

# Short-range endemic terrestrial invertebrate assessment for the Bonney Downs Energy Generating Hub

Prepared for Fortescue Ltd

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**Authorship and review**

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## EXECUTIVE SUMMARY

Fortescue Ltd (Fortescue) proposes to develop the Bonney Downs Energy Generating Hub (the Project) in the Pilbara Region of Western Australia. The Project is located approximately 10 km south-west of Nullagine.

The Harry Butler Institute, Murdoch University (HBI) was commissioned by Fortescue to undertake a detailed short-range endemic terrestrial invertebrate (SRE) survey for the Project. The Study Area of this assessment extended over 102,943 ha. The objective of the survey was to define the value of the Study Area with respect to terrestrial short-range endemics (SREs) and their habitats.

The SRE assessment included a desktop review and a two-phase field survey utilising standard SRE collecting techniques (foraging, leaf litter sifting and Winkler sac litter extractions). The field survey was undertaken at 28 sites between 12–21 February and 4–15 April 2024. Species were identified morphologically and a representative subset of 160 specimens were identified based on molecular data (Cytochrome C oxidase subunit I (COI) barcoding gene). The assessment was conducted in accordance with the Environmental Protection Agency (EPA) guidelines and internal Fortescue standards.

The desktop review focussed on Western Australia (WA) Museum and HBI database records from an approximately 40,000<sup>2</sup> km area that was centred around the Study Area. The desktop review returned 9,759 records including 21,634 specimens in the SRE target groups. Of these, 112 records (310 specimens) were from within the Study Area. These included 19 species and 12 higher taxonomic ranks that may include SREs. One confirmed SRE (the flattie spider *Karaops feedtime*) and eight potential SREs were identified from the Study Area (three species of spiders and five species of slaters). Five of these potential SRE species are currently only known from the Study Area ('Study Area endemics').

A total of 1,065 specimens in the SRE target groups were collected during the field survey, dominated by pseudoscorpions (523 specimens) and slaters (395 specimens). A total of 73 taxa from SRE target groups were recorded in the survey. Of these, 1 species is considered a confirmed SRE (the keeled millipede *Antichiropus sloanae*), 45 species were potential SREs, 12 were widespread, and 18 were not assessed but belong to higher taxonomic ranks or species-complexes that contain SREs.

A total of 40 species from the field survey are Study Area endemics: harvestmen (Opiliones – 1 species), pseudoscorpions (Pseudoscorpiones – 15), soil centipedes (Geophilomorpha – 6), tropical centipedes (Scolopendromorpha – 3), two-pronged bristletails (Diplura – 1), slaters (Isopoda – 13), and land snails (Eupulmonata – 1).

Two Study Area endemics were shared between the desktop review and field survey, resulting in a total of 43 SRE species that are currently only known from the Study Area.

The confirmed SRE from the field survey, the Roy Hill Antichiropus Millipede, *Antichiropus sloanae*, is a WA Priority 1 conservation-listed species. Noteworthy is also that *Karaops feedtime*, the confirmed SRE from the desktop review is only known from its female holotype collected in the south-west of the Study Area.

The field sites were in four broad habitat types, "Grassland on plain/in drainage line", "Woodland on plain", "Woodland in drainage line" and "Woodland along rockface/gully"; however, habitat was not a good predictor of the SRE target group communities at each site based on a non-parametric ordination analysis. Similar, broad-scale vertebrate fauna habitat types showed poor predictive power for the SRE communities. "Woodland in drainage line" yielded the most SRE taxa but also had by far the largest number of sites. No habitat type was preferred by SREs, as the number of SRE target taxa was not significantly different than expected by the number of sites within this habitat type.

In summary, the Study Area of the Bonney Downs Energy Generating Hub is species-rich with respect to terrestrial invertebrates. The number and composition of the SRE community is similar to other recent assessments by HBI for Fortescue in the Pilbara.

# 1 INTRODUCTION

Fortescue Ltd (Fortescue) proposes to develop the Bonney Downs Energy Generating Hub (the Project) in the Pilbara Region of Western Australia. The Project is located approximately 10 km south-west of Nullagine.

In March 2024 Fortescue commissioned the Harry Butler Institute, Murdoch University (HBI) to conduct a 'Detailed short-range endemic (SRE) survey' within a predefined survey area (the Study Area), covering approximately 102,943 ha (Figure 1-1).

## 1.1 SURVEY OBJECTIVES AND SCOPE OF WORKS

The objective of the survey was to define the value of the study area with respect to terrestrial SREs and their habitats.

The scope of works to achieve this objective was to:

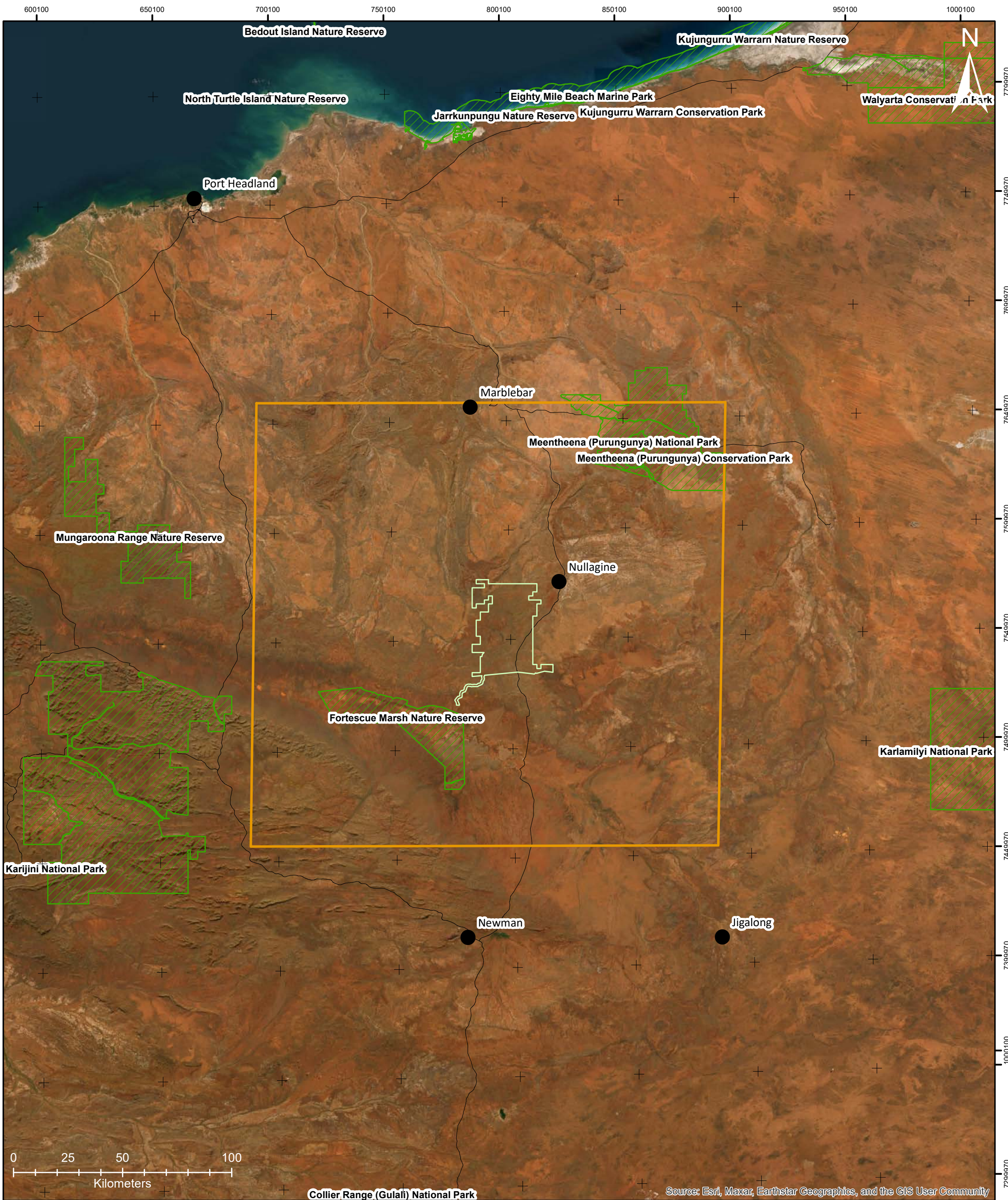
- undertake a desktop review of relevant databases:
  - Western Australian Museum, Terrestrial Invertebrates Department, Crustaceans Department and Molluscs Department
  - Harry Butler Institute invertebrate database
  - Environment Protection and Biodiversity Conservation (EPBC) database
  - Index of Biodiversity Surveys for Assessments (IBSA), literature review (previous survey reports for the study area, taxonomic publications of relevance) and habitat characterisation
- undertake a detailed SRE invertebrate fauna and habitat site assessment of the Study Area
- develop a comprehensive SRE invertebrate fauna inventory
- prepare a technical report outlining survey methods, results, significant fauna habitat and species records and statistical analyses of data to determine survey adequacy and significant variation in patterns or trends of distribution.

## 1.2 GUIDELINES

This SRE survey adhered to the principles and practices of the Environmental Protection Authority's (EPA) *Technical Guidance: Sampling of short-range endemic invertebrate fauna* (EPA 2016a) and *Environmental Factor Guideline: Terrestrial fauna* (EPA 2016b). The limitations of the survey with respect to EPA (2016a; section 3.6.1) are discussed in Section 3.7.

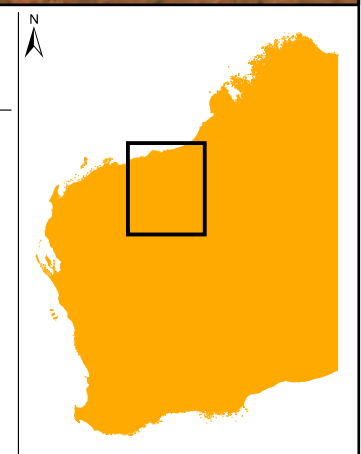
This survey also adhered to Fortescue's relevant internal environmental management guidelines and procedures, including:

- *Short range endemic invertebrate fauna assessment guidelines* (Fortescue Metals Group 2020)
- *Environmental datasets - data governance* (Fortescue Metals Group 2012)
- *Geographic information systems and raw data Guideline* (Fortescue Metals Group 2011a)
- *Proposal and project management guideline* (Fortescue Metals Group 2011b).



**Figure 1-1** Location of the Bonney Downs Energy Generating Hub Study Area

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E. S. Volschenk  
**Coordinate System:** GDA2020  
**Projection:**  
**Datum:** GDA2020



## 2 EXISTING ENVIRONMENT

### 2.1 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA

The Interim Biogeographic Regionalisation of Australia (IBRA7) defines 'bioregions' as large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems (DCCEEW 2023a; Thackway & Cresswell 1995). Australia contains 89 IBRA bioregions and 419 subregions (DCCEEW 2023a).

Western Australia contains 26 IBRA bioregions and 53 subregions. The Project falls within the Pilbara bioregion. The Pilbara bioregion covers an area of 17,823,125 ha and is divided into four subregions: Chichester, Fortescue Plains, Hamersley and Roebourne. The Study Area is largely within the Chichester subregion with minor overlaps with Fortescue Plains subregion in the south-east and south-west (Figure 2-1).

The Chichester subregion is characterised by undulating Archaean granite and basalt plains that support shrub steppe vegetation communities, predominant vegetation on the steppe of *Acacia* over *Triodia* hummock grasslands and *Eucalyptus* steppes on the ranges (Kendrick & McKenzie 2001). Rare features of the Chichester subregion include the Rippon Hills sinkhole, Meentheena Carbonate stromatolite fossils and geographical complexity of the Marble Bar-Nullagine mineral province (Kendrick & McKenzie 2001).

Habitat types that likely support SRE invertebrates in the Chichester subregion include deep litter layers of a variety of woodlands, in particular in ephemeral creek and rivers and south-facing rock faces in the ranges.

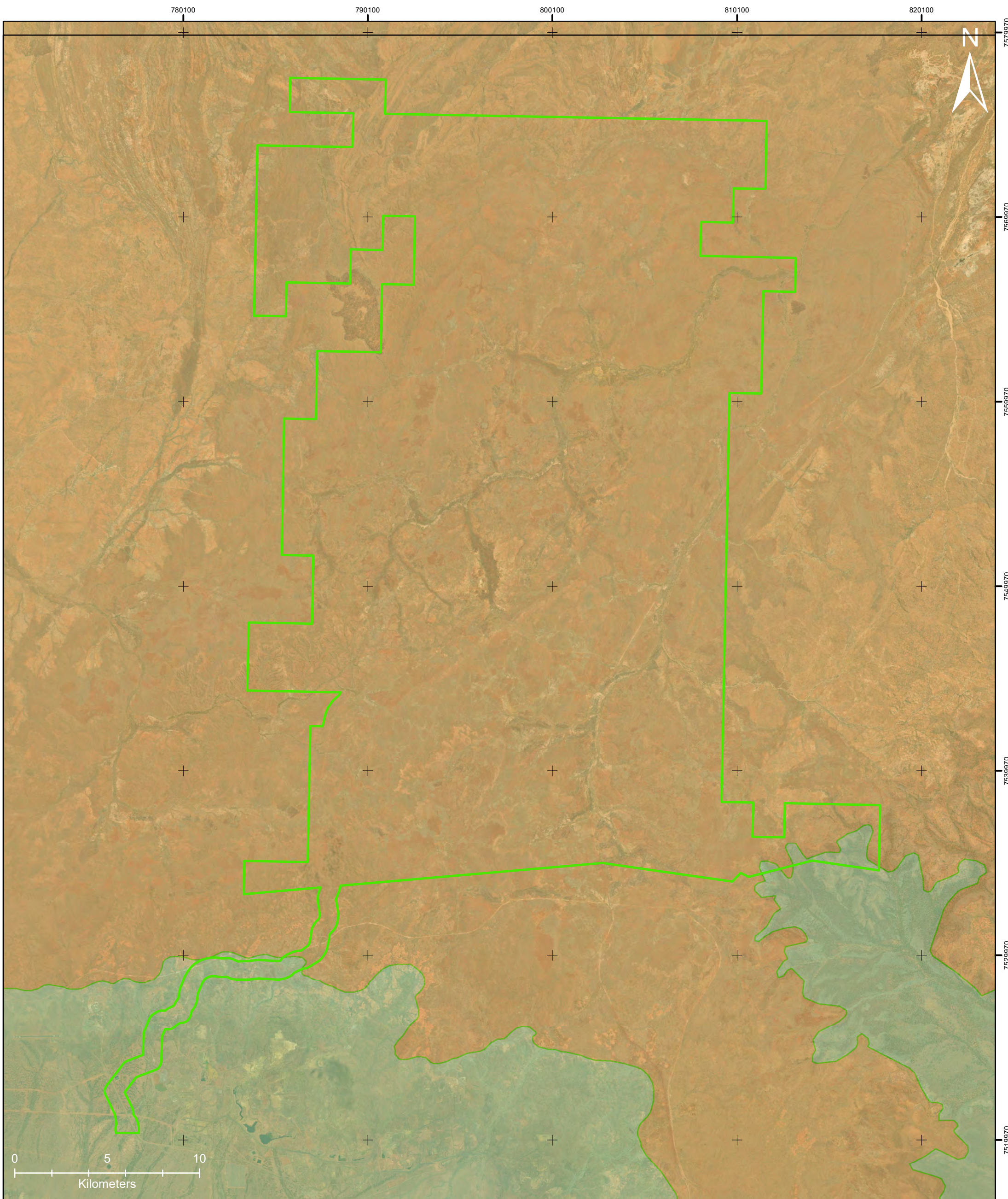
The Fortescue Plains subregions consists of alluvial plains and river frontage, extensive salt marshes with mulga-bunch grass and short grass communities on alluvial plains in the east and deeply incised gorge systems in the western (lower) part of the drainage (Kendrick 2001). River gum woodlands fringe the drainage lines. It represents the northern limit of Mulga (*Acacia aneura*). An extensive calcrete aquifer (originating within a palaeo-drainage valley) feeds numerous permanent springs in the central Fortescue, supporting large permanent wetlands with extensive stands of river gum and cadjeput *Melaleuca* woodlands.

With respect to SREs and their habitat, the Fortescue Plains subregion may harbour range-restricted habitat specialists of riparian environments, including riparian woodlands, and possible litter dwelling species in dense Mulga woodlands. Due to its extensive topographic features, the Hamersley subregion may also harbour habitat specialists along shaded south-facing rockfaces and scree slopes and deep gorges and valleys.

### 2.2 LAND SYSTEMS

The Department of Agriculture and Food Western Australia has mapped the land systems of the Pilbara bioregion from aerial photography, providing the largest-scale interpretation of vegetation units for the study area (van Vreeswyk *et al.* 2004) The study area intersects nine land systems, with the Rocklea system covering almost 55.68% of the area (Table 2-1; Figure 2-2).

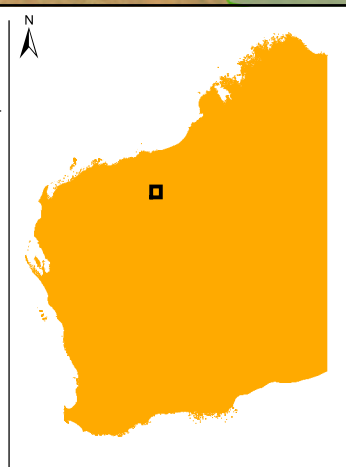
Typical habitats that are thought to harbour higher proportions of SREs in these land systems include isolated mountain tops (mesas), south-facing rockfaces, riparian habitats and dense *Acacia* woodlands.



**Figure 2-1** Location of the Study Area and associated IBRA subregions

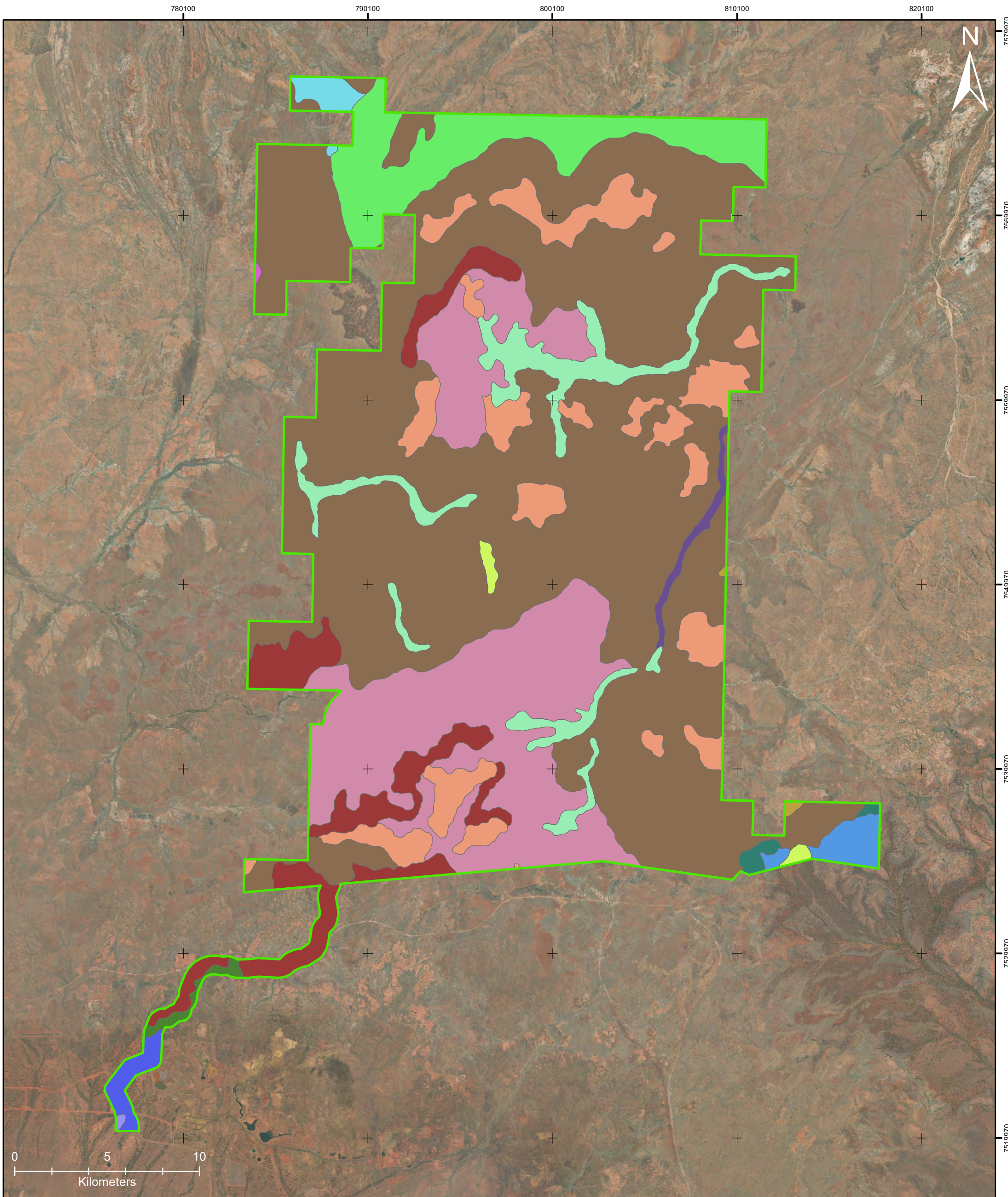
**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E. S. Volschenk  
**Coordinate System:** GDA2020 MGA Zone 50  
**Projection:** Transverse Mercator  
**Datum:** GDA2020

- Bonney Downs Study Area
- Chichester (subregion)
- Fortescue (subregion)



**Table 2-1 Land systems of the Bonney Downs Energy Generating Hub Study Area**

<b>Land system</b>	<b>Description (van Vreeswyk <i>et al.</i> 2004)</b>	<b>Area in Study Area (ha)</b>	<b>Percentage of Study Area</b>
Bonney	Low rounded hills and undulating stony plains supporting soft spinifex grasslands.	17802.21	17.29
Capricorn	Rugged sandstone hills, ridges, stony footslopes and interfluves supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs.	6301.65	6.12
Elimunna	Stony plains on basalt supporting sparse acacia and cassia shrublands and patchy tussock grasslands.	292.96	0.28
Granitic	Rugged granitic hills supporting shrubby hard and soft spinifex grasslands.	77.53	0.08
Jamindie	Stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey.	630.28	0.61
Laterite	Low lateritic plateaux, mesas, buttes and gravelly rises and plains supporting sparse mulga shrublands.	880.22	0.86
Macroy	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands.	28.19	0.03
McKay	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts.	5735.31	5.57
Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.	305.76	0.30
River	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.	499.69	0.49
Robe	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.	4320.07	4.20
Rocklea	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	57314.76	55.68
Spearhole	Gently undulating gravelly hardpan plains and dissected slopes supporting groved mulga shrublands and hard spinifex.	274.62	0.27
Talga	Hills and ridges of greenstone and chert and stony plains supporting hard and soft spinifex grasslands.	557.54	0.54
Turee	Stony alluvial plains with gilgaied and non-gilgaied surfaces supporting tussock grasslands and grassy shrublands of mulga and snakewood.	35.53	0.03
Wona	Basalt upland gilgai plains supporting Roebourne Plains grass and Mitchell grass tussock grasslands, minor hard spinifex grasslands or annual grasslands/herb fields.	7887.04	7.66
<b>Total:</b>		<b>102943.35</b>	<b>100</b>

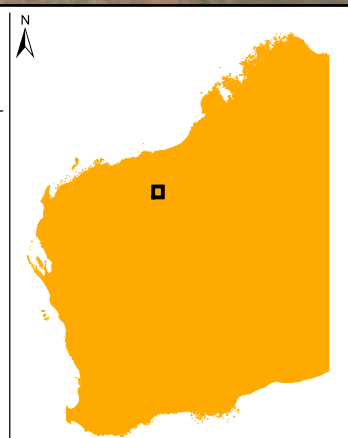


**Figure 2-2** Land systems of the Study Area

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E. S. Volschenk  
**Coordinate System:** GDA2020 MGA Zone 50  
**Projection:** Transverse Mercator  
**Datum:** GDA2020

**Land Systems**

Bonney System	Jamindie System	Newman System	Spearhole System
Capricorn System	Laterite System	River System	Talga System
Elimunna System	Macroy System	Robe System	Turee System
Granitic System	McKay System	Rocklea System	Wona System



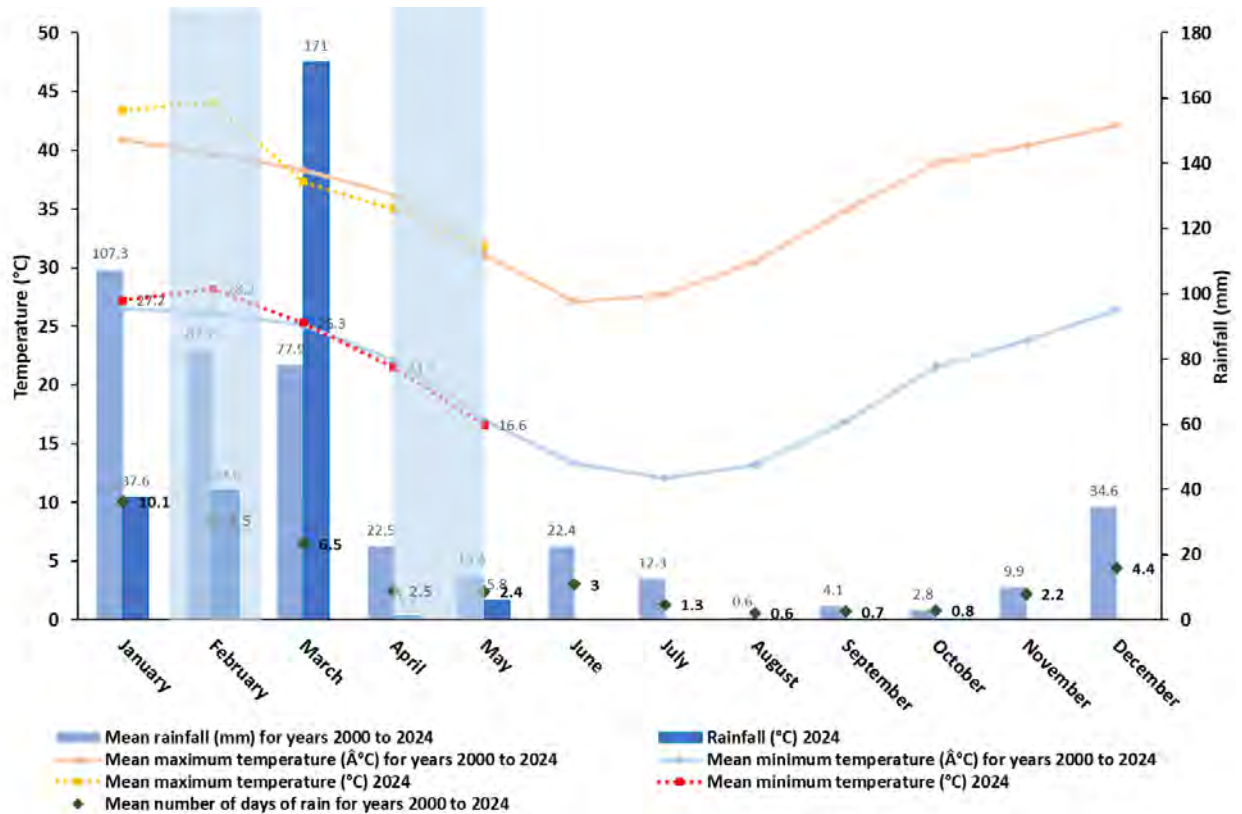
## 2.3 CLIMATE AND WEATHER DURING SURVEY

The Pilbara has very hot summers, mild winters, and low and variable rainfall. It is classified as hot desert in northern and inland areas and hot grasslands in the north-west (DPRID 2021). Annual rainfall declines from 300–350 millimetres (mm) in the north-east to less than 250 mm in the south and west.

The Bureau of Meteorology (BOM) weather station nearest to the Study Area is located at Marble Bar [004106], approximately 110 km to the north-north-west. Rainfall events in the Pilbara are frequently localised, therefore these data may not accurately reflect recent weather events in the Study Area. Marble Bar records the highest maximum mean monthly temperature (42.2°C) in December, the lowest maximum mean annual temperature (27.1°C) in June and an average annual rainfall of 383.5 mm (BoM 2024) (Figure 2-3).

During the field survey period (February – April 2024), rainfall was well below the average during February and April; however, March received more than double the average for that month (Figure 2-3). Mean daily maximum and minimum temperatures were above average in February and close to or slightly below average during March and April (Figure 2-3).

Due to less than average rainfall during most of the survey period the survey conditions were not optimal for SRE surveys, although some species may have become active due to the rain in March.



**Figure 2-3** Climate and weather pattern before and during the field survey for BOM weather station 004106 (Marble Bar), 112 km north-north-west of the Study Area (BoM 2024). Light blue shaded areas indicate field survey months

## 2.4 LAND USE

Dominant land uses in the Chichester IBRA subregion include grazing of native pastures, Aboriginal lands and Reserves, Unallocated Crown Land (UCL) and Crown Reserves, conservation, and mining leases (Kendrick & McKenzie 2001). Dominant land uses in the Fortescue Plains IBRA subregion include grazing native pastures, Unallocated Crown Land (UCL) and Crown reserves, conservation, and Aboriginal land (lease) (Kendrick 2001), although mining has increased in the subregion since that report.

### 2.4.1 Conservation reserves

The Fortescue Marsh Nature Reserve is just to the south-west of the Study Area, the Purungunya National Park and Conservation Park are about 70 km to the north-east (Figure 1-1).

## 2.5 BIOLOGICAL CONTEXT

### 2.5.1 Short-range endemic invertebrates

Short-range endemics (SREs) are organisms with small geographic distributions (Harvey 2002; Ponder & Colgan 2002), nominally less than 10,000 km<sup>2</sup> (Harvey 2002). These organisms are typically characterised by one or more of the following features:

- limited dispersal capabilities
- seasonal activity (cooler or wetter periods)
- slow growth
- low levels of fecundity.

Their limited dispersal capabilities result in small populations being isolated from each other by inhospitable geographic features such as rivers, rocky ridges, or plains. Prolonged isolation between populations eventually results in speciation, with each population becoming genetically and/or morphologically distinct over time. Two types of short-range endemism have been recognised: relictual endemism and habitat specialists (Harvey 2002; Ponder & Colgan 2002).

Relictual SREs result when speciation occurs following the fragmentation of continuous habitat into two or more refugia. In Australia, the primary driver of this over the last 65 million years has been aridification, which acted to isolate formerly widespread species living in mesic forests to small patches of mesic refugia. Relictual SREs include scorpions in the genus *Aops* (Volschenk & Prendini 2008), pseudoscorpions in the genera *Tyrannochthonius* (Edward & Harvey 2008; Harvey 1991), *Indohya* (Harvey 1993; Harvey & Volschenk 2007) and *Idioblothrus* (Harvey & Leng 2008; Muchmore 1982), and millipedes in the genus *Antichiropus* (Car & Harvey 2014; Car *et al.* 2019; Car *et al.* 2013).

Habitat specialist SREs are species that have adapted to very specific environment types, including those found in arid environments (e.g., rocky outcrops, isolated dune systems and salt lakes). These habitats are often relatively young (<10 Mio years) and therefore are not refugial. Examples of habitat specialist SREs include spiders in the family Selenopidae (Crews 2023), pseudoscorpions in the genus *Synsphyronus* (Harvey 2011, 2012, 2023), scorpions in the genera *Lychas* and *Urodacus*, and tiger beetles in the genus *Pseudotetracha* (López-López *et al.* 2016).

It is impossible to collect all groups of invertebrates that contain SREs. The main targets of our terrestrial SRE surveys in the Pilbara include:

- Arachnida
  - Araneae (spiders): all trapdoor spiders (Mygalomorphae) and selected families of Araneomorphae, such as Selenopidae (flatties) and Segestriidae (tube-web spiders)
  - Pseudoscorpiones (pseudoscorpions): all families
  - Scorpiones (scorpions): all families
- Myriapoda
  - Diplopoda (millipedes): all orders except Polyxenida (pin-cushion millipedes)
  - Chilopoda (centipedes): all families of Geophilomorpha (soil centipedes) and the family Cryptopidae from the order Scolopendromorpha (tropical centipedes)
- Crustacea
  - Isopoda (slaters): all families
- Entognatha
  - Diplura (two-pronged bristletails): all families.
- Mollusca
  - Eupulmonata (land snails): families Camaenidae, Bothriembryontidae and Succiniidae.

## 2.5.2 Assessment of short-range endemism

Assessment of short-range endemism can be challenging when data for evaluation are absent or limited. Limitations may include any of the following:

- Poor survey coverage, e.g., the fauna of an area has not been sampled extensively enough to enable assessment of species distributions. The absence of a species from survey records may not mean that it is absent from the area.
- Poor taxonomic resolution, e.g., a species has not been subject to systematic investigation. Good taxonomic resolution does not necessarily need to be in the form of published revisions, as it can be facilitated by any of the following:
  - a researcher actively working on the group who can authorise identifications
  - a publicly accessible reference collection
  - assessment of species boundaries using genomic methods such as DNA barcoding (Hebert *et al.* 2003a; Hebert *et al.* 2003b).
- Identification issues, e.g., surveys sampled life stages of SREs that are impossible to identify based on morphological characters. Examples of relevant taxa include juvenile or female millipedes, mygalomorph spiders, and *Urodacus* scorpions.

## 2.5.3 Categories of short-range endemism

The WA Museum uses a three tier-rating (confirmed, potential and widespread, not SRE) which is employed here (Western Australian Museum 2013):

- Confirmed SRE
  - known distribution of <10 000 km<sup>2</sup>
  - taxonomy well known
  - well-represented in collections and/or via comprehensive sampling
- Potential SRE
  - patchy sampling has resulted in incomplete knowledge of the geographic distribution of the group
  - incomplete taxonomic knowledge
  - not well represented in collections
  - most applicable to situations where there are gaps in our knowledge of the taxon

- Widespread (not an SRE)
  - known distribution of >10 000 km<sup>2</sup>.
  - taxonomy is well known
  - well-represented in collections and/ or via comprehensive sampling.

As it is difficult to calculate the distribution range of a species, we here use the linear range, i.e. the distance of the two records furthest apart, as surrogate for the range. Species with a linear range of more than 100 km are considered widespread. However, this does not consider patchy distribution patterns of habitat specialists in non-continuous habitats. If in doubt about habitat preferences and small-scale distribution patterns, each species will need to be assessed on its own merits.

Special regard is here given to those species that are currently only known from the Study Area ('Study Area endemics') as these are most likely impacted by future developments.

## 3 METHODS

### 3.1 DESKTOP REVIEW

#### 3.1.1 Database searches

Results of all previous surveys undertaken within the database area searches were accessible through the WA Museum database searches and a search of the HBI invertebrate database. Data that were not based on specimens lodged in public institutions were not considered as these cannot be verified.

The nominal maximum range of short-range endemism, i.e. 100 km x 100 km (Harvey 2002) guided the size of the area for the desktop review. The database search was undertaken to determine if any SRE taxa have previously been recorded in the Study Area or its vicinity. Data were requested from the WA Museum databases from the departments of Arachnology/Myriapodology, Mollusca, and Crustacea, within a rectangle of one degree Latitude (ca. 110 km) and one degree Longitude (ca. 100 km) in each cardinal direction from the approximate centre of the Study Area (NW corner 21.15°S, 118.86°E/SE corner 22.97°S, 120.76°E). The HBI invertebrate database was queried with the same parameters.

The EPBC Act Protected Matters database (DCCEEW 2023b) was searched using the same area as the W.A. Museum Search Area.

Two vertebrate surveys by Ecologia Environment (Ecologia) and Spectrum Environmental Services (Spectrum) were undertaken within the Study Area at the time of this SRE survey. Invertebrates sampled during these surveys were offered to HBI and are included in the desktop review.

##### 3.1.1.1 Desktop area data edits and filtering

Database search results provided by the WA Museum for arachnids, myriapods, crustaceans and snails consisted of all records from within the desktop area, i.e., they were not filtered for range-restricted species and no information on each species' overall distribution beyond the desktop review area was provided. These search results were therefore subjected to the following edits:

- Taxonomic groups that are not target groups for SRE surveys were removed.
- Non-terrestrial SRE groups (freshwater/subterranean) were removed by searching for their respective specialised taxa (i.e., freshwater molluscs, troglobitic schizomids) and the respective sampling type (e.g., habitat traps, troglofaunal scrape, kick-net).
- Obvious misidentifications (i.e., species generally outside their geographic range) were removed.
- Where the higher taxon field was empty or contained the values such as "unknown" or "gen. nov.", the unitalicized next higher rank name was used in place of the genus name.
- All morphospecies names including "sp. n." were renamed without that suffix, e.g., "*Rhagada* 'Pannawonica' sp. n." was renamed to *Rhagada* 'Pannawonica'. Such unpublished morphospecies names were not italicised
- All unidentified species (e.g., "sp.", "sp. indet. (juvenile)", "sp.?", "unknown") were renamed to "sp. indet."
- A new field "Genus and species" was created, into which the genus, species and, for described species, taxon author field values were concatenated. This taxonomic binomial was used in this report and all associated data (i.e., GIS submissions to Fortescue and DBCA).

### 3.1.2 Previous surveys in the desktop review area

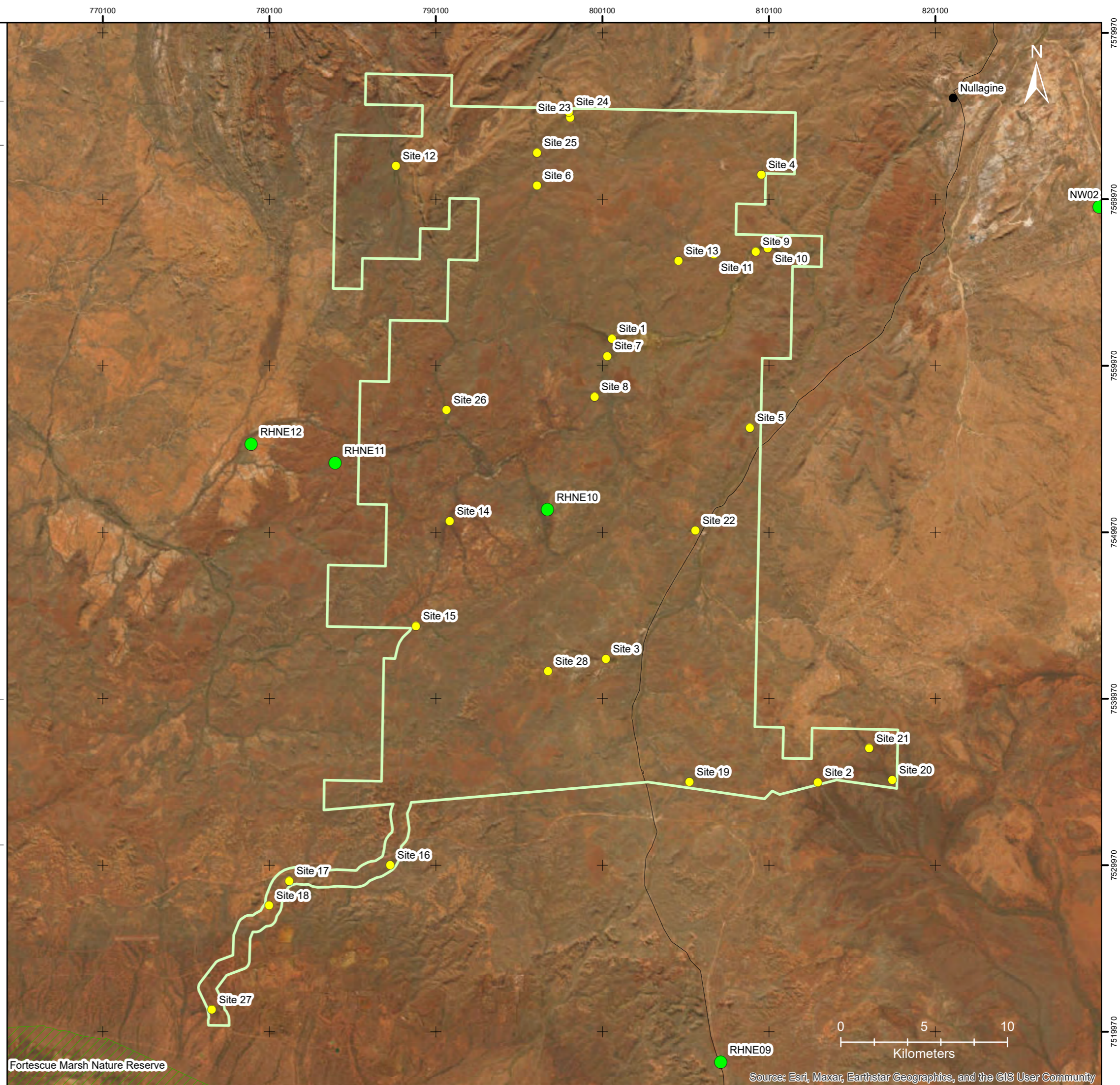
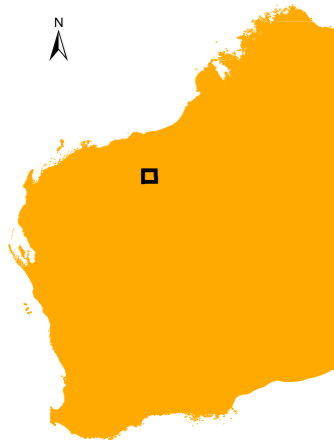
Several surveys have been undertaken in projects that intersect with the database area searches (Astron 2019; Bamford 2009; Biologic 2012; Biota 2010, 2011a, b, 2012, 2014; Ecologia 2012, 2014; Outback Ecology 2012a, b; Rapallo 2012). Results of these surveys were accessible through the WA Museum database searches. Data that were not based on publicly available specimens were not considered as these cannot be verified.

The CALM (now DBCA) Pilbara Biological Survey (McKenzie *et al.* 2009) had a number of survey areas within the area covered by the SRE desktop review and its invertebrate data were available through the WA Museum databases. One survey site of the CALM RHNE survey area was located in the Study Area (RHNE10) (Figure 3-1).

**Figure 3-1** Survey sites within the study area

- Survey Sites
- CALM Pilbara Survey sites
- Bonney Downs Study Area
- Towns
- Major Roads
- National Park / Nature Reserve

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** GDA2020 MGA Zone 50  
**Projection:** Transverse Mercator  
**Datum:** GDA2020



## 3.2 HABITAT ASSESSMENT AND SITE SELECTION

The habitat types in the study area that potentially harbour SRE invertebrates were mostly woodlands (Table 3-1):

- woodland in drainage line (21 sites) – generally riparian eucalypt and *Acacia* open woodlands in drainage lines
- woodland on plain (2 sites) – mulga woodlands on plains
- woodland along rockface/gully (2 sites) – eucalypt and *Acacia* open woodlands on a rocky hill slope and along a gorge, at moderate slopes
- grassland on plain/in drainage line (2 sites) – spinifex grasslands on moderate hill slopes

Within these habitats, a total of 28 SRE sites were surveyed (Table 3-1; Figure 3-1). Site descriptions including habitat type, topography, vegetation, soil, litter, disturbance, fire history, and a site photograph, are provided in Appendix 1.

Fortescue provided broad scale vertebrate fauna habitat mapping for the Study Area compiled by Ecologia (2025). These included the following six habitat types:

- drainage line (major) (12 sites)
- drainage line (minor) (7 sites)
- gorges/gullies (2 sites)
- plain (stony/gibber) (4 sites)
- woodland (closed) (2 sites)
- woodland (open) (1 site).

Both habitat categorisations were not entirely consistent with each other (Table 3-1), largely because the broadscale vertebrate mapping, compiled partly on satellite imagery, does not consider more localised habitat conditions and may not have been ground-truthed throughout.

We here analysed the predictive power of both habitat categorisations in relation to the SRE community at each site (see section 3.2).

**Table 3-1 Sites of short-range endemic invertebrate survey and sampling effort**

Site	Habitat (HBI)	Habitat (Ecologia)	Easting (zone 50)	Northing (zone 50)	Methods	Foraging time (mins) <sup>1</sup>	Litter sifts (no.)
1	woodland in drainage line	woodland (open)	800676	7561589	fo, li	360	15
2	woodland on plain	woodland (closed)	194659	7535095	fo, li, Wi	180	9
3	woodland in drainage line	plain (stony/gibber)	800311	7542349	fo, li, Wi	180	9
4	woodland in drainage line	drainage line (major)	809647	7571442	fo, li, Wi	180	9
5	grassland on plain/in drainage line	plain (stony/gibber)	808963	7556239	fo, li	180	9
6	grassland on plain/in drainage line	drainage line (minor)	796187	7570777	fo, li	180	9
7	woodland in drainage line	drainage line (major)	800400	7560542	fo, li	360	15
8	[no data]	drainage line (major)	799632	7558103	fo, li	360	15
9	woodland in drainage line	drainage line (major)	809307	7566818	fo, li	360	15
10	woodland in drainage line	drainage line (major)	190388	7567036	fo, li	360	15
11	woodland in drainage line	drainage line (major)	806796	7566649	fo, li, Wi	360	15
12	woodland in drainage line	drainage line (major)	787696	7571970	fo, li	360	15
13	woodland in drainage line	drainage line (major)	804675	7566269	fo, li	360	15
14	woodland in drainage line	drainage line (minor)	790938	7550627	fo, li	180	9
15	woodland in drainage line	plain (stony/gibber)	788908	7544325	fo, li, Wi	360	15
16	woodland in drainage line	drainage line (major)	787365	7529967	fo, li	360	15
17	woodland in drainage line	drainage line (major)	781297	7529009	fo, li	360	15
18	woodland along rockface/gully	plain (stony/gibber)	780089	7527537	fo, li	360	15
19	woodland in drainage line	drainage line (minor)	805339	7534969	fo, li	360	15
20	woodland in drainage line	drainage line (minor)	199122	7535422	fo, li, Wi	360	15
21	woodland in drainage line	drainage line (minor)	197656	7537258	fo, li, Wi	360	15
22	woodland in drainage line	drainage line (minor)	805684	7550066	fo, li, Wi	360	15
23	woodland in drainage line	gorges/gullies	798166	7574870	fo, li	180	9
24	woodland along rockface/gully	gorges/gullies	798093	7575216	fo, li	180	9
25	woodland in drainage line	drainage line (major)	796178	7572755	fo, li, Wi	360	15
26	woodland in drainage line	drainage line (major)	790746	7557312	fo, li	360	15
27	woodland on plain	woodland (closed)	776651	7521293	fo, li	180	9
28	woodland in drainage line	drainage line (minor)	796847	7541622	fo, li	360	15
<b>Total:</b>						<b>8,460</b>	<b>366</b>

fo – foraging, li – litter and soil sieve, Wi – litter extraction with Winkler sac.

### 3.3 FIELD METHODS

The field survey methods were approved by the Department of Biodiversity, Conservation and Attractions (DBCA) and conducted under a Fauna Taking (Biological Assessments) licence number BA27000818.

The field survey was conducted over two field trips. The first trip took place from 12–21 February 2024 and the second trip took place from 4–15 April 2024.

All survey methods per site were standardised either by time (foraging) or number of sample/traps (litter sieving, Winkler sacs) to allow for potential statistical analyses of survey data (Table 3-1).

#### 3.3.1 Foraging

Foraging methods are a group of methods that involve actively searching for invertebrates or evidence of them. These methods rely on visual detection of invertebrates (or their burrows and microhabitats) in situ. It consisted of inspection of areas with leaf litter, under logs and rocks, larger plant debris and the underside of bark of trees. Each site was sampled for a minimum of 3 hrs in total (Table 3-1). Trapdoor spider burrows identified during the searches were excavated if considered inhabited. The time to dig up burrows did not count towards the foraging time.

#### 3.3.2 Litter and soil sieving

Litter and soil sieving targets litter and surface soil dwelling invertebrates. This method utilises a series of sieves (32 cm diameter by 5 cm height), each sieve being progressively finer (top-bottom: 17 mm, 11 mm, 3 mm) through which leaf litter and surface soil below the leaf litter was sieved. The finest particles pass through all sieves into a receiving pan.

Leaf litter was collected from the southern sides of trees or shrubs and from next to the trunk. Where deep litter was present, the more open and exposed surface leaf litter was removed to access the deeper litter. Soil was also sifted, to a depth of up to approximately 20 cm.

At each litter sifting site, six sifts were carried out, each one targeting a different tree or patch of litter (Table 3-1). During each sift, approximately 5 litres of leaf litter and surface soil were sieved. The retained litter from each sieve and the receiving pan were examined separately and targeted invertebrates were picked using an aspirator or feather forceps. All target taxa were fixed and preserved in 100% Ethanol. All sifted litter was returned to the location from which it was obtained.

#### 3.3.3 Winkler sacs

Litter samples were collected with a sifter (Bestelmeyer *et al.* 2020) from three spots at each site with each sample representing approximately one square metre of coarse leaf litter and soil. The sifted leaf litter/soil sample was placed inside a mesh bag, which was then transported to camp base to be placed into a Winkler sac. Winkler sacs consisted of two detachable frames made of 20 mm PVC tubes that support a light fabric covering. Each Winkler sac accommodated up to three mesh bags. At the bottom of the Winkler sac, there was a 250 ml plastic container filled halfway with propylene glycol. As the substrate gradually dries, the mobile arthropods within the sample descend into a collection cup filled with propylene glycol.

## 3.4 TAXONOMY AND NOMENCLATURE

### 3.4.1 Morphological species identification

Morphological and molecular species identifications and SRE assessments were conducted by E. S. Volschenk. Some identifications relied on direct comparison with reference material from the WA Museum.

### 3.4.2 Molecular species identification

Following morphological species identifications, molecular investigations were undertaken on representative specimens of each taxon. Sequence fragments of the COI gene were amplified from muscle tissues obtained from specimens fixed and preserved in >95% ethanol or from samples fixed in propylene glycol and later preserved in >95% ethanol.

Sequence generation from tissues was undertaken by Genotyping Australia Pty Ltd (<https://xytovet.com.au>) and AGRF Perth (<http://www.agrf.org.au>). Sequence contigs were assembled from forward and reverse amplicons using Geneious Prime ('Geneious') and were subsequently edited and pruned by eye, prior to consensus sequences being created. Consensus sequences were then assessed for contamination using the NCBI Nucleotide Blast tool (<https://blast.ncbi.nlm.nih.gov>).

For analyses and alignment, additional sequences of species pairs were obtained from GenBank (Benson *et al.* 2012) to guide alignments and assessment of species boundaries. Species pairs were selected from taxa within the same genus or family of the taxa under investigation for which DNA sequence fragments were greater than 400 base pairs long. Sequences sourced from GenBank are identified with the GenBank accession code (comprised of two letters followed by a string of six numbers).

Sequence editing, alignment and phylogenetic analyses were performed with Geneious. For each analysis sequences were assembled and aligned using ClustalW or the Geneious alignment tool, implementing the following variable settings: global alignment with free ends, cost matrix, 70% similarity (IUB), open gap penalty, 70, gap extension penalty, 10, refinement iterations, 4.

Phylogenetic analyses were implemented using Geneious and MrBayes (Huelsenbeck & Ronquist 2001; Ronquist *et al.* 2012). Outgroups were selected from (in order of preference): sister-genus, -family, or -order, to the group under investigation, where systematic relationships were known. Species delimitation was based on an 8% sequence divergence threshold for most taxa (Barrett & Hebert 2005; Hebert *et al.* 2003a; Hebert *et al.* 2003b; Robinson *et al.* 2009). For some trapdoor spiders, the delimiting threshold of 9.5 % was used (Castalanelli *et al.* 2014; Huey *et al.* 2019) and 6 % was used for scorpions and millipedes (E.S. Volschenk unpublished data).

Reference taxa were selected from GenBank in two ways, depending on the number of sequences available for each group. For small groups, all reference COI sequences were sourced from GenBank and a subset of two or three samples were selected to represent each species or morphospecies identified. For groups with many reference COI sequences on GenBank, reference sequences were selected from BLAST (Basic Local Alignment Search Tool) results undertaken for each query sequence. Sequence BLAST was undertaken using the Nucleotide BLAST tool (<https://blast.ncbi.nlm.nih.gov/Blast.cgi>). Two or three reference sequences were selected from the 20 most similar sequences resulting from a BLAST of each query sequence.

A total of 160 specimens were successfully sequenced, representing 15% of all specimens. Specimens identified by molecular methods are indicated as such in Appendix 3. Orders with a high percentage of specimens sequenced (>70%) include spiders, harvestmen, diplurans and soil and tropical centipedes; low sequence coverage (<15% specimens) occurred for pseudoscorpions, snails, and slaters (Table 3-2).

**Table 3-2 Number of specimens sequenced for COI**

Taxonomic order	No. of specimens collected	No. of specimens successfully sequenced	No. of specimens with failed sequences	% specimen sequenced
Araneae (spiders)	18	18	-	100
Opiliones (harvestmen)	2	2	-	100
Pseudoscorpiones (pseudoscorpions)	523	43	3	8.2
Scorpiones (scorpions)	40	14	4	35
Diplura (two-pronged bristletails)	1	1	-	100
Geophilomorpha (soil centipedes)	31	22	2	71.0
Scolopendromorpha (tropical centipedes)	11	9	2	81.8
Polydesmida (keeled millipedes)	11	5	1	45.5
Isopoda (slaters)	395	44	8	11.1
Eupulmonata (land snails)	33	2	-	6.1
<b>Total:</b>	<b>1,065</b>	<b>160</b>	<b>20</b>	<b>15.0</b>

### 3.4.3 Nomenclature – Fauna Portal Australia

The taxonomic nomenclature of described invertebrates follows established taxonomic publications and catalogues (Table 3-3).

The nomenclature of undescribed invertebrates identified by HBI scientists (but not necessarily desktop species) applied the principles of the Fauna Portal Australia ([www.faunaportal.org](http://www.faunaportal.org)) (here simply referred to as 'Fauna Portal'), an online identification platform developed by HBI to provide scientific reproducibility and taxonomic stability of undescribed species.

Reproducibility is supported by the requirement that all specimens listed on the Fauna Portal need to be accessible in public institutions (e.g., museums or universities). Observational records are not considered on the Fauna Portal. The only exemption to this rule is specimen data based on a molecular sequence if the specimen was destroyed during molecular analyses.

Taxonomic stability is provided by:

- the designation of a 'Fauna Portal Reference' specimen which is equivalent to a Linnean type specimen in zoological nomenclature, and
- a diagnosis against other species on the Fauna Portal, either described or undescribed.

The nomenclature of undescribed genera and species is governed by a simple numerical system that is based on consecutive numbers of the genus and species tables in the underlying Fauna Portal database. Listing of the genus level number is flexible, for example as "Genus 2231", "Myrmecinae gen. 2231" or "Genus 2231 (*acuminatus* group)". The species designation is listed as "FP-5572". To allow backward compatibility with other parataxonomic systems, other species codes can be added as suffix in parentheses, i.e., "*Aname* FP-11621 (WAM MYG231)", "*Urodacus* FP-12345 (BoDo01)".

As an identification tool, data on described species are also available on the Fauna Portal. Rapid species identification is possible through innovative morphological and geographic image filters that allow a side-by-side comparison of diagnostic characters of species. A simple molecular module allows downloading of barcoding data, either original data or through links to GenBank.

Selected species collected during this study were uploaded to the Fauna Portal and hyperlinks are provided in the respective results tables (Table 4-2; Table 4-4).

**Table 3-3 Nomenclatural references**

Taxonomic group	Taxonomic reference for described species and higher taxa
Araneae	World Spider Catalog (2025)
Opiliones	Kury <i>et al.</i> (2023)
Pseudoscorpiones	World Pseudoscorpiones Catalog (2025)
Scorpiones	Volschenk and Prendini (2008), (Buzatto <i>et al.</i> 2023; Volschenk <i>et al.</i> 2010; Volschenk <i>et al.</i> 2000)
Diplopoda (Polydesmida: <i>Antichiropus</i> )	Car <i>et al.</i> (2019)
Chilopoda (Geophilomorpha, Cryptopidae only)	Minelli <i>et al.</i> (2006 onwards), (Bonato <i>et al.</i> 2014; Bonato <i>et al.</i> 2010)
Eupulmonata	Stanisic <i>et al.</i> (2010)
Isopoda	Schotte <i>et al.</i> (2008)

### 3.4.4 Specimen curation

Each sample was assigned a unique registration number of the HBI invertebrate collection (i.e., 240666) to enable specimen tracking until WA Museum lodgement has been completed. All material collected during this survey will be offered to the WA Museum for lodgement.

## 3.5 STATISTICAL ANALYSES

### 3.5.1 Species richness estimation curves

There are three general methods of estimating species richness from sample data: extrapolating species-accumulation curves (SACs), fitting parametric models of relative abundance, and using non-parametric estimators (Bunge & Fitzpatrick 1993; Colwell & Coddington 1994). In this report, the level of survey adequacy was estimated using the rarefaction of SACs as computed by Mao Tau estimator to estimate the number of species collected per site [S(est)]. In addition, the following species richness estimators were calculated: ACE, ICE, Chao-1, Chao-2, Jackknife-1, Jackknife-2, Bootstrap. To eliminate features caused by random or periodic temporal variation, the sample order was randomised 999 times. The estimators applied to the data set were calculated using EstimateS (v9.1.0) (Colwell 2013).

Species accumulation curves were calculated based on sample events. The species accumulation estimates are based on all species in the analysed SRE target order, not just those species considered to be SREs.

### 3.5.2 Habitat association

The similarity of the SRE fauna in different habitat types was explored with non-metric multidimensional scaling (nMDS), which is one of the most powerful ordination methods, especially adept at extracting non-linear gradients in species composition. This creates a two- or three-dimensional ordination space in which all sites are displayed with their distance reflecting their similarity based on the invertebrate community, here species and species-complexes in the SRE target groups. Sites can then be analysed in relation to the habitat type. We used Primer v7 to execute this statistical analysis (Clarke & Gorley 2015). We conducted a nMDS for our own habitat categorisation, but also using fauna habitat mapping compiled by Ecologia (2025) as supplied by Fortescue on 28 March 2025 (Table 3-1).

The habitat associations of the SRE target groups were explored with contingency tables ( $\chi^2$ -test). This test is used to determine whether there is a statistically significant difference between the expected frequencies (here number of species in the SRE target groups) in each habitat type compared to the expected number of species if there was no preference for any of the habitat types. The  $\chi^2$  statistics were calculated online (<http://www.vassarstats.net/cfit.html>; accessed 25 March 2025).

### 3.6 PROJECT PERSONNEL

HBI personnel involved in the project have extensive experience in invertebrate surveys, including SRE assessments (Table 3-4).

**Table 3-4 Project personnel**

<b>Name</b>	<b>Qualifications</b>	<b>Fauna survey experience (years)</b>	<b>Role/s</b>
Dr Erich S. Volschenk	Ph.D. (Zool.)	20+	project management, taxonomy, report writing, GIS, molecular analyses, field survey
Farhan Bokhari	B.Sc. (Zool.)	15	field survey, taxonomy
Valentina Cruz Bedon	BAppSci. (Zool. & Botany)	15	field surveys, taxonomy
Layla Clarke	B.Sc. (Zool.)	2	report writing, GIS
Jack Resta	B.Sc. (Zool.)	3	field survey
Adam McVeigh	B.Sc. (Zool.)	5+	report writing, GIS
Prof. Melissa Thomas	Ph.D. (Zool.)	20+	project management, report review (editorial)
Dr Volker W. Framenau	B.Eng. (Chem. Eng.), M.Sc. (Cons. Biol.), Ph.D. (Zool.)	20+	report review (technical)

### 3.7 SURVEY LIMITATIONS AND CONSTRAINTS

According to EPA guidelines (EPA 2016b; section 3.3.1), terrestrial fauna surveys may be limited by several aspects. There were no major limitations with respect to the survey in the Study Area (Table 3-5).

**Table 3-5 Survey limitations and constraints**

<b>Constraint</b>	<b>Comment</b>
Competency and experience of project team carrying out the survey	All members of the survey team were experienced in undertaking SRE invertebrate fauna surveys (Table 3-4).
Scope (what faunal groups were sampled and were some sampling methods not able to be employed because of constraints such as weather conditions)	The study scope was well-defined, and all target SRE taxa were sampled with the methods mandated by EPA (2016a).
Proportion of fauna identified, recorded and/or collected	The number of systematically surveyed sites (28) and survey effort are considered appropriate for the purpose of a baseline survey; species accumulation curves did not reach a plateau indicating that more species in the SRE target groups are present in the Study Area.
Sources of information e.g. previously available information (whether historic or recent) is distinct from new data	Comprehensive database records, including WAM database and conservation significant species were available and considered adequate.
Proportion of tasks achieved, and further work which might be needed	The assessment was conducted and completed according to the agreed scope.
Timing/weather/season/cycle	The field survey was within the SRE survey period as recommended by EPA guidance for the Pilbara (November – April). Site conditions during the February trip were very hot and dry; however, conditions during the April trip followed significant rainfall in the eastern Pilbara during March.
Disturbances (e.g., fire, flood, accidental human intervention) effected results of the survey	Disturbances did not affect results.
Intensity (in retrospect, was the intensity adequate)	The desktop assessment was considered adequate and was appropriate to gather background information. The number of systematically surveyed sites and survey effort are considered appropriate for the purpose of a baseline survey
Completeness (was relevant area fully surveyed)	The Study Area was fully surveyed.
Resources (e.g., degree of expertise available in animal identification to taxon level)	All zoologists were suitably qualified and experienced in SRE collection and identification within the Pilbara.
Remoteness and/or access problems	Access problems were overcome by the use of a helicopter.
Availability of contextual information (e.g. biogeographic) information on region	Broad scale bioregion and land system data were available for the study area and adequate to provide appropriate contextual information.

## 4 RESULTS

### 4.1 DESKTOP REVIEW

The desktop review returned a total of 9,759 samples representing 21,634 specimens within SRE target taxa in the desktop survey area. Of these, 112 records (310 specimens) were from within the Study Area (Appendix 2).

A total of 19 individual species and 12 higher taxonomic ranks or species-complexes that may include SREs were identified within the desktop records from the Study Area (Table 4-1; Table 4-2). Six species were officially named, illustrating the poor taxonomic knowledge of species from the Study Area. Eight species are listed on the Fauna Portal website (links in Table 4-2).

One confirmed SRE and eight potential SREs were identified from the Study Area through the desktop review (Table 4-1; Table 4-2; Figure 4-1). Ten species in the SRE target groups were widespread and 12 higher taxa could not be assessed but may include SREs.

**Table 4-1 Identification and distribution summary of SREs from the Study area**

Higher taxon	Described species	Morpho-species	Higher taxa (sp. indet. or species-complex)	Total no. of taxa	Widespread	Potential SRE	Confirmed SRE	Not assessed (higher taxon)	Study Area endemic
Araneae	4	4	1	9	4	3	1	1	3
Opiliones	-	-	1	1	-	-	-	1	-
Pseudoscorpions	1	-	6	7	1	-	-	6	-
Scorpions	1	3	2	6	4	-	-	2	-
Scolopendromorpha	-	-	1	1	-	-	-	1	-
Isopoda	-	6	-	6	1	5	-	-	2
Eupulmonata	-	-	1	1	-	-	-	1	-
<b>Total:</b>	<b>6</b>	<b>13</b>	<b>12</b>	<b>31</b>	<b>10</b>	<b>8</b>	<b>1</b>	<b>12</b>	<b>5</b>

Five species were only known from the study area:

- Araneae: *Aname* 'H-N178', *Kwonkan* 'H-N175', *Karaops feedtime*
- Isopoda: *Buddelundia* FP-13356 (ESV BoDo02); *Buddelundiinae* FP-13364 (ESV BoDo03).

Searches of the EPBC database did not reveal any Federally listed conservation significant SRE invertebrates from the area of the desktop review. No species listed in Western Australia as Threatened or Priority species have been recorded from the Study Area.

**Table 4-2 Invertebrates in the SRE target groups in the Study Area based on the desktop review**

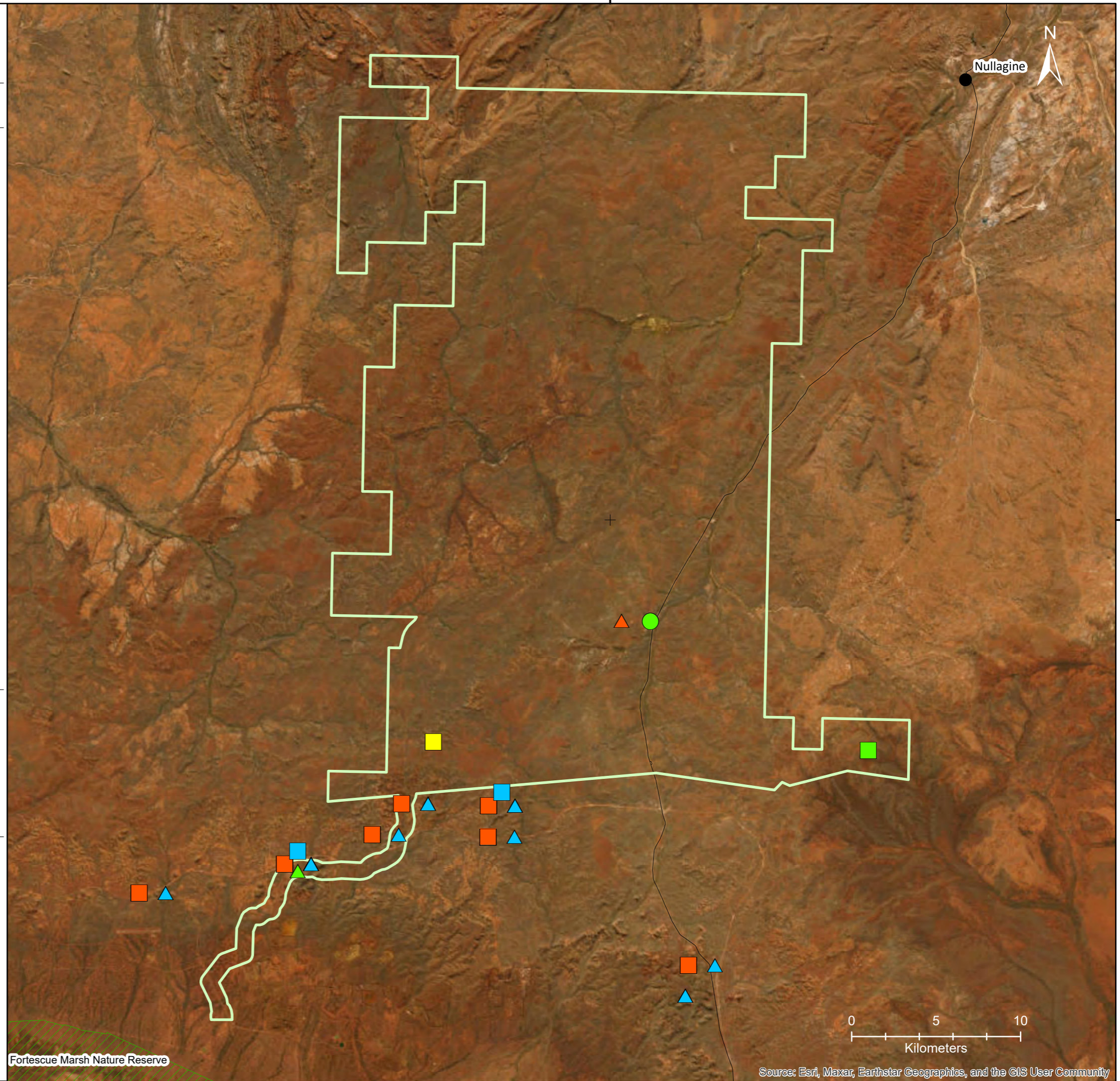
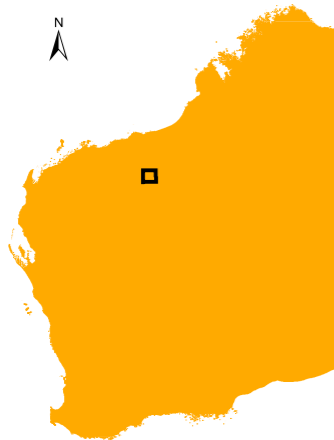
Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> )	Study area	Wider desktop area	Linear known range	SRE category	Data source	Comment
<b>ARANEAE</b>						
<b>Actinopodidae</b>						
<a href="#">Missulena rutraspina</a> Faulder, 1995	2	yes	> 200 km	widespread	WAM, also in Victoria (Faulder 1995)	
<b>Anamidae</b>						
<a href="#">Aname baileyorum</a> Castalanelli et al. 2020	4	yes	> 200 km	widespread		
<i>Aname</i> 'H-N178'	3	no	single location	potential	WAM	
<i>Kwonkan</i> 'H-N175'	1	no	single location	potential	WAM	
<a href="#">Aname FP-12532 (mellosa-complex Nyi01)</a>	1	yes	75 km	potential	HBI	
<i>Aname</i> FP-13324 (BoDo1)	1	yes	110 km	widespread	HBI	
<b>Selenopidae</b>						
<a href="#">Karaops feedtime</a> Crews, 2013	1	no	single location	confirmed	WAM	type locality (Crews 2013)
<i>Karaops nyiyaparli</i> Crews, 2013	1	yes	120 km	widespread	WAM	
<i>Karaops</i> sp. indet.	4	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<b>OPILIONES</b>						
Opiliones gen. indet. sp. indet.	1			not assessed (sp. indet.), may contain SREs	WAM	
<b>PSEUDOSCORPIONES</b>						
<b>Chthoniidae</b>						
<i>Tyrannochthonius</i> sp. indet.	1	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<b>Hyidae</b>						
<a href="#">Indohya boltoni</a> Harvey & Burger, 2023	3	yes	150 km	widespread	HBI, WAM	
<b>Olpiidae</b>						
<i>Austrohorus</i> sp. indet.	1	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<i>Beierolpium</i> sp. indet.	9	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<i>Indolpium</i> sp. indet.	27	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<i>Linnaeolpium</i> sp. indet.	2	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
Pseudoscorpiones gen. indet. sp. indet.	1	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	

Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> )	Study area	Wider desktop area	Linear known range	SRE category	Data source	Comment
<b>SCORPIONES</b>						
<b>Buthidae</b>						
<i>Lychas</i> `hairy-tail complex`	2	yes	n/a	not assessed (species complex), may contain SREs	HBI, WAM	
<i>Lychas</i> FP-11681 (ESV pilbara 1; SCO023)	1	yes	> 200 km	widespread	HBI, WAM	
<i>Lychas</i> `sp. 2`	14	yes	> 200 km	widespread	WAM	
<b>Urodacidae</b>						
<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	yes	> 200 km	widespread	HBI, WAM	
<i>Urodacus butleri</i> Volschenk et al., 2012	1	Yes	> 500 km	widespread	HBI, WAM	
<i>Urodacus</i> sp. indet.	1	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<b>SCOLOPENDROMORPHA</b>						
<i>Cryptops</i> sp. indet.	1	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	
<b>ISOPODA</b>						
<b>Armadillidae</b>						
<a href="#">Buddelundia</a> `sp. 10`	185	yes	110 km	widespread	WAM	Here considered the same as <a href="#">Buddelundia FP-11773 (SJ 10MA)</a>
<i>Buddelundia</i> `sp. 19`	20	yes	35 km	potential	WAM	
<i>Buddelundia</i> `sp. 26`	1	yes	12 km	potential	WAM	
<a href="#">Buddelundia</a> FP-13356 (ESV BoDo02)	1	no	single location	potential	HBI	
<a href="#">Buddelundiinae</a> FP-13364 (ESV BoDo03)	2	no	single location	potential	HBI	
<b>Philosciidae</b>						
<i>Laevophiloscia</i> `PES978`	15	yes	35 km	potential	WAM	
<b>EUPULMONATA</b>						
<b>Succineidae</b>						
<i>Succinea</i> sp. indet.	7	yes	n/a	not assessed (sp. indet.), may contain SREs	WAM	

**Figure 4-1** Records of SREs recorded from the Study Area based on the desktop review

- Aname 'H-N178'
- Buddelundia FP-13356 (BoDo02)
- Buddelundia 'sp. 19'
- Buddelundia 'sp. 26'
- Buddelundiinae gen. indet. FP-13364 (BoDo03)
- ▲ Karaops feedtime Crews; 2013
- ▲ Kwonkan 'sp. H-N175'
- ▲ Laevophiloscia 'sp. PES4394'
- W.A. Museum Area Search
- Bonney Downs Study Area
- Towns
- Major Roads
- National Park / Nature Reserve

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** GDA2020 MGA Zone 50  
**Projection:** Transverse Mercator  
**Datum:** GDA2020



Fortescue Marsh Nature Reserve

## 4.2 FIELD SURVEY

A total of 1,065 specimens in the SRE target groups were collected during the field survey, dominated by pseudoscorpions (523 specimens) and slaters (395 specimens) (Table 4-3; Table 4-4; Appendix 3).

A total of 73 taxa from SRE groups were recorded in the survey. Of these, three were described species, 55 were morphospecies and 15 represented higher taxonomic ranks or species complexes that cannot be assessed. Twenty species from the field survey are currently listed on the Fauna Portal. One of these was a confirmed SRE, 45 potential SREs and 12 are widespread (Table 4-3; Table 4-4; Figure 4-2–Figure 4-5).

A total of 40 species are currently only known from the Study Area, most of which being pseudoscorpions and slaters (Table 4-3).

The confirmed SRE is the keeled millipede *Antichiropus sloanae*. This species is also listed as **Priority 1 (P1)** under WA conservation legislation. It is known from outside the Study Area.

**Table 4-3 Identification and distribution summary of SREs collected in the Study Area (field survey)**

Higher taxon	Described species	Morpho-species	Higher taxa (sp. indet. or species-complex)	Total no of taxa	Widespread	Potential SRE	Confirmed SRE	Not assessed (higher taxon)	Study Area endemic
Araneae	2	3	1	6	3	2	-	1	-
Opiliones	-	1	-	1	-	1	-	-	1
Pseudoscorpions	-	20	5	25	5	15	-	5	15
Scorpions	-	2	2	4	2	-	-	2	-
Geophilomorpha	-	6	1	7	-	6	-	1	6
Scolopendromorpha	-	4	1	5	-	4	-	1	3
Polydesmida	1	-	1	2	-	-	1	1	-
Diplura	-	1	-	1	-	1	-	-	1
Isopoda	-	17	3	20	2	15	-	3	13
Eupulmonata	-	1	1	2	-	1	-	1	1
<b>Total:</b>	<b>3</b>	<b>55</b>	<b>15</b>	<b>73</b>	<b>12</b>	<b>45</b>	<b>1</b>	<b>15</b>	<b>40</b>

Only four species detected during the field survey were also reported from the desktop survey (two trapdoor spiders in the genus *Aname* and two slaters). The two slaters were collected during the Ecologia and Spektrum vertebrate surveys in the study area.

**Table 4-4 Invertebrates in the SRE target groups in the Study Area based on the field survey**

Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> ) (DNA superscript denotes species identifications using COI barcoding)	Site	No. specimens collected	Desktop review (study area)	Wider desktop area	Linear known range	SRE category	Comment
<b>ARANEAE</b>							
<a href="#">Aname watsoni</a> Castalanelli et al., 2020	2, 20	3	no	yes	> 100 km	widespread	
<a href="#">Aname</a> FP-12532 ( <i>mellosa</i> -complex Nyi01)	16, 18, 21, 27	6	yes	yes	95 km	potential	also reported in desktop review
<i>Aname</i> FP-13324 (BoDo1)	4, 21, 28	3	yes	yes	120 km	widespread	also reported in desktop review
<i>Anamidae</i> gen. indet. sp. indet.	4	1	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>Idiopidae</b>							
<i>Gaius tealei</i> Rix, Raven & Harvey, 2018	2, 20, 21	4	no	yes	> 200 km	widespread	
<b>Selenopidae</b>							
<i>Karaops</i> FP-13326 (2 ADL2023a)	20	1	no	yes	65 km	potential	species on GenBank (Acc. <a href="#">OR653510</a> )
<b>OPILIONES</b>							
<b>Assamiidae</b>							
Assamiidae gen. indet. FP-13325 (ESV BoDo01)	4, 21	2	no	no	13 km	potential	
<b>PSEUDOSCORPIONES</b>							
<b>Atemnidae</b>							
<i>Oratemnus</i> FP-11861 (WAM PSE121)	1, 4–22, 24–26, 28	385	no	yes	200 km	widespread	
Atemnidae gen. indet. FP-13327 (ESV BoDo01)	22, 28	3	no	no	12 km	potential	
<b>Chernetidae</b>							
<a href="#">Austrochernes</a> FP-12534 (PSE072; PCr01)	4, 7, 8, 11, 13, 15–17, 19, 25	58	no	yes	150 km	widespread	
<b>Chthoniidae</b>							
<i>Austrochthonius</i> sp. indet.	7	1	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>Garypidae</b>							
<i>Synsphyronus</i> FP-13471 (BoDo01)	10, 12, 23	7	No	no	23 km	potential	

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Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> ) (DNA superscript denotes species identifications using COI barcoding)	Site	No. specimens collected	Desktop review (study area)	Wider desktop area	Linear known range	SRE category	Comment
<b>Olpiidae</b>	all						
<i>Austrohorus</i> FP-13329 (ESV BoDo10)	15	1	no	no	single specimen	potential	
<i>Austrohorus</i> FP-13330 (ESV BoDo11)	28	1	no	no	single specimen	potential	
<i>Austrohorus</i> FP-13331 (ESV BoDo12)	6	1	no	no	single specimen	potential	
<i>Austrohorus</i> FP-13332 (ESV BoDo13)	2	6	no	no	single locality	potential	
<i>Austrohorus</i> sp. indet.	8	2	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<i>Beierolpium</i> FP-13333 (Biologic PSEU115)	4, 10–13, 15, 21, 22, 26	10	no	yes	105 km	widespread	species on GenBank (Acc. <a href="#">OR653886</a> , <a href="#">OR653883</a> , <a href="#">OR653877</a> )
<i>Beierolpium</i> sp. indet.	8, 15,	3	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<i>Indolpium</i> FP-13491 (ESV BoDo07)	24	1	no	no	single specimen	potential	
<i>Indolpium</i> FP-13581 (ESV BoDo01)	4, 5	2	no	no	15 km	potential	
<i>Indolpium</i> FP-13482 (ESV BoDo02)	1, 7, 28	5	no	no	20 km	potential	
<i>Indolpium</i> FP-13483 (ESV BoDo03)	18	9	no	no	single locality	potential	
<i>Indolpium</i> FP-13484 (ESV BoDo04)	24	1	no	no	single specimen	potential	
<i>Indolpium</i> FP-13485 (ESV BoDo05)	19	1	no	no	single specimen	potential	
<i>Indolpium</i> FP-13486 (ESV BoDo06)	1, 4, 5, 7	13	no	no	15 km	potential	
<i>Indolpium</i> FP-13487 (ESV BoDo08)	27	1	no	no	single specimen	potential	
<i>Indolpium</i> FP-13488 (ESV BoDo09)	18	5	no	no	single locality	potential	
<i>Indolpium</i> sp. indet.	8, 25	3	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
Olpiidae gen. 7/4 FP-13343 (PSE176)	14	2	no	yes	175 km	widespread	not in WAM; species on GenBank (Acc. <a href="#">OR653661</a> , <a href="#">OR653633</a> , <a href="#">MW078437</a> )
Olpiidae gen. indet. sp. indet.	15	1	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>Sternophoridae</b>	18						
<i>Afrosteronophorus</i> FP-13328 (PSEU100)	4	1	no	yes	180 km	widespread	species on GenBank (Acc. <a href="#">OR653713</a> )
<b>SCORPIONES</b>							
<b>Buthidae</b>							
<i>Lychas</i> FP-12652 ( <i>multipunctatus</i> -complex)	15	1	no	yes	n/a	widespread	
<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1, 5, 7, 9, 10, 12,	35	no	yes	n/a	not assessed (species complex), may contain SREs	

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Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> ) (DNA superscript denotes species identifications using COI barcoding)	Site	No. specimens collected	Desktop review (study area)	Wider desktop area	Linear known range	SRE category	Comment
	19, 22, 23, 25, 26						
<i>Lychas</i> FP-13186 (hairy tail-complex)	25	1	no	yes	n/a	not assessed (species complex), may contain SREs	also reported in desktop review
<b>Urodacidae</b>							
<i>Urodacus</i> FP-13183 (WAM SCO031)	21	3	no	Yes	> 100 km	widespread	
<b>GEOPHILOMORPHA</b>							
<b>Geophilidae</b>							
<i>Sepdonophilus</i> FP-13345 (ESV BoDo01)	7, 9, 10, 12, 13	12	no	no	23 km	potential	
<b>Mecistocephalidae</b>							
<i>Mecistocephalus</i> FP-13347 (ESV BoDo04)	18	2	no	no	single locality	potential	
<b>Oryidae</b>							
<i>Orphnaeus</i> FP13348 (ESV BoDo05)	15	1	no	no	single locality	potential	
<i>Orphnaeus</i> FP13349 (ESV BoDo06)	15, 20, 21	5	no	no	30 km	potential	
<i>Orphnaeus</i> sp. indet.	7, 21	2	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>Schendylidae</b>							
<i>Ballophilus</i> FP-13344 (ESV BoDo03)	9–11	4	no	no	3.5 km	potential	
<b>Geophilomorpha fam. indet.</b>							
Geophilomorpha gen. indet. FP-13346 (ESV BoDo02)	7, 8, 10, 19, 21	5	no	no	35 km	potential	
<b>SCOLOPENDROMORPHA</b>							
<b>Cryptopidae</b>							
<i>Cryptops</i> FP-13350 (ESV BoDo01)	20	1	no	no	single specimen	potential	
<i>Cryptops</i> FP-13351 (ESV BoDo02)	12	1	no	no	single specimen	potential	
<i>Cryptops</i> FP-13352 (ESV BoDo03)	21	1	no	no	single specimen	potential	
<i>Cryptops</i> FP-13353 (ESV BoDo04)	3, 11, 15, 17, 22, 28	6	no	yes	95 km	potential	
<i>Cryptops</i> sp. indet.	12, 20	2	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>POLYDESMIDA</b>							
<b>Paradoxosomatidae</b>							

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Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> ) (DNA superscript denotes species identifications using COI barcoding)	Site	No. specimens collected	Desktop review (study area)	Wider desktop area	Linear known range	SRE category	Comment
<i>Antichiropus sloanae</i> Car, 2019	2, 7, 20	8	no	yes	75 km	confirmed	<b>WA Priority 1 species</b>
<i>Antichiropus</i> sp. indet.	20, 24	3	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<b>DIPLURA</b>							
<b>Japygidae</b>							
Japygidae gen. indet. FP-13354 (ESV BoDo01)	9	1	no	no	single specimen	potential	
<b>ISOPODA</b>							
<b>Armadillidae</b>							
<a href="#">Buddelundia</a> FP-11798 (SJ 14fm)	1, 4, 6, 7, 11, 15, 18	41	no	Yes	> 100 km	widespread	
<a href="#">Buddelundia</a> FP-13355 (ESV BoDo01)	13	1	no	no	single specimen	potential	
<a href="#">Buddelundia</a> FP-13356 (ESV BoDo02)	20, 21	5	yes	no	2.5 km	potential	also reported in desktop review
<a href="#">Buddelundia</a> FP-13357 (ESV BoDo04)	5	1	no	no	15 km	potential	
<a href="#">Buddelundia</a> FP-13358 (ESV BoDo05)	26	6	no	yes	80 km	potential	
<a href="#">Buddelundia</a> FP-13359 (ESV BoDo06)	8, 10	4	no	no	15 km	potential	
<a href="#">Buddelundia</a> FP-13360 (ESV BoDo07)	11	6	no	no	single locality	potential	
<a href="#">Buddelundia</a> FP-13361 (ESV BoDo09)	21	3	no	no	single locality	potential	
<a href="#">Buddelundia</a> FP-13362 (ESV BoDo11)	25	3	no	no	single locality	potential	
<a href="#">Buddelundia</a> FP-12563 (ESV BoDo12)	2	1	no	no	single locality	potential	
<i>Buddelundia</i> sp. indet.	3–5, 8–17, 19–22, 24, 25	217	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<a href="#">Buddelundiinae</a> gen. indet. FP-11806 (PCr05, SJ WN)	2, 20	6	no	yes	160 km	widespread	species on GenBank (Acc. <a href="#">PP028623</a> , <a href="#">PP028683</a> )
<a href="#">Buddelundiinae</a> gen. indet. FP-13364 (ESV BoDo03)	19	1	yes	no	15 km	potential	also reported in desktop review
<a href="#">Buddelundiinae</a> gen. indet. FP-13365 (ESV BoDo08)	13, 25	8	no	yes	65 km	potential	
<a href="#">Buddelundiinae</a> gen. indet. FP-13366 (ESV BoDo10)	15, 16, 28	40	no	no	15 km	potential	
<i>Buddelundiinae</i> sp. indet.	1, 8	24	no	yes	n/a	not assessed (sp. indet.), may contain SREs	
<i>Armadillidae</i> sp. indet.	2, 3, 9, 18, 22	9	no	yes	n/a	not assessed (sp. indet.), may contain SREs	

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Genus and species (blue & underlined with link to <a href="#">Fauna Portal</a> ) (DNA superscript denotes species identifications using COI barcoding)	Site	No. specimens collected	Desktop review (study area)	Wider desktop area	Linear known range	SRE category	Comment
<b>Philosciidae</b>							
<a href="#">Philosciidae gen. indet. FP-13367 (ESV BoDo01)</a>	12, 17	4	no	no	45 km	potential	
<a href="#">Philosciidae gen. indet. FP-13368 (ESV BoDo02)</a>	10, 13	10	no	no	5.5 km	potential	
<a href="#">Philosciidae gen. indet. FP-13369 (ESV BoDo03)</a>	16, 20, 22	10	no	no	27 km	potential	
<b>EUPULMONATA</b>							
<b>Succineidae</b>							
<i>Austrosuccinea</i> FP-13370 (BoDo01)	5, 22	2	no	no	7 km	potential	
<i>Austrosuccinea</i> sp. indet.	7–13, 16, 20	31	no	yes	n/a	not assessed (sp. indet.), may contain SREs	likely <i>Austrosuccinea</i> FP-13370 (BoDo01)

**Figure 4-2** Survey records of SREs in the Study Area  
(Araneae and Opiliones)

- Aname FP-12532 (mellosoa-complex Nyi01)
- Assamiidae gen. indet. FP-13325 (BoDo01)
- Karaops FP-13326 (2 ADL2023a)

○ Survey Sites

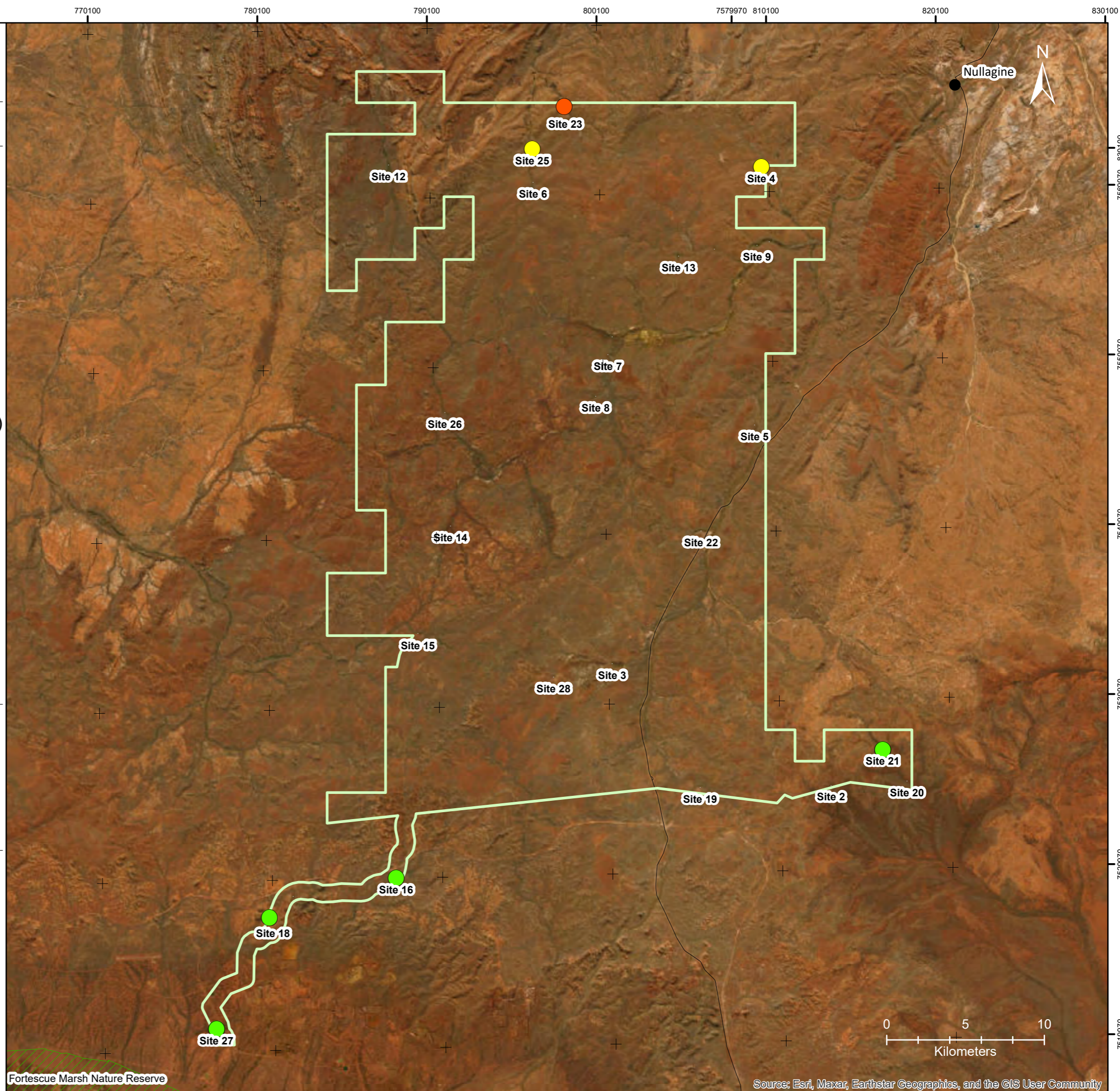
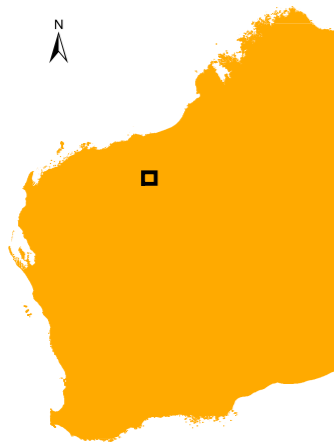
□ Bonney Downs Study Area

● Towns





















— Major Roads

▨ National Park / Nature Reserve

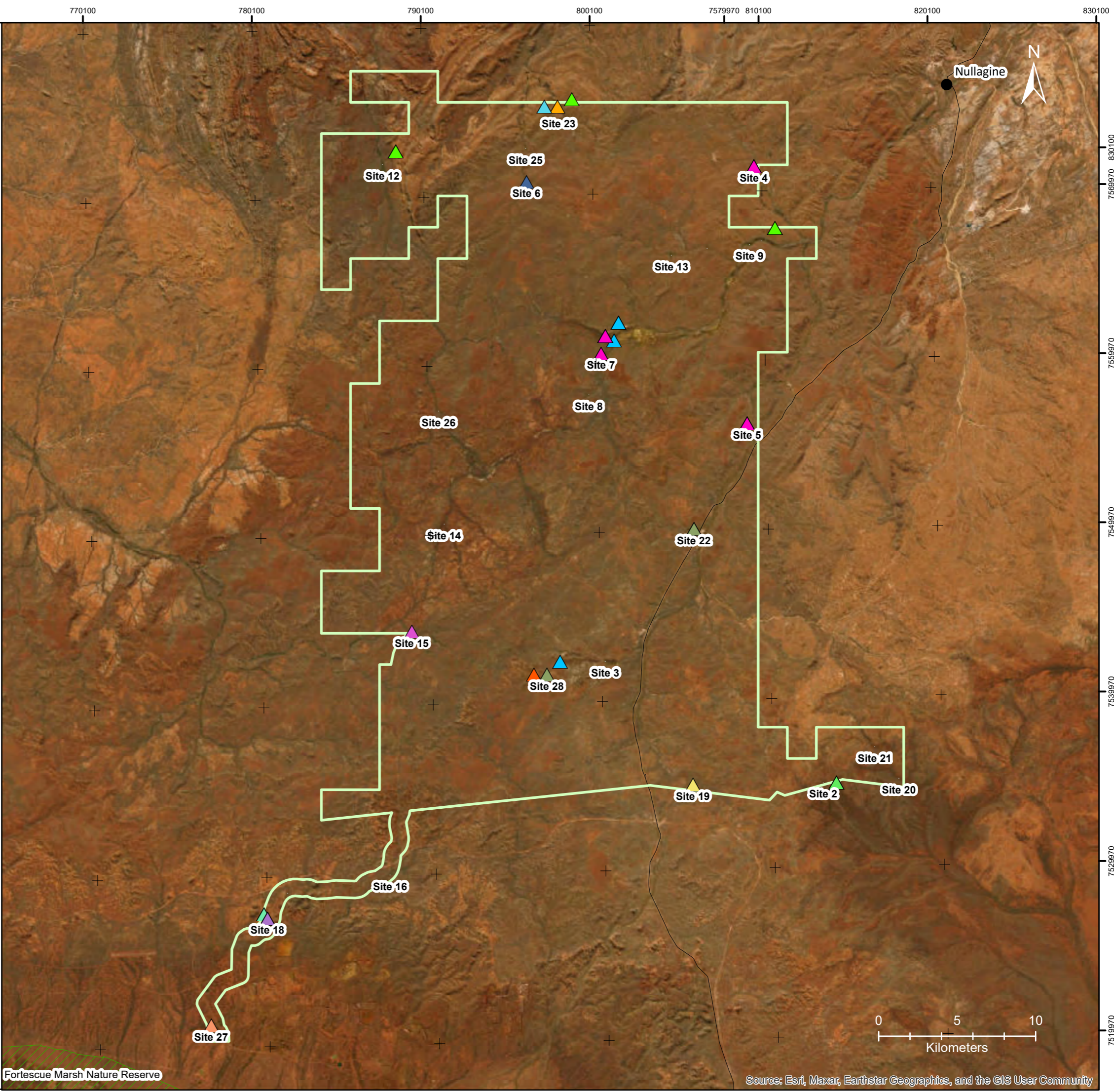
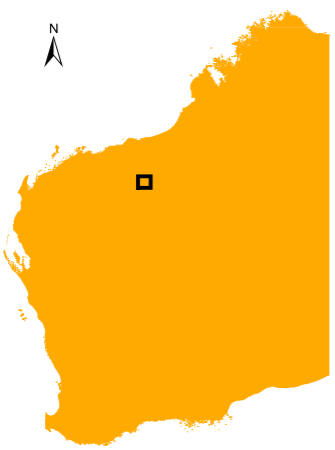
**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** WGS 1984 World Mercator  
**Projection:** Mercator  
**Datum:** WGS 1984



**Figure 4-3** Survey records of SREs in the Study Area (Pseudoscorpiones)

-  Atemnidae gen. indet. FP-13327 (BoDo01)
-  Austrohorus FP-13329 (BoDo10)
-  Austrohorus FP-13330 (BoDo11)
-  Austrohorus FP-13331 (BoDo12)
-  Austrohorus FP-13332 (BoDo13)
-  Indolpium FP-13491 (BoDo07)
-  Indolpium FP-13581 (ESV BoDo01)
-  Indolpium FP-13582 (ESV BoDo02)
-  Indolpium FP-13583 (ESV BoDo03)
-  Indolpium FP-13584 (ESV BoDo04)
-  Indolpium FP-13585 (ESV BoDo05)
-  Indolpium FP-13586 (ESV BoDo06)
-  Indolpium FP-13587 (ESV BoDo08)
-  Indolpium FP-13588 (ESV BoDo09)
-  Synsphyronus FP-13471 (ESV BoDo01)
-  Survey Sites
-  Bonney Downs Study Area
-  Towns
-  Major Roads
-  National Park / Nature Reserve

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** WGS 1984 World Mercator  
**Projection:** Mercator  
**Datum:** WGS 1984

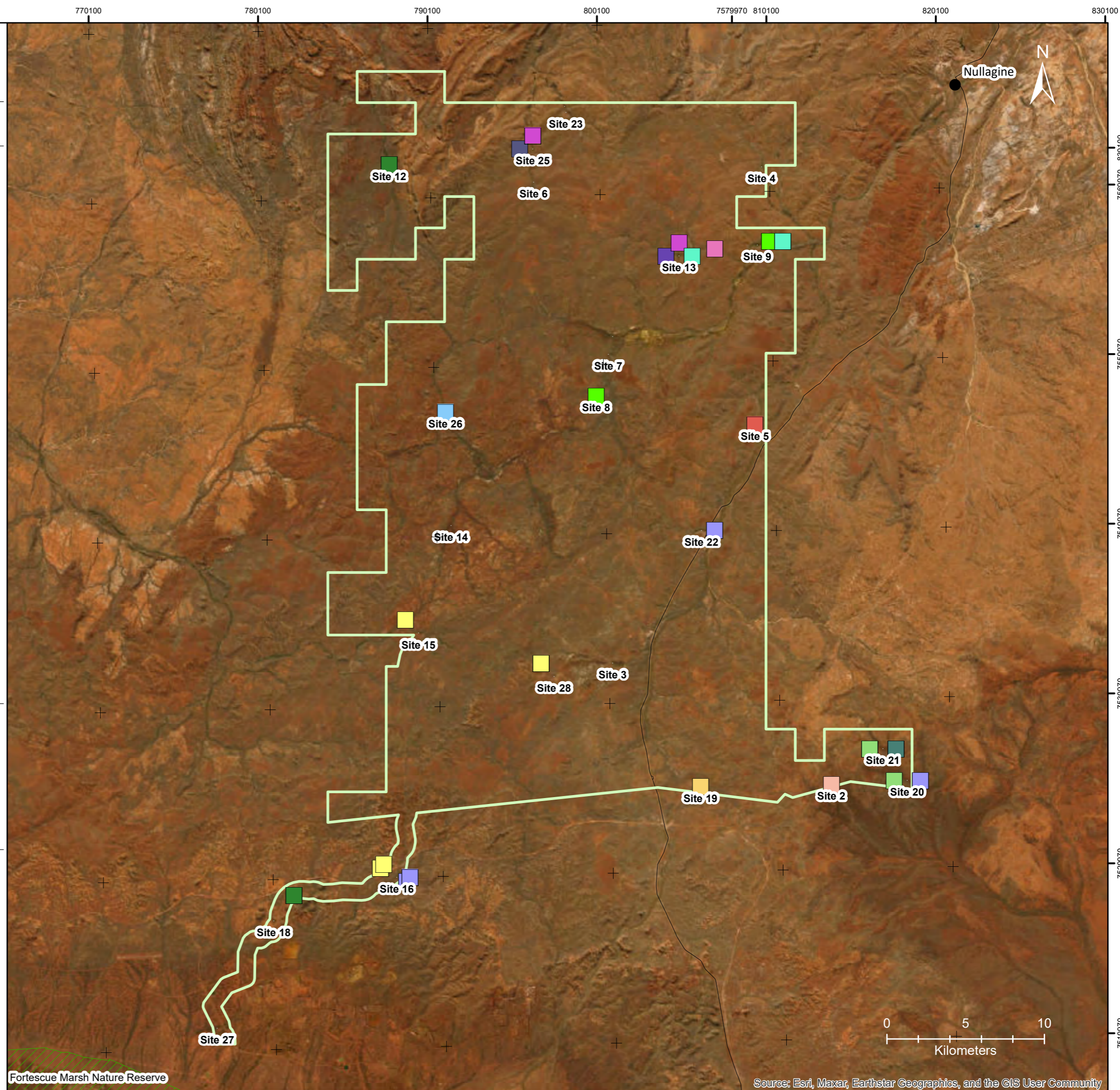


Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



















**Figure 4-4** Survey records of SREs in the Study Area (Isopoda)

- Buddelundia FP-13355 (BoDo01)
- Buddelundia FP-13356 (BoDo02)
- Buddelundia FP-13357 (BoDo04)
- Buddelundia FP-13358 (BoDo05)
- Buddelundia FP-13359 (BoDo06)
- Buddelundia FP-13360 (BoDo07)
- Buddelundia FP-13361 (BoDo09)
- Buddelundia FP-13362 (BoDo11)
- Buddelundia FP-13363 (BoDo12)
- Buddelundiinae gen. indet. FP-13364 (BoDo03)
- Buddelundiinae gen. indet. FP-13365 (BoDo08)
- Buddelundiinae gen. indet. FP-13366 (BoDo10)
- Philosciidae gen. indet. FP-13367 (BoDo01)
- Philosciidae gen. indet. FP-13368 (BoDo02)
- Philosciidae gen. indet. FP-13369 (BoDo03)
- Survey Sites
- Bonney Downs Study Area
- Towns
- Major Roads
- National Park / Nature Reserve

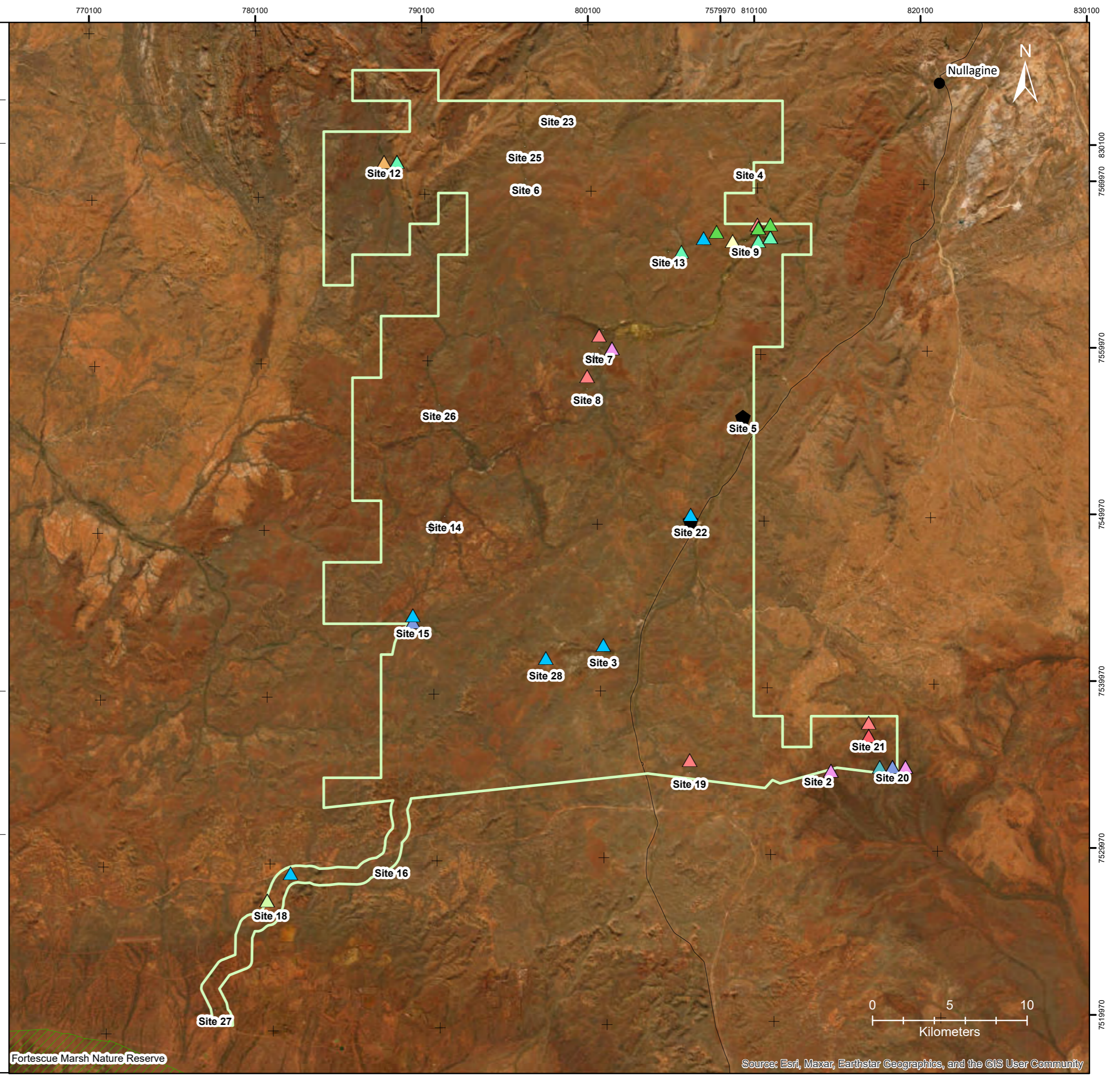
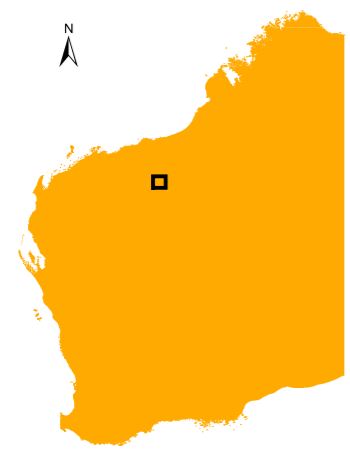
**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** WGS 1984 World Mercator  
**Projection:** Mercator  
**Datum:** WGS 1984



**Figure 4-5** Survey records of SREs in the Study Area  
(Chilopoda, Diplopoda, Entnognatha and Gastropoda)

-  Antichiropus sloanae Car; 2019
-  Ballophilus FP-13344 (BoDo03)
-  Cryptops FP-13350 (BoDo01)
-  Cryptops FP-13351 (BoDo02)
-  Cryptops FP-13352 (BoDo03)
-  Cryptops FP-13353 (BoDo04)
-  Geophilomorpha gen. indet. FP-13346 (BoDo02)
-  Japygidae gen. indet. FP-13354 (BoDo01)
-  Mecistocephalus FP-13347 (BoDo04)
-  Orphnaeus FP-13348 (BoDo05)
-  Orphnaeus FP-13349 (BoDo06)
-  Sepedonophilus FP-13345 (BoDo01)
-  Austrosuccinea FP-13370 (BoDo01)
-  Survey Sites
-  Bonney Downs Study Area
-  Towns
-  Major Roads
-  National Park / Nature Reserve

**Client:** Fortescue  
**Project:** Short-range Endemic Invertebrate Survey for the East Pilbara Energy Hub  
**Author:** E.S. Volschenk and A. McVeigh  
**Coordinate System:** WGS 1984 World Mercator  
**Projection:** Mercator  
**Datum:** WGS 1984



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

## 4.3 SHORT-RANGE ENDEMIC INVERTEBRATES KNOWN FROM THE STUDY AREA

### 4.3.1 Order Araneae (spiders)

Spiders represent one of the most diverse and abundant orders of Arachnida with more than 50,000 described species worldwide (World Spider Catalog 2025) and more than 4,000 species named from Australia (Framenau 2024).

Trapdoor spiders (infraorder Mygalomorphae) represent one of the focal groups in surveys of SRE taxa and all families are targeted (Harvey 2002). Several mygalomorph spiders are listed as Threatened on Schedule 1 of the *Biodiversity Conservation Act 2016 – Biodiversity Conservation (Listing of Native Species) Fauna Order 2022 (October 2022)*.

Modern spiders (infraorder Araneomorphae) are also likely to contain many groups that display narrow-range endemism. Families generally targeted for SRE surveys in the Pilbara include flatties (family Selenopidae) and tube-web spiders (Segestriidae).

#### 4.3.1.1 Family Anamidae (wishbone trapdoor spider)

Members of the mygalomorph spider family Anamidae are represented in Western Australia by several genera, including *Aname*, *Chenistonia*, *Hesperonatalius*, *Kwonkan*, *Proshermacha*, *Swolnpes*, *Teyl*, and *Trogloidiplura* (Harvey *et al.* 2018; Harvey *et al.* 2020). They usually dig burrows in the soil, and do not cover their burrow entrances with lids.

##### 4.3.1.1.1 Genus *Aname*

With approximately 50 described species, *Aname* is the most speciose genus in the family Anamidae and new species are frequently described (Wilson *et al.* 2023). It is currently subject to an Australia-wide revision at the Western Australian and Queensland Museums and the University of Western Australia. In Western Australia, *Aname* are regularly the most diverse mygalomorph genera in biological spider surveys. Many *Aname* species appear to have restricted distributions as shown by two studies from northern Australia, including the Pilbara (Harvey *et al.* 2012; Raven 1985). Unidentifiable specimens are therefore potential SREs.

##### ***Aname* `H-N178`**

*Aname* `H-N178` was identified from the Study Area in the desktop review based on a record from the WA Museum. It has been identified by molecular methods, but the sequence data are not publicly available. It may represent one of the other species identified here. It is a Study Area endemic (potential SRE).

##### ***Aname* FP-12532 (*melloso*-complex Nyi01)**

*Aname* FP-12532 (*melloso*-complex Nyi01) was identified from the Study Area both through the desktop review and the field survey (sites 16, 18, 21, 27). It is known from outside the Study Area and considered a potential SRE, but with a known linear range of 95 km.

##### 4.3.1.1.2 Genus *Kwonkan*

*Kwonkan* currently includes 14 species. Previously only known from southern Western and South Australia, three species were recently described from central Australia (Harvey *et al.* 2023) and two species from the Kimberley region (Wilson *et al.* 2025). Most species are only known from their respective type localities indicating restricted distributions for many species. *Kwonkan eboracum* from the York region is listed as Critically Endangered and *K. moriartii* from the Goldfields as Priority 2 under WA conservation legislation.

##### ***Kwonkan* `H-N175`**

*Aname* `H-N175` was identified from the Study Area in the desktop review based on a record from the WA Museum. It has been identified by molecular methods, but the sequence data are not publicly available. It is a Study Area endemic (potential SRE).

### 4.3.1.2 Family Selenopidae (wall crab spiders)

#### 4.3.1.2.1 Genus *Karaops*

Wall crab spiders (or Flatties) are small, flat like spiders. They include habitat specialist SREs. The Australian fauna is moderately well known with 54 described species, all in the genus *Karaops*; many more species remain to be undescribed (Crews 2013, 2023; Crews & Harvey 2011).

#### ***Karaops feedtime* Crews, 2013**

*Karaops feedtime* is only known from a single female, the holotype of the species. The type locality is in the Study Area. It is considered a confirmed SRE due to its taxonomic treatment.

#### ***Karaops* FP-13326 (2 ADL2023a)**

*Karaops* FP-13326 (2 ADL2023a) was found at a single site (20). It has also been found outside the Study Area and is considered a potential SRE. This species was identified by molecular method. As the COI sequence of *Karaops feedtime* is unknown, there is the possibility that this is the same species.

### 4.3.2 Order Opiliones (Harvestman)

Harvestmen are spider-like arachnids but differ from spiders by the lack of a constriction between cephalothorax and abdomen, and the lack of spinnerets. The harvestmen fauna of Western Australia is composed of eight families with Assamiidae and Zalmoxidae restricted to northern tropical areas. Although many harvestmen possess small ranges, these are often larger than the nominal SRE range threshold (Harvey 2002).

#### 4.3.2.1 Family Assamiidae

Few species within the family have been described, most in the genus *Dampetrus* (Shear 2001). Owing to their poor taxonomic resolution, WA species are most reliably assessed using their DNA sequences.

#### **Assamiidae gen. indet. FP-13325 (ESV BoDo01)**

This species was recorded during the field survey (sites 4 and 24). It is a Study Area endemic and considered a potential SRE.

### 4.3.3 Order Pseudoscorpiones (Pseudoscorpions)

Pseudoscorpions are very small arachnids resembling scorpions but lacking the sting bearing 'tail'. The Western Australian pseudoscorpion fauna is diverse with representatives of 19 different families (World Pseudoscorpiones Catalog 2025). They are found in a variety of biotopes, but can be most commonly collected from the bark of trees, from the underside of rocks, or from leaf litter habitats (Harvey 1992).

#### 4.3.3.1 Family Atemnidae

Atemnids are frequently found under bark of trees in Western Australia, but the systematics of the group, particularly of the genus *Oratemnus*, is uncertain and the taxonomy of individual species unclear. However, based upon current evidence, it seems that most species will eventually be found to be widely distributed.

#### **Atemnidae gen. indet. sp. indet. FP-13327**

This species was collected at two sites (22, 28). It is only known from the Study Area and considered a potential SRE.

### 4.3.3.2 Family Garypidae

In Western Australia, this family is represented by the genera *Garypus*, *Anagarypus* and *Synsphyronus* (Harvey 1987). These genera are relatively well studied; however, many undescribed species are known from WA, especially in the genus *Synsphyronus*.

#### 4.3.3.2.1 Genus *Synsphyronus*

The taxonomy of *Synsphyronus* is poorly resolved. Both widespread and SRE species are known (Cullen & Harvey 2021; Harvey 1986, 2011, 2012, 2022).

#### ***Synsphyronus* FP-13471 (ESV BoDo01)**

This species was collected at three sites (10, 12, 23). It is only known from the Study Area and considered a potential SRE.

### 4.3.3.3 Family Olpiidae

In Western Australia, this family is represented by the genera *Austrohorus*, *Beierolpium*, *Euryolpium*, *Linnaeolpium* and *Indolpium*; however, only *Beierolpium* and *Austrohorus* were originally described from Australia and the genus level identification of the other genera remains doubtful. With the application of DNA barcoding techniques, many undescribed and cryptic species have been identified, mainly from the Pilbara region. Many of these species appear to be SREs. Only ten species are currently described in Australia (World Pseudoscorpiones Catalog 2025). Little is known about the species of the most common of these genera. Owing to the uncertainty about the diversity of most species within these genera, they are all considered potential SREs.

#### 4.3.3.3.1 Genus *Austrohorus*

All representatives of this genus were new and did not match any sequences from GenBank.

***Austrohorus* FP-13329 (ESV BoDo10)** – 1 site (15), Study Area endemic, potential SRE

***Austrohorus* FP-13330 (ESV BoDo11)** – 1 site (28), Study Area endemic, potential SRE

***Austrohorus* FP-13331 (ESV BoDo12)** – 1 site (6), Study Area endemic, potential SRE

***Austrohorus* FP-13332 (ESV BoDo13)** – 1 site (2), Study Area endemic, potential SRE

#### 4.3.3.3.2 Genus *Indolpium*

All representatives of this genus were new and did not match any sequences from GenBank.

***Indolpium* FP-13491 (ESV BoDo07)** – 1 site (24), Study Area endemic, potential SRE

***Indolpium* FP-13581 (ESV BoDo01)** – 2 sites (4, 5), Study Area endemic, potential SRE

***Indolpium* FP-13482 (ESV BoDo02)** – 3 sites (1, 7, 28), Study Area endemic, potential SRE

***Indolpium* FP-13483 (ESV BoDo03)** – 1 site (18), Study Area endemic, potential SRE

***Indolpium* FP-13484 (ESV BoDo04)** – 1 site (24), Study Area endemic, potential SRE

***Indolpium* FP-13485 (ESV BoDo05)** – 1 site (19), Study Area endemic, potential SRE

***Indolpium* FP-13486 (ESV BoDo06)** – 4 sites (1, 4, 5, 7), Study Area endemic, potential SRE

***Indolpium* FP-13487 (ESV BoDo08)** – 1 site (27), Study Area endemic, potential SRE

***Indolpium* FP-13488 (ESV BoDo09)** – 1 site (18), Study Area endemic, potential SRE

### 4.3.4 Order Geophilomorpha (soil centipedes)

All five orders of centipedes can be found in Australia (Colloff *et al.* 2005). The orders Geophilomorpha and Lithobiomorpha appear to contain many SREs. Geophilomorphans inhabit soil, leaf litter and live under rocks. The Australian fauna contains representatives of four families: Geophilidae, Mecistocephalidae, Oryidae and Schendylidae (Bonato *et al.* 2014).

Geophilomorpha represents the most speciose of centipede orders, but it is also the least well-known owing to their highly reduced mouth parts, features heavily relied on for diagnosing species in other centipede orders. The application of DNA sequencing to this group of centipedes has exposed numerous species in Western Australia and most appear to be SREs. Identification of all WA soil centipedes is heavily dependent on assessment of their DNA sequence.

**Geophilomorpha gen. indet. FP-13346 (ESV BoDo02)** – 5 sites (7, 8, 10, 19, 21), Study Area endemic, potential SRE

Our molecular analysis placed this morphospecies in a clade containing sequences of both Oryidae and Schendylidae, therefore it is unidentified at the family level.

#### 4.3.4.1 Family Geophilidae

##### 4.3.4.1.1 Genus *Sepedonophilus*

*Sepedonophilus* FP-13345 (ESV BoDo01) – 5 sites (7, 9, 10, 12, 13), Study Area endemic, potential SRE.

#### 4.3.4.2 Family Mecistocephalidae

Mecistocephalidae contains a single genus only, *Mecistocephalus*. These centipedes are characterised by an elongated head.

##### 4.3.4.2.1 Genus *Mecistocephalus*

***Mecistocephalus* FP-13347 (ESV BoDo04)** – 1 site (18), Study Area endemic, potential SRE.

#### 4.3.4.3 Family Oryidae

Oryidae contains comparatively large centipedes with short, basally wide antennae. Only one genus in the family is currently known from Australia, *Orphnaeus*.

##### 4.3.4.3.1 Genus *Orphnaeus*

***Orphnaeus* FP-13348 (ESV BoDo05)** – 1 site (15), Study Area endemic, potential SRE

***Orphnaeus* FP-13349 (ESV BoDo06)** – 3 sites (15, 20, 21), Study Area endemic, potential SRE

#### 4.3.4.4 Family Schendylidae

##### 4.3.4.4.1 Genus *Ballophilus* (clubbed soil centipedes)

This genus was previously placed in its own family (Ballophilidae); however, Bonato *et al.* (2014) placed this genus in Schendylidae. This genus is very poorly known in Australia and only one species is formally described: *Ballophilus australiae* from far North Queensland. In Western Australia, this genus is only known from undescribed species from the Pilbara region.

***Ballophilus* FP-13344 (ESV BoDo03)** – 3 sites (9, 10, 11), Study Area endemic, potential SRE

### 4.3.5 Order Scolopendromorpha (tropical centipedes)

The Australian fauna has been comprehensively revised (Koch 1982, 1983a, b, c, d; Koch 1985; Koch & Burgman 1984). Almost all species are widespread and therefore these centipedes do not belong to the target groups of SRE surveys, except for the Cryptopidae, that includes blind litter-dwellers and may include range-restricted species (Edgecombe 2005).

#### 4.3.5.1 Family Cryptopidae

Cryptopidae are small blind and pale centipedes. In Australia, *Cryptops* is currently the only genus in the family (Edgecombe 2011). Six species are currently known from Australia, of which *Cryptops roeplainensis* was most recently described from caves on the Nullarbor Plain (Edgecombe 2005). The taxonomy of the group is poorly resolved and recent molecular analyses using COI sequence data revealed high genetic divergence suggesting considerable species diversity in the Pilbara region of WA. Unidentified specimens within the Cryptopidae are therefore considered potential SREs.

##### 4.3.5.1.1 Genus *Cryptops*

***Cryptops* FP-13350 (ESV BoDo01)** – 1 site (20), Study Area endemic, potential SRE

***Cryptops* FP-13351 (ESV BoDo02)** – 1 site (12), Study Area endemic, potential SRE

***Cryptops* FP-13352 (ESV BoDo03)** – 1 site (21), Study Area endemic, potential SRE

***Cryptops* FP-13353 (ESV BoDo04)** – 6 sites (3, 11, 15, 17, 28), also known from outside the Study Area, borderline potential SRE (linear range 95 km)

### 4.3.6 Order Polydesmida (flat-back millipedes)

The Australian millipedes are poorly studied and biogeographic patterns remain largely unresolved (Black 1997; Shelley & Golovatch 2011). At least eight orders of millipedes are native to Australia; all species in the order Julida are introduced. Millipedes belong to one of the main target groups of SRE surveys. Short-range endemism is particularly common within the orders Sphaerotheriida (rolling millipedes), Polydesmida, and Chordeumatida (not known from WA) (EPA 2009; Harvey 2002).

Polydesmida are the largest of all millipede orders. In Australia, the order is represented by four families, the Dalodesmidae, Haplodesmidae, Paradoxosomatidae, and Pyrgodesmidae (Mesibov 2012). Keeled millipedes have 19 or 20 body segments and some of these have lateral flanges or triangular swellings ('paranota'). They don't have eyes and are generally between 20 and 40 mm long, although smaller and much larger species are known.

Polydesmida are poor dispersers under natural conditions and seem to be very good at evolving new species. As a result, many polydesmidan species have small geographical ranges (100–1000 km<sup>2</sup>). Polydesmidan genera are also good at forming distribution mosaics, in which each species occupies its own patch on the map and overlaps very little (or not at all) with other species in the same genus.

#### 4.3.6.1 Family Paradoxosomatidae

Members of the family Paradoxosomatidae are abundant and occur widely within Australia; some 170 species in forty genera are currently described from this country (Car *et al.* 2013). They differ from the other two Australian families within the Polydesmida, Dalodesmidae and Haplodesmidae, by the separated bases of the male gonopods. Many paradoxomatids are relatively large with adults that range from 20 to 40 mm in length (Mesibov 2006). The described Western Australian fauna consists of eight genera, of which four (*Akamptogonus*, *Orthomorpha*, *Oxidus*, *Solaenodolichopus*) are represented by introduced species (Car *et al.* 2013). The remaining four indigenous genera are *Boreohesperus*, the only member of the Australiosomatini in WA (Car & Harvey 2013), and the antichiropodini genera *Helicopodosma* (one described species from Kununurra), *Stygiochiropus*, a troglobitic genus from Cape Range (Humphreys & Shear 1993) and the diverse genus *Antichiropus* (Car & Harvey 2014; Car *et al.* 2013; Wojcieszek *et al.* 2011). There are many undescribed species

in particular in the genus *Antichiropus*, from diverse habitats and most appear to have very small ranges. Most indigenous genera contain SRE taxa although they may be locally abundant. Identification by COI barcoding is challenging due to the low interspecific genetic divergence between some species (Car *et al.* 2019).

#### 4.3.6.1.1 Genus *Antichiropus*

***Antichiropus sloanae*** – 3 sites (2, 7, 20)

The species is listed as **Priority 1 (P1)** under WA conservation legislation. Due to its well-known taxonomic status, *A. sloanae* is considered a confirmed SRE.

### 4.3.7 Order Diplura (Two-pronged Bristletails)

In the Pilbara, epigeal diplurans are rarely collected and are usually represented by the families Japygidae, Parajapygidae, Projapygidae, and Campodeidae (Koch 2009). The taxonomy of species in all these families is poor for WA species and species assessments rely on assessment of their DNA sequences.

#### 4.3.7.1 Family Japygidae

***Japygidae* gen. indet. FP-13354 (ESV BoDo01)** – 1 site (9), Study Area endemic, potential SRE.

### 4.3.8 Order Isopoda (Slaters)

Isopoda represents the only order of epigeal crustaceans known to contain SREs. The suborder Oniscidea represents terrestrial and secondarily aquatic isopods with approximately 190 species described in Australia (Merrin *et al.* 2011). The WA fauna is comparatively poorly known with many undescribed species (Judd & Horwitz 2003). The WA terrestrial isopod fauna is largely undescribed and is diverse (Judd & Horwitz 2003; Judd & Perina 2013). Isopods have poor dispersal capabilities and often have specific habitat preferences, making them target SRE taxa.

#### 4.3.8.1 Family Armadillidae

Armadillidae typically have a convex dorsal surface and can roll up into a ball. The family is diverse in Australia, currently 24 genera are described, many species live in litter or under wood and stones in forest or woodland or near the coast.

##### 4.3.8.1.1 Genus *Buddelundia*

*Buddelundia* is endemic to Australia (Lewis 1998) and is the most common terrestrial isopod in WA (Judd 2004). Many undescribed species are known from morphological and molecular data, and both widespread and SRE taxa are known.

***Buddelundia* FP-13355 (BoDo01)** – 1 site (13), Study Area endemic, potential SRE

***Buddelundia* FP-13356 (BoDo02)** – 2 sites (20, 21), Study Area endemic, potential SRE

***Buddelundia* FP-13357 (BoDo04)** – 1 site (5), Study Area endemic, potential SRE

***Buddelundia* FP-13358 (BoDo05)** – 1 site (26), potential SRE, also known from outside the Study Area

***Buddelundia* FP-13359 (BoDo06)** – 2 sites (8, 10), Study Area endemic, potential SRE

***Buddelundia* FP-13360 (BoDo07)** – 1 site (11), Study Area endemic, potential SRE

***Buddelundia* FP-13361 (BoDo09)** – 1 site (21), Study Area endemic, potential SRE

***Buddelundia* FP-13362 (BoDo11)** – 1 site (25), Study Area endemic, potential SRE

***Buddelundia* FP-13363 (BoDo12)** – 1 site (2), Study Area endemic, potential SRE

#### 4.3.8.1.2 Genus *Buddelundiinae* gen. indet.

This rank of Armadillidae is morphologically similar to *Buddelundia* and several morphospecies are known from the Pilbara region. Species boundaries are currently assessed using DNA sequences.

***Buddelundiinae* gen. indet. FP-13364 (BoDo03)** – 1 site (19), Study Area endemic, potential SRE

***Buddelundiinae* gen. indet. FP-13365 (BoDo08)** – 2 sites (13, 25), potential SRE, also known from outside the study area

***Buddelundiinae* gen. indet. FP-13366 (BoDo10)** – 3 sites (15, 16, 28), Study Area endemic, potential SRE

### 4.3.8.2 Family Philosciidae

Members of the family Philosciidae cannot roll into a ball. Five of ten genera described from Australia are endemic and *Laevophiloscia* and *Plymophiloscia* are mainly Australian. These isopods are rarely collected in WA and their taxonomy is poorly known with numerous undescribed species revealed from DNA sequence data. Specimens are fragile and easily damaged, and they are best investigated by molecular methods. All philosciids found in the Pilbara are potential SRE species.

**Philosciidae gen. indet. FP-13367 (BoDo01)** – 2 sites (12, 17), Study Area endemic, potential SRE

**Philosciidae gen. indet. FP-13368 (BoDo02)** – 2 sites (10, 13), Study Area endemic, potential SRE

**Philosciidae gen. indet. FP-13369 (BoDo03)** – 3 sites (16, 20, 22), Study Area endemic, potential SRE

### 4.3.8.3 Order Eupulmonata

Molluscs are one of the most diverse groups of invertebrates and the Australian fauna is characterised by a high degree of endemism (Beesley *et al.* 1998). Land snails belong to the target groups for SRE surveys due to their limited dispersal capabilities, in combination with often strict dependencies on particular soils (EPA 2016a; Harvey 2002). These characteristics have also resulted in a significant global decline of non-marine molluscs (Lydeard *et al.* 2004).

### 4.3.8.4 Family Succineidae

Succineidae are small to medium-sized, air-breathing land snails. They are commonly called amber snails due to the colour of their fragile shells. They usually live in damp habitats such as marshes.

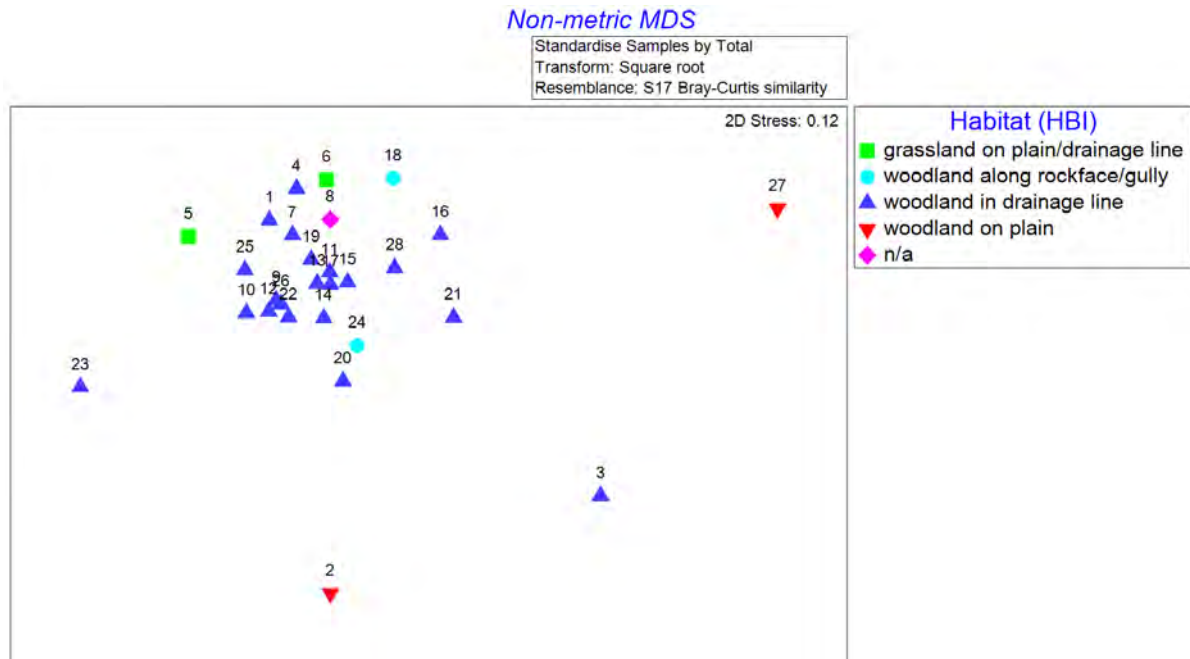
#### 4.3.8.4.1 Genus *Austrosuccinea*

The genus *Austrosuccinea* is currently listed as junior synonym of *Succinea* on MolluscaBase eds. (2025), but the Atlas of Living Australia and the Australian Faunal Directory cite it as a valid genus.

***Austrosuccinea* FP-13370 (BoDo01)** – 2 sites (5, 22), Study Area endemic, potential SRE.

## 4.4 HABITATS FOR SHORT-RANGE ENDEMIC SPECIES

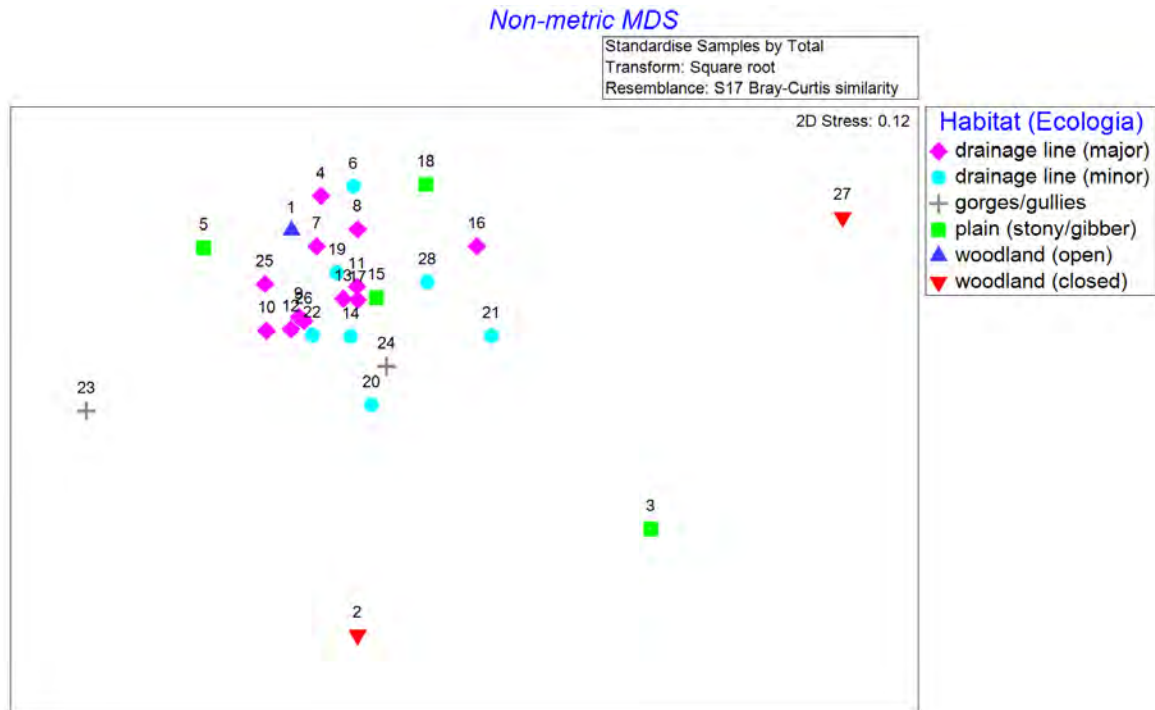
Based on the habitat types defined for the field site during our survey (Table 3-1) the communities of the SRE target groups do not cluster well by habitat. Sites of the same habitat type are fairly evenly distributed across the two-dimensional ordination space with probably the exception of “grassland on plain/drainage line”; these sites are situated towards the top left corner of the graph (Figure 4-6). But even those are fairly widely spaced and interrogating the data showed that both sites 5 and 6 only shared one species, the widespread pseudoscorpions *Oratemnus* FP-11861. The ordination stress of 0.12 is very low indicating that the ordination is a very good representation of the sample pattern.



**Figure 4-6** Non-metric multi-dimensional scaling (nMDS) of SRE target group communities per site (habitat types as determined during field survey)

A similar pattern is evident when the ordination is categorised by the habitat types compiled by Ecologia (2025) (Figure 4-7). Sites are widely spaced in the ordination space.

Neither the habitat characterisation during the SRE survey nor that provided by Ecologia (2025) are good predictors for SRE communities found at these sites.



**Figure 4-7** Non-metric multi-dimensional scaling (nMDS) of SRE target group communities per site (fauna habitat types as compiled by Ecologia (2025))

The survey sites in the study area were situated in four habitat categories, with the greatest proportion (21 sites; = 77.78%) in the habitat “woodland in drainage line” (Table 4-5). This was also the habitat type with the greatest number of species or species-complexes in the SRE target groups. There was no significant difference between the number of SRE target taxa found in each habitat compared to the expected number based on number of field sites in this habitat ( $\chi^2 = 5.128$ ;  $df = 3$ ;  $p = 0.1627$ ).

**Table 4-5** Observed and expected number of SRE target groups in each habitat type in the study area

Habitat type	No. of sites surveyed (% of all sites surveyed)	SRE species in habitat type	Expected SRE species in habitat type
grassland on plain/in drainage line	2 (0.07%)	8	6
woodland along rockface/gully	2 (0.07%)	9	6
woodland in drainage line	21 (77.78%)	51	59
woodland on plain	2 (0.07%)	8	6

## 4.5 SPECIES RICHNESS ESTIMATION

A total of 56 taxa were included in the analysis from 68 samples at the 28 sites (Figure 4-8). Species rarefaction curves reached between 69 and 115 species after 68 samples, but none a plateau. All predict that additional survey effort would have resulted in greater species richness of species in the SRE target groups.

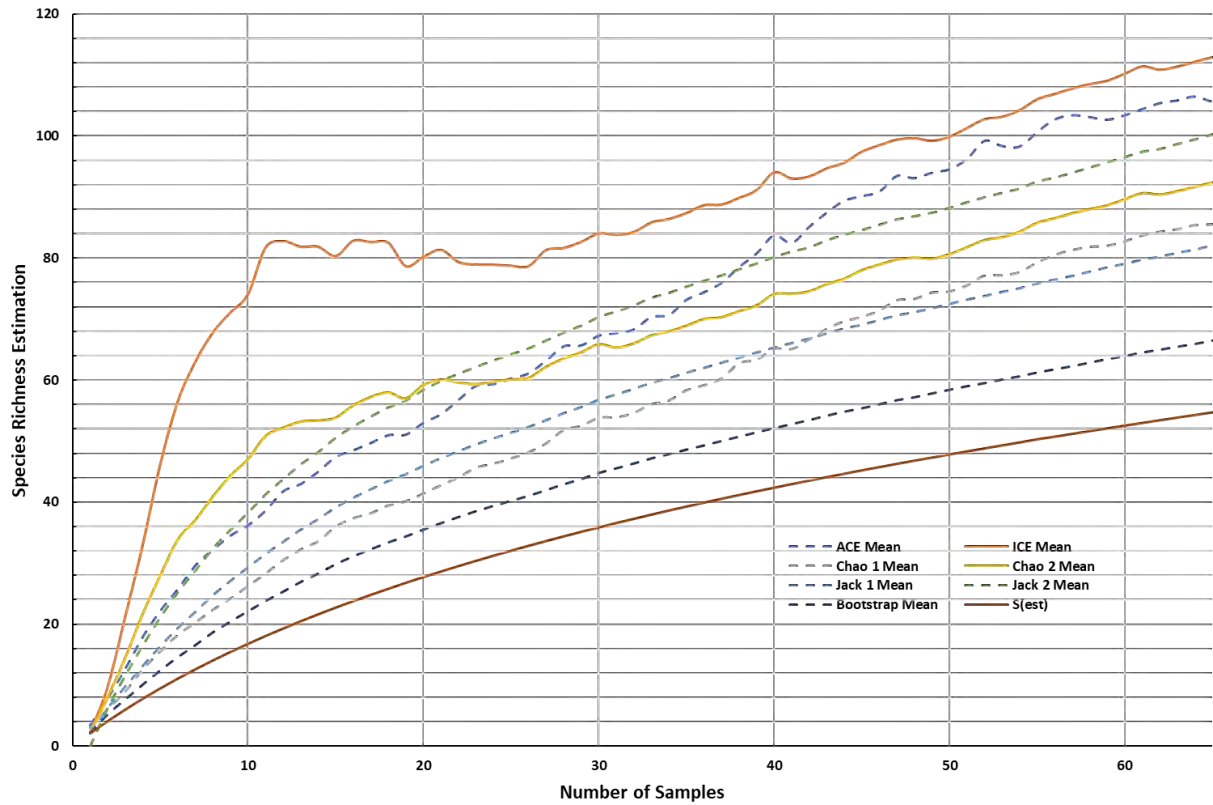


Figure 4-8 Species accumulation curves, with observed species richness (S(est)) and species estimators for all SREs and potential SREs (excl. ambiguous taxa)

## 5 DISCUSSION

### 5.1 SURVEY EFFORT

The field survey component consisted of 28 systematically selected survey sites that were sampled over two trips, which is appropriate for a baseline survey in an area the size of the Study Area. A single CALM (today DBCA) Pilbara survey site was previously installed inside the Study Area between 2003–2006 having had wet formalin pitfall traps exposed for at least 12 months (Table 3-1). The results from these traps and other commercial surveys (see section 3.1.2) contributed to the desktop review that revealed 310 specimens of SRE target groups in the Study Area. Combining the field survey and data from the desktop review, we consider that the Study Area has been surveyed reasonably well to evaluate its SRE fauna.

The taxonomic resolution of species identifications was good. Only a comparatively small number of specimens were identified at higher taxonomic levels in the desktop review (Table 4-2) and the field survey (Table 4-4). Of the 1,065 specimens sampled in this survey, 294 specimens (approximately 27.6%) remain unresolved at the species level. It can safely be assumed that some of these, in particular the unidentified *Austrosuccinea* snails, represent single species from the survey, although we conservatively did not include them as such in our species accumulation and habitat statistics. The highest percentage of unidentified specimens was in slaters (60.2%). The percentage of molecularly identified specimens in the current survey was relatively high for most taxa, but is still less than 15% for pseudoscorpions, slaters and land snails. Unidentified specimens in this survey still represent an important pool for reference specimens that can be molecularly identified if needed to show wider distribution of species. It is noteworthy, that some wider distributions of species were not recovered through the desktop review but were recovered from blasting molecular data from the field survey against public databases (see GenBank accession numbers in Comments column in (Table 4-2)).

Species rarefaction statistics did not reach a plateau, and it is therefore not possible to estimate the number of species in the SRE target groups (Figure 4-8). This is consistent with the results of the desktop review, as only four species from the field survey were also recovered in the desktop review. In total, 73 species in the SRE target groups were recorded combining the desktop review (19 species) and field survey (58 species).

To perform the species accumulation analysis, all samples from different habitat types were combined. This was necessary because analysing each habitat type separately resulted in samples sizes that were too small, making the statistical estimates unreliable. Colwell and Coddington (1994) recommend that species richness extrapolations should be restricted to areas of reasonably homogenous habitat. If a project area has four broad fauna habitats, then one species accumulation curve should be calculated for each habitat type. Therefore, the lumping approach used in this report may reduce the accuracy of the species accumulation statistics because it ignores potential differences between habitat types and assumes all habitat types have a similar species composition. Furthermore, species rarefaction curves are very susceptible to the presence of singletons and ideally sampling should continue until 'singletons vanish' (Chao *et al.* 2009). In this report, 20 of 58 species (34.4 %) in the SRE target groups were represented by singletons. This is greater than the recommended 21% of singletons, as a minimum sampling effort to produce reliable richness estimates of diverse ecosystems using corrected non-parametric estimators (Lopez *et al.* 2012).

### 5.2 SHORT-RANGE ENDEMICIS

This discussion concentrates on the SREs that are currently only known from the Study Area as those occurring outside are considered less likely to be impacted by any future development. In total, there were 50 potential and two confirmed SREs recorded in the Study Area based on the desktop review and field survey combined, with a total of 43 Study Area endemics now known. Three potential SREs from the field survey were also recovered in the desktop review, two of which being Study Area endemics: *Buddelundia* FP-13356 (ESV BoDo02) and *Buddelundiinae* FP-13364 (ESV BoDo03). Both were collected during the concurrent vertebrate surveys in the Study Area.

With respect to conservation significant species, *Antichiropus sloanae* is a confirmed SRE that was collected in the Study Area during the field survey, but it is also known from outside the Study Area. It is listed as **Priority 1** under Western Australian conservation legislation. The second confirmed SRE is the flattie *Karaops feedtime*.

This species is currently only known from a female collected at the type locality in the south-west corner of the Study Area.

The SRE fauna of the Study Area is typical for the Pilbara region. A high number of species and SREs are particularly found within pseudoscorpions, geophilomorphan and scolopendromorphan centipedes and slaters. All are taxonomically difficult groups and rely heavily on molecular analyses for species identification and evaluation of distribution patterns. But it is clear that most species have very localised distribution ranges and new species are being discovered with every SRE survey in the Pilbara.

### 5.3 HABITATS

Four major habitat types were sampled during the survey. However, based on the communities of the SRE target groups in each site, habitat type does not appear to be a good predictor of species composition (Figure 4-6). There is some evidence that within the habitat “grassland on plain/drainage line” there are some similarities in the SRE community, but similarities of sites appear to be mainly driven by the common pseudoscorpion *Oratemnus* FP-11861, that was found at 24 of the 28 sites in large numbers (total of 385 specimens). Similarly, Ecologia’s (2025) broadscale vertebrate fauna habitat types do not cluster by habitat in the two-dimensional ordination space (Figure 4-7). This suggests that these habitats also have low predictive value for the SRE composition at each site. Ecologia’s (2025) habitats are largely based on broad-scale geomorphological features (i.e. types of ‘plain’ or ‘drainage line’) (Table 3-1) not considering vegetation cover or soil type at a much smaller spatial scale, factors likely to be important for invertebrates, specifically those living in leaf litter and the upper layers of soil. Mapping habitat qualities at that scale in a Study Area of approximately 50 km x 25 km size is challenging, particularly when based on aerial imaging alone.

Another factor that influences any ordination technique to compare species composition between sites is the high number of singletons. If many sites have unique communities, with some species found only at a single site, statistical challenges are created regardless of data transformation. Additionally, if a species is recorded in a habitat only once, it is questionable if it can truly be considered a habitat specialist. In contrast, rare species are often of conservation significance and require special consideration. One way to potentially improve the habitat correlations between sites is to increase the number of identified specimens. In this study, there remain a large number of unidentified specimens of apparently cryptic species, in particular in armadillid slaters. Further identifications using molecular techniques could improve our understanding of the habitat requirements of some of these species.

Based purely on taxon numbers, none of the habitat types in the study area showed a significantly higher number of SRE target species (Table 4-5). Again, these results should be tested by increasing the taxonomic resolution of the many unidentified specimens.

### 5.4 SIGNIFICANCE OF STUDY AREA FOR SHORT-RANGE ENDEMIC INVERTEBRATES

There is no absolute scale to assess an area for conservation value in relation to SREs. One way to conduct such an assessment is by comparing the results of this study with those from other surveys in the Pilbara. This comparison remains difficult, as overall survey effort and methods often differ between surveys. With SRE surveys reaching back almost 15 years, there have been considerable taxonomic advances, specifically following the introduction of molecular methods. With more and more surveys conducted, our knowledge increases and our understanding of the distribution of species changes.

This study is compared to other recent SRE assessments conducted by HBI for Fortescue, as they were conducted using similar methods both in the field (although some have been conducted using pitfall traps and others not), in the laboratory (specimen sorting), and during taxonomic assessments (morphological and molecular identifications). We analysed the number of SREs collected in relation to the Study Area size (Figure 5-1), which is likely one of the most important factors determining the number of species present (e.g., Tjørve *et al.* 2008). With 63 SRE taxa (incl. species-complex collected), the current survey resulted in the second-highest number of range-restricted species after the 100 SREs collected as part of the Eastern Pilbara Generating Hub 2024 survey (Volschenk *et al.* 2025) (Figure 5-1). There appears to be a correlation between Study Area size and number of SREs collected; however, the SRE assessment of the Nydinghu Iron Ore mine 2024 (Framenau *et al.* 2023) breaks

this trend with a comparatively low number of SREs on the largest study area in the sample (Figure 5-1). Habitat likely plays a role, as the survey of the Nyidinghu Iron Ore mine was conducted in a topographically less varied area. In addition, the weather during a survey, particularly rainfall before and during a survey, will influence the number of active invertebrates. Overall, the selection of studies is too small to detect reliable trends; however, the Bonney Downs Study Area harbours a comparatively large number of SREs and should be valued in relation to terrestrial invertebrates.

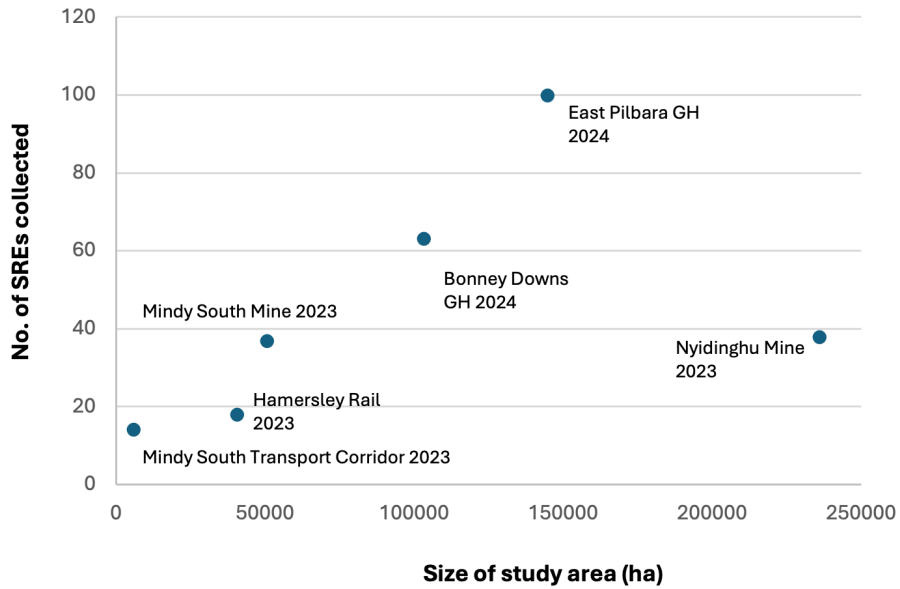


Figure 5-1: Number of SREs collected in recent SRE assessments by HBI for Fortescue

## 6 CONCLUSION

The main conclusions of the detailed SRE survey carried out within the Bonney Downs Energy Generating Hub Study Area are:

- The survey methods were consistent with Environmental Protection Agency (EPA) guidelines and internal Fortescue standards.
- Survey effort at the 28 sites during the field survey within the Study Area included:
  - 141 hours of foraging
  - 366 leaf litter sifts, some of which were analysed with Winkler sacs.
- The desktop review identified a total of 19 species (six described) and 12 higher taxonomic ranks or species-complexes in the SRE target groups in the Study Area. These included ten widespread species, eight potential SREs and one confirmed SRE, the flattie *Karaops feedtime*. Five species are currently only known from the Study Area ('Study Area endemics').
- The survey recorded a total of 58 species (three described) and 15 higher taxonomic ranks or species-complexes in the SRE target groups in the Study Area. These included 12 widespread species, 45 potential SREs and one confirmed SRE, the keeled millipede *Antichiropus sloanae*. This species is listed as Priority 1 (P1) under WA conservation legislation. Forty species are currently only known from the Study Area ('Study Area endemics').
- When combining desktop review and field survey, the Study Area harbours two confirmed SREs, 50 potential SREs and 21 widespread species. A total of 43 species are Study Area endemics.
- Species estimators did not reach a plateau and therefore it is not possible to estimate the number of species in the SRE target groups in the Study Area. This is consistent with the results of the desktop review, as species overlap between the field survey and desktop review was low. The field survey recorded 58 species in the SRE target groups and the desktop review 19, totalling 77 species with four species found in both. However, reliability of species rarefaction curves is impacted by the large number of singleton species.
- Four principal habitat types were identified during the field survey and six broad-scale vertebrate habitat types were identified for the study sites from secondary sources. Non-metric multidimensional scaling (nMDS) of the SRE target group communities at each site showed that neither habitat categorisation is a good predictor for the invertebrate communities at each site. However, the ordination is impacted by a single very common pseudoscorpion and a high number of singletons.
- None of the four habitat types had a significantly large number of SRE target group species than expected based on the number of sites surveyed.

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## 8 APPENDICES

### Appendix 1 Site descriptions

#### Site 1



#### Habitat

**Type:** riparian *Acacia*/eucalypt open woodland

**Topography:** drainage line

**Vegetation:** *Acacia* and sparse eucalypt trees, over *Acacia* shrubs, over spinifex

**Soil:** brown sandy loam

**Rockiness:** loose soil and stones, 1–25% coverage

**Litter:** 76–100%, even distribution and accumulations under trees

**Disturbance and fire:** fire >5 years

## Site 2

[no image available]

### **Habitat**

**Type:** mulga woodland

**Topography:** plain

**Vegetation:** mulga trees over spinifex and buffelgrass

**Soil:** red loamy clay

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 51–75% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** medium grazing, livestock tracks, fire 1–5 years

### Site 3

[no image available]

#### **Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypts over mixed *Acacia* shrubs, over spinifex and sparse buffelgrass

**Soil:** brown sandy clay

**Rockiness:** loose soil and stones, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** livestock tracks, high grazing, invasive grasses, fire 1–5 years

Site 4



**Habitat**

**Type:** riparian eucalypt/*Acacia*/*Hakea* open woodland

**Topography:** drainage line, gentle slope

**Vegetation:** eucalypt and *Acacia* trees over sparse *Acacia* and *Hakea* shrubs, over dense buffelgrass, sparse spinifex and other sedge grasses

**Soil:** brown sandy clay

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 1–25% coverage

**Litter:** 1–25%, even distribution and accumulations under trees

**Disturbance and fire:** medium grazing, livestock tracks, invasive grasses, fire >5 years

## Site 5



### Habitat

**Type:** spinifex grassland

**Topography:** hill slope, moderate slope

**Vegetation:** sparse *Acacia* trees over sparse mixed *Acacia* shrubs, over spinifex grass

**Soil:** rocks on brown, sandy loam

**Rockiness:** loose soil, coarse gravel, stones, and boulders, 76–100% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** low grazing, fire >5 years

Site 6



**Habitat**

**Type:** spinifex grassland

**Topography:** hill slope, moderate slope

**Vegetation:** sparse *Acacia* and *Hakea* trees over *Acacia* and *Hakea* shrubs, over spinifex grass

**Soil:** brown sandy clay

**Rockiness:** loose soil, stones, and boulders, 75–100% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** low grazing, fire >5 years

Site 7



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypts over *Acacia*, over buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil, 0% coverage

**Litter:** 76–100%, even distribution and accumulations under trees

**Disturbance and fire:** invasive grasses, fire >5 years

**Site 8**

[no image available]

[no site description available]

**Site 9**

[no image available]

**Habitat**

**Type:** eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypts over *Acacia*, over spinifex and buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil and fine gravel, 0% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** livestock tracks, high grazing, erosion channels, invasive grasses

**Site 10**

[no image available]

**Habitat**

**Type:** riparian eucalypt/*Acacia* woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia* and proteaceous shrubs, over spinifex, buffelgrass and other grasses

**Soil:** brown sand

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, fire >5 years

**Site 11**



**Habitat**

**Type:** riparian eucalypt/*Acacia*/*Melaleuca* open woodland

**Topography:** drainage line

**Vegetation:** eucalypts over mixed *Acacia* and *Melaleuca*, over buffelgrass and sedges

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 1–25% coverage

**Litter:** 26–50%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, livestock tracks, low grazing, fire >5 years

Site 12



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia*, proteaceous and other shrubs, over spinifex and buffelgrass

**Soil:** brown sand

**Rockiness:** loose soil, fine gravel, and coarse gravel, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, low and medium grazing, livestock tracks, fire >5 years

**Site 13**



**Habitat**

**Type:** riparian eucalypt open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over proteaceous, eucalypt and other shrubs, over spinifex, buffelgrass and other grasses

**Soil:** brown sandy loam

**Rockiness:** 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, livestock tracks, low grazing, vehicle tracks, erosion channels, fire >5 years

**Site 14**



**Habitat**

**Type:** riparian *Acacia* shrubland

**Topography:** drainage line

**Vegetation:** mixed *Acacia* shrubs over spinifex and buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, and coarse gravel, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, low grazing, livestock tracks, fire >5 years

Site 15



**Habitat**

**Type:** riparian mulga/eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** mulga and eucalypt trees over *Acacia* and other shrubs, over buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, and coarse gravel, 1–25% coverage

**Litter:** 1–25%, even distribution and accumulations under trees

**Disturbance and fire:** invasive grasses, livestock tracks, low grazing, fire >5 years

Site 16



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia* and other shrubs, over buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, coarse gravel, stones, and boulders 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** livestock tracks, low and medium grazing, invasive grasses, fire >5 years

Site 17



**Habitat**

**Type:** riparian *Acacia*/eucalypt open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia* and *Eremophila* shrubs, over spinifex, buffelgrass and other sedges

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, coarse gravel, stones, and boulders, 1–25% coverage

**Litter:** 26–50%, accumulations under trees and in drifts

**Disturbance and fire:** medium grazing, livestock tracks, invasive grasses

**Site 18**

[no image available]

**Habitat**

**Type:** eucalypt/*Acacia* open woodland

**Topography:** rocky hill slope, moderate slope

**Vegetation:** eucalypt trees over *Acacia* and eucalypt shrubs, over spinifex grass

**Soil:** rocks on brown soil

**Rockiness:** loose soil, fine gravel, coarse gravel, stones, and boulders, 76–100% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** fire >5 years

Site 19



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypts over *Acacia*, over buffelgrass

**Soil:** brown loam

**Rockiness:** loose soil, 0% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** invasive grasses, low and medium grazing, livestock tracks, fire >5 years

Site 20



**Habitat**

**Type:** mulga open woodland

**Topography:** drainage line

**Vegetation:** mulga trees over buffelgrass

**Soil:** rocks on brown soil

**Rockiness:** loose soil, fine gravel, and coarse gravel, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, low and medium grazing, fire >5 years

**Site 21**



**Habitat**

**Type:** riparian *Acacia*/mulga open woodland

**Topography:** drainage line

**Vegetation:** mulga and other *Acacia* trees over *Acacia* shrubs, over spinifex grass

**Soil:** brown sandy loam

**Rockiness:** fine gravel, coarse gravel, stones, and surface crust, 1–25% coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** livestock tracks, low grazing, fire >5 years

**Site 22**



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia* and eucalypt shrubs, over buffelgrass

**Soil:** brown loam

**Rockiness:** loose soil and slight cracking, 0% rock coverage

**Litter:** 1–25%, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, vehicle tracks, livestock tracks, medium and high grazing, fire >5 years

Site 23



**Habitat**

**Type:** riparian mulga/*Melaleuca* open woodland

**Topography:** drainage line

**Vegetation:** mulga and *Melaleuca* trees over proteaceous and other shrubs, over spinifex and buffelgrass

**Soil:** grey sand

**Rockiness:** fine gravel, coarse gravel, stones, and boulders, 26–50% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** invasive grasses, fire >5 years

Site 24



**Habitat**

**Type:** eucalypt/*Acacia*/*Melaleuca* open woodland

**Topography:** gorge, moderate slope

**Vegetation:** eucalypt and *Acacia* trees over *Acacia* and *Melaleuca* shrubs, over spinifex, buffelgrass and other sedge grasses

**Soil:** brown sand

**Rockiness:** loose soil, fine gravel, coarse gravel, rocks, and boulders, 51–75% coverage

**Litter:** 1–25%, under trees

**Disturbance and fire:** invasive grasses, low graving, fire >5 years

Site 25



**Habitat**

**Type:** riparian *Acacia*/eucalypt open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia*, *proteaceous* and other shrubs, over buffelgrass

**Soil:** brown sand

**Rockiness:** loose soil, fine gravel, coarse gravel, stones, and boulders, 1–25% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** invasive grasses, low grazing, livestock tracks, fire >5 years

Site 26



**Habitat**

**Type:** riparian mulga/eucalypt/*Acacia*/*Melaleuca* open woodland

**Topography:** drainage line

**Vegetation:** mulga and eucalypt trees over mixed *Acacia* and *Melaleuca* shrubs, over buffelgrass

**Soil:** brown loam

**Rockiness:** loose soil, 0% coverage

**Litter:** 76–100%, even distribution, accumulations under trees and in drifts

**Disturbance and fire:** invasive grasses, low and medium grazing, livestock tracks, fire >5 years

Site 27



**Habitat**

**Type:** mulga/*Acacia* open woodland

**Topography:** plain

**Vegetation:** mulga and *Acacia* trees over small *Acacia* shrubs, over buffelgrass

**Soil:** brown loamy clay

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 1–25% coverage

**Litter:** 1–25%, even distribution and accumulations under trees

**Disturbance and fire:** invasive grasses, low grazing, livestock tracks, current operations, vehicle tracks, exploration (drill pads and access tracks), fire >5 years

**Site 28**



**Habitat**

**Type:** riparian eucalypt/*Acacia* open woodland

**Topography:** drainage line

**Vegetation:** eucalypt trees over *Acacia*, proteaceous and other shrubs, over buffelgrass

**Soil:** brown sandy loam

**Rockiness:** loose soil, fine gravel, coarse gravel, and stones, 1–25% coverage

**Litter:** 1–25%, accumulations under trees

**Disturbance and fire:** invasive grasses, low and medium grazing, livestock tracks, fire >5 years

## Appendix 2 Terrestrial invertebrates in the SRE target groups in the Study Area (desktop review)

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
<b>Araneae</b>							
<b>Actinopodidae</b>							
WAM	T102702	<i>Missulena rutraspina</i> Faulder, 1995	1	Framenau, V.W.	2010	-21.5	119.316667
WAM	T120904	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-21.5	119.316667
WAM	T120906	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-22.533333	120.766667
WAM	T120907	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-21.666667	120.15
WAM	T120908	<i>Missulena rutraspina</i> Faulder, 1995	3	Miglio, L.	2012	-21.45	120
WAM	T120914	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-22.666667	119.833333
WAM	T120915	<i>Missulena rutraspina</i> Faulder, 1995	2	Miglio, L.	2012	-22.116667	119.866667
WAM	T120916	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-22.216667	119.016667
WAM	T120923	<i>Missulena rutraspina</i> Faulder, 1995	1	Miglio, L.	2012	-21.333333	120.766667
WAM	T149409	<i>Missulena rutraspina</i> Faulder, 1995	1	Volschenk, E.S.	2019	-23.05	119
WAM	T149410	<i>Missulena rutraspina</i> Faulder, 1995	1	Volschenk, E.S.	2019	-23.05	119
WAM	T24357	<i>Missulena rutraspina</i> Faulder, 1995	1	Faulder, R.J.	1992	-21.6	118.966667
<b>Anamidae</b>							
WAM	T161891	<i>Aname</i> `H-N178`	1	Helix		-22.183333	119.933333
WAM	T161892	<i>Aname</i> `H-N178`	1	Helix		-22.183333	119.933333
WAM	T161894	<i>Aname</i> `H-N178`	1	Helix		-22.183333	119.933333
WAM	T105212	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.216667	118.833333
WAM	T107006	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.116667	118.816667
WAM	T107007	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.116667	118.816667
WAM	T109363	<i>Aname baileyorum</i> Castalanelli et al., 2020	2	Harvey, M.S.	2018	-22.083333	119.7
WAM	T109364	<i>Aname baileyorum</i> Castalanelli et al., 2020	3	Harvey, M.S.	2018	-21.633333	120.05
WAM	T109368	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-22.116667	119.866667
WAM	T109370	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.266667	120.583333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T109372	<i>Aname baileyorum</i> Castalanelli et al., 2020	2	Harvey, M.S.	2018	-21.4	120.066667
WAM	T109377	<i>Aname baileyorum</i> Castalanelli et al., 2020	3	Harvey, M.S.	2018	-22.216667	119.016667
WAM	T109378	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-22.5	120.65
WAM	T145069	<i>Aname baileyorum</i> Castalanelli et al., 2020	3	Harvey, M.S.	2018	-22.116667	119.866667
WAM	T27352	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27353	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27354	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27355	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27356	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27357	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.95
WAM	T27360	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.983333
WAM	T27361	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.983333
WAM	T27362	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	118.983333
WAM	T27363	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.6	119.016667
WAM	T97310	<i>Aname baileyorum</i> Castalanelli et al., 2020	1	Harvey, M.S.	2018	-21.083333	118.883333
WAM	T162801	<i>Aname</i> FP-12532 (mellosa-complex Nyi01)	1	Volschenk, E.S.	2023	-22.966667	119.616667
WAM	T162802	<i>Aname</i> FP-12532 (mellosa-complex Nyi01)	1	Volschenk, E.S.	2023	-22.65	119.6
HBI	241597	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.375197	119.485
HBI	242226	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-22.2719	119.8855
HBI	242463	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	242482	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	242528	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.361569	119.738511
HBI	242531	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.399981	119.781361
HBI	242584	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.297347	119.470103
HBI	242592	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.399981	119.781361
HBI	243314	<i>Aname</i> FP-13324 (BoDo01)	1	Volschenk, E.S.	2024	-21.399981	119.781361
WAM	T161893	<i>Kwonkan</i> sp. H-N175`	1	Helix		-22.183333	119.916667

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
<b>Selenopidae</b>							
WAM	T111456	<i>Karaops feedtime</i> Crews, 2013	1	Crews, S.	2013	-22.316667	119.733333
WAM	T111455	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2013	-22.333333	119.65
WAM	T112018	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-22.333333	119.65
WAM	T112019	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-22.3	119.783333
WAM	T122639	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-21.6	119.016667
WAM	T123594	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-22.2	119.016667
WAM	T123595	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-22.05	118.983333
WAM	T123596	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-22.016667	119
WAM	T128795	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-21.6	119.283333
WAM	T135298	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2023	-21.816667	118.95
WAM	T155588	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155589	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155590	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155591	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155592	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155593	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.866667
WAM	T155594	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.883333
WAM	T155595	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.883333
WAM	T155596	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.883333
WAM	T155597	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.283333	119.883333
WAM	T155604	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.133333	119.016667
WAM	T155605	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.133333	119.016667
WAM	T155606	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.133333	119.016667
WAM	T155607	<i>Karaops nyiyaparli</i> Crews, 2013	1	Crews, S.	2021	-22.133333	119.016667

**Pseudoscorpiones****Hyidae**

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
HBI	242522	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Volschenk, E.S.	2024	-21.226011	119.258381
HBI	242973	<i>Indohya boltoni</i> Harvey & Burger, 2023	4	Volschenk, E.S.	2024	-21.259844	119.258161
HBI	242979	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Volschenk, E.S.	2024	-21.259844	119.258161
HBI	242981	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Volschenk, E.S.	2024	-21.259844	119.258161
HBI	243574	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Volschenk, E.S.	2024	-21.259844	119.258161
WAM	T107548	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.183333	119.083333
WAM	T107568	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.15	119.083333
WAM	T107572	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.15	119.083333
WAM	T107589	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.15	119.1
WAM	T107595	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.083333
WAM	T107598	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.083333
WAM	T107613	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.1
WAM	T107618	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.116667
WAM	T107620	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.116667
WAM	T110845	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.15	119.1
WAM	T110846	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.083333
WAM	T110847	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.133333	119.083333
WAM	T112020	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-22.316667	119.733333
WAM	T112021	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-22.316667	119.733333
WAM	T112022	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-22.316667	119.733333
WAM	T123599	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-22.183333	118.983333
WAM	T127502	<i>Indohya boltoni</i> Harvey & Burger, 2023	1	Harvey, M.S.	2023	-21.816667	120.2
<b>Scorpiones</b>							
<b>Buthidae</b>							
WAM	T79892	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-22.816667	119.6
WAM	T79923	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-21.333333	120.766667
WAM	T79941	<i>Lychas</i> `sp. 2`	4	Volschenk, E.S.		-22.116667	119.866667

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T79944	<i>Lychas</i> `sp. 2`	2	Volschenk, E.S.		-22.3	119
WAM	T79949	<i>Lychas</i> `sp. 2`	2	Volschenk, E.S.		-22.083333	119.7
WAM	T79953	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.		-21.666667	120.15
WAM	T79954	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-22.5	120.65
WAM	T79962	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-21.216667	119.4
WAM	T79968	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.		-21.966667	120.216667
WAM	T79970	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-22.516667	120.666667
WAM	T79976	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.		-22.283333	119.05
WAM	T79982	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.		-22.083333	119.7
WAM	T80046	<i>Lychas</i> `sp. 2`	7	Volschenk, E.S.	2007	-21.466667	120
WAM	T80048	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-22.666667	119.833333
WAM	T80049	<i>Lychas</i> `sp. 2`	2	Volschenk, E.S.	2007	-22.683333	119.766667
WAM	T80059	<i>Lychas</i> `sp. 2`	9	Volschenk, E.S.	2007	-21.383333	120.066667
WAM	T80065	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-21.233333	119.4
WAM	T80069	<i>Lychas</i> `sp. 2`	7	Volschenk, E.S.	2007	-22.066667	118.966667
WAM	T80073	<i>Lychas</i> `sp. 2`	4	Volschenk, E.S.	2007	-21.483333	120.1
WAM	T80077	<i>Lychas</i> `sp. 2`	4	Volschenk, E.S.	2007	-21.383333	120.066667
WAM	T80084	<i>Lychas</i> `sp. 2`	7	Volschenk, E.S.	2007	-22.683333	119.766667
WAM	T80086	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.	2007	-21.1	118.85
WAM	T80093	<i>Lychas</i> `sp. 2`	13	Volschenk, E.S.	2007	-22.066667	118.966667
WAM	T80094	<i>Lychas</i> `sp. 2`	10	Volschenk, E.S.	2007	-22.116667	119.866667
WAM	T80096	<i>Lychas</i> `sp. 2`	20	Volschenk, E.S.	2007	-21.966667	120.216667
WAM	T80103	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.	2007	-21.666667	120.15
WAM	T80116	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-21.766667	120.083333
WAM	T80118	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.	2007	-21.3	119.6
WAM	T80119	<i>Lychas</i> `sp. 2`	5	Volschenk, E.S.	2007	-22.4	119.983333
WAM	T80120	<i>Lychas</i> `sp. 2`	5	Volschenk, E.S.	2007	-21.766667	120.083333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T80122	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-22.933333	119.183333
WAM	T80129	<i>Lychas</i> `sp. 2`	4	Volschenk, E.S.	2007	-21.333333	120.766667
WAM	T80139	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-21.666667	120.083333
WAM	T80144	<i>Lychas</i> `sp. 2`	2	Volschenk, E.S.	2007	-21.4	120.066667
WAM	T80146	<i>Lychas</i> `sp. 2`	1	Volschenk, E.S.	2007	-22.066667	118.966667
WAM	T80179	<i>Lychas</i> `sp. 2`	2	Volschenk, E.S.	2007	-22.533333	120.766667
WAM	T80180	<i>Lychas</i> `sp. 2`	3	Volschenk, E.S.	2007	-21.4	120.066667
HBI	241035	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2024	-22.945284	119.475179
HBI	241040	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2024	-22.945284	119.475179
WAM	T102201	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.116667	119.116667
WAM	T102214	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.116667	119.116667
WAM	T103806	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T103830	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-21.516667	119.3
WAM	T103834	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T103842	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T103854	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.3
WAM	T103860	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.55	119.283333
WAM	T103868	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.516667	119.3
WAM	T103869	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.516667	119.3
WAM	T103870	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-21.516667	119.283333
WAM	T103873	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T103875	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-21.516667	119.3
WAM	T103877	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-21.516667	119.3
WAM	T103879	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-21.516667	119.283333
WAM	T103883	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T103890	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.533333	119.283333
WAM	T105350	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2020	-21.516667	119.3

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T105360	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.516667	119.316667
WAM	T105455	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.133333	119.1
WAM	T105612	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.216667	119.033333
WAM	T105617	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.233333	119.05
WAM	T106010	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-22.983333	118.95
WAM	T106014	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-22.916667	119.183333
WAM	T106022	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-22.883333	119
WAM	T106029	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-22.883333	119.05
WAM	T106032	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	2	Volschenk, E.S.	2010	-22.883333	119.05
WAM	T106043	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2010	-22.966667	118.95
WAM	T106619	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2020	-21.583333	119.15
WAM	T106620	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.583333	119.15
WAM	T106621	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-21.583333	119.15
WAM	T114157	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-22.716667	119.366667
WAM	T114312	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	2	Volschenk, E.S.	2017	-22.8	118.883333
WAM	T114313	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2017	-22.8	118.85
WAM	T60478	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2024	-22.15	119.016667
WAM	T60479	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2024	-22.15	119.016667
WAM	T79834	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.466667	120.083333
WAM	T79844	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-23.05	119.166667
WAM	T79845	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	8	Volschenk, E.S.		-22.45	119.966667
WAM	T79848	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-22.45	119.016667
WAM	T79851	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-22.933333	119.183333
WAM	T79852	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.416667	119.55
WAM	T79853	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.333333	120.75
WAM	T79856	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-22.216667	119.016667
WAM	T79865	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	4	Volschenk, E.S.		-21.233333	120.533333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T79876	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	11	Volschenk, E.S.		-21.233333	120.533333
WAM	T79877	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-22.216667	119.016667
WAM	T79879	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.		-21.466667	120.083333
WAM	T79880	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	7	Volschenk, E.S.		-22.083333	119.75
WAM	T80127	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	3	Volschenk, E.S.	2007	-22.516667	120.666667
WAM	T80188	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	2	Volschenk, E.S.	2007	-21.333333	120.75
WAM	T80197	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	3	Volschenk, E.S.	2007	-22.133333	119.016667
WAM	T80199	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2007	-22.133333	119.016667
WAM	T91890	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Huey, J.A.	2017	-22.166667	119.916667
WAM	T97019	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2009	-22.916667	119.216667
WAM	T97024	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2009	-22.933333	119.216667
WAM	T97025	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2009	-22.933333	119.2
WAM	T97029	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2009	-22.933333	119.183333
WAM	T97032	<i>Lychas</i> FP-11681 (ESV 'pilbara 1'; SCO023)	1	Volschenk, E.S.	2009	-22.916667	119.183333
HBI	243335	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	243337	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2024	-21.448422	120.027069
WAM	T105541	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.366667	119.883333
WAM	T105547	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.366667	119.733333
WAM	T105574	<i>Urodacus butleri</i> Volschenk et al., 2012	2	Volschenk, E.S.	2012	-22.366667	119.733333
WAM	T114229	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.3	119.783333
WAM	T114293	<i>Urodacus butleri</i> Volschenk et al., 2012	2	Volschenk, E.S.	2012	-22.433333	119.983333
WAM	T114294	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.316667	119.733333
WAM	T114296	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.3	119.85
WAM	T114299	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.433333	119.983333
WAM	T114300	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.283333	119.8
WAM	T114301	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-22.3	119.85
WAM	T122058	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-23.033333	119.2

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T123283	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-21.616667	120.1
WAM	T123285	<i>Urodacus butleri</i> Volschenk et al., 2012	2	Volschenk, E.S.	2012	-21.566667	120.15
WAM	T123302	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-21.616667	120.1
WAM	T123303	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-21.616667	120.1
WAM	T123304	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-21.566667	120.15
WAM	T123305	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2012	-21.616667	120.1
WAM	T132826	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2014	-21.683333	119.666667
WAM	T78173	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2008	-22.066667	118.983333
WAM	T78174	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2008	-21.9	118.966667
WAM	T78175	<i>Urodacus butleri</i> Volschenk et al., 2012	1	Volschenk, E.S.	2008	-21.983333	119.016667
HBI	242529	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	242530	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	243325	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	2	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	243326	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	243327	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	243328	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.266433	119.461486
HBI	243332	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	243333	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	243334	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	243336	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.448422	120.027069
HBI	243338	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2024	-21.448422	120.027069
WAM	T102270	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2015	-21.116667	119.133333
WAM	T102272	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2015	-21.133333	119.116667
WAM	T102274	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2015	-21.116667	119.116667
WAM	T105385	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	2	Volschenk, E.S.		-22.433333	119.966667
WAM	T105409	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	2	Volschenk, E.S.	2019	-21.133333	119.083333
WAM	T105438	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2020	-21.15	119.083333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	T114174	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2019	-21.183333	119.1
WAM	T114364	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2019	-21.816667	120.233333
WAM	T128088	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	2	Volschenk, E.S.		-22.533333	120.016667
WAM	T128089	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.		-22.566667	120.083333
WAM	T79482	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	8	Volschenk, E.S.	2007	-21.15	119.35
WAM	T79485	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2007	-21.483333	120.1
WAM	T79497	<i>Urodacus</i> FP-12656 (ESV pilbara 8)	1	Volschenk, E.S.	2007	-22.116667	119.866667
<b>Isopoda</b>							
<b>Armadillidae</b>							
WAM	C62732	Armadillidae gen. indet. `sp. pes978`	4	Judd, S.	2024	-22.45	119.966667
WAM	C62733	Armadillidae gen. indet. `sp. pes978`	3	Judd, S.	2024	-22.283333	119.8
WAM	C62734	Armadillidae gen. indet. `sp. pes978`	3	Judd, S.	2024	-22.316667	119.733333
WAM	C65481	Armadillidae gen. indet. `sp. pes978`	2	Judd, S.	2024	-22.516667	120.033333
WAM	C65482	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.516667	120.033333
WAM	C65483	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.55	120.116667
WAM	C65484	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.55	120.116667
WAM	C65485	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.483333	120.016667
WAM	C65486	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.533333	120.05
WAM	C65487	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.533333	120.016667
WAM	C65488	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.533333	120.05
WAM	C65489	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.55	120.083333
WAM	C65490	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.566667	120.1
WAM	C65491	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.566667	120.083333
WAM	C65492	Armadillidae gen. indet. `sp. pes978`	2	Judd, S.	2024	-22.566667	120.1
WAM	C65493	Armadillidae gen. indet. `sp. pes978`	1	Judd, S.	2024	-22.566667	120.1
WAM	C48140	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.316667	119.733333
WAM	C48141	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.433333	119.983333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C48142	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48143	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.85
WAM	C48144	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.383333	119.95
WAM	C48145	<i>Buddelundia</i> `sp. 10`	6	Judd, S.		-22.3	119.783333
WAM	C48146	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48147	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.3	119.783333
WAM	C48148	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48149	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48150	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48151	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.316667	119.733333
WAM	C48152	<i>Buddelundia</i> `sp. 10`	9	Judd, S.		-22.3	119.783333
WAM	C48153	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.3	119.783333
WAM	C48154	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48155	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.316667	119.733333
WAM	C48156	<i>Buddelundia</i> `sp. 10`	9	Judd, S.		-22.316667	119.733333
WAM	C48157	<i>Buddelundia</i> `sp. 10`	38	Judd, S.		-22.316667	119.733333
WAM	C48158	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.333333	119.65
WAM	C48159	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.333333	119.65
WAM	C48160	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.333333	119.65
WAM	C48161	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.333333	119.65
WAM	C48162	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.333333	119.65
WAM	C48163	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.35	119.966667
WAM	C48164	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.35	119.966667
WAM	C48165	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.85
WAM	C48166	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.3	119.783333
WAM	C48167	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.316667	119.733333
WAM	C48168	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C48169	<i>Buddelundia</i> `sp. 10`	10	Judd, S.		-22.316667	119.733333
WAM	C48170	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.35	119.966667
WAM	C48171	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.35	119.966667
WAM	C48172	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.85
WAM	C48173	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48174	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.316667	119.733333
WAM	C48175	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48176	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48177	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48178	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.35	119.966667
WAM	C48179	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.35	119.966667
WAM	C48180	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.283333	119.8
WAM	C48181	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.3	119.85
WAM	C48182	<i>Buddelundia</i> `sp. 10`	10	Judd, S.		-22.316667	119.733333
WAM	C48183	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.316667	119.733333
WAM	C48184	<i>Buddelundia</i> `sp. 10`	11	Judd, S.		-22.316667	119.733333
WAM	C48185	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.283333	119.8
WAM	C48186	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.3	119.85
WAM	C48187	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.3	119.85
WAM	C48188	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.3	119.85
WAM	C48189	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.316667	119.733333
WAM	C48190	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48191	<i>Buddelundia</i> `sp. 10`	7	Judd, S.		-22.283333	119.85
WAM	C48192	<i>Buddelundia</i> `sp. 10`	34	Judd, S.		-22.283333	119.85
WAM	C48193	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.316667	119.733333
WAM	C48194	<i>Buddelundia</i> `sp. 10`	9	Judd, S.		-22.316667	119.733333
WAM	C48195	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.383333	119.95

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C48196	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.316667	119.733333
WAM	C48197	<i>Buddelundia</i> `sp. 10`	10	Judd, S.		-22.366667	119.966667
WAM	C48198	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.316667	119.733333
WAM	C48199	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.316667	119.733333
WAM	C48200	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.433333	119.983333
WAM	C48201	<i>Buddelundia</i> `sp. 10`	8	Judd, S.		-22.3	119.85
WAM	C48202	<i>Buddelundia</i> `sp. 10`	13	Judd, S.		-22.316667	119.733333
WAM	C48203	<i>Buddelundia</i> `sp. 10`	15	Judd, S.		-22.316667	119.733333
WAM	C48204	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.366667	119.966667
WAM	C48205	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.283333	119.85
WAM	C48206	<i>Buddelundia</i> `sp. 10`	15	Judd, S.		-22.283333	119.85
WAM	C48207	<i>Buddelundia</i> `sp. 10`	2	Judd, S.		-22.316667	119.733333
WAM	C48208	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48209	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.316667	119.733333
WAM	C48210	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.316667	119.733333
WAM	C48211	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.316667	119.733333
WAM	C48212	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.366667	119.966667
WAM	C48213	<i>Buddelundia</i> `sp. 10`	3	Judd, S.		-22.366667	119.966667
WAM	C48214	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.366667	119.966667
WAM	C48215	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.283333	119.85
WAM	C48216	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.3	119.783333
WAM	C48217	<i>Buddelundia</i> `sp. 10`	4	Judd, S.		-22.316667	119.733333
WAM	C48218	<i>Buddelundia</i> `sp. 10`	5	Judd, S.		-22.366667	119.966667
WAM	C48219	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.366667	119.966667
WAM	C48220	<i>Buddelundia</i> `sp. 10`	1	Judd, S.		-22.283333	119.85
WAM	C64231	<i>Buddelundia</i> `sp. 10`	3	Judd, S.	2024	-22.3	119
WAM	C65350	<i>Buddelundia</i> `sp. 10`	1	Judd, S.	2024	-22.716667	119.033333

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Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C73873	<i>Buddelundia</i> `sp. 10`	1	Judd, S.	2018	-23.066667	119
WAM	C48297	<i>Buddelundia</i> `sp. 19`	5	Judd, S.		-22.333333	119.65
WAM	C48298	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.333333	119.65
WAM	C48299	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.333333	119.65
WAM	C48300	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.283333	119.8
WAM	C48301	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.3	119.85
WAM	C48302	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48303	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48304	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.366667	119.966667
WAM	C48306	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.783333
WAM	C48307	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.783333
WAM	C48308	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.783333
WAM	C48309	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.3	119.783333
WAM	C48310	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.316667	119.733333
WAM	C48311	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.333333	119.65
WAM	C48312	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.333333	119.65
WAM	C48313	<i>Buddelundia</i> `sp. 19`	5	Judd, S.		-22.3	119.85
WAM	C48314	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.783333
WAM	C48315	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.316667	119.733333
WAM	C48316	<i>Buddelundia</i> `sp. 19`	5	Judd, S.		-22.316667	119.733333
WAM	C48317	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48318	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.783333
WAM	C48319	<i>Buddelundia</i> `sp. 19`	3	Judd, S.		-22.3	119.85
WAM	C48320	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48321	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48322	<i>Buddelundia</i> `sp. 19`	3	Judd, S.		-22.283333	119.8
WAM	C48323	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.3	119.85

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C48324	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48325	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.316667	119.733333
WAM	C48326	<i>Buddelundia</i> `sp. 19`	5	Judd, S.		-22.366667	119.966667
WAM	C48327	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.283333	119.85
WAM	C48328	<i>Buddelundia</i> `sp. 19`	3	Judd, S.		-22.283333	119.85
WAM	C48329	<i>Buddelundia</i> `sp. 19`	15	Judd, S.		-22.283333	119.85
WAM	C48330	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.283333	119.85
WAM	C48331	<i>Buddelundia</i> `sp. 19`	2	Judd, S.		-22.316667	119.733333
WAM	C48332	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.316667	119.733333
WAM	C48333	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.366667	119.966667
WAM	C48334	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.3	119.783333
WAM	C48335	<i>Buddelundia</i> `sp. 19`	1	Judd, S.		-22.366667	119.966667
WAM	C48336	<i>Buddelundia</i> `sp. 19`	20	Judd, S.		-22.283333	119.85
WAM	C48434	<i>Buddelundia</i> `sp. 19`	3	Judd, S.		-22.3	119.783333
WAM	C48347	<i>Buddelundia</i> `sp. 26`	1	Judd, S.		-22.316667	119.733333
WAM	C62730	<i>Buddelundia</i> `sp. 26`	1	Judd, S.	2024	-22.283333	119.85
HBI	242385	<i>Buddelundia</i> FP-13356 (BoDo02)	1	Volschenk, E.S.	2024	-22.25	120.06
HBI	242377	<i>Buddelundiinae</i> gen. indet. FP-13364 (BoDo03)	1	Volschenk, E.S.	2024	-22.25	119.81
HBI	243361	<i>Buddelundiinae</i> gen. indet. FP-13364 (BoDo03)	1	Volschenk, E.S.	2024	-22.25	119.81
<b>Philosciidae</b>							
WAM	C48382	<i>Laevophiloscia</i> `PES4394`	2	Judd, S.		-22.433333	119.983333
WAM	C48383	<i>Laevophiloscia</i> `PES4394`	3	Judd, S.		-22.316667	119.733333
WAM	C48384	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.333333	119.65
WAM	C48385	<i>Laevophiloscia</i> `PES4394`	13	Judd, S.		-22.383333	119.95
WAM	C48386	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.45	119.966667
WAM	C48387	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.3	119.783333
WAM	C48388	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.283333	119.8

Source	Registration	Genus and species	No. of specimens	Identified by	Identified year	Latitude	Longitude
WAM	C48389	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.283333	119.8
WAM	C48390	<i>Laevophiloscia</i> `PES4394`	2	Judd, S.		-22.3	119.85
WAM	C48391	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.283333	119.85
WAM	C48392	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.283333	119.85
WAM	C48393	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333
WAM	C48394	<i>Laevophiloscia</i> `PES4394`	19	Judd, S.		-22.383333	119.95
WAM	C48395	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.283333	119.85
WAM	C48396	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333
WAM	C48397	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.433333	119.983333
WAM	C48398	<i>Laevophiloscia</i> `PES4394`	2	Judd, S.		-22.316667	119.733333
WAM	C48399	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.366667	119.966667
WAM	C48400	<i>Laevophiloscia</i> `PES4394`	3	Judd, S.		-22.283333	119.85
WAM	C48401	<i>Laevophiloscia</i> `PES4394`	4	Judd, S.		-22.316667	119.733333
WAM	C48402	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.333333	119.65
WAM	C48403	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333
WAM	C48404	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333
WAM	C48405	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333
WAM	C48406	<i>Laevophiloscia</i> `PES4394`	1	Judd, S.		-22.316667	119.733333

### Appendix 3 Terrestrial invertebrates in the SRE target groups collected in the Study Area

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
<b>Araneae</b>							
<b>Anamidae</b>							
242245	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242903	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	18	7527537	780089	50
242223	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242110	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	16	7529967	787365	50
242246	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	27	7521293	776651	50
241104	<i>Aname</i> FP-12532 ( <i>mellosa</i> -complex Nyi01)	1	E.S. Volschenk (COI)	27	7521293	776651	50
242911	<i>Aname</i> FP-13324 (BoDo01)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242904	<i>Aname</i> FP-13324 (BoDo01)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242226	<i>Aname</i> FP-13324 (BoDo01)	1	E.S. Volschenk	21	7537258	197656	51
242224	<i>Aname watsoni</i> Castalanelli et al., 2020	1	E.S. Volschenk (COI)	20	7535422	199122	51
242906	<i>Aname watsoni</i> Castalanelli et al., 2020	1	E.S. Volschenk (COI)	2	7535095	194659	51
242901	<i>Aname watsoni</i> Castalanelli et al., 2020	1	E.S. Volschenk (COI)	2	7535095	194659	51
242905	Anamidae gen. indet. sp. indet.	1	E.S. Volschenk	4	7571442	809647	50
<b>Idiopidae</b>							
242871	<i>Gaius tealei</i> Rix, Raven & Harvey, 2018	1	E.S. Volschenk (COI)	2	7535095	194659	51
242907	<i>Gaius tealei</i> Rix, Raven & Harvey, 2018	1	E.S. Volschenk (COI)	20	7535422	199122	51
242909	<i>Gaius tealei</i> Rix, Raven & Harvey, 2018	1	E.S. Volschenk (COI)	21	7537258	197656	51
242908	<i>Gaius tealei</i> Rix, Raven & Harvey, 2018	1	E.S. Volschenk (COI)	20	7535422	199122	51
<b>Selenopidae</b>							
242319	<i>Karaops</i> FP-13326 (2 ADL2023a)	1	E.S. Volschenk (COI)	24	7575216	798093	50
<b>Opiliones</b>							
<b>Assamiidae</b>							
242846	Assamiidae gen. indet. FP-13325 (BoDo01)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242237	Assamiidae gen. indet. FP-13325 (BoDo01)	1	E.S. Volschenk (COI)	25	7572755	796178	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
<b>Pseudoscorpiones</b>							
<b>Atemnidae</b>							
242743	Atemnidae gen. indet. FP-13327 (BoDo01)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242725	Atemnidae gen. indet. FP-13327 (BoDo01)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242752	Atemnidae gen. indet. FP-13327 (BoDo01)	1	E.S. Volschenk	22	7550066	805684	50
242788	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242675	<i>Oratemnus</i> FP-11861 (ESV PSE121)	6	E.S. Volschenk	1	7561589	800676	50
242101	<i>Oratemnus</i> FP-11861 (ESV PSE121)	2	E.S. Volschenk	1	7561589	800676	50
242864	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	4	7571442	809647	50
242945	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	5	7556239	808963	50
242942	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	6	7570777	796187	50
242321	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	7	7560542	800400	50
242714	<i>Oratemnus</i> FP-11861 (ESV PSE121)	18	E.S. Volschenk	7	7560542	800400	50
242919	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	7	7560542	800400	50
242951	<i>Oratemnus</i> FP-11861 (ESV PSE121)	5	E.S. Volschenk	8	7558103	799632	50
242291	<i>Oratemnus</i> FP-11861 (ESV PSE121)	11	E.S. Volschenk	8	7558103	799632	50
242264	<i>Oratemnus</i> FP-11861 (ESV PSE121)	25	E.S. Volschenk	9	7566818	809307	50
242337	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	9	7566818	809307	50
242831	<i>Oratemnus</i> FP-11861 (ESV PSE121)	7	E.S. Volschenk	9	7566818	809307	50
242668	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	10	7567036	190388	51
242730	<i>Oratemnus</i> FP-11861 (ESV PSE121)	15	E.S. Volschenk	10	7567036	190388	51
242832	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	10	7567036	190388	51
243009	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	10	7567036	190388	51
242923	<i>Oratemnus</i> FP-11861 (ESV PSE121)	2	E.S. Volschenk	11	7566649	806796	50
242657	<i>Oratemnus</i> FP-11861 (ESV PSE121)	27	E.S. Volschenk	11	7566649	806796	50
242884	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	11	7566649	806796	50
242895	<i>Oratemnus</i> FP-11861 (ESV PSE121)	10	E.S. Volschenk	12	7571970	787696	50
240964	<i>Oratemnus</i> FP-11861 (ESV PSE121)	17	E.S. Volschenk	12	7571970	787696	50
242329	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	12	7571970	787696	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242847	<i>Oratemnus</i> FP-11861 (ESV PSE121)	3	E.S. Volschenk	13	7566269	804675	50
242670	<i>Oratemnus</i> FP-11861 (ESV PSE121)	5	E.S. Volschenk	13	7566269	804675	50
240949	<i>Oratemnus</i> FP-11861 (ESV PSE121)	32	E.S. Volschenk	13	7566269	804675	50
242228	<i>Oratemnus</i> FP-11861 (ESV PSE121)	3	E.S. Volschenk	14	7550627	790938	50
242716	<i>Oratemnus</i> FP-11861 (ESV PSE121)	22	E.S. Volschenk	15	7544325	788908	50
242869	<i>Oratemnus</i> FP-11861 (ESV PSE121)	3	E.S. Volschenk	15	7544325	788908	50
242327	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	16	7529967	787365	50
242892	<i>Oratemnus</i> FP-11861 (ESV PSE121)	2	E.S. Volschenk	16	7529967	787365	50
242732	<i>Oratemnus</i> FP-11861 (ESV PSE121)	12	E.S. Volschenk	17	7529009	781297	50
242842	<i>Oratemnus</i> FP-11861 (ESV PSE121)	10	E.S. Volschenk	17	7529009	781297	50
242931	<i>Oratemnus</i> FP-11861 (ESV PSE121)	3	E.S. Volschenk	17	7529009	781297	50
240962	<i>Oratemnus</i> FP-11861 (ESV PSE121)	6	E.S. Volschenk	18	7527537	780089	50
240952	<i>Oratemnus</i> FP-11861 (ESV PSE121)	14	E.S. Volschenk	19	7534969	805339	50
242781	<i>Oratemnus</i> FP-11861 (ESV PSE121)	2	E.S. Volschenk	19	7534969	805339	50
242274	<i>Oratemnus</i> FP-11861 (ESV PSE121)	21	E.S. Volschenk	20	7535422	199122	51
242260	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	21	7537258	197656	51
242887	<i>Oratemnus</i> FP-11861 (ESV PSE121)	5	E.S. Volschenk	22	7550066	805684	50
243073	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	22	7550066	805684	50
240976	<i>Oratemnus</i> FP-11861 (ESV PSE121)	22	E.S. Volschenk	22	7550066	805684	50
242886	<i>Oratemnus</i> FP-11861 (ESV PSE121)	2	E.S. Volschenk	24	7575216	798093	50
242898	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	25	7572755	796178	50
242233	<i>Oratemnus</i> FP-11861 (ESV PSE121)	8	E.S. Volschenk	25	7572755	796178	50
242859	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	25	7572755	796178	50
242836	<i>Oratemnus</i> FP-11861 (ESV PSE121)	1	E.S. Volschenk	26	7557312	790746	50
242799	<i>Oratemnus</i> FP-11861 (ESV PSE121)	14	E.S. Volschenk	26	7557312	790746	50
242874	<i>Oratemnus</i> FP-11861 (ESV PSE121)	11	E.S. Volschenk	28	7541622	796847	50
242107	<i>Oratemnus</i> FP-11861 (ESV PSE121)	4	E.S. Volschenk	28	7541622	796847	50
<b>Chernetidae</b>							
242729	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	2	E.S. Volschenk (COI)	11	7566649	806796	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242715	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk (COI)	19	7534969	805339	50
240981	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk (COI)	17	7529009	781297	50
242865	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	4	7571442	809647	50
242250	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	7	7560542	800400	50
242737	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	7	7560542	800400	50
242735	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	18	E.S. Volschenk	8	7558103	799632	50
242323	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	8	7558103	799632	50
242723	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	8	7558103	799632	50
242922	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	3	E.S. Volschenk	11	7566649	806796	50
242665	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	13	7566269	804675	50
242658	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	6	E.S. Volschenk	13	7566269	804675	50
240958	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	15	7544325	788908	50
242891	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	3	E.S. Volschenk	16	7529967	787365	50
242328	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	16	7529967	787365	50
242932	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	17	7529009	781297	50
242727	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	1	E.S. Volschenk	17	7529009	781297	50
242664	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	12	E.S. Volschenk	19	7534969	805339	50
242899	<i>Austrochernes</i> FP-12534 (PSE072; PCr01)	2	E.S. Volschenk	25	7572755	796178	50
<b>Chthoniidae</b>							
242322	<i>Austrochthonius</i> sp. indet.	1	E.S. Volschenk	7	7560542	800400	50
<b>Garypidae</b>							
242280	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	1	E.S. Volschenk (COI)	10	7567036	190388	51
240971	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	1	E.S. Volschenk (COI)	23	7574870	798166	50
242663	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	1	E.S. Volschenk (COI)	12	7571970	787696	50
242756	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	2	E.S. Volschenk	10	7567036	190388	51
242650	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	1	E.S. Volschenk	12	7571970	787696	50
242331	<i>Synsphyronus</i> FP-13471 (ESV BoDo01)	1	E.S. Volschenk	12	7571970	787696	50
<b>Olpiidae</b>							
242881	<i>Austrohorus</i> FP-13329 (BoDo10)	1	E.S. Volschenk (COI)	15	7544325	788908	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242878	<i>Austrohorus</i> FP-13330 (BoDo11)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242894	<i>Austrohorus</i> FP-13331 (BoDo12)	1	E.S. Volschenk (COI)	6	7642425	796187	50
242711	<i>Austrohorus</i> FP-13332 (BoDo13)	1	E.S. Volschenk (COI)	2	7535095	194659	51
242317	<i>Austrohorus</i> FP-13332 (BoDo13)	1	E.S. Volschenk (COI)	2	7535095	194659	51
242915	<i>Austrohorus</i> FP-13332 (BoDo13)	4	E.S. Volschenk	2	7535095	194659	51
242738	<i>Austrohorus</i> sp. indet.	1	E.S. Volschenk	8	7558103	799632	50
242736	<i>Austrohorus</i> sp. indet.	1	E.S. Volschenk	8	7558103	799632	50
242289	<i>Beierolpium</i> FP-13333 (PSEU115)	2	E.S. Volschenk (COI)	11	7566649	806796	50
242867	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242240	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	26	7557312	790746	50
242641	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	12	7571970	787696	50
242828	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	10	7567036	190388	51
243118	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242753	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242673	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	13	7566269	804675	50
243066	<i>Beierolpium</i> FP-13333 (PSEU115)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242731	<i>Beierolpium</i> sp. indet.	1	E.S. Volschenk	8	7558103	799632	50
242745	<i>Beierolpium</i> sp. indet.	2	E.S. Volschenk	15	7544325	788908	50
242866	<i>Indolpium</i> FP-13491 (BoDo07)	1	E.S. Volschenk (COI)	24	7575216	798093	50
242944	<i>Indolpium</i> FP-13581 (ESV BoDo01)	1	E.S. Volschenk (COI)	5	7556239	808963	50
242719	<i>Indolpium</i> FP-13581 (ESV BoDo01)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242877	<i>Indolpium</i> FP-13582 (ESV BoDo02)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242676	<i>Indolpium</i> FP-13582 (ESV BoDo02)	1	E.S. Volschenk (COI)	1	7561589	800676	50
242720	<i>Indolpium</i> FP-13582 (ESV BoDo02)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242646	<i>Indolpium</i> FP-13582 (ESV BoDo02)	1	E.S. Volschenk	1	7561589	800676	50
242726	<i>Indolpium</i> FP-13582 (ESV BoDo02)	1	E.S. Volschenk	1	7561589	800676	50
242746	<i>Indolpium</i> FP-13583 (ESV BoDo03)	1	E.S. Volschenk (COI)	18	7527537	780089	50
242721	<i>Indolpium</i> FP-13583 (ESV BoDo03)	4	E.S. Volschenk	18	7527537	780089	50
242934	<i>Indolpium</i> FP-13583 (ESV BoDo03)	3	E.S. Volschenk	18	7527537	780089	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242631	<i>Indolpium</i> FP-13583 (ESV BoDo03)	1	E.S. Volschenk	18	7527537	780089	50
242637	<i>Indolpium</i> FP-13584 (ESV BoDo04)	1	E.S. Volschenk (COI)	24	7575216	798093	50
242927	<i>Indolpium</i> FP-13585 (ESV BoDo05)	1	E.S. Volschenk (COI)	19	7534969	805339	50
242733	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	1	7561589	800676	50
242630	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	1	7561589	800676	50
242755	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242642	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242740	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	5	7556239	808963	50
242741	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242247	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242739	<i>Indolpium</i> FP-13586 (ESV BoDo06)	3	E.S. Volschenk	1	7561589	800676	50
242724	<i>Indolpium</i> FP-13586 (ESV BoDo06)	2	E.S. Volschenk	1	7561589	800676	50
242946	<i>Indolpium</i> FP-13586 (ESV BoDo06)	1	E.S. Volschenk	5	7556239	808963	50
242108	<i>Indolpium</i> FP-13587 (ESV BoDo08)	1	E.S. Volschenk (COI)	27	7521293	776651	50
242728	<i>Indolpium</i> FP-13588 (ESV BoDo09)	1	E.S. Volschenk (COI)	18	7527537	780089	50
242722	<i>Indolpium</i> FP-13588 (ESV BoDo09)	4	E.S. Volschenk	18	7527537	780089	50
242652	<i>Indolpium</i> sp. indet.	1	E.S. Volschenk	8	7558103	799632	50
242858	<i>Indolpium</i> sp. indet.	2	E.S. Volschenk	25	7572755	796178	50
242229	Olpidae gen. 7/4 FP-13343 (PSE176)	1	E.S. Volschenk (COI)	14	7550627	790938	50
242230	Olpidae gen. 7/4 FP-13343 (PSE176)	1	E.S. Volschenk	14	7550627	790938	50
242948	Olpidae gen. indet. sp. indet.	1	E.S. Volschenk	15	7544325	788908	50
<b>Sternophoridae</b>							
242825	<i>Afrosterphorus</i> FP-13328 (PSEU100)	1	E.S. Volschenk (COI)	4	7571442	809647	50
<b>Scorpiones</b>							
<b>Buthidae</b>							
242949	<i>Lychas</i> FP-12652 ( <i>multipunctatus</i> -complex)	1	E.S. Volschenk (COI)	15	7544325	788908	50
240945	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk (COI)	7	7560542	800400	50
241101	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk (COI)	23	7574870	798166	50
242269	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	3	E.S. Volschenk (COI)	9	7566818	809307	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242674	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	1	7561589	800676	50
242947	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	5	7556239	808963	50
242251	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	7	7560542	800400	50
242096	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	10	7567036	190388	51
242112	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	7	E.S. Volschenk	10	7567036	190388	51
240965	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	3	E.S. Volschenk	12	7571970	787696	50
242928	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	19	7534969	805339	50
243074	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	22	7550066	805684	50
242941	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	6	E.S. Volschenk	22	7550066	805684	50
242889	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	22	7550066	805684	50
242896	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	2	E.S. Volschenk	25	7572755	796178	50
242854	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	2	E.S. Volschenk	25	7572755	796178	50
242860	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	1	E.S. Volschenk	25	7572755	796178	50
242917	<i>Lychas</i> FP-13185 ( <i>bituberculatus</i> -complex)	2	E.S. Volschenk	26	7557312	790746	50
242742	<i>Lychas</i> FP-13186 ( <i>hairytail</i> -complex)	1	E.S. Volschenk (COI)	25	7572755	796178	50
<b>Urodacidae</b>							
242227	<i>Urodacus</i> FP-13183 (WAM SCO031)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242111	<i>Urodacus</i> FP-13183 (WAM SCO031)	1	E.S. Volschenk	21	7537258	197656	51
242222	<i>Urodacus</i> FP-13183 (WAM SCO031)	1	E.S. Volschenk	21	7537258	197656	51
<b>Geophilomorpha</b>							
<b>Geophilidae</b>							
242834	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	10	7567036	190388	51
242097	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	10	7567036	190388	51
242918	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242914	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	12	7571970	787696	50
242332	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	12	7571970	787696	50
240944	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	13	7566269	804675	50
242267	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk (COI)	9	7566818	809307	50
242804	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk	7	7560542	800400	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242764	<i>Sepedonophilus</i> FP-13345 (BoDo01)	2	E.S. Volschenk	10	7567036	190388	51
242625	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk	10	7567036	190388	51
242833	<i>Sepedonophilus</i> FP-13345 (BoDo01)	1	E.S. Volschenk	10	7567036	190388	51
<b>Mecistocephalidae</b>							
242935	<i>Mecistocephalus</i> FP-13347 (BoDo04)	1	E.S. Volschenk (COI)	18	7527537	780089	50
242937	<i>Mecistocephalus</i> FP-13347 (BoDo04)	1	E.S. Volschenk	18	7527537	780089	50
<b>Oryidae</b>							
240957	<i>Orphnaeus</i> FP-13348 (BoDo05)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242217	<i>Orphnaeus</i> FP-13349 (BoDo06)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242225	<i>Orphnaeus</i> FP-13349 (BoDo06)	1	E.S. Volschenk (COI)	20	7535422	199122	51
240956	<i>Orphnaeus</i> FP-13349 (BoDo06)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242939	<i>Orphnaeus</i> FP-13349 (BoDo06)	1	E.S. Volschenk (COI)	20	7535422	199122	51
242272	<i>Orphnaeus</i> FP-13349 (BoDo06)	1	E.S. Volschenk	20	7535422	199122	51
242248	<i>Orphnaeus</i> sp. indet.	1	E.S. Volschenk	7	7560542	800400	50
242925	<i>Orphnaeus</i> sp. indet.	1	E.S. Volschenk	21	7537258	197656	51
<b>Schendylidae</b>							
242290	<i>Ballophilus</i> FP-13344 (BoDo03)	1	E.S. Volschenk (COI)	11	7566649	806796	50
242649	<i>Ballophilus</i> FP-13344 (BoDo03)	1	E.S. Volschenk (COI)	9	7566818	809307	50
242266	<i>Ballophilus</i> FP-13344 (BoDo03)	1	E.S. Volschenk (COI)	9	7566818	809307	50
242279	<i>Ballophilus</i> FP-13344 (BoDo03)	1	E.S. Volschenk (COI)	10	7567036	190388	51
<b>Geophilomorpha fam. indet.</b>							
242929	Geophilomorpha gen. indet. FP-13346 (BoDo02)	1	E.S. Volschenk (COI)	19	7534969	805339	50
242249	Geophilomorpha gen. indet. FP-13346 (BoDo02)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242950	Geophilomorpha gen. indet. FP-13346 (BoDo02)	1	E.S. Volschenk (COI)	8	7558103	799632	50
242926	Geophilomorpha gen. indet. FP-13346 (BoDo02)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242758	Geophilomorpha gen. indet. FP-13346 (BoDo02)	1	E.S. Volschenk (COI)	10	7567036	190388	51
<b>Scolopendromorpha</b>							
<b>Cryptopidae</b>							
242218	<i>Cryptops</i> FP-13350 (BoDo01)	1	E.S. Volschenk (COI)	20	7535422	199122	51

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242221	<i>Cryptops</i> FP-13351 (BoDo02)	1	E.S. Volschenk (COI)	12	7571970	787696	50
242839	<i>Cryptops</i> FP-13352 (BoDo03)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242862	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	11	7566649	806796	50
242857	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242880	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	3	7542349	800311	50
242849	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242840	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	17	7529009	781297	50
242734	<i>Cryptops</i> FP-13353 (BoDo04)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242333	<i>Cryptops</i> sp. indet.	1	E.S. Volschenk	12	7571970	787696	50
242273	<i>Cryptops</i> sp. indet.	1	E.S. Volschenk	20	7535422	199122	51
<b>Polydesmida</b>							
<b>Paradoxosomatidae</b>							
242324	<i>Antichiropus sloanae</i> Car, 2019	1	E.S. Volschenk (COI)	7	7560542	800400	50
242271	<i>Antichiropus sloanae</i> Car, 2019	1	E.S. Volschenk (COI)	20	7535422	199122	51
242777	<i>Antichiropus sloanae</i> Car, 2019	1	E.S. Volschenk (COI)	20	7535422	199122	51
242315	<i>Antichiropus sloanae</i> Car, 2019	1	E.S. Volschenk (COI)	2	7535095	194659	51
242771	<i>Antichiropus sloanae</i> Car, 2019	1	E.S. Volschenk (COI)	2	7535095	194659	51
242761	<i>Antichiropus sloanae</i> Car, 2019	3	E.S. Volschenk	20	7535422	199122	51
243053	Paradoxosomatidae gen. indet. sp. indet.	1	E.S. Volschenk	20	7535422	199122	51
243055	Paradoxosomatidae gen. indet. sp. indet.	1	E.S. Volschenk	20	7535422	199122	51
242912	Paradoxosomatidae gen. indet. sp. indet.	1	E.S. Volschenk	24	7575216	798093	50
<b>Isopoda</b>							
<b>Armadillidae</b>							
242872	Armadillidae gen. indet. sp. indet.	5	E.S. Volschenk	2	7535095	194659	51
243060	Armadillidae gen. indet. sp. indet.	1	E.S. Volschenk	3	7542349	800311	50
242830	Armadillidae gen. indet. sp. indet.	1	E.S. Volschenk	9	7566818	809307	50
240963	Armadillidae gen. indet. sp. indet.	1	E.S. Volschenk	18	7527537	780089	50
242888	Armadillidae gen. indet. sp. indet.	1	E.S. Volschenk	22	7550066	805684	50
242651	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	6	7642424	796187	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242943	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	6	7642427	796187	50
242936	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	18	7527537	780089	50
243069	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242677	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	1	7561589	800676	50
242800	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	4	7571442	809647	50
242776	<i>Buddelundia</i> FP-11798 (SJ 14fm)	2	E.S. Volschenk (COI)	4	7571442	809647	50
242713	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242255	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	7	7560542	800400	50
242320	<i>Buddelundia</i> FP-11798 (SJ 14fm)	19	E.S. Volschenk (COI)	7	7560542	800400	50
242868	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	4	7571442	809647	50
243119	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk (COI)	11	7566649	806796	50
240970	<i>Buddelundia</i> FP-11798 (SJ 14fm)	2	E.S. Volschenk (COI)	11	7566649	806796	50
242252	<i>Buddelundia</i> FP-11798 (SJ 14fm)	5	E.S. Volschenk	7	7560542	800400	50
242256	<i>Buddelundia</i> FP-11798 (SJ 14fm)	1	E.S. Volschenk	7	7560542	800400	50
242920	<i>Buddelundia</i> FP-11798 (SJ 14fm)	2	E.S. Volschenk	7	7560542	800400	50
242671	<i>Buddelundia</i> FP-13355 (BoDo01)	1	E.S. Volschenk (COI)	13	7566269	804675	50
242938	<i>Buddelundia</i> FP-13356 (BoDo02)	1	E.S. Volschenk (COI)	20	7535422	199122	51
242100	<i>Buddelundia</i> FP-13356 (BoDo02)	1	E.S. Volschenk (COI)	21	7537258	197656	51
243067	<i>Buddelundia</i> FP-13356 (BoDo02)	2	E.S. Volschenk	21	7537258	197656	51
242259	<i>Buddelundia</i> FP-13356 (BoDo02)	1	E.S. Volschenk	21	7537258	197656	51
242325	<i>Buddelundia</i> FP-13357 (BoDo04)	1	E.S. Volschenk (COI)	5	7556239	808963	50
242837	<i>Buddelundia</i> FP-13358 (BoDo05)	6	E.S. Volschenk (COI)	26	7557312	790746	50
242656	<i>Buddelundia</i> FP-13359 (BoDo06)	1	E.S. Volschenk (COI)	8	7558103	799632	50
242768	<i>Buddelundia</i> FP-13359 (BoDo06)	1	E.S. Volschenk (COI)	10	7567036	190388	51
242765	<i>Buddelundia</i> FP-13359 (BoDo06)	2	E.S. Volschenk	10	7567036	190388	51
242924	<i>Buddelundia</i> FP-13360 (BoDo07)	6	E.S. Volschenk (COI)	11	7566649	806796	50
242258	<i>Buddelundia</i> FP-13361 (BoDo09)	1	E.S. Volschenk (COI)	21	7537258	197656	51
242257	<i>Buddelundia</i> FP-13361 (BoDo09)	2	E.S. Volschenk	21	7537258	197656	51
242861	<i>Buddelundia</i> FP-13362 (BoDo11)	3	E.S. Volschenk	25	7572755	796178	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242916	<i>Buddelundia</i> FP-13363 (BoDo12)	1	E.S. Volschenk (COI)	2	7535095	194659	51
242851	<i>Buddelundia</i> sp. indet.	15	E.S. Volschenk (COI)	11	7566649	806796	50
243058	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	3	7542349	800311	50
242318	<i>Buddelundia</i> sp. indet.	4	E.S. Volschenk	3	7542349	800311	50
243059	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	3	7542349	800311	50
243280	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	3	7542349	800311	50
243122	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	4	7571442	809647	50
242845	<i>Buddelundia</i> sp. indet.	11	E.S. Volschenk	4	7571442	809647	50
242326	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	5	7556239	808963	50
242952	<i>Buddelundia</i> sp. indet.	7	E.S. Volschenk	8	7558103	799632	50
242654	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	8	7558103	799632	50
242265	<i>Buddelundia</i> sp. indet.	36	E.S. Volschenk	9	7566818	809307	50
242913	<i>Buddelundia</i> sp. indet.	15	E.S. Volschenk	9	7566818	809307	50
242281	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	10	7567036	190388	51
242669	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	10	7567036	190388	51
242667	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	10	7567036	190388	51
242754	<i>Buddelundia</i> sp. indet.	14	E.S. Volschenk	10	7567036	190388	51
242288	<i>Buddelundia</i> sp. indet.	4	E.S. Volschenk	11	7566649	806796	50
242330	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	12	7571970	787696	50
242707	<i>Buddelundia</i> sp. indet.	11	E.S. Volschenk	13	7566269	804675	50
242232	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	14	7550627	790938	50
242762	<i>Buddelundia</i> sp. indet.	13	E.S. Volschenk	15	7544325	788908	50
242850	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	16	7529967	787365	50
240980	<i>Buddelundia</i> sp. indet.	11	E.S. Volschenk	17	7529009	781297	50
242933	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	17	7529009	781297	50
242841	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	17	7529009	781297	50
242853	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	19	7534969	805339	50
240951	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	19	7534969	805339	50
242940	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	20	7535422	199122	51

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242275	<i>Buddelundia</i> sp. indet.	3	E.S. Volschenk	20	7535422	199122	51
242838	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	21	7537258	197656	51
242336	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	22	7550066	805684	50
240977	<i>Buddelundia</i> sp. indet.	6	E.S. Volschenk	22	7550066	805684	50
242870	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	24	7575216	798093	50
242239	<i>Buddelundia</i> sp. indet.	1	E.S. Volschenk	25	7572755	796178	50
242897	<i>Buddelundia</i> sp. indet.	2	E.S. Volschenk	25	7572755	796178	50
242879	<i>Buddelundia</i> sp. indet.	16	E.S. Volschenk	28	7541622	796847	50
242316	Buddelundiinae gen. indet. FP-11806 (PCr05; SJ WN)	2	E.S. Volschenk (COI)	2	7535095	194659	51
242757	Buddelundiinae gen. indet. FP-11806 (PCr05; SJ WN)	1	E.S. Volschenk (COI)	20	7535422	199122	51
242660	Buddelundiinae gen. indet. FP-11806 (PCr05; SJ WN)	3	E.S. Volschenk	20	7535422	199122	51
242784	Buddelundiinae gen. indet. FP-13364 (BoDo03)	1	E.S. Volschenk (COI)	19	7534969	805339	50
242238	Buddelundiinae gen. indet. FP-13365 (BoDo08)	1	E.S. Volschenk (COI)	25	7572755	796178	50
242810	Buddelundiinae gen. indet. FP-13365 (BoDo08)	6	E.S. Volschenk (COI)	25	7572755	796178	50
240950	Buddelundiinae gen. indet. FP-13365 (BoDo08)	1	E.S. Volschenk (COI)	13	7566269	804675	50
240959	Buddelundiinae gen. indet. FP-13366 (BoDo10)	1	E.S. Volschenk (COI)	15	7544325	788908	50
242106	Buddelundiinae gen. indet. FP-13366 (BoDo10)	1	E.S. Volschenk (COI)	28	7541622	796847	50
242890	Buddelundiinae gen. indet. FP-13366 (BoDo10)	3	E.S. Volschenk (COI)	16	7529967	787365	50
242571	Buddelundiinae gen. indet. FP-13366 (BoDo10)	5	E.S. Volschenk	16	7529967	787365	50
242856	Buddelundiinae gen. indet. FP-13366 (BoDo10)	6	E.S. Volschenk	16	7529967	787365	50
242770	Buddelundiinae gen. indet. FP-13366 (BoDo10)	4	E.S. Volschenk	28	7541622	796847	50
212648	Buddelundiinae gen. indet. FP-13366 (BoDo10)	7	E.S. Volschenk	28	7541622	796847	50
242873	Buddelundiinae gen. indet. FP-13366 (BoDo10)	13	E.S. Volschenk	28	7541622	796847	50
242105	Buddelundiinae gen. indet. sp. indet.	1	E.S. Volschenk (COI)	1	7561589	800676	50
242653	Buddelundiinae gen. indet. sp. indet.	1	E.S. Volschenk (COI)	1	7561589	800676	50
242292	Buddelundiinae gen. indet. sp. indet.	22	E.S. Volschenk	8	7558103	799632	50
<b>Philosciidae</b>							
242930	Philosciidae gen. indet. FP-13367 (BoDo01)	1	E.S. Volschenk (COI)	12	7571970	787696	50
242219	Philosciidae gen. indet. FP-13367 (BoDo01)	1	E.S. Volschenk (COI)	17	7529009	781297	50

Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242220	Philosciidae gen. indet. FP-13367 (BoDo01)	1	E.S. Volschenk (COI)	17	7529009	781297	50
242750	Philosciidae gen. indet. FP-13367 (BoDo01)	1	E.S. Volschenk	12	7571970	787696	50
242672	Philosciidae gen. indet. FP-13368 (BoDo02)	1	E.S. Volschenk (COI)	13	7566269	804675	50
242655	Philosciidae gen. indet. FP-13368 (BoDo02)	1	E.S. Volschenk (COI)	10	7567036	190388	51
242775	Philosciidae gen. indet. FP-13368 (BoDo02)	4	E.S. Volschenk	10	7567036	190388	51
242666	Philosciidae gen. indet. FP-13368 (BoDo02)	4	E.S. Volschenk	10	7567036	190388	51
242216	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk (COI)	16	7529967	787365	50
242893	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk (COI)	16	7529967	787365	50
242334	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242215	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk (COI)	20	7535422	199122	51
242774	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk	16	7529967	787365	50
242808	Philosciidae gen. indet. FP-13369 (BoDo03)	3	E.S. Volschenk	16	7529967	787365	50
242803	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk	20	7535422	199122	51
242779	Philosciidae gen. indet. FP-13369 (BoDo03)	1	E.S. Volschenk	22	7550066	805684	50
<b>Diplura</b>							
<b>Japygidae</b>							
242268	Japygidae gen. indet. FP-13354 (BoDo01)	1	E.S. Volschenk (COI)	9	7566818	809307	50
<b>Eupulmonata</b>							
<b>Succineidae</b>							
242910	<i>Austrosuccinea</i> FP-13370 (BoDo01)	1	E.S. Volschenk (COI)	5	7556239	808963	50
242902	<i>Austrosuccinea</i> FP-13370 (BoDo01)	1	E.S. Volschenk (COI)	22	7550066	805684	50
242253	<i>Austrosuccinea</i> sp. indet.	4	E.S. Volschenk	7	7560542	800400	50
242295	<i>Austrosuccinea</i> sp. indet.	2	E.S. Volschenk	8	7558103	799632	50
242814	<i>Austrosuccinea</i> sp. indet.	1	E.S. Volschenk	9	7566818	809307	50
242645	<i>Austrosuccinea</i> sp. indet.	1	E.S. Volschenk	10	7567036	190388	51
242286	<i>Austrosuccinea</i> sp. indet.	3	E.S. Volschenk	11	7566649	806796	50
240966	<i>Austrosuccinea</i> sp. indet.	5	E.S. Volschenk	12	7571970	787696	50
242717	<i>Austrosuccinea</i> sp. indet.	3	E.S. Volschenk	13	7566269	804675	50
241105	<i>Austrosuccinea</i> sp. indet.	6	E.S. Volschenk	16	7529967	787365	50

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Registration	Genus and species	No. of specimens	Identified by	Site	Northing	Easting	Zone
242277	<i>Austrosuccinea</i> sp. indet.	6	E.S. Volschenk	20	7535422	199122	51

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## Appendix 4 Sequences of COI DNA fragment generated from this study

>Afrosteronophorus PSEU100-HBIID242825

AACGATATATTTAATTTTTGGAATTATAGCGGGTTTTGTGGGAATAGGATATAGAATGCTTATTTCGATTGGAATTAAGTTTTCTT  
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TTGGTGGGTTTGGAAATTGGCTAATTCCTTAATGATCGGATCAGTTGATATAGCTTTCCCTCGAATAAATAATATAAGATTTTG  
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CTTACTTCTTAAATGCTCATTGATGCAGCAGTAGATTTAGCTATTTTTCTTCTTCTAGCTGGAGTTTCTCAATTTTGG  
GAGCAGTAAATTTTATCTCAACTATTCTAAATATACGTTCTCCTTTAGTTTCATATAGTCAAATACCTTTATTTGTATGGTCAGTAT  
TGATTACAATAATTTAATTTTATTAGCTATACCTGTATTGGCGGGTGCTATTACTATACTTTAACTGATCGGAATTTTAGAACAT  
CGTTTTTAATCCTACTGGGGGGGGAGATCCTATTTTATTTCAACATTTGTTT

>Aname BoDo01-HBIID242226

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TGGGAGATTTTAGGGGATGATCATTGTATAATGTAGTAGTAACAGCTCATGCTTTAGTTATGATTTTTTTATAGTTATACCTA  
TTATGATTGGGGGGTTTGGTAATTGATTAGTTTCTTTGATATTGGGGGCACCGGATATAGCTTTTCTCGTATGAATAATTTGA  
GTTTTTGGTTGCTTCTCCTCATTATTTTTGTTAATTTTGTATCTTTAACTGATGTGGGGGTGGGGGCAGGATGAACAATTT  
ATCCTCCTTTATCTTCAGTTATTGGACATGGGGGAGGAGGAATGGATTTTGTCTATTTTTCTTGCATTTGGCGGGGGCATCT  
TCTATTATGGGGGCTATTAATTTTATTTCAACTATTATTAATATGCGTATGGTAGGAATGAGAATAGAACGGGTTCCCTTGTGTTG  
TTTGATCAGTTTTGATTACTGCTATTTTATTGTTGTTATCTTCCGGTGTGGCGGGGGCAATTACTATACTTTTGACAGATCG  
AAATTTAATACCTCTTTTTTTGATCCTGCGGGGGGGGTGATCCTATTTTATTTCAACATTTGTTT

>Aname BoDo01-HBIID242364

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TGGAAGATTTTGGGGGATGATCACTTGTATAATGTAGTAGTGACGGCTCATGCTTTAGTTATGATTTTTTTATAGTTATACCT  
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TATCCTCCTTTATCTTCAGCTATTGGACATGGGGGAGGAGGAATGGATTTTGTCTATTTTTTTCATTGCATTTGGCGGGGGCATCT  
TCTATTATAGGGGCTATTAATTTTATTTCAACTATTATTAATATGCGTATGGTAGGAATGAGAATAGAACGGGTTCCCTTGTGTTG  
TTGATCAGTTTTGATTACTGCTATTTTATTGTTGTTATCTTCCGGTGTAGCGGGGGCAATCACTATACTTTTGACAGATCGG  
AATTTAATACTTCTTTTTTTGATCCTGCTGGGGGGGGGTGATCCTATTTTATTTCAACATTTGTTT

>Aname BoDo01-HBIID242400

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>Aname BoDo01-HBIID242904

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TTATGATTGGGGGGTTTGGTAATTGATTAGTTTCTTTGATATTGGGGGCACCGGATATAGCTTTTCTCGCATGAATAATTTGA  
GTTTTTGGTTACTTCTCCTCATTATTTTTGTTAATTTTGTATCTTTAACTGATGTAGGGGTGGGGGCAGGATGAACAATTT  
ATCCCCTCTATCTTCAGCTATTGGGCATGGGGGAGGAGGAATAGATTTTGTCTATTTTTTTCATTGCATTTGGCGGGGGCATCT  
TCTATTATGGGGGCTATTAATTTTATTTCAACTATTATTAATATGCGTATGGTAGGAATGAGAATGGAACGGGTTCCCTTGTGTTG  
TTTGATCAGTTTTGATTACTGCTATTTTATTGTTGTTATCTTCCGGTGTAGCGGGGGGCAATCACTATACTTTTGACAGATCG  
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>Aname BoDo01-HBIID242911

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ATCATGATTGGGGGTTTGGAAATTGATTAGTTCCTTTGATGTTGGGAGCGCCGGATATAGCTTTTCTCGTATGAATAATTTG  
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TACCTCCTTTATCTCAGTTATTGGGCATGGGGGAGGGGAATGGATTTTGTATTTTTTTCATTGCATTTGGCGGGGGCATC  
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>Aname mellosa complex (Nyi01)-HBIID241104

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AGGAAGATTTTTAGGTGATGATCATTGTATAACGTTGTAGTTACTGCTCATGCATTAGTAATGATTTTTTTTATAGTTATGCCTA  
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TATCTCCTTTGTCTTCGGTAGTGGGTCATAGAGGGGGGGGAATAGATTTGCTATTTTTTCTTTACATTTGGCGGGGGCCTC  
TTCTATTATGGGGGCGATTAATTTTTATTCTACAATTGTAAATATACGTTCAATAGGTATATCTATAGAGCGGGTACCTTTATTTGT  
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>Aname mellosa complex (Nyi01)-HBIID242110

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TTATGATTGGAGGGTTTGGGAATTGGTTGGTTCCTTTAATATTAGGAGCTCCAGATATAGCATTTCCTCGAATGAACAATTTAA  
GATTTTGGTTGCTTCCGCTTATTGTTTCTTTGATTTTGTCTTCTTTAACAGATGTGGGGGTAGGGGCAGGTTGGACAATT  
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TTCTATTATGGGGGCGATTAATTTTTATCTACTATTGTAAATATACGTTCAATAGGTATATCTATAGAGCGGGTACCTTTATTTGT  
GTGGTGGTTTTAATACTGCTATTTATTATTATTGTCTTTACCAGTTTTGGCGGGGGCTATTACTATATTGTTAACAGATCGGA  
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>Aname mellosa complex (Nyi01)-HBIID242223

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TCATGATTGGTGGGTTTGGGAATTGGTTGGTTCCTTTAATATTAGGAGCTCCAGATATAGCATTTCCTCGAATGAACAATTTAA  
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TCTATTATGGGGGCGATTAATTTTTATTCTACAATTGTAAATATACGTTTCGATAGGTATGTCTATAGAGCGGGTACCTTTATTTGT  
GTGATCGTTTTAATACTGCTATTTATTATTATTGTCTTTACCAGTTTTGGCAGGGGGCTATTACTATATTGTTAACGGATCGG  
AATTTAATACATCTTTTTTTGATCCAGCAGGGGGAGGGGATCCTATTTTGTTCAGCACTTGTTT

>Aname mellosa complex (Nyi01)-HBIID242245

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CATGATTGGTGGGTTTGGGAATTGGTTGGTTCCTTTAATATTAGGAGCTCCAGATATAGCATTTCCTCGAATGAACAATTTAA  
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>Aname mellosa complex (Nyi01)-HBIID242246

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>Aname mellosa complex (Nyi01)-HBIID242381

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>Aname mellosa complex (Nyi01)-HBIID242903

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>Aname watsoni-HBIID242224

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>Aname watsoni-HBIID242901

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>Aname watsoni-HBIID242906

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>Antichiropus sloanae-HBIID242271

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>Antichiropus sloanae-HBIID242315

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>Antichiropus sloanae-HBIID242324

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>Antichiropus sloanae-HBIID242771

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>Antichiropus sloanae-HBIID242777

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>Assamiidae BoDo01-HBIID242237

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>Assamiidae BoDo01-HBIID242846

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>Atemnidae BoDo01-HBIID242725

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>Atemnidae BoDo01-HBIID242743

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>Austrochernes PSE072-HBIID240981

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>Austrochernes PSE072-HBIID242715

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>Austrochernes PSE072-HBIID242729

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>Austrohorus BoDo10-HBIID242881

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>Austrohorus BoDo11-HBIID242878

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>Austrohorus BoDo12-HBIID242894

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>Austrohorus BoDo13-HBIID242317

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>Austrohorus BoDo13-HBIID242711

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>Austrosuccinea BoDo01-HBIID242902

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>Austrosuccinea BoDo01-HBIID242910

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>Ballophilus BoDo03-HBIID242266

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>Ballophilus BoDo03-HBIID242279

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>Ballophilus BoDo03-HBIID242649

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>Lychas bituberculatus complex-HBIID240945

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>Lychas bituberculatus complex-HBIID241101

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>Lychas bituberculatus complex-HBIID242269

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>Lychas cf. hairytail complex-HBIID242742

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>Lychas glauerti (SCO039)-HBIID242359

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>Lychas glauerti (SCO039)-HBIID242371

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>Lychas multipunctatus complex-HBIID242949

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>Mecistocephalus BoDo04-HBIID242935

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>Myrmecophilidae MiSo01-HBIID242744

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>Myrmecophilidae MiSo03-HBIID242813

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>Myrmecophilidae MiSo03-HBIID242875

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>Oratemnus PSE121-HBIID242788

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>Orphnaeus BoDo05-HBIID240957

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>Orphnaeus BoDo06-HBIID240956

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>Orphnaeus BoDo06-HBIID242217

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>Orphnaeus BoDo06-HBIID242225

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>Orphnaeus BoDo06-HBIID242939

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>Philosciidae BoDo01-HBIID242219

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>Philosciidae BoDo01-HBIID242220

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>Philosciidae BoDo01-HBIID242930

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>Philosciidae BoDo02-HBIID242655

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>Philosciidae BoDo02-HBIID242672

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>Philosciidae BoDo03-HBIID242215

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>Philosciidae BoDo03-HBIID242216

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>Philosciidae BoDo03-HBIID242334

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>Philosciidae BoDo03-HBIID242893

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>Sepedonophilus BoDo01-HBIID240944

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>Sepedonophilus BoDo01-HBIID242097

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>Sepedonophilus BoDo01-HBIID242267

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>Sepedonophilus BoDo01-HBIID242332

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>Sepedonophilus BoDo01-HBIID242834

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>Sepedonophilus BoDo01-HBIID242914

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>Sepedonophilus BoDo01-HBIID242918

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>Synsphyronus BoDo01-HBIID240971

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>Synsphyronus BoDo01-HBIID242280

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>Synsphyronus BoDo01-HBIID242663

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>Urodacus butleri-HBIID242785

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>Urodacus butleri-HBIID242793

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>Urodacus butleri-HBIID242812

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>Urodacus butleri-HBIID242829

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>Urodacus pilbara8-HBIID242344

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>Urodacus pilbara8-HBIID242350

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>Urodacus pilbara8-HBIID242352

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>Urodacus pilbara8-HBIID242415

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>Urodacus pilbara8-HBIID242780

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>Urodacus SCO031-HBIID242227

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