Bennelongia Environmental Consultants

Ministers North

Targeted Troglofauna Survey

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Short-Range Endemics I Subterranean Fauna

Waterbirds I Wetlands

Ministers North Targeted Troglofauna Survey

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EXECUTIVE SUMMARY

Ministers North (henceforth referred to as the 'Study Area') is located approximately 90 km north-west of Newman in the Pilbara region of Western Australia and 5 km south of BHP's Yandi mining operations.

Subterranean fauna surveys previously conducted in the Study Area by Subterranean Ecology and Bennelongia Environmental Consultants identified that two troglofauna species had been collected only from areas where troglofauna might be impacted by future mining activities. The species are:

- Palpigradi sp. B24; and
- *Hanseniella* sp. B43-DNA.

This report provides the results of a targeted troglofauna survey for these two species in 2020/2021. The aim of the survey was to provide further information about the distributions of the two species.

Forty exploration drill holes were sampled and yielded 198 troglofaunal animals, representing at least 14 species of eight orders. Neither of the targeted species was collected. One species of pauropod was recorded for the first time at Ministers North, Pauropodidae sp. B04. This species is likely to be *Decapauropus tenuis*, which is widespread with a circum-tropical distribution.

Sampling effort was focussed around the known locations of the two target species. The failure to collect either species is most likely a result of the target species occurring in low abundance in association with the lower number of samples taken in 2020/2021.

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1. INTRODUCTION

Ministers North (henceforth referred to as the 'Study Area') is located approximately 90 km north-west of Newman in the Pilbara region of Western Australia and 5 km south of BHP's Yandi mining operations (Figure 1).

Troglofauna and stygofauna surveys were conducted in the Study Area in 2009 and 2010 by Subterranean Ecology (2010) as part of BHP's Regional Subterranean Fauna Sampling Program (RSFSP). Further subterranean fauna surveys were undertaken in 2017 and 2018 by Bennelongia (2018) to provide further information about the subterranean fauna of Ministers North.

The compiled data from these surveys suggested that few stygofauna species occur at Ministers North but that a large number of troglofauna species occur, with 31 of these species known only from the Study Area (Bennelongia 2018). In 2020, BHP defined areas where troglofauna might be impacted by future mining activities and determined that two troglofauna species had been collected only from these areas within the Study Area. The potentially restricted species are:

- the palpigrade (small, fragile and similar to whip scorpions) Palpigradi sp. B24; and
- the symphylan (or garden centipede) *Hanseniella* sp. B43-DNA.

This report provides the results of a targeted troglofauna survey at Study Area in 2020/2021. The aim of the survey was to provide further information about the distributions of the two troglofauna species listed above.

2. METHODS

Troglofauna survey was conducted according to the general principles laid out for subterranean fauna sampling by the Environmental Protection Authority (EPA) in *Technical Guidance – subterranean fauna survey* (EPA 2016a), *Technical Guidance – sampling methods for subterranean fauna* (EPA 2016b), and the *Environmental Factor Guideline – subterranean fauna* (EPA 2016c).

2.1. Sampling Effort

The selection of drill holes to be sampled was based on a list of holes identified by BHP, boundaries of potential impact supplied by BHP, and the location of the previous records of the two troglofauna species that were the targets of survey (Figure 2). The availability of drill holes significantly constrained the selection of holes to be sampled.

Forty exploration drill holes were sampled (Appendix 1). This resulted in collection of 39 scrape samples (one hole was not scrapped due to a snag) and 50 trap samples (two traps were set in a quarter of holes) (Appendix 2). Scrapping and setting traps were undertaken between 24-25 November 2020 and traps were retrieved on 25 February 2021.

2.2. Troglofauna Field and Laboratory Methods

Troglofauna samples were collected from vertical, uncased drill holes using two collecting techniques:

1. *Trapping*. Custom made cylindrical PVC traps (entrance holes side and top) were used for trapping. Traps were baited with moist leaf litter (sterilised by microwaving) and lowered on nylon cord to the depths at which they were set. In every fourth hole two traps were set (one 'shallow' and one 'deep'). Holes were sealed while traps were set to minimise the ingress of surface invertebrates. Traps were retrieved after 13 weeks, and their contents (bait and captured fauna) were emptied into a zip-lock bag and transported alive to the laboratory in Perth.

   The average depth of troglofauna traps, including when two traps were set in a hole, was 21.9 ± 9.8 mbgl (range of 5 to 45 mbgl).

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GCS GDA 1994
Author: VMarques
Date: 1/11/2021

Figure 1. The Ministers North tenement and nearby BHP development envelopes.

Legend

- Project location (inset)
- Ministers North tenement
- Mining Area C
- Yandi

2. *Scraping*. Scrapes were collected immediately prior to setting traps. A troglofauna net (weighted ring net, 150 micrometre (µm) screen) was lowered to the bottom of the hole, or to the water table, and scraped back to the surface along the walls of the hole. Each scrape comprised four sequences of lowering and retrieving with the aim of scraping all troglofauna present on the walls of the hole into the net. After each scrape, the contents of the net were transferred to a 125 millilitre (ml) vial and preserved in 100% ethanol.

After delivery to the laboratory, leaf litter from the traps was processed in Berlese funnels under halogen lamps for 72 hours, during which time the light and heat drives animals downwards and towards a vial containing 100% ethanol as a preservative. Litter was quickly checked after removal from the funnels to ensure no invertebrates remained. Samples in ethanol from the Berlese funnels were then carefully screened under a dissecting microscope and potential troglofauna picked out.

Troglofauna scrape samples were elutriated 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. All potential troglofaunal animals were removed from these samples for species or morpho-species level identification. Surface animals were identified to Order level. Potential troglofaunal species were distinguished from surface species by the presence of troglomorphic characteristics (reduced eyes and pigmentation, well developed sensory organs, slender appendages, vermiform body shape).

Troglofaunal animals were examined with particular emphasis on whether they might be one of the two target species. Dissection and examination under a compound microscope were used as necessary.

2.3. Personnel

Fieldwork was conducted by Jim Cocking, Louis Masarei and Sam Chidgzey. Sample sorting was done by Jane McRae, Melanie Fulcher, Melita Pennifold, Sam Chidgzey and Vitor Marques, and all morphological identifications were made by Jane McRae.

3. RESULTS

The targeted troglofauna survey collected 198 troglofaunal animals, representing eight orders and at least 14 species (Table 1). This includes representatives of three orders of arachnids, one order of crustaceans, two classes of myriapods and six orders of hexapods, but no representatives of the target groups: palpigrades and symphylans.

Five of the 14 species were identified only to genus or family level but clearly represent distinct taxa in the list of species collected. Two other higher level identifications were treated as synonymous with other animals collected in 2020/2021 (Table 2).

Nine of the 14 species are known from previous surveys of the Study Area. One species of pauropod, Pauropodidae sp. B04, was recorded in the Study Area for the first time during the targeted sampling. Based on morphology, this species is thought to be *Decapauropus tenuis*, which has a circumtropical distribution. and it is likely that all five distinct higher level taxa were also collected in previous surveys.

Of the remaining four species, *Pelicinus* 'BAR133' is considered likely to be conspecific with Oonopidae sp. B19, which was recorded as one juvenile in 2018. Molecular data would be needed to fully confirm conspecificity. If this is not the case, *Pelicinus* sp. represents an extra species in the Study Area outside the area of expected impact. The other three taxa are higher level identifications (*Lagynochthonius* sp., *Japygidae* sp., *Dodecastyla* sp.) that are likely to be species collected in the earlier surveys.

Taxonomic changes have been made between the time of Bennelongia (2018) and this report are shown in Appendix 3.

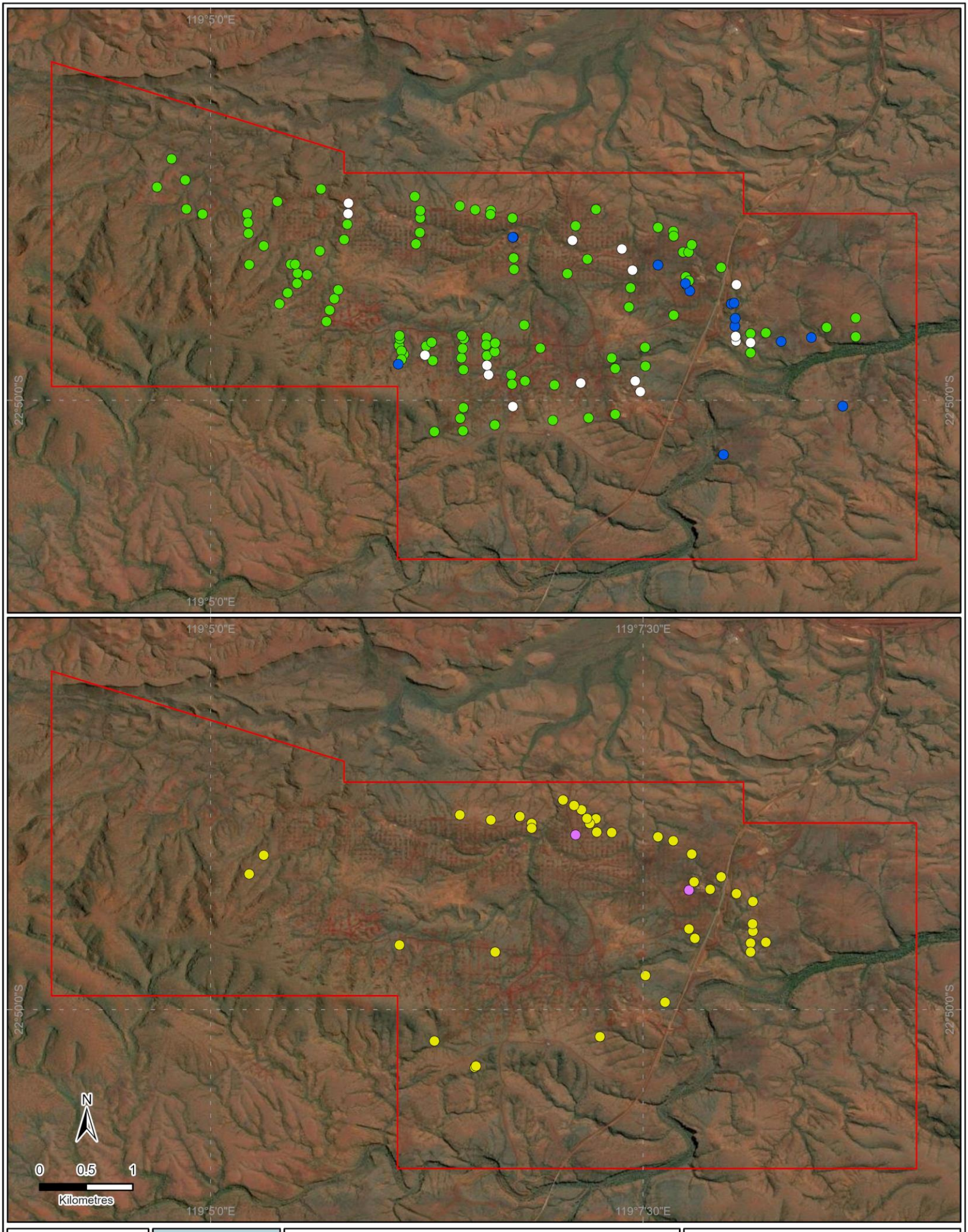


Figure 1. Location of targeted troglofauna species, historical (top panel) and new (bottom) sampling in the Study Area.

Table 1. Troglofauna species and number of individuals collected during the 2020/2021 targeted survey.
Additional species recorded during this survey highlighted in blue; higher level identifications considered synonymous with other species collected in 2020/2021 highlighted in grey.

Higher Taxonomy	Lowest Identification	Specimens (subsamples)	Distribution	Linear Range (km)
Chelicerata				
Arachnida				
Araneae				
Oonopidae	*Pelicinus* 'BAR133'	2 (2)	Likely Oonopidae sp. B19	3
Pseudoscorpiones				
Chthoniidae	*Lagynochthonius* sp.	4 (3)	Likely *Lagynochthonius* sp. B20	-
Schizomida				
Hubbardiidae	*Draculoides* `BSC039`	1 (1)	Only known from Ministers North	1.5
	Draculoides sp.	2 (1)	Probably *Draculoides* `BSC039`	-
Crustacea				
Isopoda				
Armadillidae	*Troglarmadillo* sp. B64 (= sp. S14)	2 (1)	Only known from Ministers North	4.5
Myriapoda				
Diplopoda				
Polyxenida				
Lophoproctidae	*Lophoturus madecassus*	1 (1)	Cosmopolitan	1100
Pauropoda				
Tetramerocerata				
Pauropodidae	Pauropodidae sp. B04 (*Decapauropus tenuis*?)	1 (1)	Possibly widespread	-
Hexapoda				
Entognatha				
Diplura				
Japygidae	Japygidae sp.	2 (2)	Likely same species as Diplura sp.	-
Insecta				
Blattodea				
Blattidae	Blattidae sp. B06 (= sp. S02)	3 (2)	Central Hamersley (Mining Area C, Ministers North and Jinidi)	46
Nocticolidae	*Nocticola* sp. B36 (*cockingi* s.l.)	4 (2)	Only known from Ministers North	7
	Nocticola sp.	26 (10)	Probably *Nocticola* sp. B36 (*cockingi* s.l.)	-
Coleoptera				
Curculionidae	Cryptorhynchinae sp. B10	1 (1)	Only known from Ministers North	4.5
Diptera				
Sciaridae	*Allopnyxia* sp. B01	87 (3)	Gascoyne and Pilbara	490
Hemiptera				
Cixiidae	Cixiidae sp. B02	1 (1)	Pilbara	480
Meenoplidae	*Phaconeura* `BHE032`	2 (1)	Only known from Ministers North	4
	Phaconeura sp.	50 (1)	Probably *Phaconeura* `BHE032`	-
Zygentoma				
Nicoletiidae	*Dodecastyla* sp.	9 (3)	Likely *Dodecastyla* sp. B02	-

4. DISCUSSION

The targeted troglofauna survey at Ministers North in 2020/2021 yielded 198 troglofauna animals representing eight orders and at least 14 species but did not collect either of the two target species. One species, Pauropodidae sp. B04, was recorded for the first time in the Study Area. This species is likely to be the widespread *Decapauropus tenuis*, although the current identification is not definitive. The majority of the species collected during targeted survey were in low abundance and almost half of them were known from single sites.

If measured as the number of species collected per sample, efficiency of sampling in 2020/2021 was similar to previous years. The ratio of species to specimens was low in 2020/2021, however, because several abundant species were collected in relatively higher numbers then previous years. This was

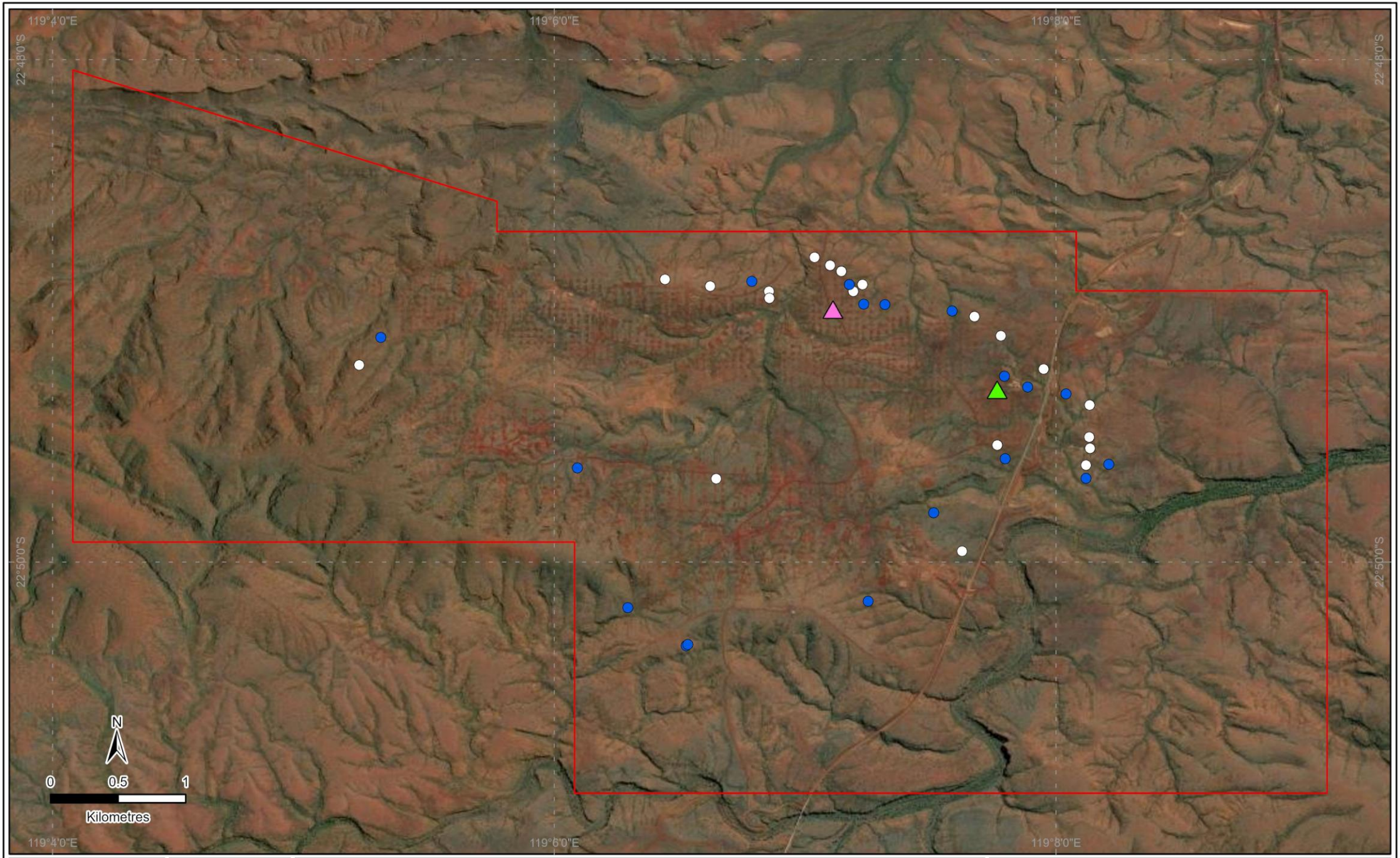
especially the case for the bug *Phaconeura* and, to a lesser extent, the fly *Allopynxia* and cockroach *Nocticola* (Table 2).

Table 2: Troglofauna sampling effort and efficiency at Ministers North.

Date	Samples	Specimens	Species	Specimens/ sample	Species/ sample	Species/ specimen
Subterranean Ecology (2010)						
2009	49	86	18	1.76	**0.37**	0.21
2010	60	81	14	1.35	**0.23**	0.17
Bennelongia (2018)						
2017	59	156	22	2.64	**0.37**	0.14
2018	65	139	18	2.14	**0.28**	0.13
This report						
2020/21	40	198	14	4.95	**0.35**	0.07

Sampling in 2020/2021 was concentrated around the previous records of Palpigradi sp. B24 and *Hanseniella* sp. B43-DNA. The most likely reason for failing to collect either species is that they are low abundance taxa. Both were previously collected as single animals in 2010 and 2017, respectively. The relationship between low abundance and stochastic capture was illustrated by the pattern of collection of Palpigradi sp. B24 in 2010, when it was found in the fourth and last scrape of a drill hole during the second round of sampling in 2010. More generally, an analysis of troglofaunal sampling in the Pilbara showed that the probability of recollecting a troglofauna species collected as a single animal by sampling the hole on another two occasions is only 6% (Halse 2018). In contrast, if the species is relatively abundant (≥3 animals collected) the probability of recollecting is 61%.

Given that sampling effort in 2020/2021 was approximately one third of the effort in each of 2009/2010 and 2017/2018, the likelihood of recollecting Palpigradi sp. B24 and *Hanseniella* sp. B43-DNA was low without being able to target their habitat very specifically. It appears likely that focussing effort in the vicinity of previous records did not provide sufficient focus on the species' habitats.



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Date: 1/11/2021

Legend

- Project location (inset)
- Ministers North Tenement

Troglofauna Records - Survey 2020/2021

- Yes
- No

Targeted Species

- Hanseniella sp. B43-DNA
- Palpigradi sp. B24

Figure 3. Location of troglofauna records from 2020/2021 Survey, and targeted species previously collected.

5. REFERENCES

Bennelongia (2018) Ministers North subterranean fauna survey. Bennelongia Environmental Consultants, 326, Jolimont, WA, 42 pp.

EPA (2016a) Technical Guidance - Subterranean fauna survey. Environmental Protection Authority, Perth, WA, 24 pp.

EPA (2016b) Technical Guidance - Sampling methods for subterranean fauna. Environmental Protection Authority, Perth, WA, 37 pp.

EPA (2016c) Environmental Factor Guideline - Subterranean Fauna. Environmental Protection Authority, Perth, WA, 5 pp.

Halse, S., 2018. Conservation and Impact Assessment of Subterranean Fauna in Australia. In: O.T. Moldovan, L. Kovac and S. Halse (Eds.), Cave Ecology. Springer Nature Switzerland, Cham, Switzerland, pp. 479-494.

Subterranean Ecology (2010) Pilbara Regional Subterranean Fauna Survey Area C North Mining Area - Ministers North. Subterranean Ecology Pty Ltd, Report No. 2010/18, Stirling, WA, 84 pp.

APPENDICES

Appendix 1. Sites sampled during the current survey

Hole ID	Latitude	Longitude
EXR0512	-22.82217	119.13399
MN0066R	-22.83593	119.12085
MN0069R	-22.83879	119.10888
MN0290R	-22.82026	119.08704
MN0295R	-22.81844	119.08847
MN0413R	-22.83637	119.10488
MN0466R	-22.81457	119.10736
MN0479R	-22.8278	119.11076
MN0490R	-22.81504	119.11035
MN0528R	-22.81471	119.11312
MN0601R	-22.81623	119.12055
MN0602R	-22.81492	119.12047
MN0623R	-22.81624	119.12197
MN0646R	-22.83005	119.12522
MN0675R	-22.81668	119.12642
MN0696R	-22.81705	119.12792
MN0712R	-22.81833	119.12967
MN0734R	-22.82053	119.13251
MN0744R	-22.82779	119.13534
MN0745R	-22.8269	119.13534

Hole ID	Latitude	Longitude
MN0752R	-22.82684	119.13683
MN1190R	-22.81583	119.11428
MN1191R	-22.81538	119.11427
MN1277R	-22.81538	119.11986
MN1278R	-22.81491	119.11961
MN1458R	-22.82557	119.12944
MN1472R	-22.82647	119.12997
MN1488R	-22.82173	119.13146
MN1960R	-22.821	119.12991
MN2617R	-22.83262	119.1271
MN2620R	-22.82291	119.13557
MN2622R	-22.82505	119.13554
MN2625R	-22.82579	119.13559
MN2658R	-22.81311	119.1173
MN2659R	-22.81364	119.11833
MN2660R	-22.81471	119.11311
MN2661R	-22.81405	119.11906
MN2662R	-22.83889	119.10877
MN2664R	-22.81625	119.12196
MN0393R	-22.82709	119.10154

Appendix 2. Samples taken during the current survey

SWL, standing water level (mbgl). EOH, end of hole (mbgl). Trap Depth (mgbl).

Hole ID	Visit/Set Date	Sampled Collected	Sample Name	Collectors	SWL	EOH	Trap Depth
EXR0512	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	41	84	
EXR0512	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	41	84	30
MN0066R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		43	
MN0066R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		43	40
MN0069R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		55	
MN0069R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		55	45
MN0290R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		21	
MN0290R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		21	20
MN0295R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		20	
MN0295R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		20	10

Hole ID	Visit/Set Date	Sampled Collected	Sample Name	Collectors	SWL	EOH	Trap Depth
MN0295R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		20	20
MN0413R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		45	
MN0413R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		45	30
MN0466R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		27	
MN0466R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		27	25
MN0479R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		21	
MN0479R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		21	15
MN0490R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		21	
MN0490R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		21	16
MN0528R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		33	
MN0528R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		33	25
MN0601R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		32	
MN0601R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		32	22
MN0602R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		21	
MN0602R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		21	6
MN0602R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		21	18
MN0623R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		20	
MN0623R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		20	20
MN0646R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		39	
MN0646R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		39	30
MN0675R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		26	
MN0675R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		26	10
MN0675R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		26	25
MN0696R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		39	
MN0696R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		39	30
MN0712R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		45	
MN0712R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		45	38
MN0734R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		20	20
MN0744R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	22	33	
MN0744R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	22	33	15
MN0745R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	29	45	
MN0745R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	29	45	20
MN0752R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	36.5	57	
MN0752R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	36.5	57	10
MN0752R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey	36.5	57	27
MN1190R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		40	
MN1190R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		40	35
MN1191R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		14	
MN1191R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		14	12
MN1277R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		19	
MN1277R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		19	15
MN1278R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		33	
MN1278R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		33	30
MN1458R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		39	
MN1458R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		39	28
MN1472R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		39	
MN1472R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		39	28
MN1488R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	46	147	
MN1488R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	46	147	10
MN1488R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey	46	147	40
MN1960R	25/11/2020	25/11/2020	Scrape	J.S. Cocking, L.P. Masarei		34	
MN1960R	25/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		34	16
MN1960R	25/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		34	30
MN2617R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		30	
MN2617R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		30	10
MN2617R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		30	20
MN2620R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		5	
MN2620R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		5	5
MN2622R	25/11/2020	25/11/2020	Scrape	J.S. Cocking, L.P. Masarei	36	36	
MN2622R	25/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	36	36	30
MN2625R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	35	54	
MN2625R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	35	54	30
MN2658R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		30	
MN2658R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		30	20
MN2659R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		30	
MN2659R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		30	10

Hole ID	Visit/Set Date	Sampled Collected	Sample Name	Collectors	SWL	EOH	Trap Depth
MN2659R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		30	25
MN2660R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		30	
MN2660R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		30	10
MN2660R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey		30	20
MN2661R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		6	
MN2661R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		6	6
MN2662R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei	37	45	
MN2662R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey	37	45	10
MN2662R	24/11/2020	25/02/2021	Trap 2	J.S. Cocking, S.R. Chidgzey	37	45	30
MN2664R	24/11/2020	24/11/2020	Scrape	J.S. Cocking, L.P. Masarei		42	
MN2664R	24/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		42	35
MN0393R	25/11/2020	25/11/2020	Scrape	J.S. Cocking, L.P. Masarei		33	
MN0393R	25/11/2020	25/02/2021	Trap 1	J.S. Cocking, S.R. Chidgzey		33	25

Appendix 3. Taxonomic changes made since the 2018 report

New species name	Previous species name	Hole ID	Sample	Date Collected
Allopnyxia sp. B01	Sciaridae sp. B01	MN0285R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0286R	Trap 2	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0343R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0767R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0454R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0609R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0752R	Trap 1	18/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0471R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0445RE	Trap 2	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0445RE	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0711R	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0413R	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0708R	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0288R	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0767R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0609R	Trap 1	20/12/2017
Allopnyxia sp. B01	Sciaridae sp. B01	MN0708R	Trap 1	3/05/2018
Allopnyxia sp. B01	Sciaridae sp. B01	MN0343R	Trap 1	20/12/2017
Cixiidae sp. B02	Hemiptera sp. B02 (=Fulgoridae S01=Cixidae S01)	MN0295R	Scrape	18/10/2017
Cixiidae sp. B02	Hemiptera sp. B02 (=Fulgoridae S01=Cixidae S01)	MN0602R	Scrape	7/03/2018
Cixiidae sp. B02	Hemiptera sp. B02 (=Fulgoridae S01=Cixidae S01)	MN0647R	Scrape	6/03/2018
Cixiidae sp. B02	Hemiptera sp. B02 (=Fulgoridae S01=Cixidae S01)	EXR0597	Scrape	20/02/2009
Cixiidae sp. B02	Hemiptera sp. B02 (=Fulgoridae S01=Cixidae S01)	MN0013R	Net	24/05/2009
Draculoides `BSC027`	*Draculoides* sp. B52	MN0445RE	Trap 1	20/12/2017
Draculoides `BSC027`	*Draculoides* sp. B52	MN0444R	Trap 1	20/12/2017
Draculoides `BSC027`	*Draculoides* sp. B52	MN0609R	Trap 1	20/12/2017
Draculoides `BSC027`	*Draculoides* sp. B52	MN0603R	Scrape	6/03/2018
Draculoides `BSC027`	*Draculoides* sp. B52	MN0444R	Trap 1	3/05/2018
Draculoides `BSC036` (SCH030 complex)	*Draculoides* sp. B61 (SCH030 complex)	MN0295R	Scrape	18/10/2017
Draculoides `BSC036` (SCH030 complex)	*Draculoides* sp. B61 (SCH030 complex)	MN0602R	Trap 1	20/12/2017
Draculoides `BSC037`	*Draculoides* sp. B62	MN0514R	Trap 1	20/12/2017
Draculoides `BSC037`	*Draculoides* sp. B62	MN0514R	Trap 2	20/12/2017
Draculoides `BSC037`	*Draculoides* sp. B62	MN0711R	Trap 1	20/12/2017
Draculoides `BSC037`	*Draculoides* sp. B62	MN0479R	Trap 1	20/12/2017
Draculoides `BSC037`	*Draculoides* sp. B62	MN0287R	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0845DTM	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0711R	Trap 2	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0712R	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0711R	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0538R	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	MN0514R	Trap 1	3/05/2018
Draculoides `BSC037`	*Draculoides* sp. B62	EXR0597	Trap 1	23/05/2009
Draculoides `BSC037`	*Draculoides* sp. B62	EXR0973	Trap 1	23/05/2009
Draculoides `BSC037`	*Draculoides* sp. B62	EXR0601	Scrape	10/04/2010
Draculoides `BSC037`	*Draculoides* sp. B62	EXR1154	Trap 1	8/04/2010
Draculoides `BSC039`	*Draculoides* sp. B65	MN0768R	Trap 1	20/12/2017
Draculoides `BSC039`	*Draculoides* sp. B65	MN0760R	Trap 1	3/05/2018
Draculoides `BSC042-DNA`	*Draculoides* sp. B67-DNA	MN0289R	Trap 1	20/12/2017
Draculoides `BSC042-DNA`	*Draculoides* sp. B67-DNA	MN0321R	Trap 1	3/05/2018
Draculoides `BSC042-DNA`	*Draculoides* sp. B67-DNA	MN0294R	Trap 1	3/05/2018
Draculoides `BSC042-DNA`	*Draculoides* sp. B67-DNA	MN0343R	Trap 1	3/05/2018