 2024)				S		S			C		Possible	Infrequent visitor (foraging/ dispersal)	Not recorded but suitable habitat is present within the Study Area and includes potential critical habitat (Sand Plain), although it is highly fragmented within the Study Area, and supporting habitats for foraging and dispersal (Major Drainage Line and Drainage Area/ Floodplain).

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
BIRDS																			
ACANTHIZIDAE																			
southern whiteface (*Aphelocephala leucopsis*)	VU			Occupies a wide range of open woodlands and shrublands with grass and/or shrub dominated understory (DCCEEW, 2023). Vegetation is often dominated by *Acacia* or *Eucalyptus/ Corymbia* 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	20.3 km E (2020) (BHP, 2023)			S	S	C		S	S			Possible	Resident	May occur within 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, Major Drainage Line, Stony Plain and Sand Plain if in association with critical habitat.
ANATIDAE																			
Garganey (*Anas querquedula*)	MI	MI		Garganey is a small teal. This duck is a rare visitor to Australia recorded from sewage ponds, lakes and sometimes inland waterbodies (Johnstone & Storr, 1998).	Yes	25.3 km E (2013) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area.
APODIDAE																			
fork-tailed swift (*Apus pacificus*)	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, 1998). Aerial species, which forages high above the tree canopy and rarely lower (Johnstone & Storr, 1998).	Yes	6.4 km E (2022) (DBCA, 2024)	•	•	•	•	•	•	•	•	•		Possible	Infrequent visitor (foraging/ migration only)	May occasionally occur within the airspace above the Study Area to forage in all habitats, unlikely to land or nest within Study Area.

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
CHARADRIIDAE																			
little ringed plover (Charadrius *dubius*)	MI	MI		Bare or sparsely vegetated sandy and pebbly shores of shallow standing freshwater pools, lakes or slow-flowing rivers. Also found in artificial habitats including gravel pits, sewage works, industrial wastelands and rubbish tips (BirdLife International, 2016b)	Yes	4.8 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
greater sand plover (*Charadrius leschenaultia*)	MI / VU	VU		Wide, sandy or shelly beaches, sandspits, sand clays, tidal mudflats, reefs, mangroves, saltmarsh, dunes and bare paddocks (Pizzey & Knight, 2007)	Yes	42 km SE (1982) (ALA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
oriental plover (*Charadrius veredus*)	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	8.3 km S (1981) (DBCA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
FALCONIDAE																			
grey falcon (*Falco hypoleucos*)	VU	VU		Timbered lowlands, particularly Acacia shrubland and along inland drainage systems. Also frequent spinifex and tussock grassland (Burbidge *et al.*, 2010; Olsen & Olsen, 1986)	Yes	~3.3 km NW (2021) (BHP, 2023)			C		S		S				Possible	Infrequent visitor (foraging or dispersal)	Species' occurrence is likely to be dependent on the proximity of nesting. Critical nesting habitat is considered Major Drainage Line within the Study Area; however, no records were observed during the current survey. May occasionally occur to forage within Drainage Area/ Floodplain and Minor Drainage Line habitats. Frequency of occurrence likely to be occasional and dependent on proximity of nesting to the Study Area.

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
peregrine falcon (*Falco peregrinus*)		OS		Arid areas and is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr, 1998). It typically nests on rocky ledges occurring on tall, vertical cliff faces between 25 m and 50 m high (Olsen *et al.*, 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, 1998).	Yes	1.3 km NNE (2013) (BHP, 2023)	•		•						•		Possible	Infrequent visitor (foraging or dispersal)	Possible to occur within the Study Area to forage, particularly within Hillcrest/ Hillslope and Major 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. Marginal suitable nesting habitat present in Breakaway/ Cliff habitat but are limited in extent. Tall eucalypts along the Major Drainage may also provide nesting opportunities.
HIRUNDINIDAE																			
barn swallow (*Hirundo rustica*)	MI	MI		Non-breeding summer visitor to the Pilbara and Kimberley. It favours areas near water (Johnstone *et al.*, 2013) (Menkhorst *et al.*, 2017).	Yes	5.7 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
LARIDAE																			
gull-billed tern (*Gelochelidon nilotica*)	MI	MI		Shallow sheltered seas close to land, estuaries, tidal creeks; and inundated samphire flats, flooded salt lakes, claypans and watercourses in the interior (Johnstone & Storr, 1998).	Yes	6.3 km E (1999) (DBCA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
caspian tern (*Sterna caspia*)	MI	MI		Mainly sheltered seas, estuaries and tidal creeks; occasionally near-coastal salt lakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh water (Johnstone & Storr, 1998).	Yes	6.3 km E (2004) (DBCA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
MOTACILLIDAE																			
grey wagtail (*Motacilla cinerea*)	MI	MI		Higher altitudes near fast-running water (Simpson *et al.*, 2010).	Yes	658 km NE (2019) (ALA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
yellow wagtail (*Motacilla flava*)	MI	MI		An uncommon but regular visitor to the Pilbara region (Johnstone *et al.*, 2013). Occupies a range of damp or wet habitats with low vegetation although favors edges of fresh water, especially sewage ponds (Johnstone & Storr, 2004).	Yes	346 km NW (2022) (ALA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
PSITTACIDAE																			
night parrot (*Pezoporus occidentalis*)	EN	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	~90 km N (~2005) (Biota, 2005)											Unlikely	N/A	No records in proximity to the Study Area and preferred habitat not present.
princess parrot (*Polytelis alexandrae*)	VU		P4	The princess parrot inhabits low open eucalypt woodlands and savannah shrublands in arid deserts, usually where *Casuarina* and *Allocasuarina* species are present (Baxter & Henderson, 2000; Pavey *et al.*, 2014). The species also occurs and breeds in vegetated riverine and littoral areas, with breeding primarily occurring in marble gum hollows (DEWHA, 2008; Pavey *et al.*, 2014).	No	~38 km N (2012) (DBCA, 2024)												Unlikely	N/A	Preferred habitat not present and outside modelled distribution for which species, or species habitat, is known, likely, or may occur.
ROSTRATULIDAE																			
Australian painted snipe (*Rostratula australis*)	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, 2016a).	Yes	56.8 km N (2012) (ALA, 2024)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area
SCOLOPACIDAE																			
common sandpiper *(Actitis hypoleucos)*	MI	MI		Estuaries and deltas of streams, as well as banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans (Geering *et al.*, 2007; Johnstone & Storr, 1998).	Yes	2.9 km E (2014) (BHP, 2023)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area
sharp-tailed sandpiper (*Calidris acuminata*)	MI	MI		Coastal and inland areas saline and freshwater but prefers non-tidal fresh or brackish wetlands (Geering *et al.*, 2007). Favors flooded samphire flats and grasslands, mangrove creeks mudflats, beaches, river	Yes	4.1 km SSW (1981) (DBCA, 2024)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
				pools, saltwork ponds, sewage ponds and freshwater soaks (Johnstone *et al.*, 2013).															
curlew sandpiper (*Calidris ferruginea*)	CR / MI	CR / MI		Inhabits intertidal mudflats in sheltered coastal areas (i.e. estuaries, bays, inlets and lagoons) (Geering *et al.*, 2007). This rare species generally roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (Geering *et al.*, 2007).	Yes	4.8 km E (2014) (BHP, 2023)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area
pectoral sandpiper (Calidris melanotos)	MI	MI		Coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (Johnstone *et al.*, 2013). It prefers wetlands with open fringing mudflats and low, emergent or fringing vegetation (Geering *et al.*, 2007).	Yes	4.8 km E (2014) (BHP, 2023)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area
red-necked stint (*Calidris ruficollis*)	MI	MI		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 and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998)	Yes	6.5 km E (2005) (DBCA, 2024)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area
long-toed stint (*Calidris subminuta*)	MI	MI		They prefer shallow freshwater or brackish wetlands but are also fond of muddy shorelines, growths of short grasses, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire. Also frequents permanent wetlands and forages on wet mud or in shallow water, often among	Yes	4.8 km E (2014) (BHP, 2023)												Highly Unlikely	N/A	Suitable habitat not present in the Study Area

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
				short grass, weeds and other vegetation on islets or around the edges of wetlands. They roost or loaf in sparse vegetation at the edges of wetlands and on damp mud near shallow water. It also roosts in small depressions in the mud (Johnstone & Storr, 1998).															
black-tailed godwit (*Limosa limosa*)	MI	MI		Found mainly in coastal habitats like estuaries, tidal mudflats, sandspits, shallow river margins, sewage ponds. Inland habitats include large shallow fresh or brackish waters (Pizzey & Knight, 2007). There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks (Higgins & Davies, 1996).	Yes	4.8 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
ruff (*Calidris pugnax*)	MI	MI		Mainly fresh, brackish and saline wetlands with exposed mudflats. Found near lakes, swamps, pools, lagoons, tidal rivers and floodlands. Sometimes observed in sheltered coastal areas, including harbours and estuaries (DoEE, 2019).	Yes	4.8 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
wood sandpiper (*Tringa glareola*)	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 *et al.*, 2013). Freshwater wetlands and occasional brackish intertidal mudflats (Geering *et al.*, 2007).	Yes	2.9 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
common greenshank (*Tringa nebularia*)	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	Yes	4.8 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
				saltwork and sewage ponds (Johnstone *et al.*, 2013).															
marsh sandpiper (*Tringa stagnatilis*)	MI	MI		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 and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998).	Yes	6.1 km E (2014) (BHP, 2023)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
common redshank (*Tringa tetanus*)	MI	MI		It is found at sheltered coastal wetlands with bare open flats and banks of mud or sand. They are also found around salt lakes, freshwater lagoons, artificial wetlands and saltworks and sewage farms. The species has been observed feeding in shallow water, on wet bare mud or sand, or on algal deposits and roosting on small elevated areas such as estuarine sandbars and muddy islets surrounded by water (Johnstone & Storr, 1998).	Yes	10.1 km SW (2012) (DBCA, 2024)											Highly Unlikely	N/A	Suitable habitat not present in the Study Area
THRESKIORNITHIDAE																			
glossy ibis (*Plegadis falcinellus*)	MI	MI		Freshwater wetlands, irrigated areas, margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone *et al.*, 2013).	Yes	2.9 km E (2014) (BHP, 2023)											Unlikely	N/A	Suitable habitat not present in the Study Area.
REPTILES																			
PYTHONIDAE																			
Pilbara olive python (*Liasis olivaceus* supsp. *barroni*)	VU	VU		Associated with drainage systems, including areas with localised drainage and watercourses (Pearson, 1993). In the inland Pilbara the species is most often	Yes	Within (2013) (BHP, 2023)	C	C	C				S		S		Confirmed	Resident	Recorded on one occasion during the current survey (skin/ slough) and has also previously been recorded within the Study Area on one occasion.

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	EPBC Act	BC Act	DBCA				Breakaway/ Cliff	Gorge/ Gully	Major Drainage Line	Stony Plain	Drainage Area/ Floodplain	Undulating Low Hills	Minor Drainage Line	Sand Plain	Hillcrest/ Hillslope	Cleared/ Disturbed			
				encountered near permanent waterholes in rocky ranges or among riverine vegetation (Pearson, 1993).															Critical denning habitat includes Gorge/ Gully, Major Drainage Line and Breakaway/ Cliff habitats. Supporting foraging and dispersal habitat comprises Minor Drainage Line and Hillcrest/ Hillslope habitats.
SCINCIDAE																			
spotted ctenotus (northeast) (*Ctenotus uber* subsp. *johnstonei*)			P2	Within the Pilbara, the taxon is known from *Triodia* on hillslopes, *Acacia xiphophylla* over chenopods, and *Acacia xiphophylla* scattered tall shrubs to high open shrubland (Cogger, 2014).	Yes	19.2 km E (2016) (BHP, 2023)				•		•			•		Possible	Resident	May occur in Stony Plain, Undulating Low Hills and lower slopes of Hillcrest/ Hillslope habitats. Taxonomic status of the disjunct Pilbara population unknown, may represent an undescribed taxon (P. Doughty, Western Australian Museum, *pers. comm.*).
great desert skink (*Liopholis kintorei*)	VU	VU		Sandplain vegetated by spinifex and scattered shrubs appears to be the habitat type most widely used by the species, and some adjacent dunefield swales (Pavey, 2006). In the Tanami Desert and parts of the Great Sandy Desert they also inhabit paleodrainage lines characterised by giant termite mounds and titree (*Melaleuca* spp.) shrubs.	No	~62 km ESE (2010) (DBCA, 2024)											Highly Unlikely	N/A	The Study Area is outside the modelled distribution for which the species, or species habitat, is known, or likely to occur. The Sand Plain habitat present within the Study Area is not considered suitable to support the species due to the absence of large undisturbed areas of the habitat.
TYPHLOPIDAE																			
Gane's blind snake (*Anilios ganei*)			P1	Little is known of the species' ecology, but it is often associated with moist soils and leaf litter within gorges and gullies (Wilson & Swan, 2021) 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, 2022).	Yes	4.8 km E (2009) (BHP, 2023; DBCA, 2024)	•	•							•		Possible	Resident	Likely to occur in Hillcrest/ Hillslope, Breakaway Cliff and Gorge/ Gully habitats, particularly where moist substrates are present for prolonged periods.