

Memo Report

To: Janine Cameron, KCGM

From: Paula Strickland

Date: 20 September 2021

Subject: Fimiston IIE survey for *Camponotus* sp. nr. *terebrans*

Dear Janine,

Phoenix Environmental Sciences (Phoenix) is pleased to present this memo report summarising the results of field surveys for the ant species *Camponotus* sp. nr. *terebrans*, host of the Critically Endangered Arid Bronze Azure Butterfly (ABAB, *Ogyris subterrestris petrina*), within the area of Kalgoorlie Consolidated Gold Mines Ltd (KCGM) Fimiston Gold Mine Operations Extension IIE and IIE north (Figure 1).

Background

Phoenix has been undertaking a program of biological survey work to support KCGM's Fimiston Operations including, flora and vegetation, vertebrate fauna and short-range endemic invertebrate fauna (Phoenix 2018). The ABAB has been listed as Critically Endangered under Western Australia's *Wildlife Conservation Act 1950* (WC Act, now superseded by the *Biodiversity Conservation Act 2016* (BC Act)) since 2008, and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) since 2015, but detailed survey guidelines were not published until September 2020 (DBCA 2020b, c). As of 2020, populations are only known to have existed at Lake Douglas southwest of Kalgoorlie (extinct since 1993), Barbalin Reserve near Mukinbudin, and another undisclosed location in the Wheatbelt (DBCA 2020a). In December 2020 an adult female ABAB was photographed by Greg Harewood (Zootopia Environmental Services, subcontracting for Botanica Consulting) during a Malleefowl survey at an undisclosed location between Kalgoorlie and Menzies (pers. comm. to R. Eastwood by A.A.E. Williams, DBCA).

The butterfly is difficult to survey because adults are present only for a few weeks each year and may disperse through habitat unsuitable for breeding. Caterpillars of the ABAB are thought to live only within nests of an undescribed species of sugar ant (now referred to as *Camponotus* sp. nr. *terebrans*), associated with smooth-barked eucalypt woodlands on sandy soil.

The survey approach now recommended is to survey first for the ant and look for the butterfly only at sites with large colonies of the host ant. This ant species was previously also only known to exist at two sites in WA, but a number of additional records have recently been reported from woodlands near Marvel Loch (Williams *et al.* 2018) and Koolyanobbing (Phoenix 2021).

The guidelines include a map of potential habitat for the host ant in WA, which includes large areas of woodland across the State. All significant *Camponotus* sp. nr. *terebrans* colonies are assumed to be critical habitat for ABAB; the status of habitat is dynamic, as ABAB can disperse across the landscape and (presumably) become established at new colonies, while existing colonies can also decline over time. Potential presence of the ABAB in the vicinity is likely to be seen by regulators as a constraint to proposed clearing and development actions.

Scope

The scope of work was as below:

- Desktop assessment of habitat suitability across the study area based on available vegetation mapping, producing maps and shapefile of potentially suitable habitat for *Camponotus* sp. nr. *terebrans*

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- Conduct survey for the ant species in all areas of suitable habitat in the study area, applying the formula for number and spacing of sample trees given by Department of Biodiversity, Conservation and Attractions (DBCA) based on area of suitable habitat
- Produce a succinct memo report and maps to identify presence/absence of *Camponotus* sp. nr. *terebrans* at all surveyed trees, and extent of any large colonies of the ant for subsequent ABAB survey.

Study area

The study area consists of three areas:

- northern area (1,023.81 ha)
- southern area (355.24 ha)
- rehabilitation areas (134.5 ha).

Potential habitat for *Camponotus* sp. nr. *terebrans*

Based on vegetation mapping undertaken by Phoenix, seven vegetation units contain eucalypts in the study area. These are considered potential habitat for *C. sp. nr. terebrans*, and the mapped extent of these vegetation units was adopted as the study area for the survey (Figure 1):

- OD-EW1 - Low woodland of *Eucalyptus salmonophloia* over low scrub of *Acacia hemiteles*/*Eremophila ionantha*/*Maireana sedifolia* and dwarf scrub of *Atriplex vesicaria*/*Eremophila parvifolia*.
- OD-EW2 - Low woodland of *Eucalyptus stricklandii*/*Eucalyptus ravidia* over low scrub of *Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria*.
- CLP-EW1 - Low woodland of *Eucalyptus lesouefii* over low scrub of *Maireana sedifolia*/*Eremophila scoparia*/*Cratystylis conocephala* and dwarf scrub of *Eremophila parvifolia*
- CLP-EW2 - Mid *Eucalyptus salmonophloia* woodland over tall open *Eremophila scoparia* and *Exocarpos aphyllus* shrubland over mid open *Acacia hemiteles*, *Senna artemisioides* subsp. *filifolia* and *chenopod spp.* shrubland. *E. salmonophloia* is a known habitat tree for *Camponotus* sp. nr. *terebrans*.
- CLP-EW3 - Forest of *Eucalyptus salubris* over low scrub of *Eremophila scoparia* and low heath of *Maireana sedifolia*
- CLP-EW4 - Low woodland of *Eucalyptus lesouefii* over open low scrub of *Exocarpos aphyllus* and open dwarf scrub of *Eremophila parvifolia*/*Olearia muelleri*.
- RP-EW1 - Low woodland of *Eucalyptus ravidia* over low scrub of *Eremophila pustulata*/*Eremophila scoparia* and *Atriplex vesicaria*.

Methods

Fimiston IIE and IIE north study area

The field survey was conducted on the 16-20 August 2021 by Rod Eastwood and Paula Strickland. Dr Eastwood is a Research Associate at the WA Museum who has extensive field and research experience with myrmecophilous lycaenid butterflies (e.g. Eastwood *et al.* 2008; Eastwood & Fraser 1999). He has conducted fieldwork at Barbalin NR and multiple other sites with *Ogyris-Camponotus* associations. During surveys in 2021 he identified two additional colonies of the host ant, significantly increasing its known area of occupation (Phoenix 2021).

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Field methods followed those described in the DBCA survey guidelines (DBCA 2020b, c). Suitable habitat was identified using vegetation mapping (Phoenix 2018). Vegetation types recorded as or potentially containing smooth-barked eucalypt species were identified with reference to site descriptions and mapping and the EUCLID database (Centre for Australian National Biodiversity Research 2015).

To include a margin of safety, a 100 m buffer was applied to the two study areas, defining new study areas of 500.52 ha f and 1,153.47 ha, for a combined total study area of 1,653.99 ha (Figure 2).

Based on this area, the formulae (DBCA 2020c) for number and spacing of sample tree locations were applied:

$$\text{No. sample trees} = 10 \times \sqrt{\text{site area in hectares}} = 406 \text{ trees}$$

$$\text{Spacing} = \sqrt{[(\text{site area in hectares} \times 10,000) / \text{No. sample trees}]} = 200 \text{ m}$$

This number of trees and spacing was then adjusted to allow for more points for a final number and spacing of 461 trees at 190 m spacing. Prior to survey, a set of sampling points was created to cover potentially suitable habitat in the study area, based on a square grid of points spaced 190 m apart, and saved to field devices (Figure 2).

For navigation and data collection in the field GPS-capable tablets loaded with base data including aerial photography, study area boundary, vegetation mapping, and the grid of preselected sites were used. Garmin GPSs loaded with the grid of pre-selected sites were also taken on the survey.

All preselected points were visited during walked transects. At each point, multiple trees (usually ~10 or more) were inspected in the vicinity (within 50 m); if no *Camponotus* ant nests were identified, the point was scored 'absent' (recorded in the field by changing the colour of the point in GISPro on the tablet). If habitat was assessed as unsuitable in the vicinity of the point (e.g. clay soil, dense shrub vegetation, or flood-prone topography) it was classified as unsuitable without necessarily checking individual trees.

If *Camponotus* ant nests were found at any tree in the vicinity of the preselected point, the following data were recorded using a Mobile Data Studio app: GPS location, tree species (if determined), diameter at breast height (DBH), soil type, and notes and photographs of the tree, nest, and ants. The point was scored 'present' (coloured in GISPro on the tablet) and additional nest locations around the same point might or might not be recorded using MDS. Presence of any *Iridomyrmex* meat ants (which can exclude *Camponotus* from otherwise suitable habitat) was also noted.

Where *Camponotus* ants were recorded, two workers were collected (n=2) and preserved with numbered label in vials of 100% ethanol to confirm identification and offered to the WAM as voucher specimens. Species identifications were confirmed by Brian Heterick (WA Museum).

All preselected points in the Fimiston study area were visited and, if assessed as suitable habitat, individual trees and additional points were inspected and classified for presence of *Camponotus* sp. nr. *terebrans*.

Trees were identified by Phoenix botanists David Leach and Andrew Perkins based on photographs showing growth form, bark, foliage, and fruit and specimens collected under Flora Taking License FB62000357 issued to Paula Strickland.

Rehabilitation areas

The rehabilitation areas north and west of the main pit are not considered to be suitable habitat due to absence or sparseness of mature eucalypts, fragmentation with other areas of native vegetation and, small size. The largest continuous area is 64 ha and the smallest is 15 ha.

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Results

Camponotus sp. nr. *terebrans* was not detected at any sites within the study area. Records of two other species of *Camponotus* sp. ant nests were identified at two locations in two different species of smooth-barked eucalypt trees: Salmon Gum (*Eucalyptus salmonophloia*) and Gimlet (*Eucalyptus salubris*). The nests of these species, identified as *C. gouldianus* and the second *C. nigriceps*, are similar in appearance to nests of *C. sp. nr. Terebrans*.

Conclusion

The targeted *C. sp. nr. terebrans* survey of the Fimiston study area did not detect any nests of this species. The study area has been adequately searched; it is concluded that it does not contain any significant colony of the host ant (most likely completely absent), and consequently no part of the study area represents habitat for the ABAB.

Yours Sincerely,

Paula Strickland

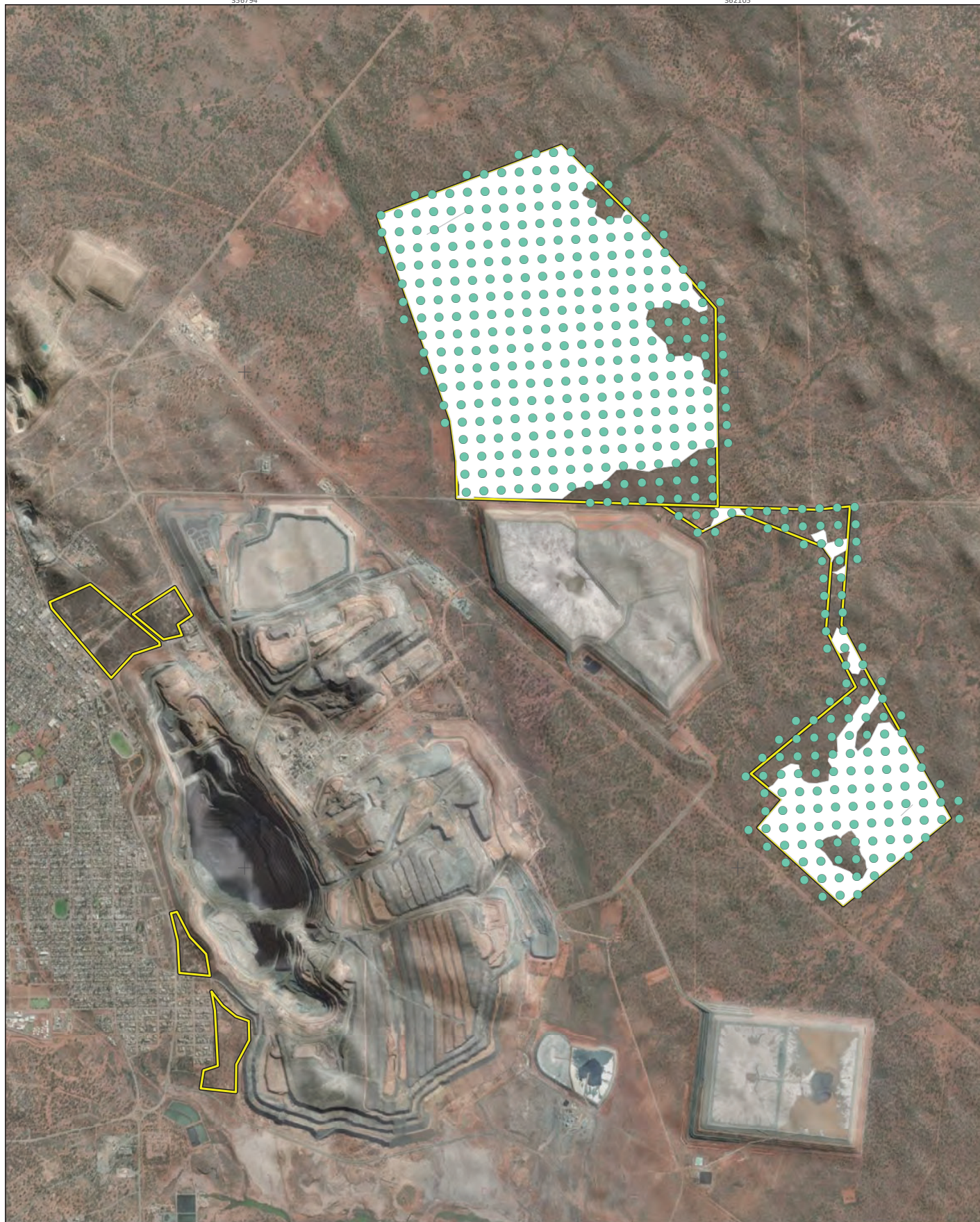
Zoologist

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Kalgoorlie Consolidated Gold Mines Pty Ltd
KCGM Operations

Project No	1443-FIM-KCG-TIN
Date	20/09/2021
Drawn by	IN
Map author	AJ

Scale: 0 0.5 1 Kilometers

1:53,200 (at A4) GDA 1994 MGA Zone 51

- Study area
- Site
- Potential ABAB habitat**
- RP-EW1

Figure 2
Potential habitat and sampling locations



All information within this map is current as of 20/09/2021. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.