

Bennelongia

Environmental
Consultants



East Pilbara Generation Hub (EPGH) Subterranean Fauna Assessment

Prepared for:
Fortescue Ltd

April 2025
Final Report

Short-Range Endemics | Subterranean Fauna

Waterbirds | Wetlands



East Pilbara Generation Hub (EPGH) Subterranean Fauna Assessment

Bennelongia Pty Ltd
5 Bishop Street
Jolimont WA 6014

P: (08) 9285 8722
F: (08) 9285 8811
E: info@bennelongia.com.au

ABN: 55 124 110 167

Report Number: 713

Report Version	Prepared by	Reviewed by	Submitted to Client	
			Method	Date
Draft	Blake Wyber	Stuart Halse	email	7 April 2025
Final	Stuart Halse		email	14 April 2015

T:\FMG_78\BEC_EPGH Subfauna Assessment_final14iv25

This document has been prepared to the requirements of the Client and is for the use by the Client, its agents, and Bennelongia Environmental Consultants. Copyright and any other Intellectual Property associated with the document belongs to Bennelongia Environmental Consultants and may not be reproduced without written permission of the Client or Bennelongia. No liability or responsibility is accepted in respect of any use by a third party or for purposes other than for which the document was commissioned. Bennelongia has not attempted to verify the accuracy and completeness of information supplied by the Client. © Copyright 2020 Bennelongia Pty Ltd.

EXECUTIVE SUMMARY

Fortescue Ltd (Fortescue) is exploring the development of the East Pilbara Generation Hub Project, located approximately 30 km southeast of Marble Bar in Western Australia. During the initial construction phase, groundwater extraction will be required, potentially affecting subterranean fauna, particularly stygofauna. In response, Fortescue has engaged Bennelongia Environmental Consultants to conduct a desktop review and baseline survey of subterranean fauna and their habitat in the Project area.

The available information on geology suggests the Project may be moderately prospective for troglofauna but the lack of below ground disturbance means the Project poses no threat to troglofauna. Information on hydrogeology suggests parts of the Project area are prospective for stygofauna. A desktop search, utilizing the Western Australian and Bennelongia databases for a 150 x 150 km area centred on the Project found 795 records of troglofauna representing 128 species and 2057 records of stygofauna representing 228 species. There were few records from the Project area for either subterranean fauna group.

Field surveys for stygofauna in 2022 and 2024 collected 32 species of stygofauna in 25 samples of stygofauna taken from 17 sites. Eight of the stygofauna species collected are known only from the Project area. These species include: the amphipods *Bogidiella* `BAM216`, Paramelitidae `BAM214` and Paramelitidae Genus 2 `BAM215`, the cyclopoid copepod *Diacyclops* `BCY113`, and four harpacticoid copepods *Megastygonoecrella* `BHA256`, Ectinosomatidae `BHA413`, *Parastenocaris* `BHA331` and *Parastenocaris* `BHA412`. However, none of these species was collected from the very small areas (<1 km²) of groundwater drawdown area associated with Project water supply. Maximum vertical drawdowns within the drawdown areas will be 4 m. All species were found in continuous hydrogeological formations and ranges of the species are considered likely to be widespread at the local scale. Linear ranges of up to 35 km were recorded during survey, covering the full extent of the surveyed area.

When the likely locally wide ranges of species and small drawdown in very small drawdown areas are considered, the threat to subterranean fauna conservation values from Project development and operation, for both troglofauna and stygofauna, will be very low.

CONTENTS

Executive Summary	ii
1. Introduction	1
2. Subterranean Fauna.....	1
3. Environment.....	2
3.1. Biogeography	2
3.2. Project Details	2
3.3. Geology	2
3.4. Hydrogeology	2
4. Methods.....	9
4.1. Desktop Search Methods	9
4.2. Field Survey Methods	9
4.2.1. Field Sampling	9
4.2.2. Laboratory Processing	9
4.3. Personnel.....	12
5. Results.....	12
5.1. Desktop Results	12
5.2. Survey Results	12
5.3. Physico-chemical Measurements	14
6. Discussion.....	15
7. References.....	18
Appendices.....	19
Appendix 1 – Stygofauna Desktop Results.....	19
Appendix 2 – Troglifauna Desktop Records	32
Appendix 3 – Site Groundwater Physico-Chemistry.....	41

LIST OF FIGURES

Figure 1 – Project Locality	3
Figure 2 – IBRA Subregions.....	4
Figure 3 – Regolith Geologies Underlying The Project.....	5
Figure 4 – Bedrock Geologies Underlying The Project	6
Figure 5 – Hydrogeology Underlying The Project.....	7
Figure 6 – Palaeovalleys Surrounding the Project.....	8
Figure 7 – Desktop Search Area surrounding the Project.	10
Figure 8 – Subfauna Records Identified Within The Desktop Search Area	11
Figure 9 – Stygofauna Sampling	16
Figure 10 – Species Identified only Within the Survey Area	17

LIST OF TABLES

Table 1. Qualifications and role of staff involved in Project.	12
Table 2. Stygofauna species collected from Project area surveys in the 2022 and 2024.	13
Table 3. Species found only within the Project area.....	15

1. INTRODUCTION

Fortescue Ltd (hereafter Fortescue) is investigating development of the East Pilbara Generation Hub Project (the Project), located in the Pilbara region of Western Australia approximately 30 km south-east of Marble Bar and 90 km east/south-east of Fortescue's Iron Bridge Project (Figure 1). The Project will generate power via wind and solar radiation.

Generated power will be transmitted along a high voltage power line to Iron Bridge with the aim to decarbonise Fortescue's mining operations and replace use of fossil fuel with green power. During the initial phase of the Project, abstraction of groundwater will be required for construction purposes. Recognising that there may be potential impacts on subterranean fauna, specifically on stygofauna, associated with the Project, Fortescue requested that Bennelongia Environmental Consultants undertake a baseline survey of the occurrence of subterranean fauna and habitat in the Project area.

This report used the results of a desktop review and baseline field sampling in the Project area during 2022 and 2024 to characterise the subterranean fauna of the Project area and to assess the impact of Project development of subterranean fauna, especially stygofauna. Results of the desktop review and 2022 field survey are available in Bennelongia (2022) and are repeated in this report.

The specific objectives of investigation of the Project were:

- Review available geological and hydrogeological information to assess the likelihood of habitats suitable for subterranean fauna occurring in the vicinity of the Project.
- Collate records of subterranean fauna in the vicinity of the Project (including listed species and communities) to characterise the likely subterranean fauna communities in the Project area.
- Conduct subterranean fauna survey in the Project area.
- Assess the distribution of any species restricted to the Project footprint and determine the likelihood that groundwater drawdown will affect regional stygofauna conservation values.

2. SUBTERRANEAN FAUNA

The term subterranean fauna is applied to animals that inhabit underground habitats. These subterranean habitats include caves but the smaller caverns and small voids extending out from caves, or found more widely across the landscape, are usually more important, especially in Western Australia. Subterranean species are broadly characterised into two groups: stygofauna and troglifauna. Stygofauna inhabit aquatic subterranean habitats, such as groundwater aquifers. Troglifauna are air-breathing animals and inhabit subterranean spaces above the water table but nevertheless require a high level of humidity (Gibson *et al.* 2019).

The majority of subterranean species in Western Australia are invertebrates, although a subterranean fish (Whitley 1974) and reptiles (Aplin 1998) have also been recorded. The diversity in subterranean fauna in Western Australia is particularly rich, with estimates indicating at least 4,500 distinct species are present across the state, many of which remain undescribed (Guzik *et al.* 2011; Halse 2018a).

The ranges of subterranean species are often highly restricted, with most distributions satisfying Harvey's (2002) range area definition for a short-range endemic of 10,000km². The distribution of subterranean animals is driven primarily by presence of various spaces in the subterranean matrix and, most importantly, by the degree of three-dimensional inter-connectivity of these open spaces. Vertical connectivity is most important for the delivery of nutrients and rainfall discharge to the vadose zone and underlying aquifers. Meanwhile, lateral connectivity determines the capacity for movement across the subterranean landscape, and the extent to which they may disperse. While lateral connectivity may sometimes facilitate large ranges in troglobitic species (Marsh *et al.* 2023), most species with large ranges are troglaphiles or troglonexes with a surface dispersal phase in their life cycle.

3. ENVIRONMENT

3.1. Biogeography

The Project is located south of Marble Bar on a flat landscape in the Chichester subregion of the Pilbara bioregion (Figure 2; Thackway and Cresswell 1995). The climate ranges from arid to tropical, with the mean monthly maximum temperature at nearby Marble Bar being highest in December (41.6°C) and mean monthly minimum lowest in July (11.7°C). Mean annual rainfall at Marble Bar is 361.7mm, with rainfall highly concentrated within the wet-seasons months from December to March.

3.2. Project Details

It is anticipated that the water requirement for Project construction will be 0.68 gigalitre per annum (GL/a) for 22 months. On-going requirements will be 0.1 GL/a. Groundwater to meet these requirements will be supplied from five bores in the south-eastern part of the Project (Figure 1). Drawdown around production bores will have small vertical and horizontal extent (Fortescue 2025).

3.3. Geology

The eastern part of the Project area lies in the East Pilbara Terrain of the Pilbara Craton, which includes some of the oldest rocks in the world (Hickman 1983; Fortescue 2025). The geology consists of granitic, sedimentary and volcanic sequences.

Surface geology in the Project area is mapped as predominantly exposed rock (Figure 3) but, in fact, has a layer of sandy colluvium formed by sand, silt, scree and gravel. Alluvium and thicker areas of colluvium occur on drainage lines as well as on floodplains around rivers. Overall, the thickness of the colluvium varies from 3-10 m. Bedrock geology consists predominantly of granite, gneiss and mafic/ultramafic, with some basalt and a small area of dolerite in the south-east close to the location of production bores (Figure 4).

In general, alluvium and colluvium are prospective for stygofauna if saturated and of uncertain prospectivity (although troglofauna species have been found in them) for troglofauna in the Pilbara. The main rock geologies in the Project area - basalt, granite and gneiss - are not prospective for subterranean fauna unless strongly weathered. Greenstone areas sometimes support moderate troglofauna communities, depending on the extent of weathering present.

3.4. Hydrogeology

Regional aquifers of the Pilbara can be divided into three types:




- Unconsolidated sedimentary aquifers (i.e. alluvium, detrital iron);
- Chemically deposited aquifers associated with drainage channels (i.e. calcrete and channel iron); and
- Fractured-rock aquifers (i.e. banded iron, mafic/ultramafic).

Much of the Project area has a surficial aquifer several metres thickness in alluvium or colluvium that overlies weathered or fractured rock aquifers in the mostly granite granitic basement. Groundwater is shallow, with 25 bores in the Project area mostly having depth to groundwater of about 0.25 mbgl. Salinity varies from 500-1,000 mg/L total dissolved solids in the surficial aquifer and from 1,000-2,000 mg/L in deeper aquifers. pHs is usually about 7.8-8.4 with bicarbonate-dominating anion chemistry.


Stygofauna in general is more common in sedimentary and chemically deposited aquifers (especially alluvium and calcrete) than in fractured rock aquifers. However, the abundance of stygofauna in alluvium and calcrete decreases significantly where depth to groundwater is more than 30 m (Halse *et al.* 2014). Occasionally fractured rock aquifers contain significant stygofauna and occurrence of stygofauna in such aquifers is relatively independent of depth.

Figure 1 - Locality of The Project and surrounds.

Legend

-  The EPGH Project
-  EPGH Production Bores
-  Towns

Road Lines

-  Secondary Road
-  Minor Road
-  Track

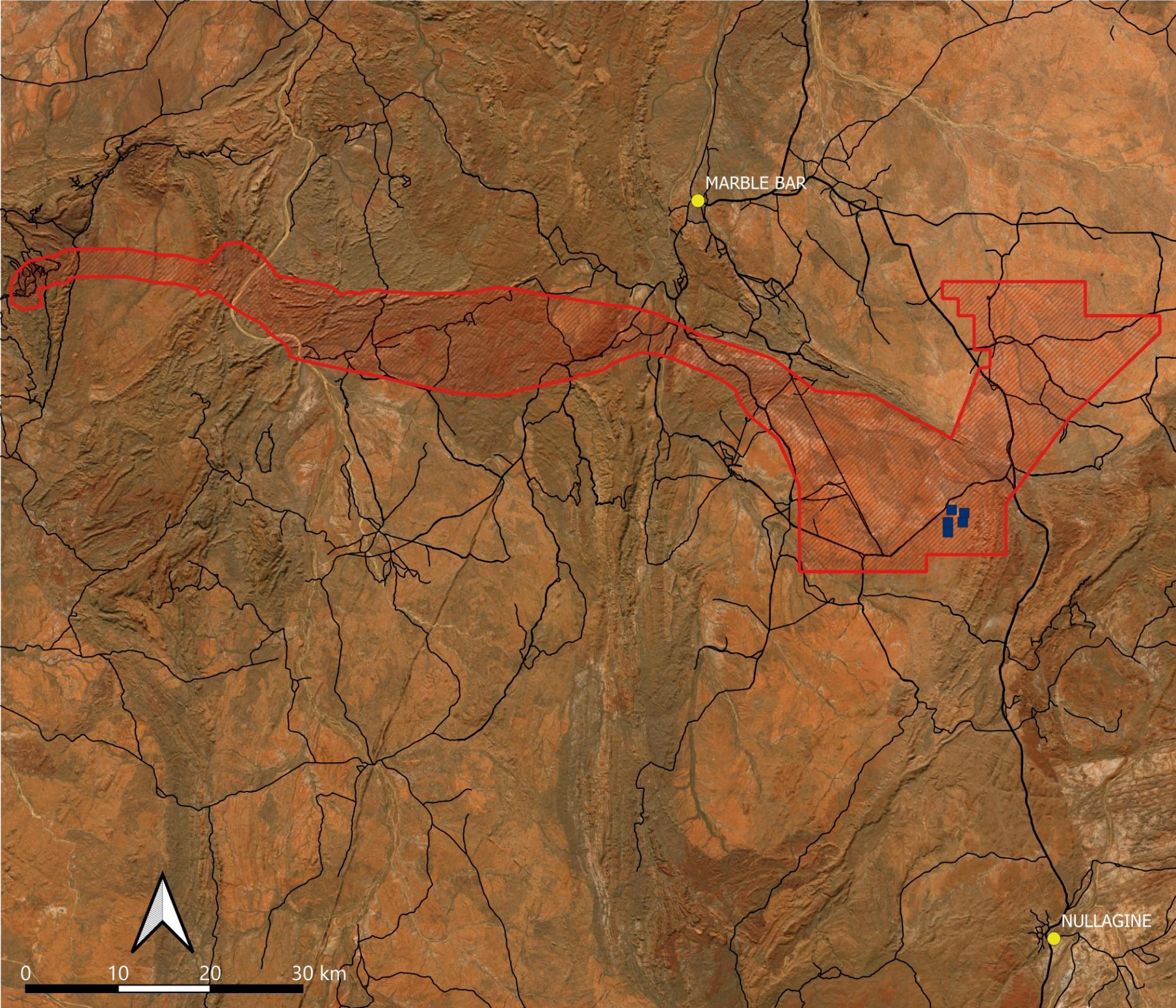


Figure 2 - IBRA Subregions Underlying the Project, and Surrounds.

Legend

-  The EPGH Project
-  EPGH Production Bores

IBRA Regions

-  Dampierland
-  Great Sandy Desert
-  Pilbara

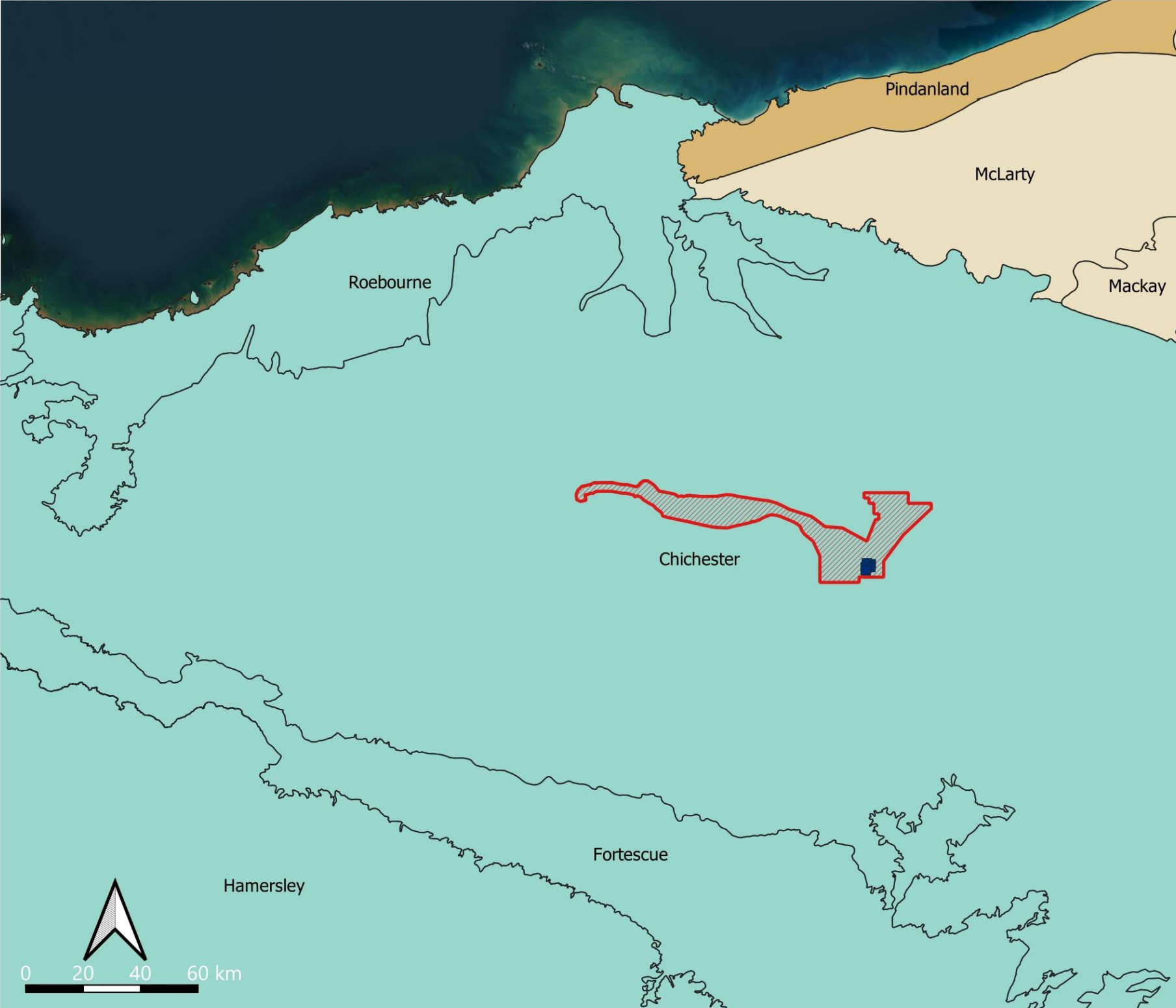







Figure 3 - Regolith Geologies Underlying the Project, and Surrounds.

Legend

-  The EPGH Project
-  EPGH Production Bores

Regolith Geology

-  Alluvium
-  Calcrete
-  Colluvium
-  Exposed
-  Residual

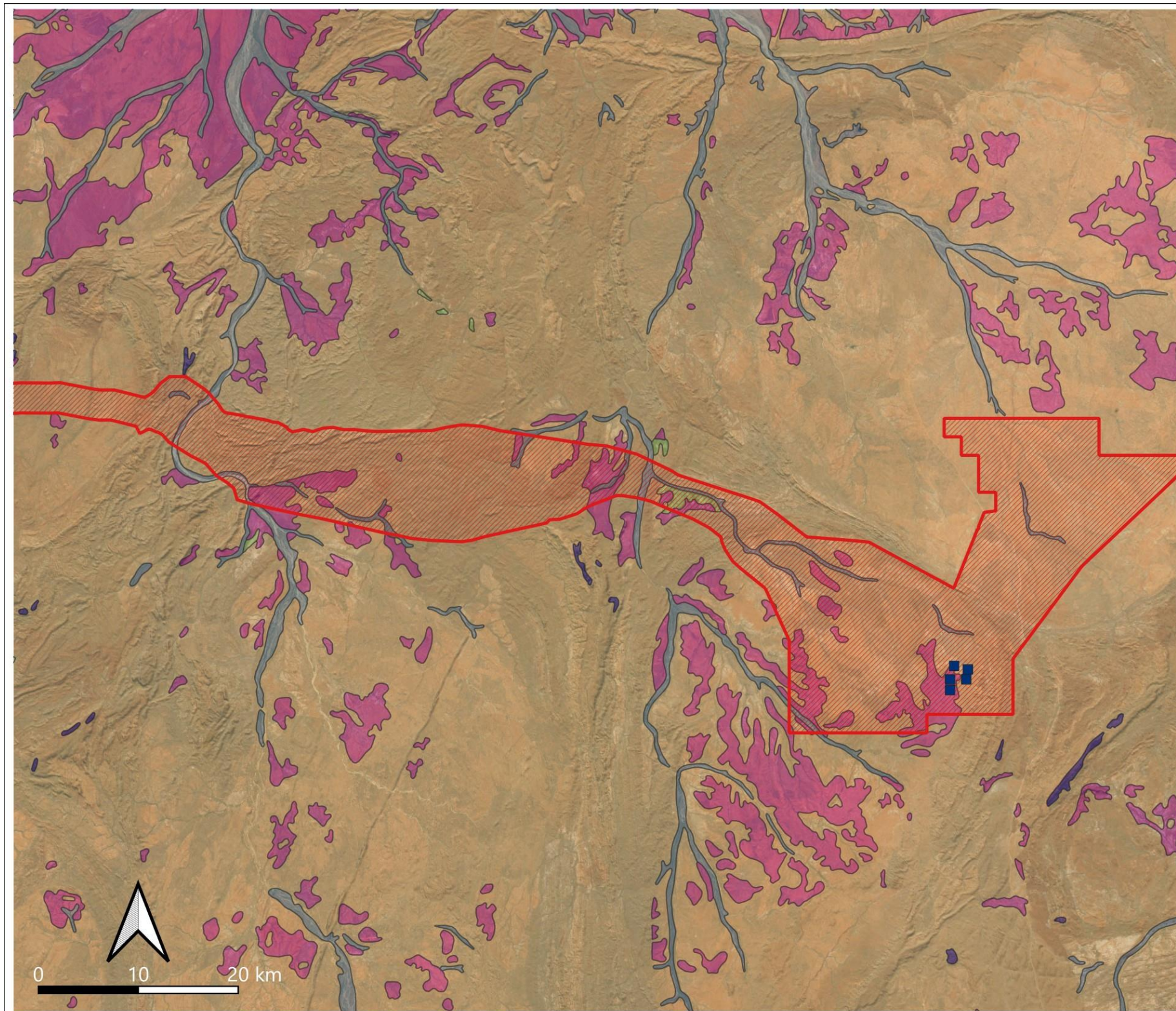
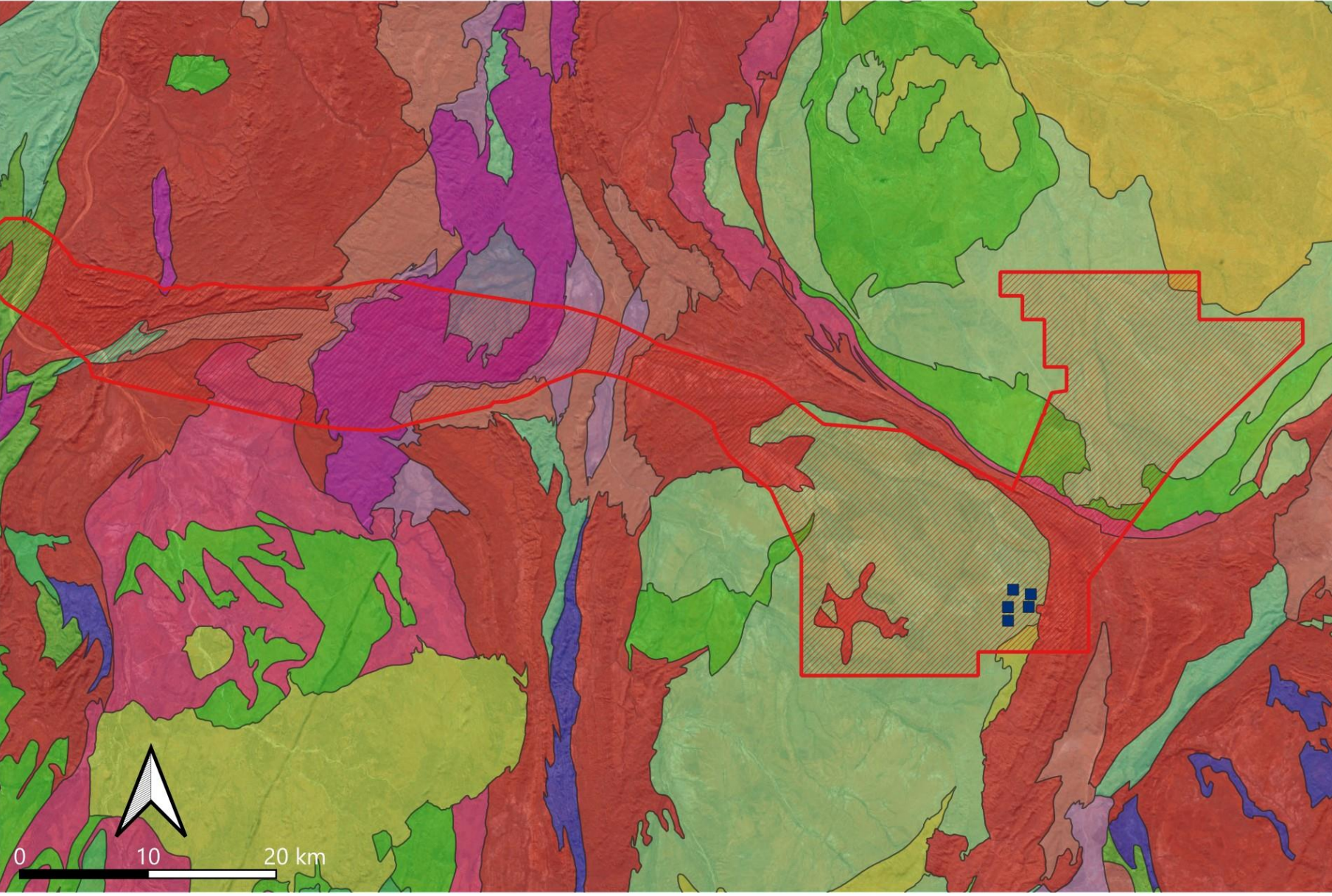


Figure 4 - Bedrock Geologies Underlying The Project, and Surrounds.

Legend

-  The EPGH Project
-  EPGH Production Bores















-  Basaltic volcanic and siliciclastic sedimentary rocks; metamorphosed. Includes Bellary Formation and Mount Roe Basalt
-  Clastic sedimentary rocks, banded iron-formation and chert, and subordinate mafic and felsic volcanic rocks; weakly metamorphosed
-  Granitic and ultramafic to mafic intrusive rocks; metamorphosed
-  Mafic and felsic volcanic rocks, with minor sedimentary and intrusive rocks; metamorphosed
-  Mafic and ultramafic intrusive rocks; metamorphosed
-  Metadiorite to metasyenogranite; massive to gneissic
-  Metatonalite and metagranodiorite; gneissic to massive; local leucocratic monzogranite
-  Monzogranite and granodiorite; minor trondhjemite; metamorphosed
-  Monzogranite, granodiorite, and tonalite; local gabbro and dolerite; variably metamorphosed
-  Pillowed and massive basaltic flows with basaltic breccia, siltstone and mudstone; minor chert; local komatiitic basalt, dacite, and rhyolite; metamorphosed. Includes Kylena and Boongal Formations
-  Pyroxene spinifex-textured basalt, basaltic andesite, dacite, rhyolite, komatiite and local sedimentary rocks; metamorphosed. Includes Pyradie, Tumbiana, Maddina, Bunjinah, and Pear Creek Formations
-  Sedimentary and felsic volcanic rocks; local intrusive rocks. Includes Hardey Formation
- Siliciclastic sedimentary rocks, iron formation and shale; local volcanic rocks; metamorphosed
- Undivided granitic rocks including monzogranite, syenogranite, and pegmatite



Figure 5 - Groundwater
Drawdown Contours
Around the Project
Production Bores.

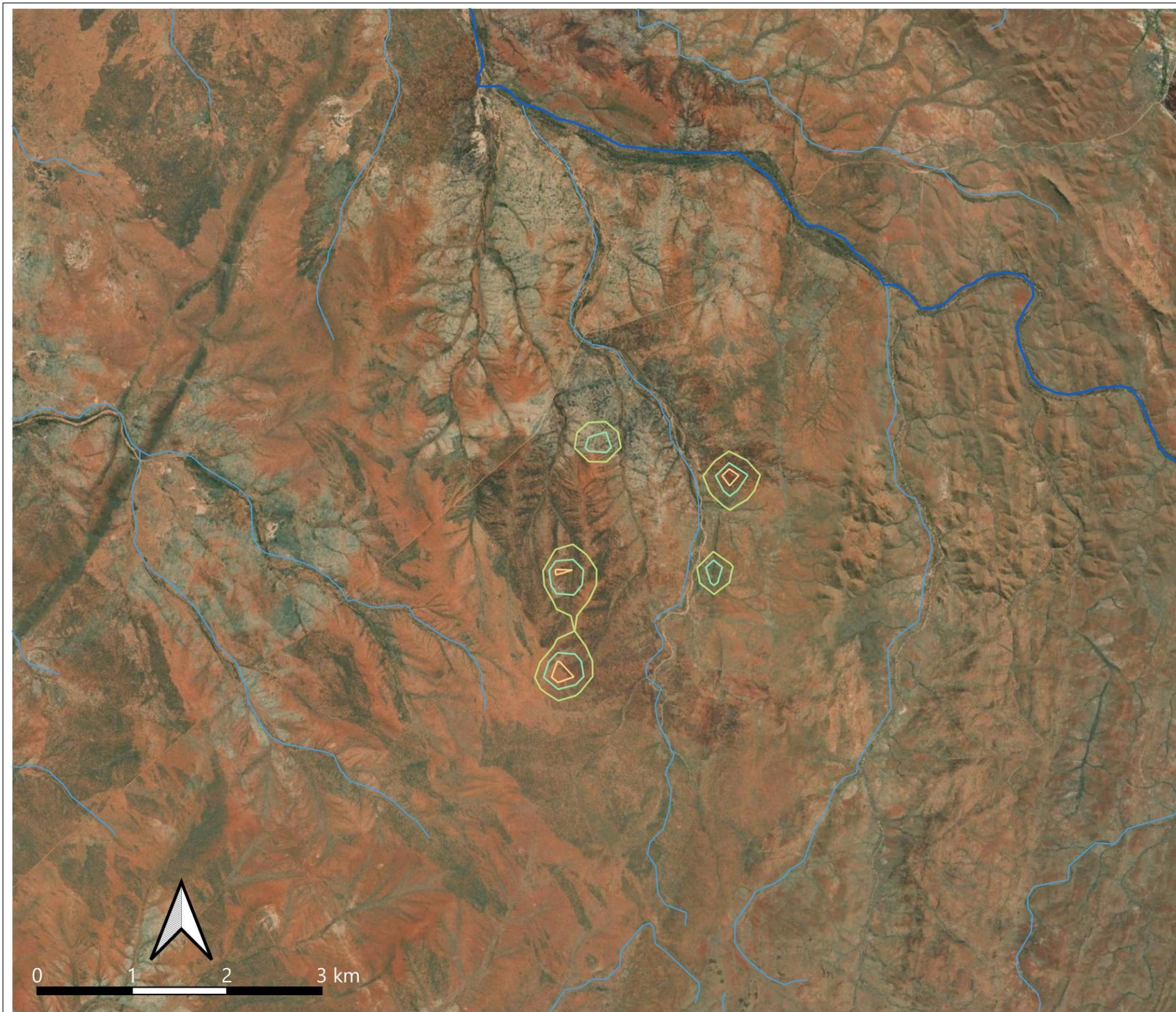
Legend

Drainage Lines

- Major
- Minor

EPGH Drawdown

- 2 m
- 3 m
- 4 m
- 5 m








0 1 2 3 km

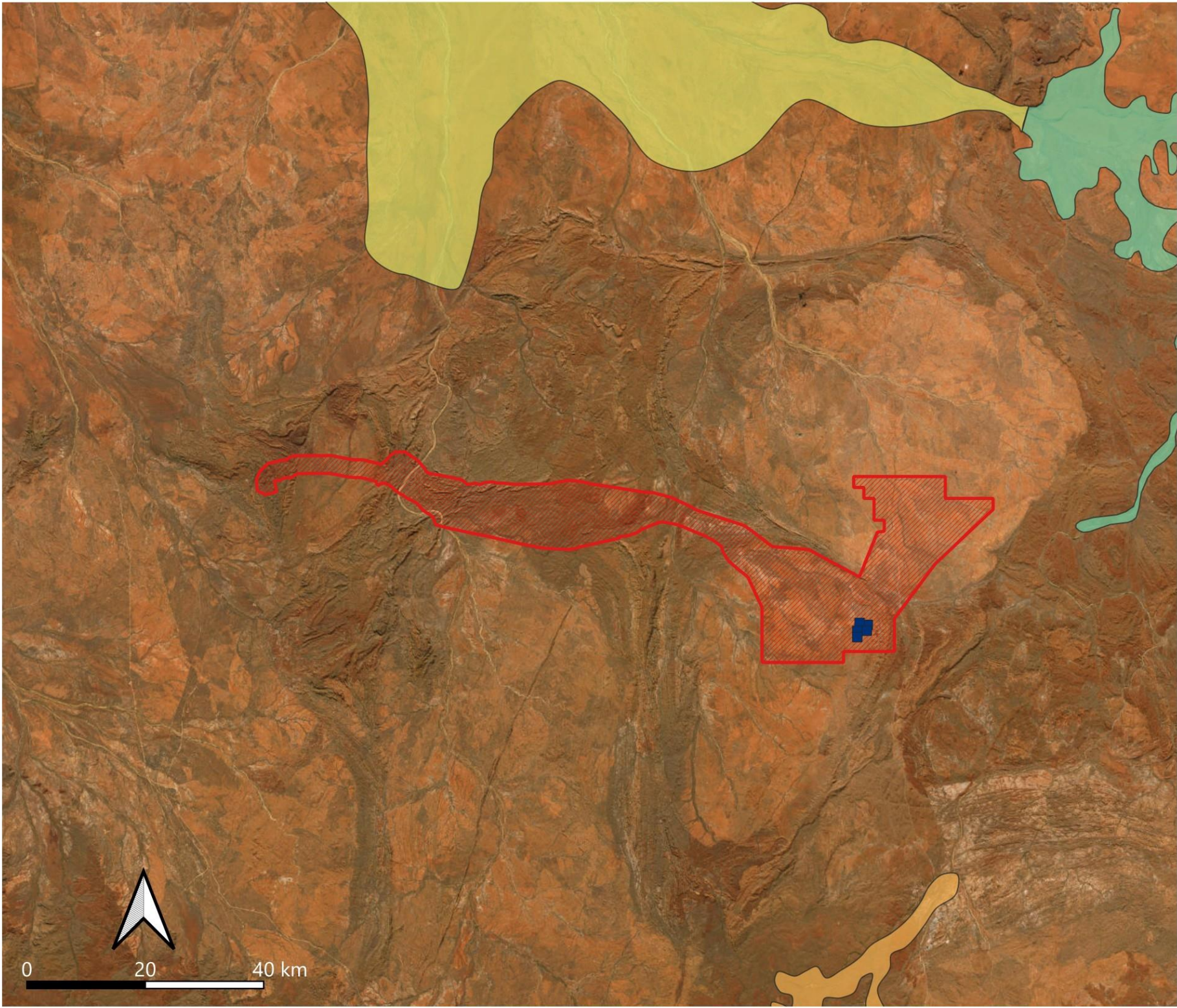


Figure 6 - Localisation of
Palaeochannels in Relation
to The Project.

Legend

- The EPGH Project 
- EPGH Production Bores 

- Palaeovalleys**
- De Grey 
- Nullagine 
- Oakover 



0 20 40 km

4. METHODS

4.1. Desktop Search Methods

A desktop review of subterranean fauna occurrence in an area of 150 km x 150 km centred on the Project area (119.0532°S to 121.0532°S and 20.3495°E to 22.3495°E, Figure 7) was undertaken using three sources of information:

- fauna records in the Western Australia Museum's (WAM) database;
- fauna records in Bennelongia's field survey database; and
- information in scientific papers and consultant reports, as well as that available via online portals such as ALA and the Australian Faunal Directory.

Database search results were filtered to include only species belonging to taxonomic groups known to contain subterranean species collected from below ground (as judged by collecting method or habitat information). Analysis and mapping were done using ArcGIS Pro v2.9.5.

4.2. Field Survey Methods

Surveys for stygofauna in the Project area were undertaken according to the general principles laid out by the Environmental Protection Authority (EPA) in *Environmental Factor Guideline – subterranean fauna* (EPA 2016a), *Technical Guidance: sampling methods for subterranean fauna* (EPA 2016b) and *Technical Guidance: subterranean fauna surveys for environmental impact assessment* (EPA 2021).

4.2.1. Field Sampling

Twenty-five samples of stygofauna were collected from 17 sites in a survey area that covered the eastern portion of the Project (Figure 9). The western portion will be used for roads and transmission lines only. Samples were collected from eight sites in on 28 June 2022 and 17 sites (including eight of the 2022 sites) between 5 and 9 June 2024. Twenty-four of the sites sampled were pastoral wells; CRD0058 was a cased bore. Most of the pastoral wells had only a small depth of water (Appendix 3).

Six hauls were taken at each site, three using a 50 µm mesh net and three with a 150 µm mesh net. The net was lowered to the end of the hole and tugged up and down briefly to agitate benthos (increasing the likelihood of collecting benthic species) and then slowly retrieved. Contents of the net were transferred to 125 ml polycarbonate vial after each haul, flushed with bore water to reduce fine sediment content, preserved in 100% ethanol and kept on ice until return to the laboratory, where they were refrigerated at 4 °C. Nets were washed between holes to minimise site-to-site contamination.

In situ water quality parameters – temperature, electrical conductivity (EC) and pH – were measured at each site. Standing water level was measured using a Solinst water level meter.



4.2.2. Laboratory Processing

Stygofauna samples were further elutriated in the laboratory to separate animals from sediment and put through sieves to fractionate the contents according to size (53, 90 and 250 µm) to improve searching efficiency while sorting under a dissecting microscope. All potential subterranean species were removed from samples during sorting for later morphological or genetic identification.

Morphological identifications were made by examining animals under dissecting and, usually, compound microscopes. Published, unpublished and informal taxonomic keys, as well as species descriptions in the scientific literature, were used to recognise described and undescribed species. The latter were assigned voucher codes to facilitate comparison with other animals and track their potential occurrence at other sites, thus allowing determination of their ranges.

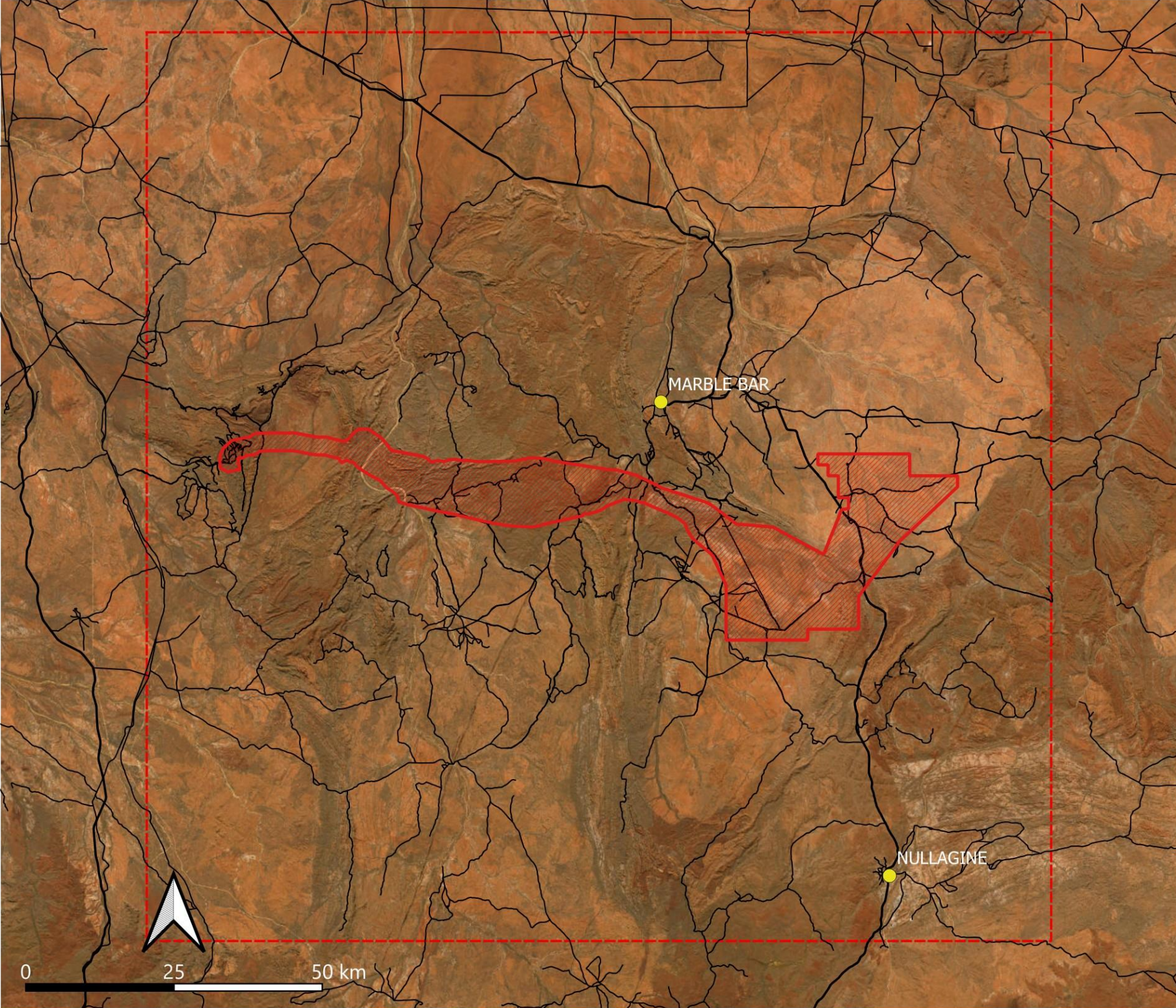
Figure 7 - Location of the Desktop Search Area (150 x 150 km) Surrounding The Project.

Legend

-  The EPGH Project
-  Desktop Search Area
-  Towns

Road Lines

-  Principal Road
-  Secondary Road
-  Minor Road
-  Track



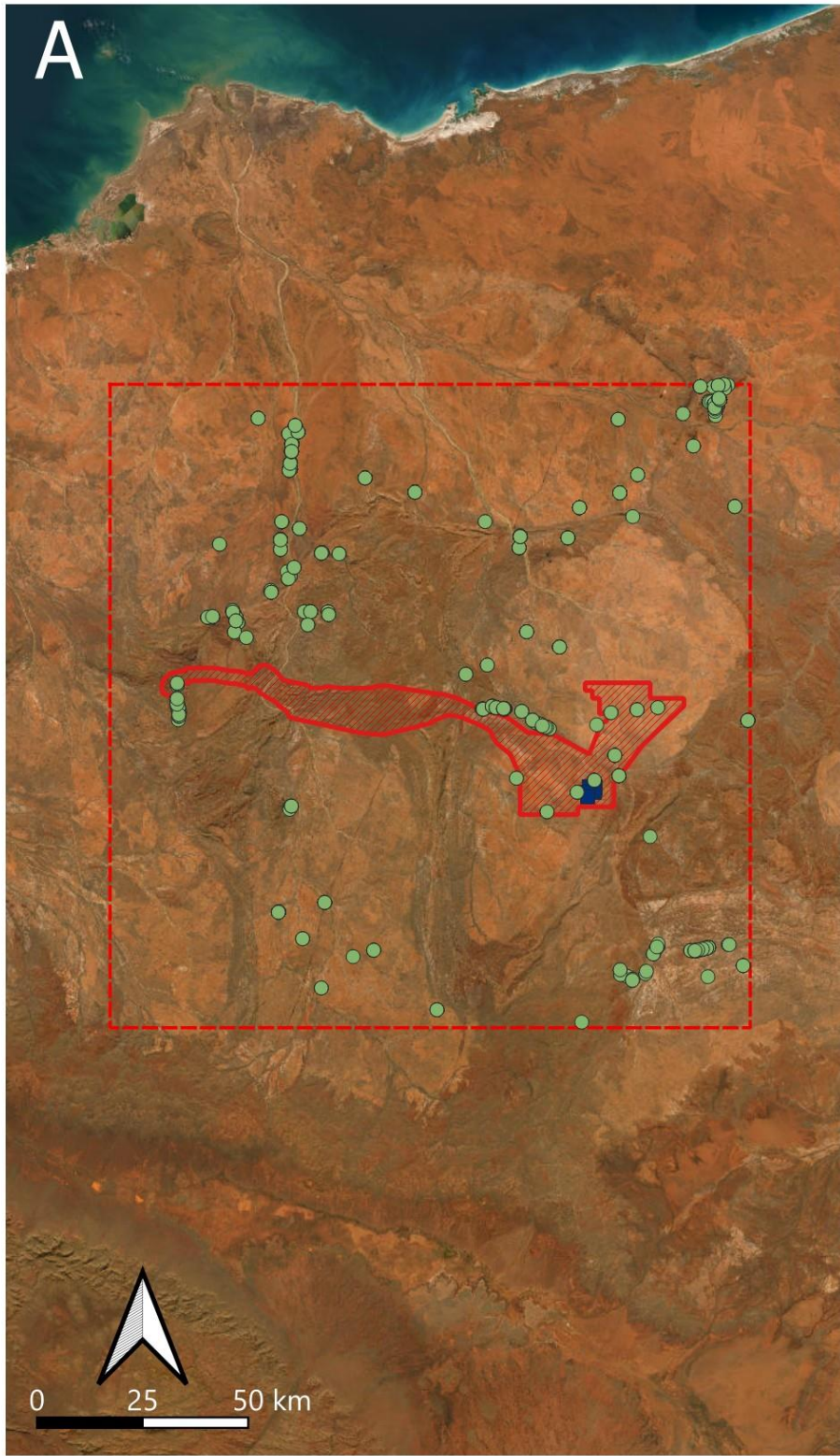
A**B**

Figure 8 - Location of Stygofauna (A) and Troglifauna (B) Records Within the Desktop Search Area Surrounding The Project.

Legend

- The EPGH Project
- EPGH Production Bores
- Desktop Search Area
- Stygofauna Records
- Troglifauna Records



4.3. Personnel

Desktop and field survey in 2022 written up by Melanie McGellin and Monique Moroney. The field survey in 2024 was conducted between by Ashley Browse and Adam Barnard. Laboratory sorting was conducted by Adam Barnard, Ella Carstens, Jaxon Haines, and Oscar Garswood. Species identifications were completed by Jane McRae, Ella Carstens and Ana Vasconcelos. GIS, mapping, and writing for this report were completed by Blake Wyber.

Table 1. Qualifications and role of staff involved in Project.

Staff	Qualifications	Role
Melanie McGellin	BSc (Hons)	Fieldwork
Monique Moroney	BSc (Hons)	Fieldwork
Ashley Browse	BSc MSc	Fieldwork
Adam Barnard	BSc (Hons)	Fieldwork, sorting
Ella Carstens	BSc	Sorting, identification
Jaxon Haines	BSc	Sorting
Oscar Garswood	BSc	Sorting
Jane McRae	23 papers on invertebrates	Identification
Ana Vasconcelos	BSc (Hons) MSc PhD	Identification
Blake Wyber	BSc MSc PhD	Writing

5. RESULTS

5.1. Desktop Results

Searches of the WAM and Bennelongia databases provided 2,865 records of subterranean fauna within the desktop search area, with 795 troglofauna records, and 2057 stygofauna records (Figure 8). The records represented 128 species of troglofauna and 228 stygofauna species (Appendices 1 and 2).

Troglofauna species in the search area are taxonomically extremely diverse and include araneomorph spiders, harvestmen (Opiliones), palpigrads, pseudoscorpions, true scorpions, schizomids, millipedes, centipedes, diplurans, cockroaches, beetles, dipterans, hemipterans, silverfish, isopods, pauropods, and symphylans.

The larger number of stygofauna species consists mostly of crustaceans and reflects less taxonomic diversity, although species present includes annelid worms, snails, nematodes, flat worms and rotifers.

Geological characteristics and troglofauna records suggest the Project area may represent moderately suitable habitat for troglofauna. However, the kind of development that will be taking place in the Project poses little threat to troglofauna, as operations will be limited to above ground activities. Small amounts of dewatering do not impact troglofauna (Halse 2018b). On this basis, it was concluded that there is no requirement for field survey of troglofauna (Bennelongia 2022). There is, however, a requirement for field survey of stygofauna because of the groundwater abstraction that will occur during Project construction.

5.2. Survey Results

Surveys in 2022 and 2024 yielded 32 species of stygofauna from 17 stygofauna species from the 836 specimens (Table 2, Figure 10). Seventeen species were collected in 2022 and 28 in 2024. Crustaceans dominated the fauna, with cyclopoid and harpacticoid copepods, amphipods and ostracods prominent in the community of the survey area in terms of species richness, though worm species were often represented by many individuals.

Stygofauna species were collected from all eight bores sampled in 2022 and all 17 species sampled in 2024. Many of the holes contained little water and only the very surface of the aquifer was sampled. Eight of the species collected during sampling are known only from the Project area. These comprise three species of amphipod, one cyclopoid copepod and four species of harpacticoid copepod. The cyclopoid species, *Diacyclops* 'BCY113' is a genetic variant of the widespread species complex *Diacyclops humphreyis* and, based on the distributions of other variants, probably has a range extending beyond the Project area. A ninth species, the isopod Microcerberidae 'BIS580', is known only from Project surveys but at bore hole CRD0058, which is just north of the Project area.

No sites were sampled within the predicted areas of groundwater drawdown for the Project (these areas had not been identified at the time of sampling). However, there are two species collected within a few kilometres of the drawdown (and known only from the Project area), namely the amphipod *Bogidiella* 'BAM216' and harpacticoid *Parastenocaris* 'BHA412'. Both species have been shown to have linear ranges of at least 35 km by their occurrence at 1956 Well to the west of drawdown (Figure 10).

Table 2. Stygofauna species collected from Project area surveys in the 2022 and 2024.

*Records highlighted in grey are considered higher-order identifications and do not contribute to the species count. Those in orange are known from Project area.

Taxa	2022	2024
Annelida		
Aphanoneura		
Aeolosomatidae		
<i>Aeolosoma</i> sp.	5	16
Clitellata		
Haplotaxida		
Naididae		
<i>Dero (Aulophorus) furcatus</i>	18	7
<i>Dero (Dero) nivea</i>		2
<i>Pristina longiseta</i>	4	47
Phreodrilidae		
Phreodrilidae sp. AP DVC s.l.	38	72
Phreodrilidae sp. AP SVC s.l.		1
Tubificida		
Naididae		
<i>Monopylephorus</i> sp. nov. WA29 (ex <i>Pristina</i> WA3) (PSS)		3
Arthropoda		
Malacostraca		
Amphipoda		
Bogidiellidae		
<i>Bogidiella</i> `BAM216`	7	2
Paramelitidae		
Paramelitidae sp.	1	
Paramelitidae `BAM214`	5	2
Paramelitidae Genus 2 `BAM215`	4	14
<i>Pilbarus</i> sp.	4	
Isopoda		
Microcerberidae		
Microcerberidae `BIS580`		1

Taxa	2022	2024
Maxillopoda		
Cyclopoida		
Cyclopidae		
Cyclopidae sp.		1
<i>Diacyclops</i> `BCY113`	1	18
<i>Diacyclops cockingi</i>	4	
<i>Diacyclops scanloni</i>		4
<i>Mesocyclops brooksi</i>		57
<i>Microcyclops varicans</i>	1	23
<i>Thermocyclops decipiens</i>		10
Harpacticoida		
Ameiridae		
<i>Megastygonitocrella</i> `BHA256`		4
<i>Megastygonitocrella unispinosa</i>		5
<i>Megastygonitocrella unispinosa</i> s.l.	1	3
Canthocamptidae		
<i>Elaphoidella humphreysi</i>	1	11
Ectinosomatidae		
Ectinosomatidae `BHA413`		3
Parastenocarididae		
<i>Parastenocaris</i> sp.	1	2
<i>Parastenocaris</i> `BHA331`	2	10
<i>Parastenocaris</i> `BHA412`		16
Ostracoda		
Ostracoda sp. unident.		74
Podocopida		
Candonidae		
<i>Areacandona incogitata</i>		6
<i>Kencandona verrucosa</i>	2	
Cyprididae		
<i>Cypretta seurati</i>	85	216
<i>Cyprinotus kimberleyensis</i> s.l.		17
Nematoda		
Nematoda spp.	1	2
Rotifera		
Bdelloidea		
Bdelloidea sp.		2

5.3. Physico-chemical Measurements

Information about depth of groundwater in the sites sampled, as well as groundwater temperature, electrical conductivity, pH, standing water level (SWL), and total depth of hole (EOH) is presented in Appendix 3.

Salinity in the survey area ranged from about 200 to 1500 mg/L total dissolved solids (results are presented as $\mu\text{S}/\text{cm}$) and pH ranged from neutral to alkaline, reflecting the known weak bicarbonate dominance in the groundwater chemistry. Water conditions are suitable for stygofauna (Reeves *et al.* 2007).

Table 3. Species found only within the Project area.

Species	Locations
<i>Bogidiella</i> `BAM216`	Tonys Well, Underwood Bore, 1956 Well
Paramelitidae `BAM214`	Allies Well (2), House Well, Underwood Bore, and Kelyee Well
Paramelitidae Genus 2 `BAM215`	Underwood Bore and 1956 Well
<i>Diacyclops</i> `BCY113`	1956 Well, Cobbers Well, Kelyee Well, No 9 Well, Pelingine Well, and Underwood Bore
<i>Megastygonitocrella</i> `BHA256`	Allies Well
Ectinosomatidae `BHA413`	1956 Well
<i>Parastenocaris</i> `BHA331`	No 7 Well
<i>Parastenocaris</i> `BHA412`	Links Well, 1956 Well, Pelingine Well, and Underwood Bore

6. DISCUSSION

The desktop review by Bennelongia (2022) found diverse communities of stygofauna and troglofauna, with 244 and 128 species identified, respectfully, in a search area around the Project (Appendices 1 and 2). Very few records were identified within the Project during desktop review (Figure 8) but this was shown by field sampling to be principally the result of little previous sampling in the Project area. In fact, field surveys indicate that a moderately rich stygofauna community exists in the Project area, with stygofauna being collected from all holes sampled. The short distance between standing water level and end of hole is likely to mean that less than the full range of stygofauna species in the aquifer below each site was sampled (Stumpp and Hose 2013), with the 33 species collected under-representing the richness of the community at the Project.



Currently, eight species have been recorded only from the Project area (Table 3). The single record of the isopod Microcerberidae 'BIS580' in 2024 was from just north of the Project area and is not treated as a restricted species. Five of the eight species known only from the Project area occur at multiple sites within the Project, suggesting the species are widespread at the scale of Project drawdown, which is less than 1 km² at the largest of the drawdown areas. Maximum drawdown within these areas will be 4 m and will occupy only a small proportion of the drawdown area (Figure 5).

The probable locally widespread nature of the distributions of the eight species in Table 3 is highlighted by the distribution of the two species collected closest to drawdown, namely the amphipod *Bogidiella* 'BAM216' and harpacticoid *Parastenocaris* 'BHA412'. Both have been shown to have linear ranges of at least 35 km by their occurrence at 1956 Well to the west of drawdown (Figure 10). Both these field survey results, and the more theoretical results of general modelling by Eberhard *et al.* (2009) and Halse *et al.* (2014), suggest there is extremely low likelihood of any stygofauna species having highly restricted ranges in the homogeneous habitat that occurs in the areas of predicted groundwater drawdown. Furthermore, with a maximum drawdown of only 4 m that occupies a very small part of each drawdown area, there is very low likelihood of impact on a restricted species in the unlikely event that one occurs.





Accordingly, the threat to subterranean fauna conservation values from Project development and operation, for both troglofauna and stygofauna, is very low.

Figure 9 - Location of Stygofauna Sampling Sites Within the Survey Area, and Surrounds.

Legend

-  The EPGH Project
-  Sample Locations

EPGH Drawdown

-  2 m
-  3 m
-  4 m
-  5 m

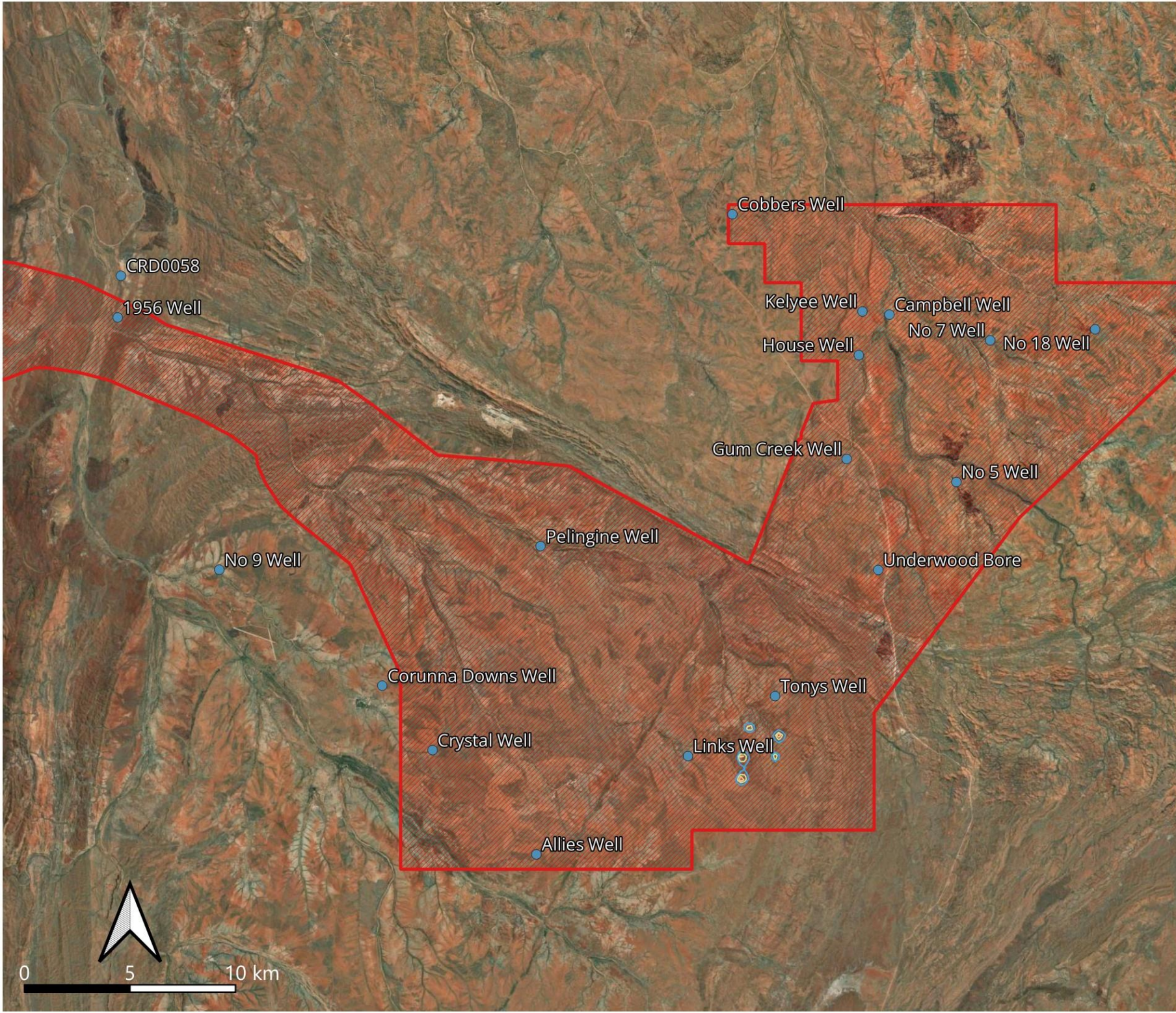









Figure 10 - Location of Stygofauna Found Only Within Close Proximity to the Survey Area; with Underlying Regolith Geology.





Legend

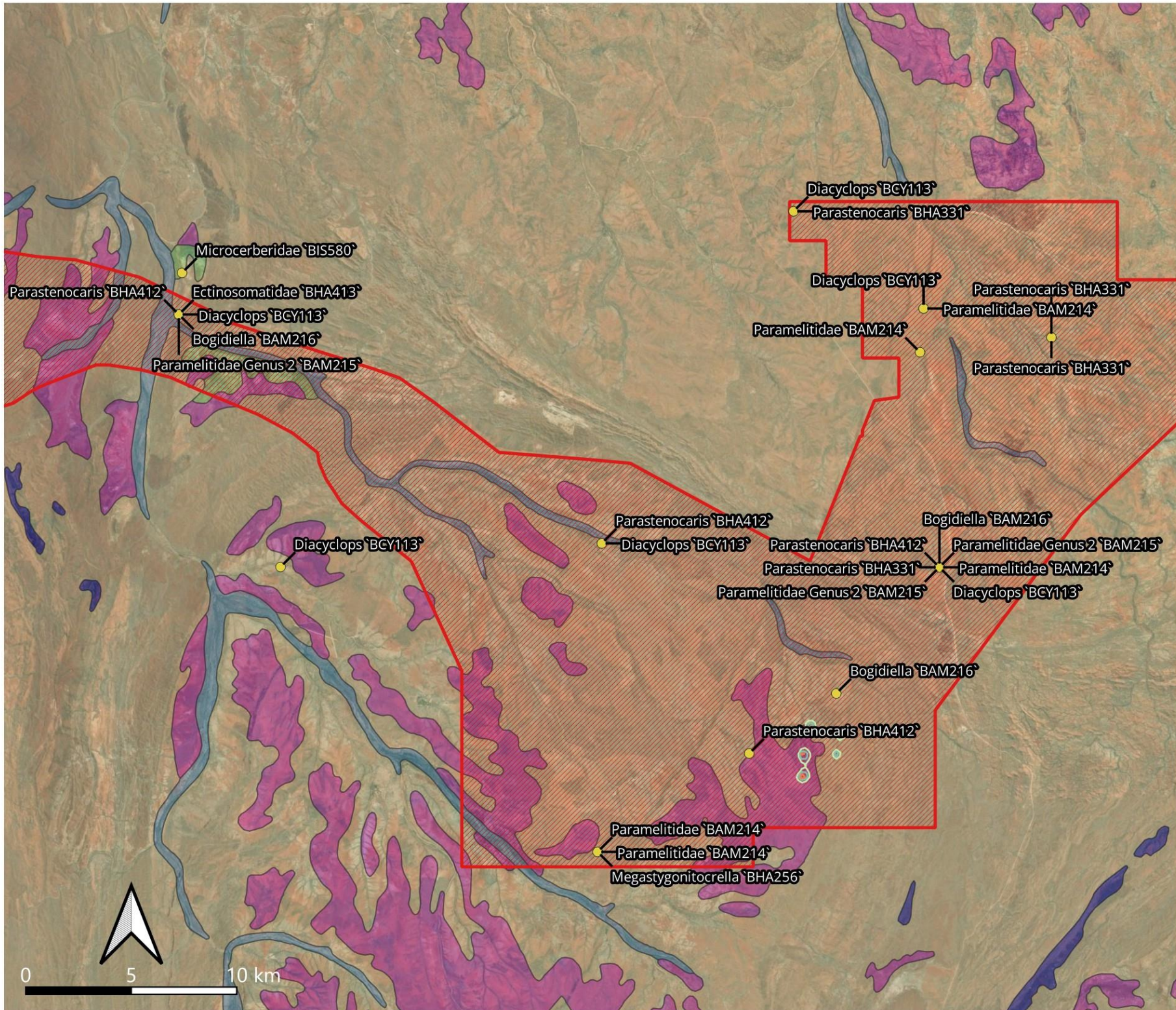
-  The EPGH Project
-  Stygofauna Records

Regolith Geology

-  Alluvium
-  Calcrete
-  Colluvium
-  Exposed
-  Residual

EPGH Drawdown

-  2 m
-  3 m
-  4 m
-  5 m



7. REFERENCES

- Aplin, K.P. (1998) Three new blindsnakes (Squamata, Typhlopidae) from north western Australia. *Records of the Western Museum* **19**, 1-12.
- Bennelongia (2022) East Pilbara Generation Hub (EPGH) subterranean fauna survey and desktop assessment. Report 520. Bennelongia Pty Ltd, Jolimont, 25 pp.
- EPA (2016a) Environmental factor guideline: subterranean fauna. Environmental Protection Authority, Perth, 5 pp.
- EPA (2016b) Technical guidance: sampling methods for subterranean fauna. Environmental Protection Authority, Perth, 32 pp.
- EPA (2021) Technical Guidance: subterranean fauna surveys for environmental impact assessment. Environmental Protection Authority, Joondalup, 35 pp.
- Fortescue (2015) EPGH: Construction water supply hydrogeological assessment. AUSS0003-0000-HG-REP-0003. Fortescue Metals Group Ltd, Perth.
- Gibson, L., Humphreys, W.F., Harvey, M., Hyder, B., and Winzer, A. (2019) Shedding light on the hidden world of subterranean fauna: A transdisciplinary research approach. *Science of The Total Environment* **684**, 381-389.
- Guzik, M.T., Cooper, S.J.B., Humphreys, W.F., Ong, S., Kawakami, T., and Austin, A.D. (2011) Evidence for population fragmentation within a subterranean aquatic habitat in the Western Australian desert. *Heredity* **107**, 215-230.
- Halse, S.A. (2018a) Subterranean fauna of the arid zone. In: H Lambers (Ed.), *The ecology of the Australian arid zone*. Springer Nature, Basel, pp. 215-241.
- Halse, S. (2018b) Conservation and impact assessment of subterranean fauna in Australia. In: OT Moldovan, L Kovac and S Halse (Eds.), *Cave Ecology*. Springer Nature, Gland, pp. 479-493.
- Halse, S.A., Scanlon, M.D., Cocking, J.S., Barron, H.J., Richardson, J.B., and Eberhard, S.M. (2014) Pilbara stygofauna: deep groundwater of an arid landscape contains globally significant radiation of biodiversity. *Records of the Western Australian Museum Supplement* **78**, 443-483.
- Harvey, M.S. (2002) Short-range endemism among the Australian fauna: some examples from non-marine environments. *Invertebrate Systematics* **16**, 555-570.
- Hickman, A.H. (1983) Geology of the Pilbara Block and its environs. Bulletin 127. Geological Survey of Western Australia, Perth.
- Reeves, J.M., De Deckker, P., and Halse, S.A. (2007) Groundwater ostracods from the arid Pilbara region of northwestern Australia: distribution and water chemistry. *Hydrobiologia* **585**, 99-118.
- Stumpp, C., and Hose, G.C. (2013) The Impact of Water Table Drawdown and Drying on Subterranean Aquatic Fauna in In-Vitro Experiments. *PLoS ONE* **8**, e78502.
- Thackway, R., and Cresswell, I.D. (eds) (1995) 'An Interim biogeographic regionalisation for Australia: A framework for establishing the national system of reserves, Version 4.0.' Australian Nature Conservation Agency, Canberra.
- Whitely, P.G. (1945) New sharks and fishes from Western Australia. Part 2. *Australian Zoologist* **11**, 1-45.

APPENDICES

Appendix 1 – Stygofauna Desktop Results

Records highlighted in grey are considered higher-order identifications and thus do not contribute to the species count.

Row Labels	Sample Count
Annelida	
Annelida sp.	40
Aphanoneura	
Aeolosomatidae	
Aeolosomatidae sp.	1
<i>Aeolosoma</i> sp.	6
<i>Aeolosoma</i> sp. 1 (PSS)	30
<i>Aeolosoma</i> sp. 3 (PSS)	4
Clitellata	
Oligochaeta sp.	594
Oligochaeta sp. S01	10
Enchytraeida	
Enchytraeidae	
Enchytraeidae sp.	28
Enchytraeidae `3 bundle` s.l. (short sclero)	104
Enchytraeidae `BOL028` (3 bundle, short sclero)	107
Enchytraeidae sp. B01 Nullagine	3
Enchytraeidae sp. E06-06	70
Enchytraeidae sp. E06-11	1
Enchytraeidae sp. E13	1
Enchytraeidae sp. S03	254
<i>Enchytraeus</i> sp. AP PSS1 s.l.	117
<i>Enchytraeus</i> sp. AP PSS2 s.l.	29
Haplotaxida	

Row Labels	Sample Count
Naididae	
<i>Dero (Dero) nivea</i>	42
<i>Dero (Aulophorus) furcatus</i>	24
Pristina sp.	1
<i>Pristina aequiseta</i>	6
<i>Pristina longiseta</i>	252
Phreodrilidae	
Phreodrilidae sp. AP DVC s.l.	266
Phreodrilidae sp. AP SVC s.l.	50
Phreodrilidae sp. P09	211
Phreodrilidae sp. P13	20
Phreodrilidae sp. P16	1
Phreodrilidae sp. S01	10
Phreodrilidae sp. S05	1
Phreodrilidae sp. WA36 (PSS)	9
<i>Phreodrilus peniculus</i>	13
Insulodrilus sp.	1
<i>Insulodrilus lacustris</i> s.l. Pilbara type 1 (PSS)	2
<i>Insulodrilus lacustris</i> s.l. Pilbara type 2/3 (PSS)	36
Tubificida	
Naididae	
<i>Ainudrilus</i> sp. WA25 (PSS)	1
<i>Monopylephorus</i> sp. nov. WA29 (ex <i>Pristina</i> WA3) (PSS)	359
Tubificidae `stygo type 2` (PSS)	3
Tubificidae `stygo type 4`	3
Tubificidae `WA28` (SAP)	1
Tubificinae sp.	3
Tubificinae `BOL049`	4

Row Labels	Sample Count
Tubificinae `BOL050`	44
Tubificinae `BOL066`	8
Polychaeta	
Phyllodocida	
Nereididae	
<i>Namanereis pilbarensis</i>	17
Arthropoda	
Arachnida	
Acari sp.	1
Trombidiformes	
Anisitsiellidae	
<i>Rutacarus</i> sp.	1
Arrenuridae	
Arrenurus sp.	2
<i>Arrenurus</i> sp. S03 (PSS)	1
Halacaridae	
Halacaridae sp.	4
Halacaridae sp. 1 (PSS)	12
Hydryphantidae	
<i>Wandesia</i> sp.	1
Mideopsidae	
<i>Guineaxonopsis</i> sp.	1
<i>Guineaxonopsis</i> sp. B05 (S01 group)	6
<i>Guineaxonopsis</i> sp. S01 group (PSS)	1
Unionicolidae	
<i>Recifella</i> sp.	1
Malacostraca	
Amphipoda	

Row Labels	Sample Count
Bogidiellidae	
Bogidiellidae sp.	41
<i>Bogidiella</i> `BAM216`	7
<i>Bogidiella</i> sp. B03	1
Eriopisidae	
<i>Pilbarana</i> sp. B01	22
Melitidae `BAM159` (sp. 1 group)	4
Melitidae `BAM160` (sp. 1 group)	9
<i>Nedsia</i> sp.	553
<i>Nedsia shawensis</i>	130
Melitidae	
Melitidae sp.	6
Melitidae `sp. S4`	2
Melitidae `sp. MW`	1
Melitidae `sp. 1 group (PSS) s.l.`	4
Melitidae sp. S04	1
Paramelitidae	
Paramelitidae sp.	35
Paramelitidae `sp. S1`	42
Paramelitidae `sp. S2`	26
Paramelitidae `sp. S3`	2
Paramelitidae `sp. S5/S6`	34
Paramelitidae `sp. MW`	3
Paramelitidae `sp. S5`	40
Paramelitidae `BAM161`	139
Paramelitidae `BAM162`	5
Paramelitidae `BAM214`	5
Paramelitidae Genus 2 `BAM060`	38

Row Labels	Sample Count
Paramelitidae Genus 2 `BAM163`	8
Paramelitidae Genus 2 `BAM164`	1
Paramelitidae Genus 2 `BAM215`	4
Paramelitidae Genus 2 sp.	3
Paramelitidae Genus 2 sp. B10	3
Paramelitidae Genus 2 sp. B14	2
Paramelitidae sp. 2 s.l. (PSS)	69
Paramelitidae sp. 6 s.l. (PSS)	134
Paramelitidae sp. 7 s.l. (PSS)	98
Paramelitidae sp. 8 s.l. (PSS)	1
Paramelitidae sp. B12	12
Paramelitidae sp. B13	33
Paramelitidae sp. B29	1
Paramelitidae sp. S01	83
Paramelitidae sp. S02	1
Paramelitidae sp. S03	2
Paramelitidae sp. S09	4
<i>Chydaekata</i> `sp. S2`	1
<i>Pilbarus</i> sp.	6
nr <i>Pilbarus</i> sp. B06	3
<i>Pilbarus</i> `BAM059`	63
<i>Pilbarus</i> millsii s.l.	2
<i>Pilbarus</i> sp. S02 (PSS)	3
Isopoda	
Microcerberidae	
Microcerberidae sp.	158
Microcerberidae `BIS356` (B01 gp)	8
Microcerberidae `BIS357`	17

Row Labels	Sample Count
Microcerberidae `sp. S1`	45
Microcerberidae sp. B01	14
Microcerberidae sp. B02	5
Microcerberidae sp. B05	37
Tainisopidae	
<i>Pygolabis</i> sp.	23
Syncarida	
Syncarida sp.	24
Bathynellacea	
Bathynellidae	
Bathynellidae sp.	18
Bathynellidae `DeGrey`	3854
Bathynellidae sp. S03	396
<i>Anguillanella</i> `sp. 1`	13
<i>Anguillanella</i> `sp. 2`	1
<i>Anguillanella callawaensis</i>	322
Bathynellidae `sp. McPhee`	1
<i>Muccanella cundalinensis</i>	91
<i>Bathynella</i> sp. B05	13
<i>Pilbaranella</i> sp.	158
<i>Pilbaranella</i> `BSY042`	2
Parabathynellidae	
Parabathynellidae sp.	95
<i>Atopobathynella</i> sp.	88
<i>Atopobathynella</i> `BSY204`	6
<i>Atopobathynella</i> sp. B05	8
<i>Atopobathynella</i> sp. B31	18
<i>Atopobathynella</i> sp. S01	165

Row Labels	Sample Count
<i>Atopobathynella</i> `sp. S1`	117
<i>Atopobathynella</i> `sp. CA`	133
<i>Atopobathynella</i> `sp. Yarrie`	7
nr <i>Atopobathynella</i> sp. B16	117
nr <i>Atopobathynella</i> sp. B18	13
nr <i>Atopobathynella</i> sp. S01	1263
<i>Billibathynella</i> `BSY177`	1
<i>Billibathynella</i> `sp. MW`	4
<i>Chilibathynella</i> sp.	16
<i>Hexabathynella</i> `B` (PSS)	1
<i>Notobathynella</i> sp.	45
Maxillopoda	
Cyclopoida	
Cyclopoida sp.	142
Cyclopoida sp. ?S01	8
Cyclopidae	
<i>Ancyclops yarriensis</i>	37
<i>Anzyclops</i> `BCY060`	14
<i>Anzyclops</i> sp. B07	1
<i>Australocyclops</i> sp.	5
<i>Pescecylops</i> `BCY065`	10
<i>Pescecylops</i> `BCY066`	10
<i>Pescecylops pilbaricus</i>	9
<i>Pescecylops</i> sp. B01 (nr <i>pilbaricus</i>)	17
<i>Diacyclops</i> sp.	7
<i>Diacyclops cockingi</i>	248
<i>Diacyclops einslei</i>	2
<i>Diacyclops humphreysi</i> s.l.	2587

Row Labels	Sample Count
<i>Diacyclops scanloni</i>	644
<i>Diacyclops sobeprolatus</i>	144
<i>Dussartcyclops nr uniarticulatus</i>	3
<i>Ectocyclops phaleratus</i>	5
<i>Mesocyclops sp.</i>	1
<i>Mesocyclops brooksi</i>	277
<i>Mesocyclops darwini</i>	2
<i>Mesocyclops notius</i>	65
<i>Metacyclops sp.</i>	87
<i>Metacyclops sp. S01 [`yarriensis`]</i>	100
<i>Microcyclops sp. S01</i>	43
<i>Microcyclops varicans</i>	706
<i>Orbuscyclops westaustraliensis</i>	6
nr <i>Pilbaracyclops ngen sp. B02</i>	32
<i>Pilbaracyclops sp. B03 (nr frustratio)</i>	4
<i>Thermocyclops sp. S01</i>	2
<i>Thermocyclops decipiens</i>	7
Harpacticoida	
Harpacticoida sp.	68
Harpacticoida sp. B03	2
Ameiridae	
<i>Megastygonitocrella `BHA256`</i>	8
<i>Megastygonitocrella bispinosa</i>	167
<i>Megastygonitocrella sp. B02</i>	1
<i>Megastygonitocrella trispinosa</i>	759
<i>Megastygonitocrella unispinosa</i>	119
<i>Stygonitocrella sp.</i>	1
Canthocamptidae	

Row Labels	Sample Count
Canthocamptidae sp.	12
Canthocamptidae `BHA267`	1
Canthocamptidae sp. B02	30
Canthocamptidae sp. B05	5
<i>Elaphoidella</i> sp.	3
<i>Elaphoidella humphreysi</i>	843
Ectinosomatidae	21
<i>Pseudectinosoma galassiae</i>	21
Parastenocarididae	
Parastenocarididae sp.	37
Parastenocarididae n. gen. `BHA265`	17
<i>Parastenocaris</i> sp.	137
<i>Parastenocaris</i> `BHA266`	15
<i>Parastenocaris</i> `BHA268`	3
<i>Parastenocaris</i> `BHA298`	3
<i>Parastenocaris</i> `BHA331`	2
<i>Parastenocaris</i> `COP001`	1
<i>Parastenocaris jane</i>	32
<i>Parastenocaris</i> sp. 3 (PSS)	1
<i>Parastenocaris</i> sp. B23	50
<i>Parastenocaris</i> sp. nov. B02	20
<i>Dussartstenocaris</i> sp. B06	1
<i>Dussartstenocaris</i> sp. nov. B03 (PIL)	4
Ostracoda	5
Ostracoda sp. unident.	1320
Candonidae	
Candonidae `BOS1332`	30
Candonidae `BOS1333`	3

Row Labels	Sample Count
Podocopida	
Candonidae	
Candonidae sp.	9
Candonidae `1`	1
Candonidae `BOS1455`	1
Candonidae `BOS1457`	2
<i>Amphitritecandona prima</i>	23
<i>Amphitritecandona secunda</i>	5
<i>Areacandona</i> sp.	1
<i>Areacandona akatallele</i>	41
<i>Areacandona iuno</i>	200
<i>Areacandona</i> nr `1` (PSS)	2
<i>Candonopsis</i> sp.	3
<i>Candonopsis pilbarae</i>	97
<i>Candonopsis tenuis</i>	195
<i>Deminutiocandona</i> sp.	17
<i>Deminutiocandona murrayi</i>	18
<i>Deminutiocandona</i> nr <i>halsei</i>	6
<i>Humphreyscandona</i> sp.	1
<i>Humphreyscandona</i> `BOS1401`	2
<i>Humphreyscandona capillus</i>	403
<i>Kencandona harleyi</i>	34
<i>Kencandona verrucosa</i>	2
<i>Leicacandona</i> `BOS1236`	36
<i>Leicacandona</i> `BOS1343`	22
<i>Leicacandona</i> `BOS1354`	43
<i>Leicacandona</i> `BOS1356`	16
<i>Leicacandona</i> `BOS1357`	8

Row Labels	Sample Count
<i>Leicacandona carinata</i>	4
<i>Leicacandona halsei</i>	32
<i>Leicacandona jimi</i>	4
<i>Leicacandona lite</i>	23
<i>Leicacandona makra</i>	9
<i>Leicacandona quasihalsei</i>	2
<i>Leicacandona quasimookae</i>	32
<i>Meridiescandona lucerna</i>	90
<i>Notacandona nr carinata</i>	5
<i>Notacandona 'whitecliff'</i>	15
Cyprididae	
Cyprididae sp.	22
Cyprididae `A`	4
<i>Ampullacypris `BOS1341`</i>	15
Bennelongia sp.	1
<i>Bennelongia shieli</i>	9
<i>Bennelongia strellyensis</i>	111
<i>Cypretta</i> sp.	45
<i>Cypretta `BOS1353`</i>	4
<i>Cypretta seurati</i>	936
<i>Cypridopsis</i> sp.	50
<i>Cypridopsis `BOS1337`</i>	20
<i>Cypridopsis vidua</i>	94
<i>Cyprinotus</i> sp.	1
<i>Cyprinotus kimberleyensis</i> s.l.	266
<i>Heterocypris</i> sp.	7
<i>Heterocypris `BOS1237`</i>	5
<i>Ilyodromus</i> sp.	7

Row Labels	Sample Count
<i>Riocypris fitzroyi</i>	69
<i>Sarscypridopsis ochracea</i>	2
<i>Stenocypris major</i>	40
<i>Strandesia</i> sp.	267
<i>Strandesia kimberleyi</i>	120
Darwinulidae	
Darwinulidae sp.	132
<i>Penthesilenula brasiliensis</i>	21
<i>Darwinula stevensoni</i>	2
<i>Vestalenula marmonieri</i>	5
<i>Vestalenula matildae</i>	107
Ilyocyprididae	
<i>Ilyocypris</i> sp.	1
Limnocytheridae	
<i>Gomphodella hirsuta</i>	245
<i>Gomphodella pilbarensis</i>	28
<i>Gomphodella quasihistuta</i>	1
<i>Limnocythere</i> sp.	2
<i>Limnocythere</i> `1` (PSS)	1
<i>Limnocythere dorsosicula</i>	50
Mollusca	
Gastropoda	
Gastropoda sp.	4
Hypsogastropoda	
Hydrobiidae	
Hydrobiidae sp.	7
Hydrobiidae sp. B04	6
Nematoda	

Row Labels	Sample Count
Nematoda spp.	924
Nematoda sp. 01 (rat-tailed gp) (PSS)	5
Nematoda sp. 02 (PSS)	3
Nematoda sp. 04 (PSS)	1
Nematoda sp. 13 (PSS)	1
Nematoda sp. 14 (PSS)	5
Nematoda sp. 17 (PSS)	1
Platyhelminthes	
Turbellaria	
Turbellaria sp.	55
Microturbellaria	
Microturbellaria sp.	2
Rotifera	
Bdelloidea	
Bdelloidea sp.	149
Bdelloidea sp. 2:2	14
Monogononta	
Flosculariaceae	
Filiniidae	
<i>Filinia</i> sp.	2
Ploima	
Notommatidae	
<i>Eosphora ehrenbergii</i>	3

Appendix 2 – Troglifauna Desktop Records

Records highlighted in grey are considered higher-order identifications and thus do not contribute to the species count.

Row Labels	Sample Count
Arthropoda	
Arachnida	
Araneae	
Araneae sp.	4
Araneomorphae sp. B03	2
Gnaphosidae	
Gnaphosidae sp.	2
Gnaphosidae sp. S02	7
nr <i>Encoptarthria</i> sp. B05	3
Oonopidae	
Camptoscaphiella sp. S01	2
Oonopidae `BAR134`	1
<i>Prethopalpus</i> sp.	1
<i>Prethopalpus</i> `BAR135`	1
<i>Prethopalpus</i> sp. B26	1
Symphytognathidae	
<i>Anapistula</i> sp.	1
Tetrablemmidae	
<i>Tetrablemma</i> sp. nov. Nullagine	1
Tetrablemmidae sp. S01	9
Trochanteriidae	
Trochanteriidae sp. S01	4
Opiliones	
Phalangodidae	
Phalangodidae sp. S01	1

Row Labels	Sample Count
Palpigradi	
Palpigradi sp.	3
Palpigradi sp. B08	1
<i>Eukoenenia</i> `BPAL048`	1
Pseudoscorpiones	
Pseudoscorpiones sp.	6
Chthoniidae	
Chthoniidae sp.	5
`Genus indet.` `Chthoniidae sp. NS`	1
`Lagynochthonius?`	1
<i>Lagynochthonius leemouldi</i>	26
<i>Lagynochthonius nr polydentatus</i>	1
<i>Tyrannochthonius</i>	3
<i>Tyrannochthonius</i> `sp. indet.`	1
<i>Tyrannochthonius</i> `abydos`	2
<i>Tyrannochthonius</i> `BPS228`	1
<i>Tyrannochthonius</i> `BPS439`	1
<i>Tyrannochthonius</i> `PSE054`	1
<i>Tyrannochthonius</i> `sp. AB A`	1
<i>Tyrannochthonius</i> `sp. AB B`	1
<i>Tyrannochthonius</i> `sp. Yarrie`	5
<i>Tyrannochthonius</i> sp. S01	5
Hyidae	
<i>Indohya</i> sp.	4
<i>Indohya</i> `PSE002`	5
<i>Indohya</i> `PSE003`	8
<i>Indohya</i> `PSE177`	1
<i>Indohya</i> `PSE180`	9

Row Labels	Sample Count
<i>Indohya</i> sp. S01	7
Schizomida	
Schizomida sp.	2
Hubbardiidae	17
<i>Draculoides</i> sp.	2
<i>Draculoides</i> `BSC002`	1
<i>Draculoides</i> `BSC038`	3
<i>Draculoides</i> `SCH019`	10
<i>Draculoides</i> `sp. MW`	1
Chilopoda	
Geophilida	
Geophilidae	
Geophilidae sp. S01	1
Scolopendrida	
Scolopendrida sp. S03	1
Cryptopidae	
Cryptopidae sp.	1
<i>Cryptops</i> `BSCOL076`	1
<i>Cryptops</i> sp. B04 (nr <i>megalophora</i>)	3
<i>Cryptops</i> sp. B06 (=SV, B14)	1
<i>Cryptops</i> sp. B49	1
Scolopendridae	
<i>Cormocephalus</i> sp. B03	1
Diplopoda	
Diplopoda sp.	3
Polydesmida	
Polydesmida sp.	1
Doratodesmidae	

Row Labels	Sample Count
Doratodesmidae sp. S01	72
Doratodesmidae sp. S02	1
Dalodesmidae	
Dalodesmidae `BDI073`	1
Haplodesmidae	
Haplodesmidae `Genus indet.` `sp. S1`	59
<i>Prosopodesmus</i> nr `OES8`	5
Paradoxosomatidae	
Paradoxosomatidae sp.	2
Paradoxosomatidae `Genus indet.` `sp. S1`	4
Paradoxosomatidae sp. S01	4
Polyxenida	
Polyxenida sp.	2
Lophoproctidae	
Lophoproctidae sp.	27
Lophoproctidae `Genus indet.` `sp. B01`	2
<i>Lophoturus madecassus</i>	59
Polyxenidae	
Polyxenidae sp.	12
Entognatha	
Diplura	
Diplura sp.	1
Campodeidae	
Campodeidae sp. B12	1
Japygidae	
Japygidae sp.	4
Japygidae `BDP187`	1
Japygidae sp. B21	2

Row Labels	Sample Count
Japygidae sp. B22	2
Japygidae sp. S01	1
Parajapygidae	
Parajapygidae `BDP174`	1
Parajapygidae `DPL029` (<i>Parajapax swani</i> group)	2
Parajapygidae `DPL030` s.l.	2
Parajapygidae `DPL031` s.l.	8
Parajapygidae sp. S02	3
Parajapygidae `BDP181`	1
Projapygidae	
Projapygidae sp. B08	1
Projapygidae sp. B23	1
Projapygidae sp. S02	1
Insecta	
Insecta sp.	1
Blattodea	
Blattidae	
Blattidae sp.	42
Blattidae sp. S02	2
Nocticolidae	
Nocticolidae sp.	18
<i>Nocticola</i> sp.	157
<i>Nocticola</i> `BLA002`	1
<i>Nocticola</i> `BLA005`	6
<i>Nocticola</i> `BLA006` (<i>currani</i> gp)	1
<i>Nocticola</i> `sp. 10`	2
<i>Nocticola</i> `sp. NS2`	5
<i>Nocticola</i> `sp. S5_NS1`	23

Row Labels	Sample Count
<i>Nocticola</i> `sp. S8`	3
<i>Nocticola</i> `sp. S9`	2
<i>Nocticola currani</i> s.l.	13
<i>Nocticola quartermainei</i> s.l.	3
<i>Nocticola</i> sp. B04	9
<i>Nocticola</i> sp. B04/B05 (imm or female)	42
<i>Nocticola</i> sp. B05	3
<i>Nocticola</i> sp. B20	10
<i>Nocticola</i> sp. B30	30
<i>Nocticola</i> sp. B35	1
<i>Nocticola</i> sp. S08	17
<i>Nocticola</i> sp. S09	23
<i>Nocticola</i> sp. S10	4
Coleoptera	
Coleoptera gen 1 sp. B08	16
Coleoptera sp. B02	2
Coleoptera sp. S01	1
Coleoptera sp. S03	1
Carabidae	
Carabidae sp.	13
Bembidiinae sp. B07	6
<i>Gracilanillus</i> `BCO217`	7
<i>Illaphanus</i> sp. S01	6
Curculionidae	
Curculionidae sp.	8
Curculionidae `sp. B07`	8
Curculionidae Genus 1 `BCO218`	11
Curculionidae sp. S01	2

Row Labels	Sample Count
Curculionidae sp. S03	6
Curculionidae sp. S07	9
Cryptorhynchinae `BCO185`	1
Cryptorhynchinae `BCO192`	2
Staphylinidae	
Pselaphinae sp.	44
Pselaphinae sp. S01	98
Diptera	
Diptera sp.	3
Sciaridae	
Sciaridae sp.	5
<i>Allopyxia</i> sp. B01	37
Sciaridae `DPT006`	1
Hemiptera	
Cixiidae	
Cixiidae sp. B02	4
Enicocephalidae	
Enicocephalidae sp.	3
Meenoplidae	
Meenoplidae sp.	27
Meenoplidae sp. S01A	5
Meenoplidae sp. S02	4
<i>Phaconeura</i> sp.	103
<i>Phaconeura</i> sp. B02 s.l. (=Meenoplidae sp. S01)	4
Reduviidae	
<i>Ploiaria</i> sp.	3
Isoptera	
Termitidae	

Row Labels	Sample Count
<i>Microcerotermes serratus</i>	1
Zygentoma	
Zygentoma sp.	1
Nicoletiidae	
Nicoletiidae sp.	10
Atelurinae sp.	12
<i>Atelurodes</i> sp. S01	2
<i>Dodecastyla</i> sp.	3
<i>Dodecastyla</i> `BZY087`	2
<i>Trinemura</i> sp.	8
<i>Trinemura</i> `BZY088`	4
<i>Trinemura</i> sp. B14	1
<i>Trinemura</i> sp. B31	6
<i>Trinemura</i> sp. S01	11
Malacostraca	
Isopoda	
Armadillidae	42
Armadillidae gen. indet. `BIS416`	1
Armadillidae gen. indet. `BIS438`	1
<i>Buddelundia</i> sp.	2
<i>Buddelundia</i> `ISO002`	3
<i>Troglarmadillo</i> sp.	3
<i>Troglarmadillo</i> sp. S01	9
<i>Troglarmadillo</i> sp. S02	5
<i>Troglarmadillo</i> `ISO006`	16
<i>Troglarmadillo</i> sp. B41	2
Microcerberidae	
Microcerberidae sp. S03	1

Row Labels	Sample Count
Philosciidae	
Philosciidae sp.	1
Philosciidae `ISO017`	4
nr <i>Andricophiloscia</i> sp. B01	1
Stenoniscidae	
Stenoniscidae gen. nov. sp. B02	1
Pauropoda	
Tetramerocerata	
Pauropodidae	
Pauropodidae `BPU083`	2
Pauropodidae `BPU084`	1
Pauropodidae `BPU085`	1
Pauropodidae `BPU086`	1
Symphyla	
Symphyla sp.	1
Symphyla sp. S01	3
Cephalostigmata	
Scolopendrellidae	
<i>Symphylella</i> sp. B11	2
Scutigereididae	
<i>Hanseniella</i> sp. B13	1
<i>Hanseniella</i> sp. B22	1

Appendix 3 – Site Groundwater Physico-Chemistry

Site Name	Bore Use	Sampling Year(s)	Latitude	Longitude	2022 SWL (mbgl)	2024 SWL (mbgl)	EOH (mbgl)	EC (µS/cm)	pH	Temp (°C)	Comments
1956 Well	Pastoral	2024	-21.2981	119.7205	N/A	6.76	12	355	7.48	26.2	
Allies Well	Pastoral	2022, 2024	-21.527	119.9121	12.13	11.92	17	2001	8.12	21.2	
Campbell Well	Pastoral	2024	-21.2969	120.0737	N/A	7.33	8	2514	8.62	27.6	
Cobbers Well	Pastoral	2024	-21.2541	120.0018	N/A	8.85	11	914.1	7.65	25.4	
Corunna Downs Well	Pastoral	2022	-21.455101	119.841593	N/A	N/A		1106	7.05	13.5	Sample collected by outlet pipe passing through net in 2022. Left for 8 hours.
CRD0058	Exploration	2024	-21.2804	119.722	N/A	4.77	60	1271	8.02	27.4	
Crystal Well	Pastoral	2024	-21.4826	119.8646	N/A	8.80	10	1037	7.41	24.6	
Gum Creek Well	Pastoral	2024	-21.3585	120.0541	N/A	3.27	4	1338	8.21	19	
House Well	Pastoral	2022, 2024	-21.3142	120.0597	2.68	2.52	4	1149	6.84	25.9	
Kelyee Well	Pastoral	2024	-21.2956	120.0613	N/A	2.53	10	898.3	7.23	25.9	
Links Well	Pastoral	2022	-21.4851	119.9815	N/A	6.36	8	889.9	8.2	21.2	Sample collected by outlet pipe passing through net in 2022. Left for 8 hours.
No 18 Well	Pastoral	2022, 2024	-21.3032	120.1678	7.57	6.51	9	1076	8.23	19.6	
No 5 Well	Pastoral	2022, 2024	-21.3683	120.1044		4.80	6	1186	7.96	20.9	Well dry in 2022.
No 7 Well	Pastoral	2022, 2024	-21.3079	120.1198	N/A	2.39	8	1746	7.52	21.4	Sample collected by outlet pipe passing through net in 2022. Left for 45 mins.
No 9 Well	Pastoral	2024	-21.4057	119.767	N/A	6.81	8	582.1	8.13	18.7	
Pelingine Well	Pastoral	2024	-21.3957	119.914	N/A	5.06	10	1762	8.57	21	
Tonys Well	Pastoral	2022, 2024	-21.4595	120.0214	7.22	8.15	11.5	1735	7.79	25.5	
Underwood Bore	Pastoral	2022, 2024	-21.4058	120.0686	7.3	7.57	10	1129	7.2	26.2	