

Memo Report



To: Janine Cameron, KCGM

From: Dr John Scanlon

Date: 25 October 2021

Subject: Fimiston 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 Fimiston Floodway study area (Figure 1), conducted on 25-26 May and 15 October 2021.

Background

Phoenix has been undertaking a program of biological survey work to support KCGM's Fimiston extension works (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ABAB has been listed as Critically Endangered under Western Australia's *Wildlife Conservation Act 1950* (WC Act, now superseded by the *Biodiversity Conservation Act 2016* (BC Act)) since 2008, and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*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). 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 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.

Methods

Vegetation types recorded as or potentially containing smooth-barked eucalypt species were identified with reference to site descriptions and mapping (Phoenix 2018) and the EUCLID database (Centre for Australian National Biodiversity Research 2015), and a shapefile was produced in QGIS by intersecting existing mapping with the study area. Remnant shrubland vegetation, cleared, and rehabilitated areas are considered unsuitable. The resulting polygons comprise 588 ha of potentially suitable woodland habitat (Figure 2).

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

$$\text{No. sample trees} = 10 \times \sqrt{\text{site area in hectares}} = 242$$

$$\text{Spacing} = \sqrt{[(\text{site area in hectares} \times 10,000) / \text{No. sample trees}]} = 155 \text{ m}$$

In total, 295 points spaced 130 m apart were created to represent sampling points across the study area in potentially suitable habitat (Figure 2).

Field methods followed those described in the DBCA survey guidelines. Nocturnal survey (to detect ants while they are active above ground, with minimal disturbance) was not adopted, for reasons including personal safety. Survey work was conducted under licence FO25000006-12 issued to the WA Museum (WAM).

Surveys were conducted on 25-26 May 2021 by Rod Eastwood and John Scanlon and on 15 October 2021 by Rod Eastwood and Caitlin Nagle. Dr Eastwood is a Research Associate at the WAM, has extensive field and research experience with myrmecophilous lycaenid butterflies (e.g. Eastwood *et al.* 2008; Eastwood & Fraser 1999) and has conducted fieldwork at Barbalin NR and multiple other sites with *Ogyris* - *Camponotus* associations. Dr Scanlon has previously conducted targeted surveys for *C. sp. nr. terebrans*, including inspection of the Barbalin NR site to collect comparative specimens of the ant and gain familiarity with its habitat, nest structure and behaviour (Ecoscape 2012). During surveys in 2021, we have identified two additional colonies of the host ant, significantly increasing its known area of occupation (Phoenix 2021).

For navigation and data collection in the field we used GPS-capable tablets loaded with base data including aerial photography, study area boundary, vegetation mapping, and the grid of preselected sites. A spacing of 130 m between sample points was used (in areas previously mapped as having smooth-barked eucalypt species; Figure 2) and at each point:

- 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 habitat appeared suitable, multiple trees (usually ~10 or more) were inspected in the vicinity of the point, and at any trees with *Camponotus* ant nests 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

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ants. 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 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 (WAM).

Trees were identified by Phoenix botanist David Leach based on photographs showing growth form, bark, foliage and fruit.

Results

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*.

Camponotus ant nests were identified at multiple smooth-barked eucalypt trees (Salmon Gum *Eucalyptus salmonophloia*), some of them similar in appearance to nests of the host ant, and 12 samples were collected for positive identification. Eleven of these were confirmed to be *C. gouldianus* and one *C. nigriceps*.

Camponotus sp. nr. *terebrans* was not detected at any sites within the study area. Nests of other ant species are included in Figure 2 along with preselected points.

One of the nests subsequently identified as *C. gouldianus* contained leafhoppers identified as *Pogonoscopus myrmex*, the same species often found as a symbiote in nests of *C. sp. nr. terebrans*. However, it is not restricted to one species of ant and has previously been reported with *C. gouldianus* in South Australia (Day & Pullen 1999).

Discussion and conclusion

The targeted *C. sp. nr. terebrans* survey of the Fimiston Floodway study area, conducted by zoologists familiar with the ant species at several other colonies and following the appropriate methods described in the survey guidelines, 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,

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Senior Zoologist

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