Bennelongia Environmental Consultants

Lake Roe Project: Short Range Endemic (SRE) Invertebrate Survey and Assessment

Prepared for:

Ramelius Resources Limited

May 2025

Final Report

Short-Range Endemics | Subterranean Fauna

Waterbirds | Wetlands

Lake Roe Project: Short Range Endemic Survey and Assessment

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EXECUTIVE SUMMARY

Ramelius Resources Limited (Ramelius) are looking to progress the approvals process for the Lake Roe Project, located approximately 100km east of Kalgoorlie, (Figure 1) and require a review of previous SRE Invertebrate records, in particular any new information, and an Assessment of expanded areas, noting that the project has expanded to the North and beyond the survey area previously assessed by Stantec in 2021. Ramelius commissioned Bennelongia Environmental Consultants to perform a comprehensive risk assessment of short-range endemic (SRE) invertebrate species in relation to potential direct and indirect impacts. This assessment included a desktop review of available data, and a field survey for SRE invertebrates that meets EPA guidance and the requirements of an EPA referral.

The desktop review of SRE fauna suggests a moderately diverse assemblage of SRE invertebrate groups within the search area (100x100 km^2 around the Project) and in the proximity of the survey area. A total of 46 species in SRE groups were recorded from the search area. Of these, none were Confirmed SRE or Listed Threatened or Priority species but one species was listed as an unlikely potential SRE. An additional 18 species were categorised as Data Deficient Potential SREs, given that there is a lack of taxonomic certainty and/or because they were represented by singleton specimens with no other data. 26 species were assessed as widespread according to the Guidance statements and published research. None of these species were found within the Field Survey area.

The field survey did not yield any Listed Threatened or Priority species or Confirmed SREs but three likely potential SREs were collected: an unidentified species of the millipede genus *Antichiropus*, the millipede species Siphonotidae `BDI094`, and the centipede species Chilenophilidae `BGE099`. We were able to establish the presence of seven records of Data deficient potential SREs, all of which were undescribed species. Although it is not possible to assess the ranges of all the Data deficient species due to taxonomic uncertainty.

The findings of both the field survey and desktop assessment suggest that it is unlikely that development at Lake Roe will impact populations of conservation significant SRE groups or any Listed Threatened or Priority species, as the number of species from SRE groups collected in the survey area indicate only moderate levels of diversity, and the area of project impact is comparatively small. Habitat mapping by Stantec supports these findings suggests that habitats at the Project were at most low to moderate in their prospectivity of hosting SRE species. We conclude that there is a low likelihood that development at Lake Roe will impact on SRE conservation values or populations of Listed Threatened or Priority species.

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1. INTRODUCTION

Ramelius Resources Limited (Ramelius) are looking to progress the approvals process for the Lake Roe Gold Project, located approximately 100km east of Kalgoorlie, (Figure 1). The client requires a review of previous SRE Invertebrate Fauna records, in particular any new information, and an Assessment of expanded areas, noting that the project has expanded to the North and beyond the survey area previously assessed for SRE fauna by Stantec Australia Pty Ltd in 2021. In addition to this, Ramelius commissioned Bennelongia Environmental Consultants (Bennelongia) to perform a comprehensive risk assessment of SRE Invertebrate species in relation to potential, direct and indirect impacts in the form of a desktop review, and a field survey that meets EPA guidance and the requirements of an EPA referral.

2. SRE FRAMEWORK

2.1. Short Range Endemics

In addition to having ranges notionally less than 10,000 km^2, short-range endemic (SRE) species usually have patchy distributions within their range, poor dispersal capabilities, and specific habitat requirements (e.g. permanent moisture). Many species such as trapdoor spiders also have slow growth rates, metabolic rates, and comparatively low fecundity. Guidelines for the consideration and assessment of SRE invertebrates in Western Australia are provided in the *Environmental Factor Guideline: Terrestrial Fauna* EPA 2016a and *Technical Guidance: Sampling of short range endemic invertebrate fauna* EPA 2016b. Assessment focusses on SRE Groups which are higher-level taxonomic groupings known to contain moderate to high proportions of SRE species. SRE Groups include land snails (Gastropoda), millipedes (Diplopoda), centipedes (Chilopoda), harvestmen (Opiliones), pseudoscorpions (Pseudoscorpiones), scorpions (Scorpiones), spiders (Araneae; mainly trapdoor spiders, Mygalomorphae), slaters (Isopoda), and in mesic landscapes velvet worms (Onychophora) and earthworms (Oligochaeta).

Not all species in SRE Groups have restricted ranges and some or indeed more widespread than the SRE threshold of 10.000 km^2. Determining whether a species belonging to an SRE Group is in fact an SRE is often difficult. One approach is to assume that the distribution of a species reflects the extent of its preferred or obligate habitat(s), and that species found only in restricted or patchy habitats have smaller ranges than those collected from extensive or common habitats. However, in cases where short range endemism is driven by life history characteristics, a species may be a true SRE but inhabit a widespread, apparently well-connected habitat Harvey 2002b; Harvey *et al.* 2015; Harvey *et al.* 2011; Rix *et al.* 2015. Therefore, several factors are considered in conjunction when evaluating the SRE status of a species and the likelihood of threat to that species. These factors include the known range of the species; habitat(s) at the collection site(s), and the spatial extent and connectivity of these habitats. In the absence of additional data, distribution patterns of phylogenetically related surrogate species (ideally members of the same genus) might also be used for range assessments.

In order to synthesise investigations of these factors in the context of determining SRE status, this report follows the Western Australia Museum's (WAM) classification system for SREs in recognising three categories:

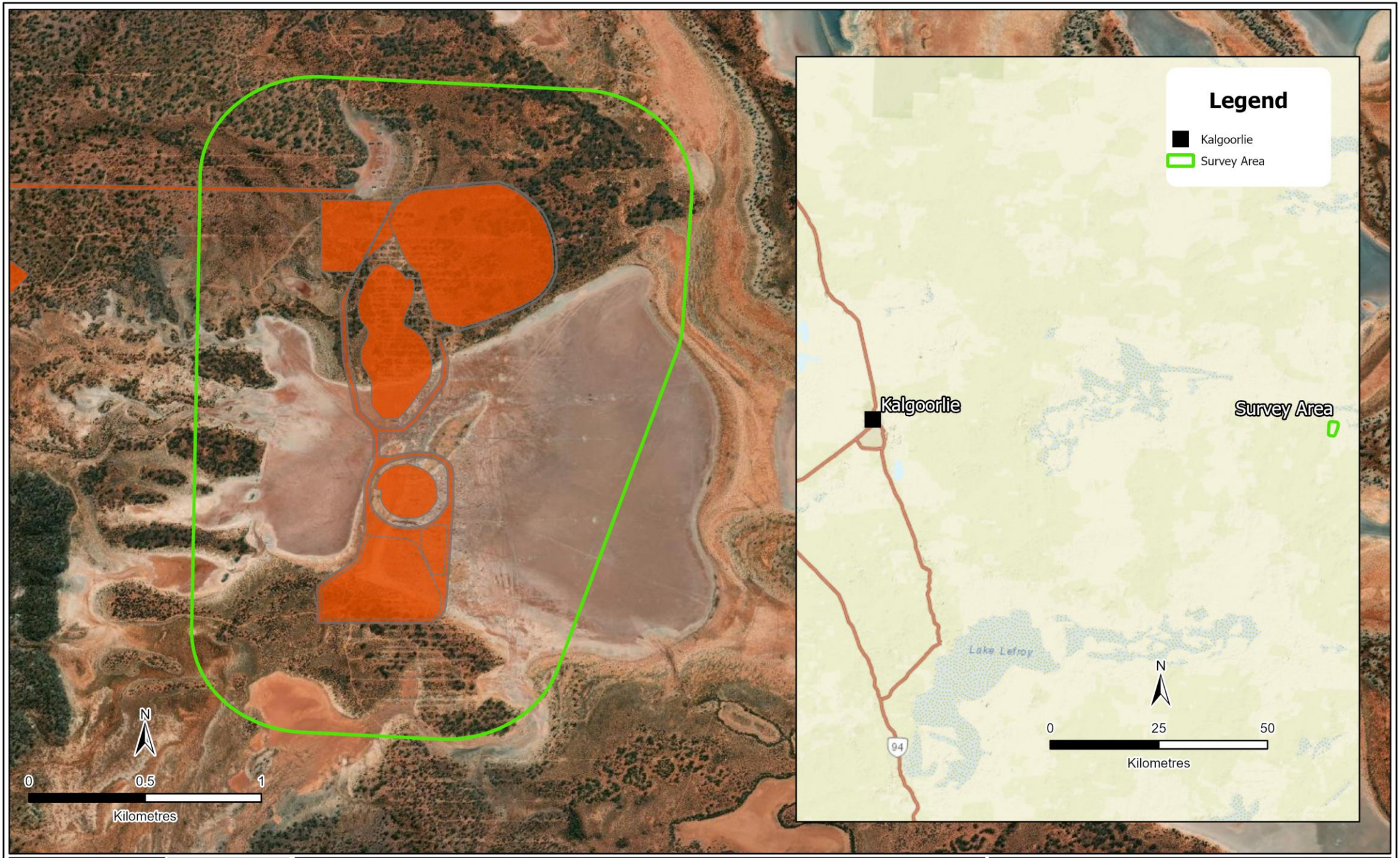
1. **Confirmed SRE** species have a known distribution range smaller than 10,000 km^2. The taxonomy is well known, and the group well represented in collections and/or via comprehensive sampling.
2. **Potential SRE** species belong to a group with gaps in our knowledge of its distribution, either because the group is not well represented in collections, taxonomic knowledge is incomplete, or the distribution is poorly understood due to insufficient sampling.

3. **Widespread (not SRE)** species have a known distribution range larger than 10,000 km^2. The taxonomy is well known, and the group is well represented in collections via comprehensive sampling.

In many surveys, most species fit the **Potential SRE** category, but the likelihood of species within the category actually being SREs varies substantially. In an attempt to increase the accuracy of categorisation, for the purposes of this report the Potential SRE category is further sub-divided into three categories:

A. **Data Deficient Potential SRE**, indicating that insufficient data are available to determine SRE status. Insufficiency of data may be caused either by a lack of geographic or taxonomic information, or because the individuals sampled are not identifiable to species level (e.g. nondiagnostic sex, juvenile, damaged). This category is applied only to those species that belong to a known SRE Group, rather than being applied to any undescribed species in the records.
B. **Unlikely Potential SRE** species status is applied in one of two cases. First, the species belongs to an SRE Group but has been collected from many sites and/or multiple habitats. Second, the species belongs to a smaller taxonomic group within the SRE Group that tends not to contain SREs.
C. **Likely Potential SRE** species are from taxonomic groups in which SREs are likely, and when specimens have been collected from one or very few sites and/or habitats.

In the context of these categories, identifying a species as a Potential or Confirmed SRE is often only the first step in determining the impacts of mining activities on that species. Even a Confirmed SRE species may be locally widespread around a Project Area, and therefore at minimal risk of disturbance. The actual level of threat to an SRE species therefore depends on its distribution relative to the development footprint, rather than its SRE status alone. Determining the likely level of threat to a species therefore requires further consideration of the extent of the species' preferred habitat, both within and beyond the area of activity.



Bennelongia Environmental Consultants

GCS GDA 1994
Author: K. Sagastume
Date: 23/05/2025

Legend

- Survey Area
- Disturbance Footprint

Figure 1. Location and layout of the Lake Roe Project area.

2.2. Conservation Framework

The *Biodiversity Conservation Act 2016* (BC Act) in Western Australia outlines measures for the protection, conservation, and sustainable use of the state's biodiversity, and provides general protection for all native species. Some species are given special protection under the BC Act, primarily because they are rare, and are referred to as Threatened species. Species may also be recognised and protected as Threatened at the national level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There is a general concordance of species listed under the two acts, but the BC Act has greater invertebrate coverage.

Additionally, the Department of Biodiversity, Conservation and Attractions (DBCA) lists some Priority species for conservation. Such species are typically listed as Priority primarily when they are considered potentially under threat but there is insufficient evidence to support listing as a Threatened species. Priority species listed by DBCA are still recognised but do not receive the high levels of protection as those under either the BC Act or EPBC Act.

Information available from the BC and EPBC Acts, as well as from the DBCA's list of Priority species, is often used to complement a species' SRE assessment. When a species is listed in these sources is found in a Project Area, the potential impact of development on that species requires additional consideration of its taxonomy, distribution, habitat requirements, and sometimes also abundance.

3. ENVIRONMENT

3.1. Regional Setting

The Lake Roe Project is situated in the Eastern Goldfields (Sub-region; COO3) of the Coolgardie Bioregion, as recognised by the Interim Biogeographic Regionalisation of Australia (IBRA; Figure 2). COO3 lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line Cowan 2001.

The sub-region's climate is semi-arid to arid with 200-300mm of rainfall, sometimes in summer but usually in winter. This climate supports vegetation communities of Mallee, Acacia thickets and shrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrubland occur on basic graninulites of the Fraser Range. There are no Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) in this sub-region DBCA 2023a, b.

3.2. Vegetation

The Survey Area includes three separate Beard veg associations, 125, 480 and 481 (Figure 2). Beard Veg Association 125 is characterised by a bare, salt flat association and has a low conservation priority. 480 is characterised by succulent steppe with open low woodland, mulga & sheoak over salt bush, and has a high conservation priority. 481 is a Mosaic and includes Medium woodland of salmon gum & red mallee, hummock grasslands on a mallee steppe, and red mallee over salt bush. This association has a medium conservation priority Cowan 2001. Of the 10 sampling sites, 2 were located in Assoc. 481 (Sites 1 and 2), 4 were located in Assoc. 480 (Sites 3, 4, 5 and 6) with the remaining 4 located in Assoc. 125 (Sites 7, 8, 9 and 10) (Figure 2).

In 2020, Stantec Australia Pty Ltd (Stantec) conducted an SRE survey for the Lake Roe Project and on behalf of Breaker Resources NL (Breaker). During this survey, an extensive habitat assessment was conducted, including vegetation mapping which resulted in 12 habitats likely to support SRE taxa. These consisted of *Eucalyptus* woodland, Freshwater claypans, Gypsum dunes, Mallee over spinifex sandplain, Playa, Samphires, Sheoak over chenopod, Sheoak on stony rise, Mallee on hills, Mallee over spinifex on low rise, Acacias on low rise and shrubland on flats (Figure 2). These habitats were categorised as having a high, medium or low potential to support terrestrial SRE species based on the presence of microhabitats, whether the habitat was restricted or widespread in the landscape and whether the habitat formed isolates or was well connected in the landscape. Stantec 2020. *Eucalyptus* woodland, Shrubland on flats and Sheoak over chenopods were categorised as having a low likelihood of supporting SRE taxa, while the remaining habitats were categorised as having a moderate likelihood of supporting SRE taxa Stantec 2020. Of the ten sampling sites, four were located on 'Mallee over spinifex sandplain' (Sites 4, 5, 6 and 9) and two were located on 'Samphires' (Sites 7 and 8). The remaining four sites all spanned different habitat types, including 'Playa' (Site 10), 'Shrubland on flats' (Site 1), 'Sheoak over chenopod' (Site 2) and 'Eucalypt woodland' (Site 3) (Figure 2).

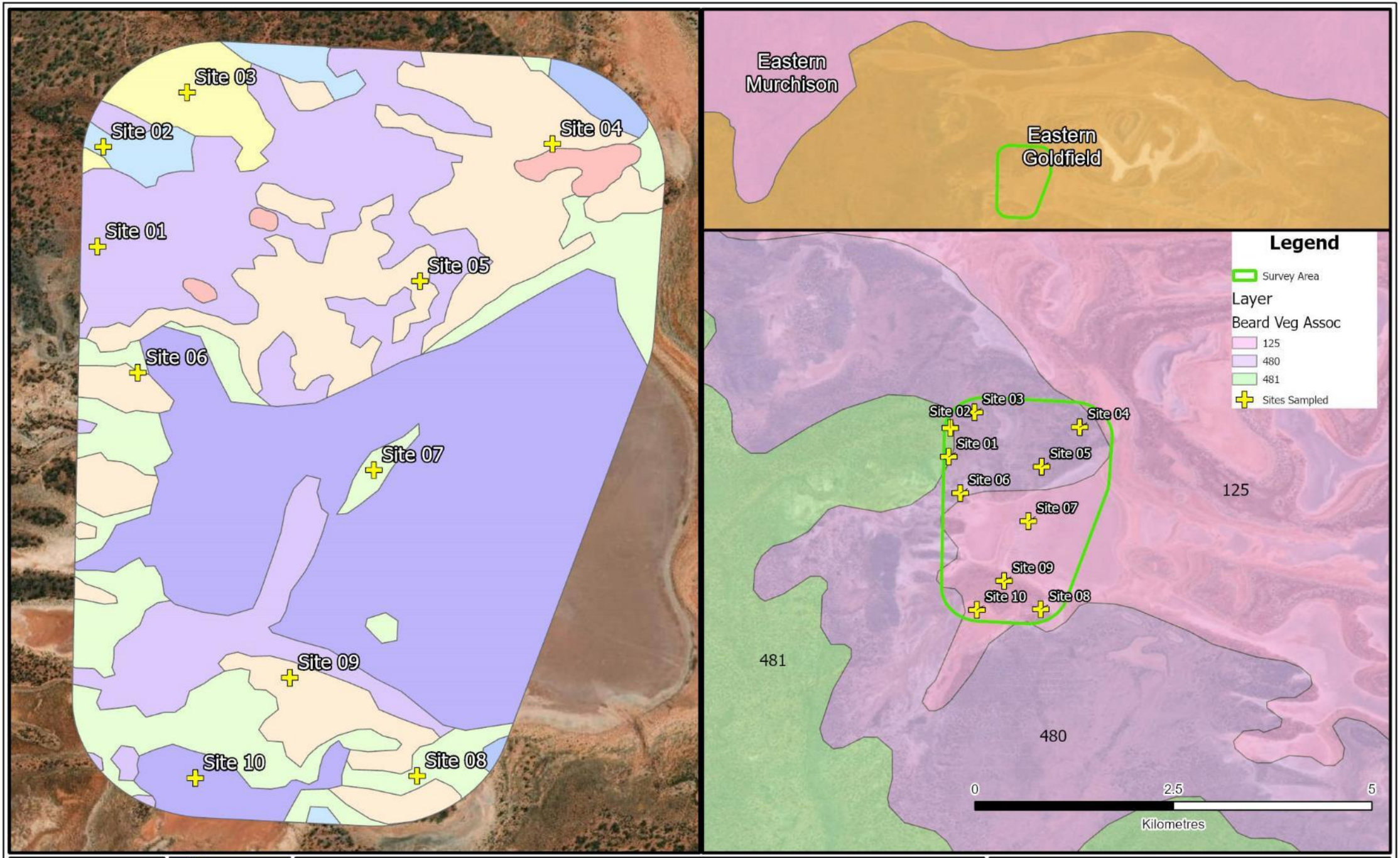


Figure 2. Stantec Veg Mapping (Left), IBRA Subregion (Top Right), Beard Veg Association (Bottom Right).

3.3. Landforms and Surface Geology

The Survey Area includes two major soil landscape systems, the Mx43 atlas and the Carnegie system. There is also a subsystem of the Carnegie system, called the Carnegie Lake Bed subsystem (Figure 3a). The Carnegie system is categorised by Salt lakes with fringing saline flats and dunes, with the Lake beds containing unvegetated saline and gypsiferous sediments, and the alluvial plains containing sandy-surfaced saline duplex on hardpan Pringle *et al.* 1994. The Mx43 atlas system consists of Gently undulating valley plains and pediments; and some outcrop of basic rock DPIRD 2022.

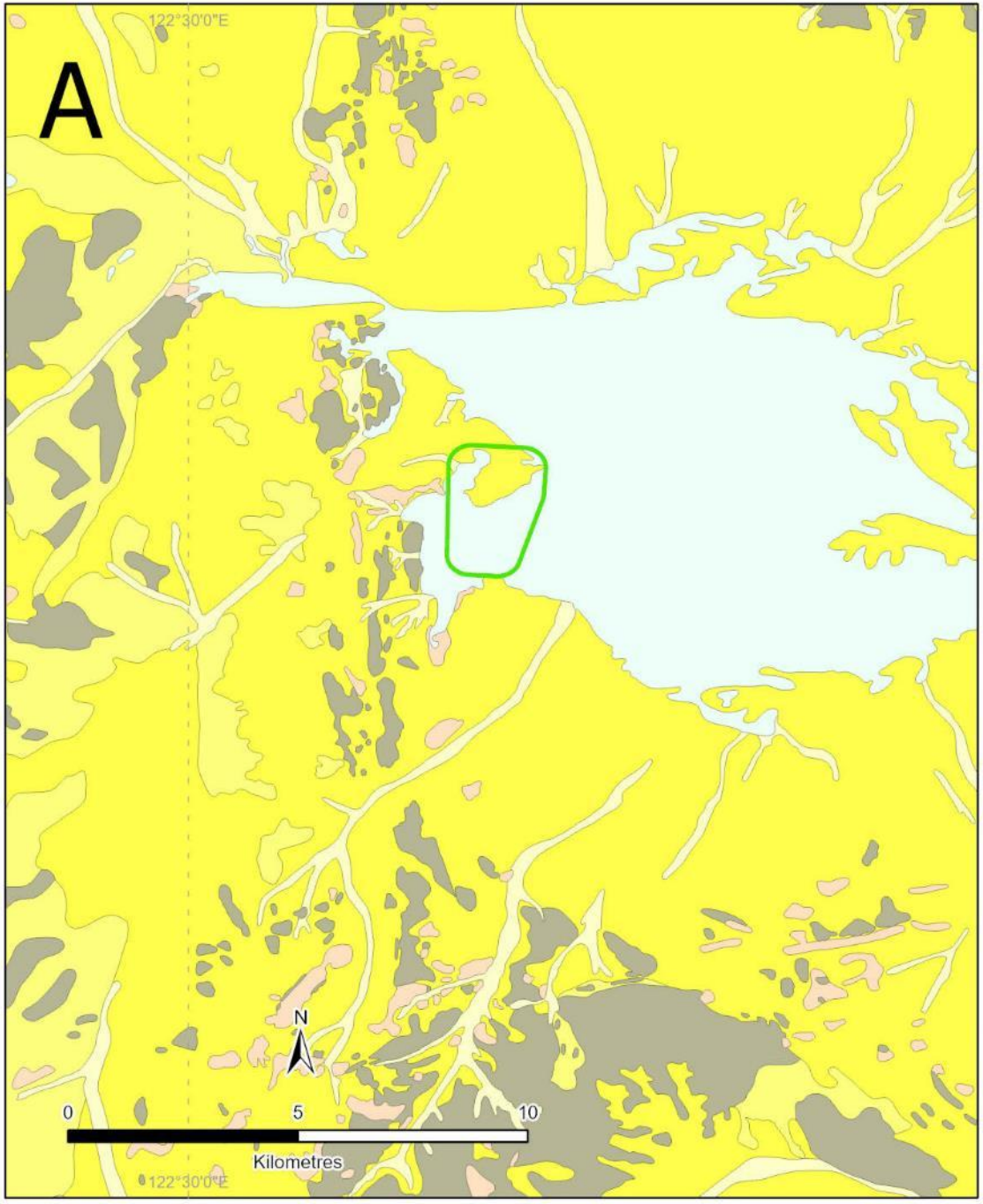
Regoliths representing surface geology often correspond to soil and landscape systems. The survey area mostly consists of lacustrine and colluvium regolith, with a small portion of alluvium (Figure 3b). These regolith units correspond to landforms that result in the creation of the unique surface geology. Colluvium is derived from slope deposits, and sheetwash, lacustrine refers to lakes, playas and fringing dunes, and alluvium in drainage channels, floodplains and deltas Marnham and Morris 2003.

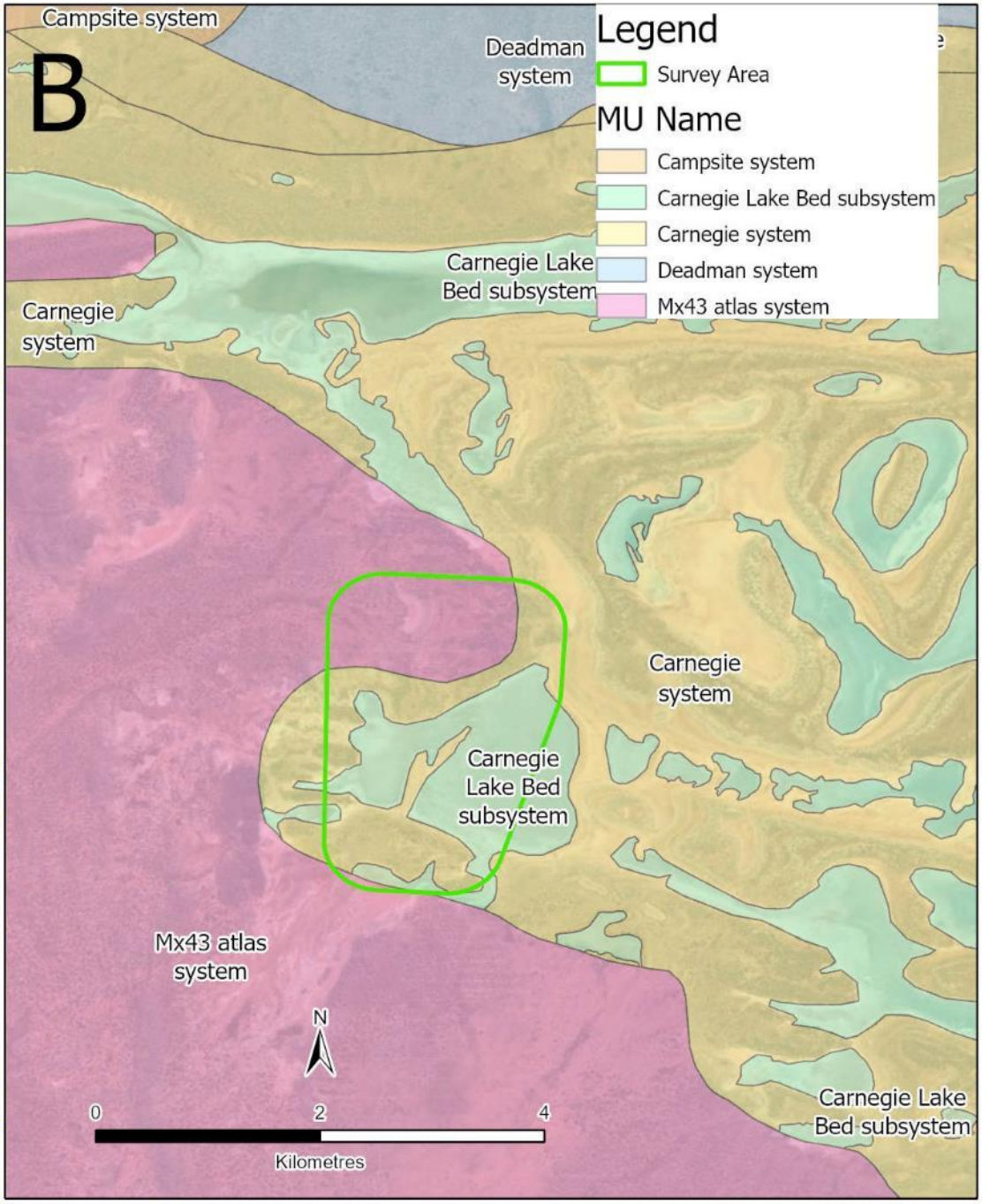
3.4. Hydrology

The Survey Area lies along the south western margin of Lake Roe, which is part of the Roe Palaeodrainage system bounded to the north and to the south by the Lake Rebecca and Lefroy Paleovalleys respectively, drained easterly into the Eucla basin and flowing through the Lake Roe Area B Hou 2022. The headwaters of this system are Lake Ballard, with drainage occurring in a south easterly direction to Lake Marmion, Lake Rebecca and Lake Roe, terminating broadly at Lake Yindarlgooda Stantec 2020.

Salt lakes along the drainage system consist of clay, silt and sand, interbedded with evaporite minerals such as gypsum and halite Campagna 2007. The playas are naturally saline, although they are often surrounded by numerous smaller peripheral claypans that are often freshwater. While typically dry, major flood events are known to occur infrequently, associated with intense winter rains or cyclonic events.

Long-term rainfall data (1968 to 2020) is available from the nearest Bureau of Meteorology (BoM) weather station at Cowarna Downs (Station (012220), which was located approximately 37 km southwest of the Project, however was decommissioned in 2020. Rainfall is variable, with a long-term annual average of 227 mm Bureau of Meteorology 2023. February is usually the wettest month, with rainfall related to ex-tropical cyclone activity from the Pilbara region.





Bennelongia Environmental Consultants

GCS GDA 1994
Author: ogarswood
Date: 30/04/2025

Legend

Survey Area

Regolith

Alluvium

Colluvium

Lacustrine

Residual

Sandplain

Exposed

Figure 3. Regolith (A) and Landscape mapping (B) occurring around project area

4. METHODS

4.1. Desktop assessment

The desktop assessment combined three sources of information using GIS mapping: records of occurrence of species belonging to SRE Groups provided by the Western Australia Museum (WAM); records of species from SRE Groups in the Bennelongia database; and any publicly available information such as published scientific papers and environmental reports accessible via online portals such as Atlas of Living Australia (ALA) and the Australian Faunal Directory. The WAM uses an internal code for undescribed species that is followed here, e.g. PSE072 for pseudoscorpion species 072, which is followed here. Bennelongia uses additional codes for species not listed in the WAM database, e.g. BIS for Isopoda. The full species name is used for described species,

Database searches covered an area of 10,000 km^2 and centred on the Survey area (30.256165°S to 31.159656°S and 122.073766°E to 123.044467°E). Database searches were combined and filtered to include species belonging to taxonomic groups known to contain short-range endemic species ('SRE Groups') and excluding other records. Where possible, each taxon was categorised according to the Western Australian Museum SRE classification scheme (see Section 2.1). Categorisation followed a combination of information regarding the taxon's known distribution, habitat preferences and extent, and species ecology. Spatial analyses and mapping were undertaken using ArcGIS Pro v2.9.5 and using baseline layers provided by the client.

4.2. Field Survey

Following the Technical Guidance for Sampling of Short-Range Endemic Invertebrate Fauna EPA 2016b, a field survey targeting invertebrates belonging to SRE Groups was carried out from 16-19 December 2024 by Bennelongia. During the survey a total of ten sites (Figure 4) were sampled via hand-forage techniques (see Section 4.2.1). The aim of the survey was to collect species from representative habitat types in the Project area, with the survey design and effort informed by the desktop assessment. The survey targeted all SRE groups mentioned in the EPA guidelines.

4.2.1. Sampling techniques

Sampling techniques followed published guidelines EPA 2016b. At least one hour was spent at each site, with two team members conducting various foraging techniques as outlined below.

Hand foraging consisted of actively searching for taxa belonging to SRE Groups in their preferred habitats, making basic assumptions about the target species' (or Group's) biology. Hand foraging techniques included:

- *Log flipping and litter raking*: turning over and breaking apart logs and dead wood in search of isopods, myriapods, and pseudoscorpions. Raking also helps to uncover camouflaged mygalomorph spider burrows or to uncover buried land snails that may aestivate below the surface.
- *Rock flipping*: turning over rocks and other debris in search of harvestmen, centipedes, and isopods. Rocks were returned to their natural position when possible.
- *Leaf litter sieving*: sieving leaf litter to target litter- and soil-dwelling species. Leaf litter sieving also uncovers small-bodied SRE species (such as pseudoscorpions, millipedes, and land snails).
- *Leaf litter bags:* two leaf litter samples per site were collected and transported in cloth bags to the laboratory and placed in Tullgren funnels to collect litter-dwelling invertebrates.
- *Leaf blowing*: hand-held leaf blowers were used to remove leaf litter and reveal mygalomorph spider burrows covered by litter or otherwise difficult to identify unaided. If found, burrows were examined and burrows likely to house a mygalomorph spider were then excavated.
- *Bark peeling and tree digging*: removing pieces of bark from trees with smooth and exfoliating bark for inspection, and removing dirt from the bases of trees to search for SRE taxa. These

techniques were only applied at sites containing trees (i.e. not at sites only containing shrubs or spinifex).
- *Night searching*: with the aid of ultraviolet torches, selected sites were visited at night in search of scorpions, which fluoresce under ultraviolet light and are thereby easily detected.

4.2.2. Preservation and identification of samples

Specimens collected in the field through hand foraging techniques were placed in 100% ethanol for further study and transported to Bennelongia's laboratory for taxonomic identification. Specimens were first sorted and separated from by-catch. When a specimen belonging to an SRE Group was found during this process, it was transferred to a labelled vial containing 100% ethanol for further identification.

Taxonomic expertise from multiple team members contributed to the identification process of SRE group species (Table 3). Morphological identifications were made using Leica stereomicroscopes and equipment necessary to study relevant taxonomic characters (e.g. micro-needles). Representative specimens will be lodged at the WAM upon completion of this report.

To increase taxonomic accuracy in some of the specimens belonging to potential SRE species, and to infer potential wider species ranges, a total of 10 specimens were also subjected to molecular analysis and a fragment of the mitochondrial "barcoding" cytochrome c oxidase subunit 1 gene was amplified in-house using standard primers, sequenced externally, and then subjected to molecular taxonomic analyses. This helped to clarify the ranges of some species that could otherwise not be identified, e.g. some centipedes and slaters. Details of the molecular assessment can be found in Appendix 3.

Figure 4. SRE sites sampled within the Survey area.

5. RESULTS

5.1. Desktop Assessment

After compiling WAM and Bennelongia database records, the desktop assessment found a number of species from SRE groups within a 100km x100km search area, indicating a moderately diverse fauna. No Confirmed SRE or Listed Threatened or Priority species were recovered from the desktop assessment and 26 species in SRE Groups were assessed as widespread according to published databases or research papers. One species in SRE Groups were classified as Unlikely Potential SREs (section 5.2; Figure 5). 18 additional species was categorised as Data Deficient Potential SREs, given a lack of taxonomical certainty and/or because they were represented by singleton specimens with little known knowledge of their habitat requirements and actual distribution.

5.2. SRE Groups in the search area

MOLLOUSCA

Gastropoda (land snails)

Seven species of land snails were recovered from the search area (see Appendix 1). All seven species were categorised as Widespread and not of conservation relevance within the SRE framework. One species of *Bothriembryon* was identified, *Bothriembryon dux*, and another indeterminate *Bothriembryon* sp. which might actually represent the same species. *Bothriembryon dux* is considered a widespread species in a group that otherwise has many SRE species. It is found along the southern coast of Western Australia.

ARACHNIDA

Araneae (Spiders)

Desktop Survey revealed a diverse spider fauna that includes 23 species of mygalomoph spiders (trapdoor spiders and allies) within the search area. Mygalomorph spiders tend to be SREs because of poor dispersal capacities and restriction to specific microhabitats. These species were divided between the families Anamidae, Barychelidae, Euagridae, Idiopidae and Theraphosidae. Of the 23 species, ten were categorised as 'Widespread' and the remaining 13 were determined to be 'Data Deficient" potential SREs with unknown distribution ranges but an ecology that might facilitate endemism. The 'Widespread' classification applies to species that have a range greater than 10,000km^2, or a linear range greater than 100km. All of the species listed as Widespread have records in the Bennelongia Database that show these species fitting said criteria.

Some araneomorph spiders such as the wolf spiders in the family Lycosidae (genus *Australohogna*) have species found on salt lakes that are considered habitat specialists with short ranges; however, no representatives of these species were identified in the desktop assessment and such species will be restricted to the playa of salt lakes. Some jumping spiders in the family Salticidae are also short-ranging, but there are no database records for these groups.

Pseudoscorpiones (pseudoscorpiones)

The desktop search recovered records of at least eleven Pseudoscorpion species within the desktop search area (Appendix 1). Only one of these is formally described, *Synsphyronus dorothyae*, and is considered Widespread according to SRE criteria. The remaining species are not formally described and are only recognised by their identification codes. Three of these have been categorised as Data Deficient Potential SREs as little is known about their actual distributions and habitat requirements. The remaining species are all considered Widespread as they have distributions larger than 100km and/or have been collected from widespread habitats. Some species are often found in ephemeral habitats (e.g. under tree bark) and have generally wide ranges. There are also some species in the arid-adapted Olpiidae genera *Austrohorus* and *Beierolpium*. There is increasing evidence that at least some species in these diverse genera are SREs and two taxa reported here are data deficient and nothing can be said about their ranges.

Scorpiones (scorpions)

At least eight species of scorpions were detected in the desktop search and these belong to three different families (Appendix 1). Five of these species, primarily in the genus *Lychas*, are widespread and not of conservation concern. Two undescribed species, *Isometroides* `goldfields1`, and *Urodacus* `BSCO092` are considered data deficient potential SREs. The last species, *Urodacus* `BSCO066` is Widespread due to a linear range exceeding 100km according to Bennelongia records.

MYRIAPODA

Chilopoda (centipedes)

Two species of Centipedes were found in the desktop area, each representing a separate family, the widespread and large species *Scolopendra morsitans* (family Scolopendridae), and an unidentified species in the genus *Mecistocephalus* (family Mecistocephalidae). Molecular studies have shown that some species in the latter family are short-ranging, and this species is a data efficient potential SRE species.

Diplopoda (millipedes)

Three species of millipedes were identified in the desktop search, including the widespread pincushion millipedes *Phyrssonotus novaehollandiae***,** and an unidentified species of *Unixenus* sp. The final member is Paradoxosomatidae sp., another specimen unable to be identified to species level. No confirmed or likely SRE millipede species were found in the database search.

CRUSTACEA

The 'Widespread' criteria of a range of greater than 10,000km^2 or a greater linear range than 100km was met by these records according to Bennelongia database records.

Terrestrial isopods (slaters)

Four species of Isopoda were found during the desktop search, with three of the four being members of the highly diverse genus *Buddelundia* within the family Armadillidae., These three species are listed as 'BIS434', 'BIS435', and 'BIS436' and are Data deficient potential SREs. The final isopod was *Laevophiloscia* sp. in the family Philosciidae. These slaters are generally moisture dependent but little is known about their taxonomy and they are considered Data deficient potential SREs.

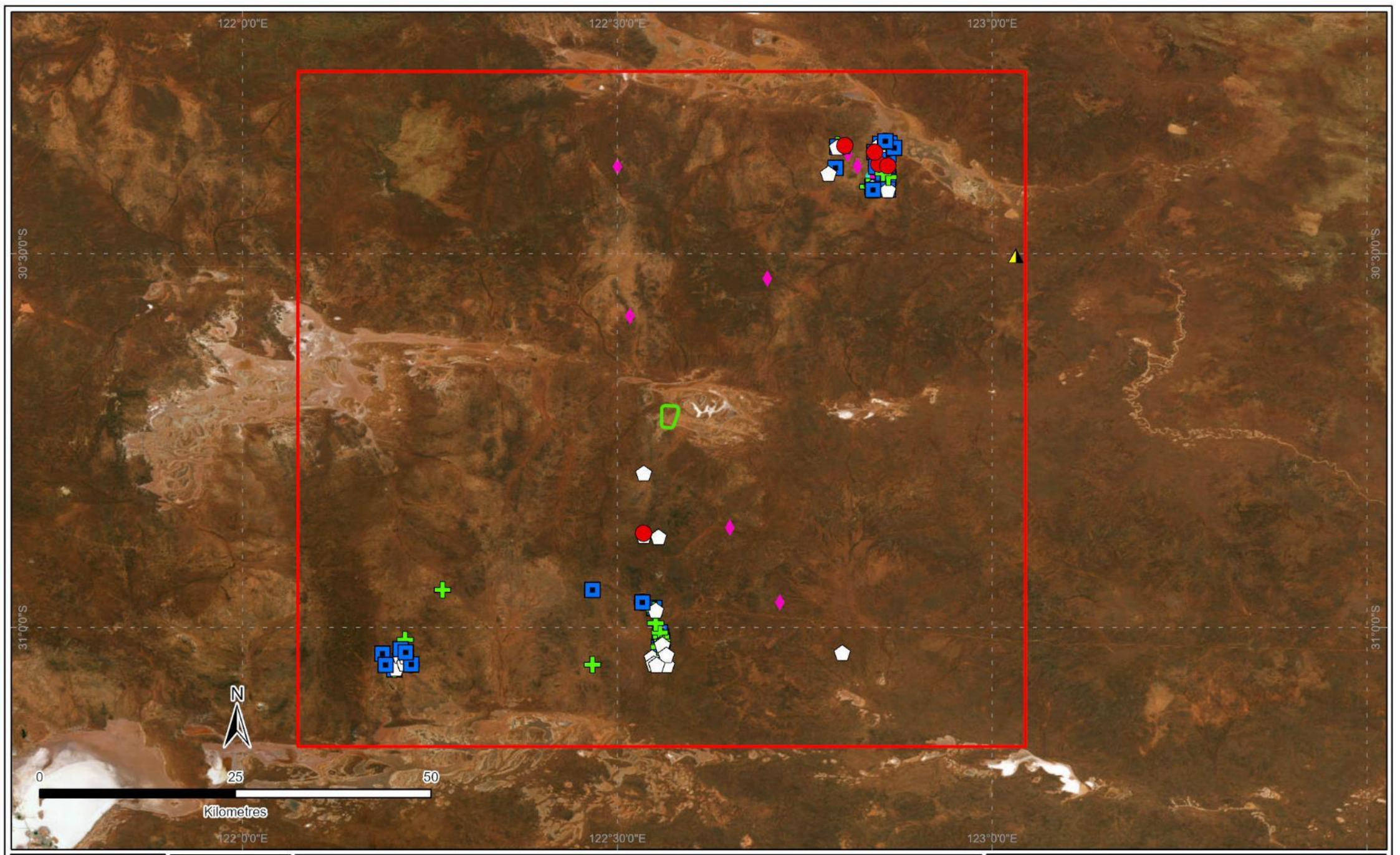


Figure 5. Desktop search area and the distribution of SRE groups found

5.3. Habitat

During the field survey, staff collect data on habitat at each site, including taking photos of each site (Appendix 4) to identify microhabitats within major habitat categories, as well as to verify the results of remote sensing. The descriptions provided are as follows:

Table 1: Habitat descriptions resulting from field study.

Sites in Habitat Type:	Habitat Description:
2	Mosaic: Medium woodland; salmon gum & red mallee / Hummock grasslands, mallee steppe; red mallee over spinifex Triodia scariosa
3, 5	Succulent steppe with open low woodland; mulga & sheoak over salt bush
10	Bare areas; salt lakes
1	Low lying succulent steppe and saltbush
8	Edge of salt lake and run-off area, patches of small salt shrub, mostly bare ground
6	Shrubland next to lakebed habitat
7	Island within lake drainage area, very little vegetation, heavy mining exploration
9	Edge of salt lake, open Eucalyptus woodland on dense spinifex shrubs.
4	Open *Eucalyptus* woodland on dense spinifex shrubs

In addition to the habitats identified above, Stantec 2020 identified twelve different habitat types within their original survey area for Lake Roe, however only nine appeared within the 2024 Bennelongia SRE survey boundary (Figure 2). Habitats differed primarily in the composition of their vegetation structure, the presence of woody debris and the presence of water. These habitats were categorised as having a high, medium or low potential to support terrestrial SRE taxa based on the criteria of microhabitats, distribution and connectivity. Microhabitats included areas of sheltered, relatively mesic environments such as slopes with south-west facing aspects, vine thickets, rock piles, drainage systems, deep gorges, mound springs/natural springs, fire refuge areas such as cliffs/isolated rock piles, and other similar habitats EPA 2016b.

Overall, the habitats represented by the Survey sites can be grouped into five categories: 'Mallee over spinifex sandplain' (Sites 4, 5, 6 and 9), 'Samphires' (Sites 7 and 8), 'Playa' (Site 10), 'Shrubland on flats' (Site 1), 'Sheoak over chenopod' (Site 2) and 'Eucalypt woodland' (Site 3) (Figure 2).

Mallee over spinifex sandplain was characterised by a lower storey of Triodia sp. ~0.3 m high and ranging from 10–30% to 30–70% cover. The upper storey comprised a moderate cover of Eucalypt mallee; however, cover was lower in degraded areas (lower right). There was over a minimal shrub mid storey comprising young mallee or *Eremophila* sp. This habitat was found overlying the Borrow Pit footprints on the low rises, as well as in the northern and central sections of the Mine Survey area. Substrates comprised red sand with high burrowing suitability and minimal or no coarse fragment and cryptogam cover. The habitat was long unburnt, evident from spinifex growth (e.g. ring pictured right). The long-unburnt Triodia of this habitat, limited extent within the Survey Area, and the presence of peeling bark, leaf litter, small hollows (<10 cm in diameter) and woody debris indicates the area may be moderately suitable for SRE taxa.

Samphires were dominated by *Tecticornia* sp. and lacked an upper and mid storey. The lower storey also comprised *Carpobrotus* sp. and varied from moderate (left) to low (right) cover. Substrates were compact and vegetation debris and rocky fragments were absent. This habitat is prone to flooding and was minimally affected by exploration clearing and tracks.

Samphires may provide habitat for salt-lake specialist invertebrates such as wolf spiders (Lycosidae). As such, the habitat is of moderate suitability to SRE taxa.

Playas are large, level, semi-permanent saltwater lakes. These areas contained no vegetation and were characterised by medium to heavy compact clays. Sites ranged from having minimal disturbance from exploration tracks (left) to large expanses of heavily degraded areas impacted by exploration drilling and tracks (right). Debris on the Lake Playa may provide micro-habitat for burrowing saline-specialist invertebrates such as salt-lake tiger beetles (*Pseudotetracha* spp.), salt-lake wolf spiders (*Australohogna*), and salt-lake crickets (*Apterogryllus* spp.). As such, the habitat is of moderate suitability to SRE taxa.

Shrubland on flats contained isolated clumps of trees such as Acacia (picture right), or no upper storey (pictured left). This tended to be over a sparse shrub midstory (including Eremophila sp. (bottom left) and *Dodonaea* sp.) and a moderate to a high cover of low Chenopod shrubs, dominated by *Atriplex* sp., *Maireana* sp. and *Tecticornia* sp. This habitat tended to occur on the low flat areas and was often saline influenced. This habitat tended to contain no leaf litter, hollows or peeling bark, and only occasionally contained minimal woody debris. Substrates tended to be compact. The lack of microhabitats, and the widespread and well-connected nature of the habitat indicates this habitat is of low suitability for SRE taxa.

Sheoak over chenopod is characterised by an upper storey dominated by a low cover of sheoak. This was over a low to sparse cover dominated by *Mariana* sp. and *Cratystylis microphylla*, however also comprised *Senna* sp. and *Eremophila* sp. (upper right). The habitat transitioned into Eucalyptus mallee over spinifex in some areas, with a sparse lower cover of *Triodia* sp. (lower right). This habitat contained a moderate level of leaf litter, moderate to common amount woody debris and no hollows. Topsoil ranged from compact with moderate burrowing suitability to sandy with high burrowing suitability. The habitat is widespread and well connected within the Survey Area and therefore is of low likelihood to support SRE taxa.

Eucalypt woodland was characterised by an upper storey of large, long unburnt *Eucalyptus* trees over a lower story of chenopods. The upper story provided an abundance of woody debris, medium to large hollows, peeling bark and leaf litter. Woody debris tended to comprise large tree limbs and contained termites, providing an abundance of hollow logs and crevices. The upper storey ranged from moderate (top left) to low cover (bottom right) and was over a moderate to high cover. Substrates tended to contain quartzite fragments (20 mm – 60 mm). Habitats were largely on plains, however included hills (bottom right) which contained areas of higher dark coarse fragment cover. The presence of hollow logs, crevices and leaf litter may provide microhabitats for SRE taxa and is suitable for SRE species. However, the habitat is widespread and well connected within the Survey Area and surrounding landscape.

5.4. Survey Results

In the Survey, 112 specimens were collected. The field survey did not yield any Confirmed SREs, but two millipede species and one centipede species were Likely Potential SREs (Table 3). It is possible that some of the Data deficient animals could correspond with Higher Order animals from the Desktop, but it is impossible to know due to limited taxonomical information.

Gastropoda:

Seven species of Gastropods were identified, as well as two instances of higher order finals. These were divided into five families, Camaenidae, Charopidae, Gastrocoptidae, Punctidae and Pupillidae.

Within Camaenidae, there was a single genus represented with two species, *Sinumelon jimberlanensis and Sinumelon nullarboricum*. *Sinumelon jimberlanensis* had three specimens in total collected at Site 2, which was represented by the 'sheoak over chenopod' habitat according to Stantec 2020. *Sinumelon nullarboricum* had two specimens collected in total at Site 3, represented by the 'Eucalypt woodland' habitat. Both species are widespread according to the Atlas of Living Australia and not of conservation concern.

Within Charopidae, there was a single higher order final specimen collected, '*Charopidae* sp indet..' collected at Site 3, represented by the 'Eucalypt woodland' habitat. The single specimen was unable to be identified further due to the specimen being too broken. Some Charopidae have restricted ranges and we treat this unidentified as a data deficient SRE species.

Within Gastrocoptidae, there was a single genus represented with two species, *Gastrocopta bannertonensis* and *Gastrocopta margaretae*. *Gastrocopta bannertonensis* has seven specimens collected, two from Site 2, represented by the 'sheoak over chenopod' habitat, and the other five from Site 6, represented by 'Mallee over spinifex sandplain'. *Gastrocopta margaretae* had two specimens collected from Site 2 as well, and one from Site 9, represented by 'Mallee over spinfex sandplain'. Both of these species are clearly widespread species.

Punctidae included a single genus and single species *Westraloma experta*. It has a single specimen collected from Site 6, represented by Mallee over spinifex sandplain'. This species is also widespread.

Pupilidae included a single genus, containing two species, *Pupoides adelaidae* and *Pupoides myoporinae*. *Pupoides adelaidae* has 21 specimens collected, with eight specimens from Site 1, represented by 'Shrubland on flats', nine specimens from Site 3, represented by 'Eucalypt woodland', two specimens from Site 2, represented by 'Sheoak over chenopod' and two from Site 4, represented by 'Mallee over spinifex sandplain'. *Pupoides myoporinae* has a single specimen collected, from Site 3. Both of these species are considered widespread.

As all these species are Widespread, they do not represent particular conservation concerns, in addition to the fact that no members of the SRE genus *Bothriembryon* were recovered in the search area and given the habitats present within the Project area, the likelihood of *Bothriembryon* species occurring in the Project area is considered low.

Araneae:

Two species of mygalomorph spider and one higher order araneomorph spider were found during the Survey. Typically only mygalomorph (trapdoor) spiders are collected during SRE Survey, however salt lake environments are known to contain SRE species of 'Araneomorphs' such as members of the family 'Lycosidae', commonly known as 'Wolf Spiders' (Stantec 2020). Wolf spiders were indeed collected during the survey but they did not represent salt lake specialists, as usually evident from their white body colouration. The species collected is not relevant to the assessment and is not included in the species list (Table 2).

Of the Mygalomorphs, there was one family represented, Idiopidae, with one genus represented with two species of `*Idiosoma sp.*`. This family has a high number of SRE members that are also considered threatened, such as *Idiosoma nigrum* or *Idiosoma kopejtkaorum* (DCCEEW 2024 Bennelongia 2024). The two species collected here were *Idiosoma* `MYG721` and *Idiosoma* `BMYG168`. As a result of DNA Analysis, in conjunction with Bennelongia database records, it was shown that both of these species had a linear range greater than 100km. As per Harvey (2002a)'s criteria for SRE Invertebrates, both of these undescribed species are therefore considered 'Widespread'.

Pseudoscorpiones:

Two species of pseudoscorpions were collected during the survey and both belong to the family Olpiidae which is extremely diverse and abundant in arid Western Australia. Species identification is difficult but two specimens of the genus *Austrohorus* was collected and were classified here as a new species *Austrohorus* `BPS590`. The specimens were collected from Site 4, represented by 'Mallee over spinifex sandplain'. The second species was *Beierolpium* `BPS602`, of which four specimens were collected, three in Site 4 and one in Site 3, represented by 'Eucalypt woodland'. Both of these undescribed species are classified as 'Data Deficient' potential SREs because they are the sole representatives of their respective genera within the search area, and taxonomical and distributional data are lacking. Although it is not clear what are the actual distributions and habitat requirements of these species, it is not expected that their distributions are restricted to the footprint of the Project.

Scorpiones:

Three species of Scorpions were found in the survey area belonging to two different families, Buthidae and Urodacidae. Within the Buthidae, two species were collected from single specimens respectively. *Isometroides* `BSCO084` was collected from Site 3 which represents 'Eucalypt woodland'. The second species was *Lychas* `BSCO093` which was a single specimen collected in Site 2, represented by 'sheoak over chenopod'. *Isometroides* `BSCO084` is considered 'Widespread' based on molecular data, and *Lychas* `BSCO093` is classified as a data deficient potential SRE species.

The family Urodacidae was represented by a single new species *Urodacus* `BSCO066`. A total of eight specimens were collected from five sites:_ Site 9, represented by 'Mallee over spinifex sandplain'; Site 5, represented by 'Mallee over spinifex sandplain'; Site 1, represented by 'Shrubland on flats', Sites 2, and 6, represented by 'Mallee over spinifex sandplain' *Urodacus* `BSCO066` is likely widespread, due to Bennelongia records showing it has a linear range of over 100km, and lives in a variety of habitats that are not restricted.

Isopoda:

18 isopods were collected during the field survey, with all but one identified in the genus '*Buddelundia*', with a single specimen found from the Genus '*Laevophiloscia*'. There was two species of *Buddelundia,* the first being *Buddelundia* `BIS603`, found exclusively during this survey. 16 specimens were collected,

with eight being collected from Site 2, characterised by 'Sheoak over chenopod'. Seven were collected from Site 3, characterised by 'Eucalypt woodland'. The remaining specimen was collected from Site 4, characterised by 'Mallee over spinifex sandplain'. The other species of *Buddelundia* was *Buddelundia* `BIS434`, where a single specimen was collected from Site 3.

The remaining specimen was *Laevophiloscia* `BIS604`, a single specimen collected from Site 2. All 3 of these species are considered Data deficient, as there are not enough records of these undescribed species to determine their range, however it is likely that *Buddelundia* `BIS603` has a much larger range due to the variety of widely distributed habitats it was found in. It is also likely that the other isopods collected are more widely distributed, but lack of records makes it unable to be known for sure.

In Australia, the order Isopoda contains a diverse and largely undescribed group of terrestrial epigean crustaceans (suborder Oniscidae) that, due to poor dispersal capabilities and specific habitat preferences, are often SREs (Judd 2004; Judd and Horwitz 2003; Judd and Tati 2011). We classify our specimens as date deficient potential SREs.

Chilopoda:

Two members of Chilopoda (Centipedes) were collected, each singleton representing a different family. The first was in the family Scolopendridae and identified as *Scolopendra* `BSCOL112`. The single specimen was collected from Site 2, represented by 'Sheoak over chenopod'. Scolopendrid centipedes are often large and agile species that are widespread in Australia. The species is no of conservation concern.

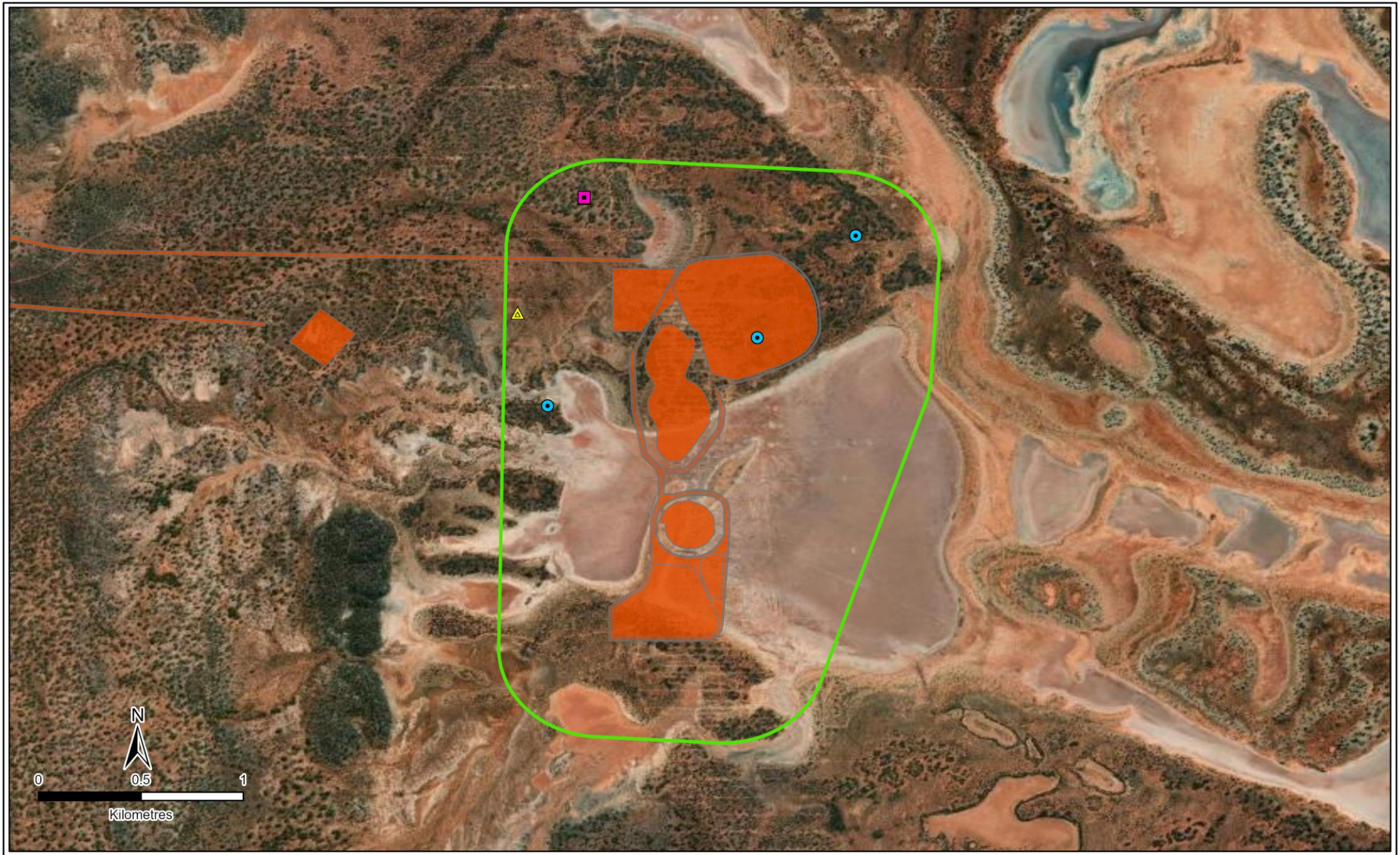
The other family represented was Chilenophilidae and the single specimen corresponds to `Chilenophilidae `BGE099`. It was collected in Site 3. There is no taxonomic framework for geophilid centipedes in Australia but there is increasing molecular evidence that many species have short ranges. The present specimen is considered a data deficient potential SRE for these reasons (Figure 6).

Diplopoda:

Three families of Diplopoda (millipedes) across 28 collected specimens were recovered from the Survey and these belong to the Paradoxosomatidae, Synxenidae, and Siphonotidae. The recovered species provide a mix of widespread and potentially range restricted species.

Three unidentified *Antichiropus* specimens were collected from Site 3, ('Eucalypt woodland') and Site 1 ('Shrubland on flats'). Almost all species of *Antichiropus* have distribution ranges below the SRE threshold and the genus is amongst the "flagship" taxa of SRE group taxa (Car et al. 2013). Given the present species represents a higher order identification from a known SRE genus, it is classified here as Likely Potential SREs (Figure 6).

The survey also recovered 25 specimens of Siphonotidae, all classified here as a single undescribed species Siphonotidae `BDI094`. Eight were recovered from Site 6, 10 were recovered from site 4 ('Mallee over spinifex sandplain') and seven from Site 5 ('Mallee over spinifex sandplain). These millipedes are moisture-dependent and potential SREs according to ecological characteristics (Figure 6).



Bennelongia Environmental Consultants

GCS GDA 1994
Author: K. Sagastume
Date: 23/05/2025

Legend

- Survey Area
- Disturbance Footprint

Survey Species

- Antichiropus sp.
- Chilenophilidae `BGE099`
- Siphonotidae `BDI094`

Figure 6: Potential SRE species recovered from the Project area.

6. DISCUSSION

The desktop portion of the assessment suggests a moderately diverse assemblage of SRE Invertebrate groups within the search area in the proximity of the survey area. No Confirmed SRE or Listed Threatened or Priority species were recovered from the desktop assessment, but one species was Unlikely Potential SRE (section 5.2; Figure 5). Given a lack of taxonomical certainty and/or because they were represented by singleton specimens with little known of their habitat requirements and actual distribution, 18 species were categorised as Data Deficient Potential SREs. 27 species have either been confirmed through published research or inferred through available records to be widespread. None of these records were found within the Field Survey area.

The field survey did not yield any Confirmed SREs or Likely Potential SREs, but two millipede species and one centipede species were Likely Potential SREs (Table 3). It is possible that some of the Data deficient animals could correspond with Higher Order animals from the Desktop, but it is impossible to know due to limited taxonomical information.

The findings of both the field survey and desktop assessment suggest that it is unlikely that development at Lake Roe will impact populations of conservation significant SRE groups, as the number of species from SRE groups is relatively small, and because none of the desktop records occurred within the development area. In addition to this, many of the habitats are widespread, and the Stantec habitat mapping suggested that the habitats present were at most low to moderate in their prospectivity of hosting SRE species.

A total of eight habitats identified by Stantec occurred throughout the Survey Area. None of the fauna habitats were classified as having high potential to support SRE taxa. Four habitats were classified as having a moderate potential to support SRE taxa, comprising: Lake playa, Mallee over spinifex sandplain, Gypsum dunes, and Freshwater claypan. The remaining four habitats were classified as having low potential to support SRE taxa, comprising: Eucalyptus woodland, Shrubland on flats, Samphire, and Sheoak over chenopod. The beard vegetation associations are also widespread associations, with the 10 sites being divided between Associations 125, 480 and 481.

We conclude that the relatively low number of SRE species in combination with relatively few habits suggest that there is no risk of development at Lake Roe impacting on SRE conservation values. These findings are also supported by the relatively small Project footprint, and the fact that the present habitat extend beyond this footprint.

6.1. Species List from Survey

Table 2: Species List resulting from Survey

Taxon	Specimen Count	SRE Status	Sample Sites
Mollusca			
Gastropoda			
Stylommatophora			
Camaenidae			
Sinumelon jimberlanensis	3	Widespread	Site 2
Sinumelon nullarboricum	2	Widespread	Site 3
Charopidae			
Charopidae sp. indet.	1	Data Deficient	Site 3
Gastrocoptidae			
Gastrocopta bannertonensis	7	Widespread	Site 2, Site 6
Gastrocopta margaretae	3	Widespread	Site 2, Site 9
Punctidae			
Westralaoma experta	1	Widespread	Site 6
Pupillidae			
Pupoides adelaidae	21	Widespread	Sites 1-4
Pupoides myoporinae	1	Widespread	Site 3
Unidentified			
Gastropoda sp. indet.	7		Site 3
Arthropoda			
Arachnida			
Pseudoscorpiones			
Olpiidae			
Austrohorus `BPS590`	2	Data Deficient	Site 4
Beierolpium 8/4 `BPS602`	4	Data Deficient	Sites 3-4
Scorpiones			
Buthidae			
Lychas `BSCO093` (*annulatus* complex)	1	Data Deficient	Site 2
Isometroides SCO051	1	Widespread	Site 3
Urodacidae			
Urodacus `BSCO066`	8	Widespread	Sites 1, 2, 5, 6 & 9
Araneae			
Idiopidae			
Idiosoma `MYG721`	1	Widespread	Site 3
Idiosoma `BMYG168`	1	Widespread	Site 4
Malacostraca			
Isopoda			
Armadillidae			
Buddelundia `BIS603`	16	Data Deficient	Sites 2-4

Taxon	Specimen Count	SRE Status	Sample Sites
Buddelundia `BIS434`	1	Data Deficient	Site 3
Philosciidae			
Laevophiloscia `BIS604`	1	Data Deficient	Site 2
Chilopoda			
Scolopendromorpha			
Scolopendridae			
Scolopendra `BSCOL112`	1	Widespread	Site 2
Geophilomorpha			
Chilenophilidae			
Chilenophilidae `BGE099`	1	Likely Potential SRE	Site 3
Diplopoda			
Polydesmida			
Paradoxosomatidae			
Antichiropus sp. indet.	3	Likely Potential SRE	Site 1, Site 3
Polyzoniida			
Siphonotidae			
Siphonotidae `BDI094`	25	Likely Potential SRE	Sites 4-6
Grand Total	112		

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8. APPENDICES

Appendix 1: Desktop Species List

SRE Group	Lowest ID	SRE Cat	Comments
Gastropoda:			
Bothriembryontidae	*Bothriembryon dux*	Widespread	
	Bothriembryon sp. indet.		Higher order ID
	Sinumelon kalgum	Widespread	
	Sinumelon tarcoolanum	Widespread	
Stylommatophora			
Camaenidae	*Sinumelon nullarboricum*	Widespread	
Gastrocoptidae	*Gastrocopta bannertonensis*	Widespread	
Pupillidae	*Pupoides adelaidae*	Widespread	
	Pupoides myoporinae	Widespread	
	Pupoides sp.		Higher order ID
Arachnida:			
Pseudoscorpiones:			
Atemnidae	Atemnidae sp. indet.		Higher order ID
	Oratemnus `sp. indet.`		Higher order ID
Cheiridiidae	Cheiridiidae `BPS344`	Data Deficient	
Cheliferidae	Cheliferidae `BPS354`	Widespread	
Chernetidae	Chernetidae `BPS351`	Widespread	
	Chernetidae `BPS352`	Widespread	
	Chernetidae `sp. indet.`		Higher order ID
	Conicochernes `PSE024`	Widespread	
	Nesidiochernes `BPS343`	Widespread	
Garypidae	*Synsphyronus* `BPS353`	Data Deficient	
	Synsphyronus `sp. indet.`		Higher order ID
	Synsphyronus dorothyae	Widespread	
Olpiidae	*Austrohorus* sp indet.		Higher order ID
	Beierolpium `sp. indet`		Higher order ID
	Beierolpium 8/4 `BPS345`	Data Deficient	
	Olpiidae `sp. indet.`		Higher order ID
Scorpiones:			
Bothriuridae	*Cercophonius michaelseni*	Widespread	
Buthidae	*Isometroides* `goldfields1`	Data Deficient	
	Isometroides `vescus`	Widespread	
	Lychas `annulatus`	Widespread	
	Lychas `BSCO092` `splendens group`	Widespread	
	Lychas `SCO039` (annulatus complex)	Widespread	
	Lychas sp indet.		Higher order ID
Urodacidae	*Urodacus* `BSCO061`	Data deficient	

SRE Group	Lowest ID	SRE Cat	Comments
	Urodacus `BSCO066`	Widespread	
	Urodacus sp. indet.		Higher order ID
Araneae:			
Anamidae	*Aname* `mainae`	Widespread	
	Aname `MYG181`	Data Deficient	
	Aname `MYG212`	Widespread	
	Aname simoneae	Widespread	
	Kwonkan `BMYG180`	Data Deficient	
	Kwonkan `MYG263`	Data Deficient	
	Proshermacha `BMYG179`	Data Deficient	
	Proshermacha `MYG502`	Data Deficient	
Barychelidae	*Idiommata* `BMYG181`	Data Deficient	
	Mandjelia `BMYG182`	Data Deficient	
	Synothele `MYG264`	Data Deficient	
	Synothele meadhunteri	Widespread	
	Synothele `BMYG172	Data Deficient	
Euagridae	*Cethegus* `BMYG248`	Widespread	
	Cethegus `fugax`	Widespread	
	Cethegus ischnotheloides	Widespread	
Idiopidae	*Bungulla bertmaini*	Widespread	
	Idiosoma `BMYG168`	Widespread	
	Idiosoma `MYG159?`	Data Deficient	
	Idiosoma `MYG721`	Data Deficient	
	Idiosoma `rhaphiduca, twig-lining`	Data Deficient	
	Idiosoma `sp. indet.`		Higher order ID
	Idiosoma sp. Tropicana 1	Data Deficient	
Theraphosidae	*Selenotholus foelschei*	Widespread	
Crustacea:			
Isopoda:			
Armadillidae	*Buddelundia* `BIS434`	Data Deficient	
	Buddelundia `BIS435`	Data Deficient	
	Buddelundia `BIS436`	Data Deficient	
	Buddelundia sp. indet.		
Philosciidae	*Laevophiloscia* sp. indet.	Data Deficient	Higher order ID
Myriapoda:	Isopoda sp.		Higher order ID
Chilopoda:			
Scolopendridae	*Scolopendra morsitans*	Widespread	
Mecistocephalidae	*Mecistocephalus* `sp.`		Higher order ID
Polyxenidae	*Unixenus* sp.		Higher order ID
Synxenidae	*Phryssonotus novaehollandiae*	Widespread	
Paradoxosomatidae	Paradoxosomatidae sp.		Higher order ID

Appendix 2: Site Coordinates and Landform Description

Site Number:	Latitude:	Longitude:	Landform Description:
Site 01	-30.711082	122.559698	Sand, silt, and gypsum in stabilized dunes adjacent to playas
Site 02	-30.707303	122.559919	Alluvium - clay, silt, and gravel; in stream channels and floodplains
Site 03	-30.705242	122.563093	Colluvium - gravel and sand as sheetwash and talus; includes laterite fragments
Site 04	-30.707191	122.576934	Sand, silt, and gypsum in stabilized dunes adjacent to playas
Site 05	-30.71239	122.571916	Colluvium - gravel and sand as sheetwash and talus; includes laterite fragments
Site 06	-30.715861	122.561226	Evaporite interbedded with clay, silt, and sand in playas
Site 07	-30.719547	122.57017	Sand, silt, and gypsum in stabilized dunes adjacent to playas
Site 08	-30.731133	122.571808	Evaporite interbedded with clay, silt, and sand in playas
Site 09	-30.727416	122.566984	Sand, silt, and gypsum in stabilized dunes adjacent to playas
Site 10	-30.731215	122.563407	Evaporite interbedded with clay, silt, and sand in playas

Appendix 3: DNA Analysis Table

Final Identification	Identification before DNA	Site Code	Location	Collection Date	Comments
Urodacus `BSCO066`	*Urodacus* `BSCO066`	Site 02	East Kalgoorlie	17/12/2024	A species-level match of 1.8% genetic distance was found with *Urodacus* `BSCO066` in the Bennelongia database
Lychas `BSCO093` `annulatus compelx`	*Lychas* `multipunctatus group`	Site 02	East Kalgoorlie	17/12/2024	A species-level match of 8.7% genetic distance was found with *Lychas* `BSCO093` `annulatus complex` in the Bennelongia database. Closer to `*annulatus* complex` than `*multipunctatus* group`.
Scolopendra `BSCOL112`	*Scolopendra* sp.	Site 02	East Kalgoorlie	17/12/2024	Bennelongia database confirmed with 10.1% genetic distance with an animal 400km away, closest to *Scolopendra* `BSCOL112`.
Idiosoma `MYG721`	*Idiosoma* sp.	Site 03	East Kalgoorlie	16/12/2024	Bennelongia database included a species level match, with 3.8% genetic distance with Lake Rebecca specimen *Idiosoma* `MYG721`
Isometroides BSCO051	*Isometroides vescus* s.l.	Site 03	East Kalgoorlie	16/12/2024	Closest to Biologic Database for COI, 5.5% genetic distance from Biologic-SCOR010; however likely the same as Benn database SCO051, likely same as Biologic SCOR-010.
Chilenophilidae `BGE099`	*Geophilida* sp.	Site 03	East Kalgoorlie	16/12/2024	Geophilida sp. CHI009 from Genbank closest match, 12.5% genetic distance, 14.9% genetic distance from Benn. Chilenophilidae BGE051, no close hits, a likely new species of Geophilidae.
Austrohorus `BPS590`	*Austrohorus* `BPS590`	Site 03	East Kalgoorlie	16/12/2024	Benn. Database found 11.9% distance from *Austrohorus* BPS357, No close hits, remains as `BPS590`.
Idiosoma `BMYG168`	*Idiosoma* sp.	Site 04	East Kalgoorlie	16/12/2024	Closest hit was Benn. Database, species level match, *Idiosoma* `BMYG168` from Lake Rebecca, with 6.1% genetic distance.
Beierolpium `BPS602`	*Indolpium* `BPS587`	Site 04	East Kalgoorlie	16/12/2024	Genbank database shows closer match to *Beierolpium* sp. Biologic-PSEU056, with 16.67% distance, compared to Benn. Database 25.3% distance from *Indolpium* `BPS587`, and is 17.3% distance from *Beierolpium* `BPS441`. New species
Urodacus `BSCO066`	*Urodacus* `BSCO061`	Site 09	East Kalgoorlie	17/02/2024	Benn. Database showed a species level match with 2.1% genetic distance from *Urodacus* `BSCO066`. 0.3% genetic distance from the reference *Urodacus* `BSCO066`. Confirmed as *Urodacus* `BSCO066`

Appendix 4 – Photographs of SRE Collection sites within the Survey Area

Site 1:




Site 2:



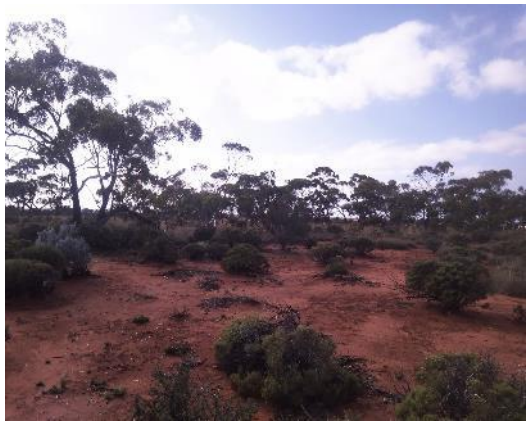

Site 3:




Site 4:




Site 5:




Site 6:




Site 7:




Site 8:




Site 9:




Site 10: