



Jonathon Barker
Principal: Environmental Approvals
De Grey Mining Limited
jonathon.barker@degreymining.com.au

Blake Wyber
Bennelongia Environmental Consultants
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Hemi Gold Project Targeted Stygofauna Survey

This memo reports the preliminary findings of the targeted stygofauna survey conducted by Bennelongia Environmental Consultants (hereafter, BEC). Following prior surveying conducted, in which novel species were collected solely within the outlined drawdown area, De Grey Mining Limited commissioned BEC to conduct a targeted stygofauna survey. Species within the drawdown area included the amphipod Paramelitidae `BAM210`, the isopods Microcerberidae `BIS464` and Microcerberidae `BIS544`, the harpacticoid *Parastenocaris* `BHA392`, and the syncarid *Breyisomabathynella* `BSY226`. The present survey was conducted solely outside of the drawdown area, in efforts to determine the extent of these species across the broader landscape.

A total of 42 samples were collected within the targeted survey across 33 sites, consisting of monitoring bores and pastoral wells (Figure 1). Due to the paucity of available sampling sites, nine sites chosen for re-sampling due to having greater amount of water column, to increase the volume of sampled habitat.

The survey collected a total of 126 invertebrate specimens, representing 31 identifiable stygofauna species (Table 1). Stygofauna groups collected include eight species of oligochaete worms, five amphipods, a single isopod, six cyclopoid and two harpacticoid copepods, and nine ostracods. Notably, no representative species of syncarid or harpacticoid copepods of the genus *Parastenocaris* were collected, so we cannot confirm the presence of *Breyisomabathynella* `BSY226` or *Parastenocaris* `BHA392` outside of the drawdown area.

The target survey resulted in the collection of eight amphipod specimens, three of which were morphologically similar to the restricted Paramelitidae `BAM210`. Subsequent DNA analysis found that these three specimens were representatives of two species, neither of which were Paramelitidae `BAM210` (Table 2). Furthermore, the genetic analysis also resulted in the original specimens of Paramelitidae `BAM210` being split into two species. This has resulted in a total of three Paramelitid amphipods species identified through the genetic work, Paramelitidae `BAM238`, Paramelitidae_gen_nov_1_AMP002 and Paramelitidae `BAM210`. Of these three species, only Paramelitidae `BAM210` remains restricted to the drawdowns.



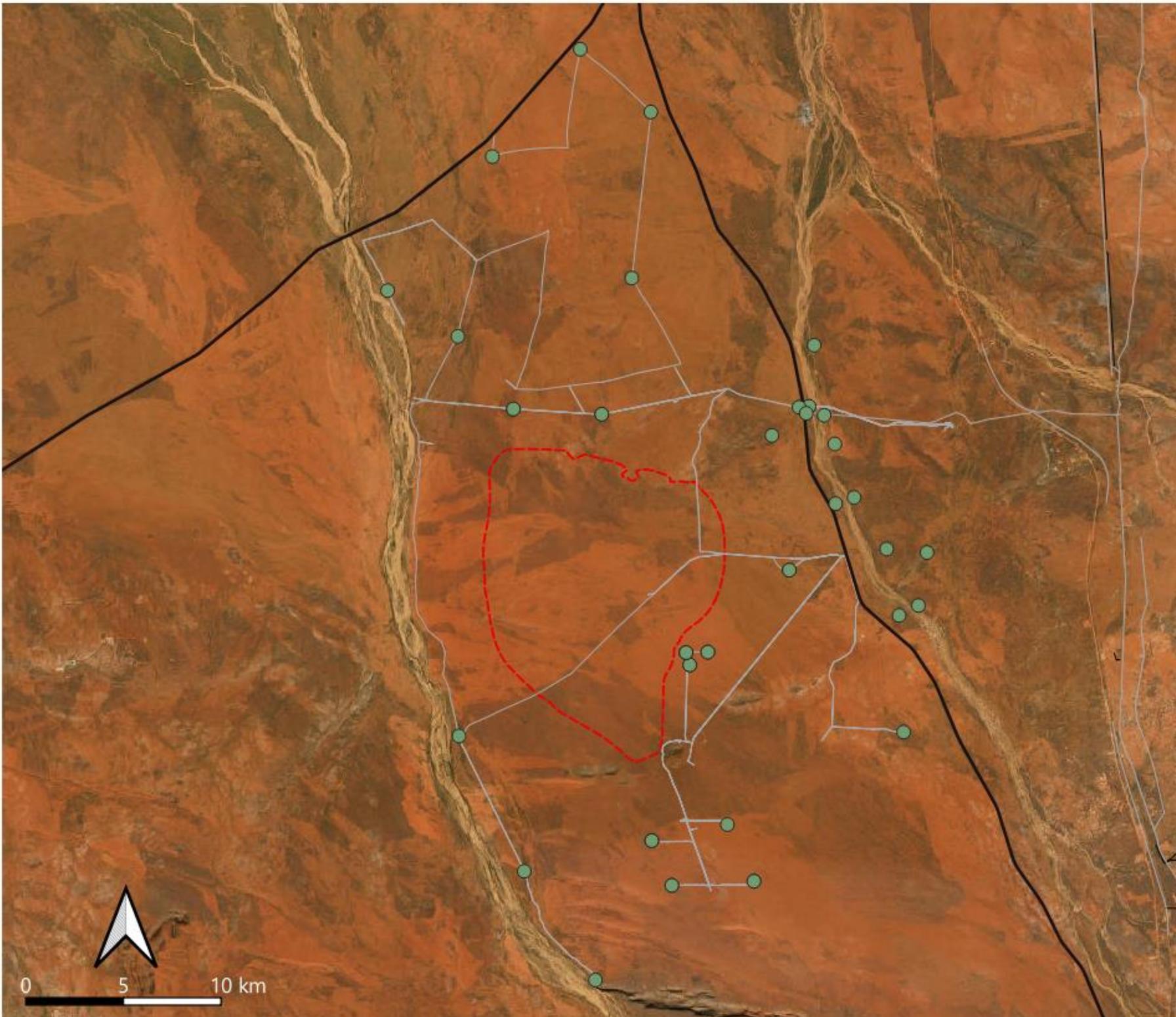
A single bore yielded the only isopod specimens collected during the survey, located approximately 7 km south of the drawdown area. Via DNA sequencing, this species was confirmed to be distinct from Microcerberidae `BIS464` and `BIS544`, and represents a novel species (Microcerberidae `BIS579`).

The results of the targeted survey did not extend the known ranges of the identified restricted species and as such, these species remain currently only known from the proposed drawdowns at Hemi.

Figure 1 - Survey Effort for Hemi 2024 Stygofauna Survey.

Legend

- Peak Water Table Drawdown
- Sealed Roads
- Tracks
- 2024 Survey Bores



0 5 10 km



Figure 2 - Targeted
Stygofauna Groups
Collected in Hemi 2024
Survey.

Legend

— Peak Water Table Drawdown

— Sealed Roads

— Tracks

Targeted Stygofauna Groups

● Microcerberidae 'BIS579'

● Paramelitidae_gen_nov_1_AMPO02

● Paramelitidae 'BAM238'

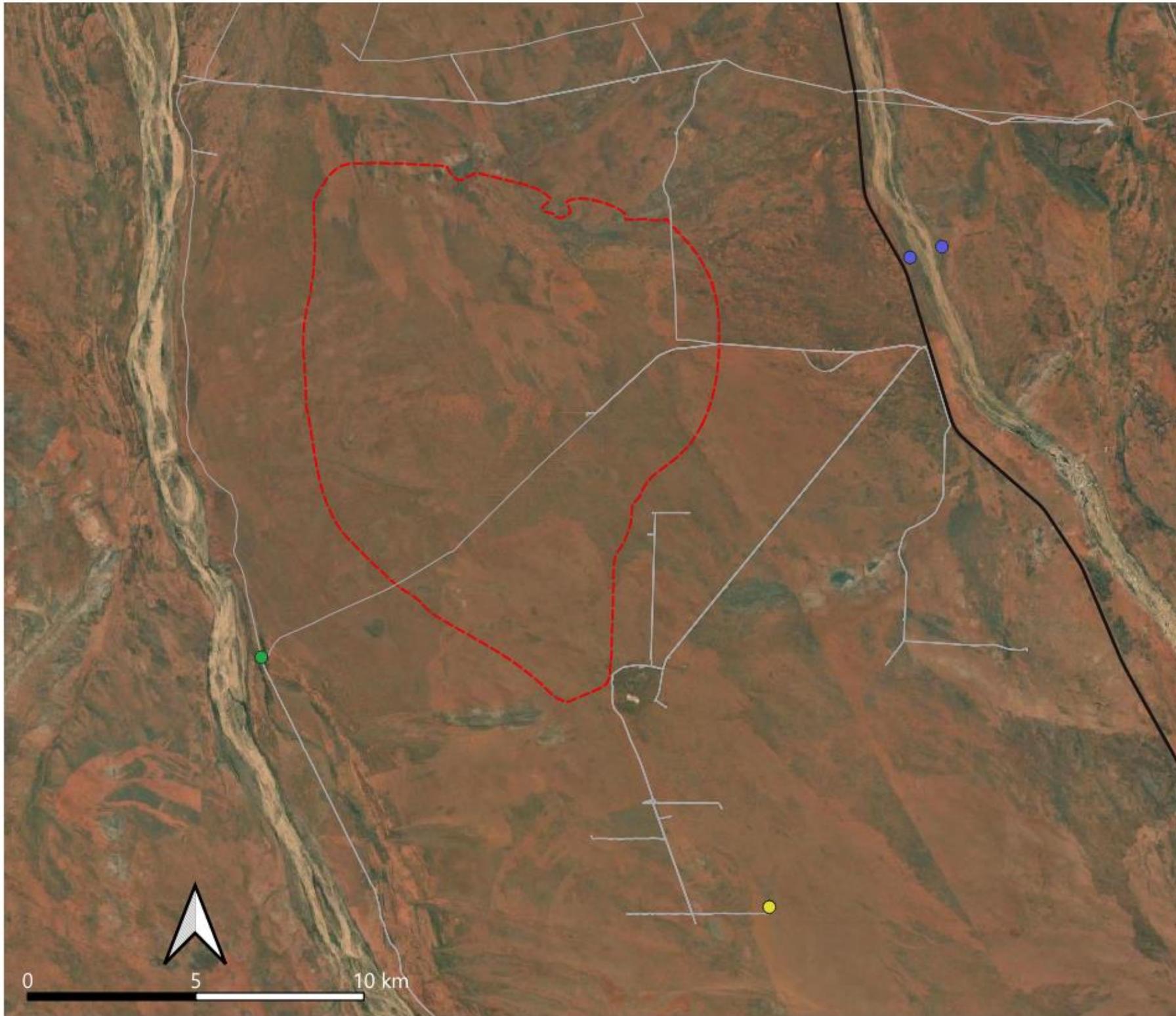


Table 1 –Species list following surveying of reference sites surrounding the Hemi gold project.

Species Classification	Count	Comments
Annelida		
Clitellata		
Enchytraeida		
Enchytraeidae		
Enchytraeidae `2 bundle` s.l. (long thin 4 per seg)	35	
Haplotaxida		
Haplotaxidae		
<i>Haplotaxis</i> sp.	1	
Naididae		
<i>Dero furcata</i>	76	
Naididae `BOL097`	15	
Phreodrilidae		
Phreodrilidae `BOL076` (AP DVC 1H)	3	
Phreodrilidae sp. AP SVC s.l.	3	
Tubificidae		
<i>Monopylephorus</i> sp. nov. WA29 (ex <i>Pristina</i> WA3) (PSS)	35	
Tubificinae `BOL075`	10	
Arthropoda		
Malacostraca		
Amphipoda		
Eriopisidae		
<i>Nedsia</i> `hurlberti group` sp. 1 spine	55	
<i>Pilbarana</i> `BAM219`	3	
Paramelitidae		
Paramelitidae_gen_nov_1_AMP002	1	Widespread species confirmed by DNA analysis.
Paramelitidae `BAM238`	2	New species confirmed by DNA analysis. Collected outside the impact area.

Species Classification	Count	Comments
Paramelitidae Genus 2 sp. B22	5	
Isopoda		
Microcerberidae		
Microcerberidae `BIS579`	9	New species confirmed by DNA analysis. Collected outside the impact area.
Maxillopoda		
Cyclopoida		
Cyclopidae		
<i>Apocyclops dengizicus</i>	26	
Cyclopidae Unk Gen `BCY110`	3	
<i>Diacyclops `BCY087`</i>	49	
<i>Diacyclops scanloni</i>	1	
<i>Diacyclops sp.</i>	18	
<i>Microcyclops varicans</i>	71	
Harpacticoida		
Ameiridae		
<i>Megastygontocrella trispinosa</i>	29	
Canthocamptidae		
<i>Elaphoidella humphreysi</i>	4	
Ostracoda		
Podocopida		
Candonidae		
<i>Areacandona `BOS1653`</i>	8	
<i>Areacandona akatallele</i>	27	
<i>Areacandona incogitata</i>	48	
<i>Areacandona quasilepte</i>	1	
<i>Areacandona yuleae</i>	20	
Cyprididae		
<i>Cyprinotus kimberleyensis s.l.</i>	108	

Species Classification	Count	Comments
<i>Riocypris fitzroyi</i>	40	
<i>Sarscypridopsis aculeata</i>	190	
<i>Stenocypris malcolmsoni</i>	4	
Darwinulidae		
<i>Vestalenula marmonieri</i>	19	
Nematoda		
Nematoda spp.	18	Cannot identify beyond this level.

Table 2 – Results of molecular analysis for stygofauna collected at reference sites surrounding the Hemi gold project.

Cap	Location	Date	Bore Code	Final Identification	Identification before DNA	Comments
1	Hemi	17/05/2022	HMB004	Paramelitidae `BAM238`	Paramelitidae `BAM210`	No species level match based on mitochondrial or nuclear DNA. Caps 1, 2 and 4 are within similarity threshold to be considered the same, new species.
2	Hemi	15/05/2024	HMB018	Paramelitidae `BAM238`	Paramelitidae `BAM210`	
3	Hemi	15/05/2024	No 5	Paramelitidae_gen_nov_1_AMP002	Paramelitidae `BAM210`	This sequence matched , and was 2.25% distant to Paramelitidae_gen_nov_1_AMP002, a species previously sequenced by Bennelongia.
4	Hemi	16/05/2024	HMB021	Paramelitidae `BAM238`	Paramelitidae `BAM210`	
5	Hemi	16/05/2024	HMB080	Microcerberidae `BIS579`	Microcerberidae sp.	No species level match within Bennelongia database, 17.28% distant to Microcerberidae `BIS464`. Caps 5, 6 and 7 reflect a singular new species.
6	Hemi	16/05/2024	HMB080	Microcerberidae `BIS579`	Microcerberidae sp.	
7	Hemi	16/05/2024	HMB080	Microcerberidae `BIS579`	Microcerberidae sp.	