The critically endangered Arid Bronze Azure butterfly (*Ogyris subterrestris petrina*): progress report and recommendations for future actions

Andrew Williams[1], Tim Gamblin[1], Jeff Richardson[1], Matthew Williams[1], Paul Blechynden[2]

[1]DEC Science Division, Perth

[2]DEC Yilgarn District, Merredin

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INTRODUCTION

This report documents the conservation activities completed in November 2008 for the critically endangered Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina* Field, 1999) and makes recommendations for future actions. The butterfly was assessed as Critically Endangered by the Threatened Species Scientific Committee and gazetted as Schedule 1 (rare or likely to become extinct) on 5th August 2008 (Government Gazette 5 August 2008, p 3483). The threats posed to this butterfly by a proposal for vegetation clearing have been documented previously (Williams & Williams, 2008; Fig. 1). Previous assessments have established an urgent and on-going need to survey potential habitat elsewhere for additional populations of this rare butterfly.

The Arid Bronze Azure butterfly is currently known from a single locality adjacent to Barbalin Nature Reserve in the northern wheatbelt. In order to reproduce, the butterfly has an obligate association with a single form of one species of ant, the pale-coloured or 'Goldfields' form of *Camponotus terebrans*. The larvae are fed by or predate the ants and live entirely within the ant's nest during their development. Thus the survival of the Arid Bronze Azure butterfly depends on the continued existence of strong colonies of its host ant.

Male Arid Bronze Azure butterflies typically form small flight areas or territories (leks) adjacent to the breeding area. They patrol these leks and defend them against other males (Williams & Williams 2008). At Barbalin Nature Reserve the primary lekking area is along a 500 m stretch of the main road between the Barbalin Road intersection and the mallee-fowl sign (see Fig.1). Here, male butterflies frequently settle on the tarmac road, periodically flying up to intercept intruding males or visiting females.

In mid November 2008 a visit was made to the Mukinbudin area by DEC officers Andrew Williams, Jeff Richardson and Tim Gamblin. The primary aims of this visit were:

1. To survey the existing population and look for new populations in the vicinity of Barbalin Nature Reserve.
2. To engage and liaise with members of the Mukinbudin Shire Council, DEC Regional staff and the Mukinbudin Conservation Group.

METHODS

Within the existing population, we undertook walk transects along four previously established routes and established a new transect (transect E) in the patch of remnant vegetation presently under application for clearing (Fig. 2). Sampling was conducted when weather conditions were conducive to butterfly activity.

Searches for other populations were undertaken in remnant woodland habitats within a radius of approximately 50 km of Barbalin Nature Reserve.

RESULTS

Surveys

In sampling the transects within the known population, warm sunny conditions with temperatures >24° C were experienced that are ideal for butterfly detection. A total of 12 butterflies were recorded on the main road transect (transect A): five on 10/11/08 and two on 13/11/08. On 11 November two freshly killed males were collected from the tarmac road between transect survey marker A07 and A08. Later in the day another dead butterfly on the road was blown away by the draft of a passing grain truck before it could be retrieved. On a subsequent visit to the site (21st November 2008), 2 more butterfly road kills were observed (one male and one female, Kelvyn Dunn, pers. comm.). During sampling, traffic on the main road was heavy with a large proportion of vehicles being grain trucks.

Twelve butterflies were recorded along the railway transect (transect B) between 10–13 November. A further six were seen along the Barbalin North and South roads (transects C, D) and in the remnant vegetation proposed for clearing (transect E).

In searching for new populations, cool overcast conditions reduced the potential for butterfly activity so the main focus of the searches was for colonies of the butterfly's host ant. A total of 31 locations were visited (Table 1; Figs 3 and 4) but no butterflies or colonies of their *Camponotus* host ants were observed.

Liaison

Several DEC and Mukinbudin Shire staff attended an on-site meeting on 11/11/2008. Present were Trevor Smith, CEO Mukinbudin Shire Council; Paul Blechynden (DEC Merredin), Andrew Williams, Liesl Rohl, Craig Olejnik, Jeff Richardson and Tim Gamblin (DEC Perth) and Kelvyn Dunn, a visiting lepidopterist from Queensland.

The assembled group was taken on a familiarization tour of the Arid Bronze Azure butterfly site. The butterfly's behaviour, its life history, and particularly its ant-dependency were discussed. Colonies of the butterfly's host ant, *Camponotus terebrans* were located and examined. Male Arid Bronze Azure butterflies were also observed; two on Barbalin North Road, between transect markers D00 and D01, and one on the main road between transect markers A07 and A08.

Members of the Mukinbudin Conservation Group (MCG) also visited the site on 14/11/2008 (Fig. 5). Arid Bronze Azure butterflies were observed and photographed at very close quarters (Figs 6 and 7). *Camponotus terebrans* colonies were also examined and ant specimens collected for reference purposes. Having seen Arid Bronze Azure butterflies, members of the MCG are now able to search their own areas for signs of this endangered species.

DISCUSSION

Of the total 30 butterflies observed, 5 were dead individuals found on the roadside. The number of butterfly fatalities is likely to be higher than the few individuals found as many of the butterflies killed would be trapped in vehicle radiator grills, blown off the road by the wind-draft of following vehicles, or consumed by ants or birds. The impact of vehicle traffic and road-kills on the Arid Bronze Azure butterfly population needs to be examined further.

Previous surveys at this time of the year have consistently recorded much higher numbers of butterflies in this area. A small number of Arid Bronze Azure butterflies were seen on the Railway Reserve Transect where they have previously been encountered very infrequently.

Strong interest in the conservation of this butterfly was demonstrated by the CEO of the Mukinbudin Shire Council and the MCG, who volunteered their time to visit the site.

RECOMMENDATIONS:

1. The existing road and proposed re-alignment

Both traffic on the existing road and the proposed road re-alignment have the potential to impact the only known population of this critically endangered butterfly. Pending closer investigation of direct mortality of butterflies by traffic (see below), proposals to reduce the amount and speed of traffic should be considered.

In order for any proposed re-alignment of the road to be approved, the proposal should demonstrate that it will not impact the butterfly population, nests of the host ant or the trees under which they occur, or any other resources required to sustain populations of the butterfly and its associated ant. The existing proposal for vegetation clearing (Fig. 1) would have severe and direct impacts on all of these elements and in all likelihood would cause extinction of this butterfly (Williams & Williams 2008). Alternative proposals would need to be closely examined to determine their potential to (i) cause damage to host ant nests and the associated vegetation on which they forage; (ii) increase road kills of butterflies; (iii) facilitate colonisation of the area by introduced ants or other taxa that may impact upon the butterfly or ant populations; (iv) alter the microclimate or local hydrology in the area where the existing population breeds; and (v) affect the distribution and abundance of food and other resources, both for adult butterflies (lekking areas and nectar) and host ants (as yet undetermined).

Because of the obligate association between the host ant and the butterfly, it is important to map both the realised and potential habitat of the ant at this site. Although the ant appears to currently have a restricted distribution within the site, it would be premature to conclude that this existing distribution is the only suitable habitat. Over time populations of the ant may colonise other areas nearby, and removal of potentially suitable habitat may have detrimental consequences for the persistence of both the ant and the butterfly in the long term. This ant species is

known to be restricted to sandy soils, and mapping of soils around the existing colony would clarify if other potential habitat exists.

2. Ongoing monitoring of the existing Arid Bronze Azure population and its habitat.

We recommend that the following procedures are adopted to monitor the butterfly population and its habitat at Barbalin:

1. Compile and summarize all existing survey information.
2. Continue to sample the monitoring transects using existing methodology on at least one occasion each year, in October or November.
3. That more frequent sampling be considered by the recovery team (see below).
4. That the ant colonies at the Barbalin site also be monitored for any signs of decline. Appropriate methods for this monitoring should be established by the recovery team (see below).
5. That the impact of vehicle traffic on the butterfly be examined.

3. Searches for additional populations of Arid Bronze Azure butterflies and their host ant

On-going searches for additional populations of the Arid Bronze Azure butterfly are needed to locate additional populations, which would increase the security of this species. The initial focus of these surveys should be in areas where populations of the pale Goldfields' form of the host ant *Camponotus terebrans* are known to occur. DEC should liaise closely with Dr Brian Heterick of Curtin University, an acknowledged authority on the Western Australian ant fauna, regarding locality information for *C. terebrans*.

4. Mukinbudin Conservation Group.

The Mukinbudin Conservation Group should be encouraged to "take ownership" of the Arid Bronze Azure butterfly population at Barbalin Nature Reserve and promote awareness of its conservation value within the local community. The

MCG should also be encouraged and supported in their searches for additional populations of the butterfly.

5. Arid Bronze Azure butterfly Recovery Team.

A Recovery Team should be formed to oversee the conservation of this species and should develop a recovery plan for this critically endangered butterfly. Membership of the team should include Dr B. Heterick (Curtin University), M. Williams and A. Williams (DEC Perth), appropriate regional DEC staff, and representatives of the Mukinbudin Shire Council and MCG.

REFERENCE

WILLIAMS, M.R. and WILLIAMS, A.A.E. 2008. Threats to the critically endangered Arid Bronze Azure butterfly (*Ogyris subterrestris petrina*) by proposed vegetation clearing. DEC Internal report, Nov 2008, 17 pp.

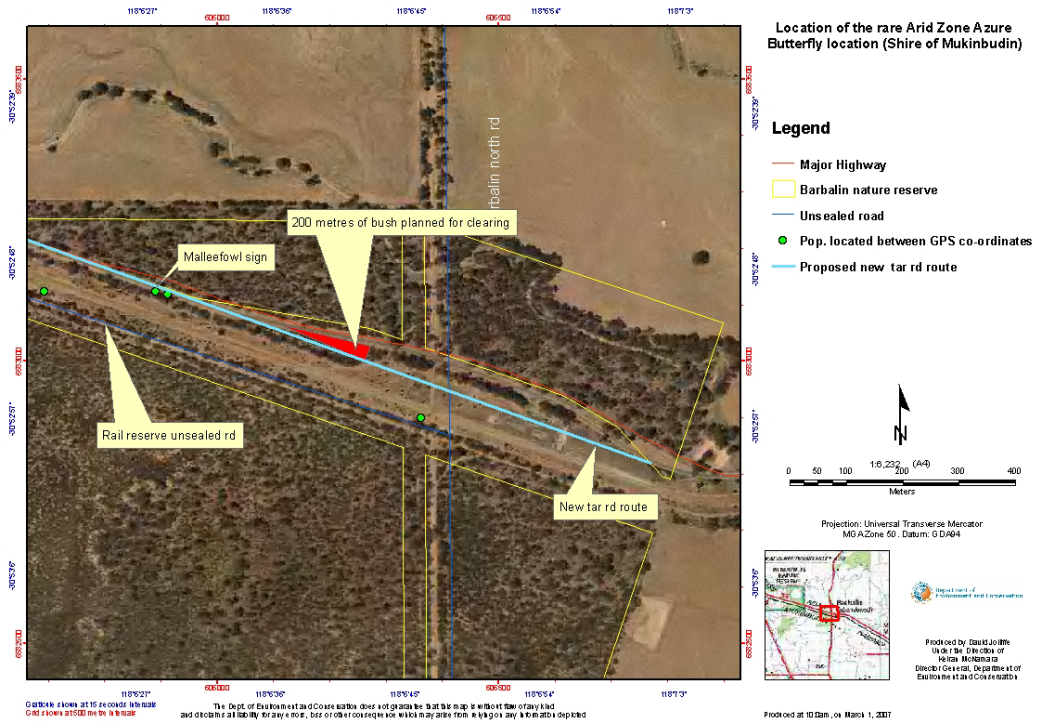

Figure 1 – Area of remnant vegetation under application for clearing adjacent to Barbalin Nature Reserve.

Figure 2 - Arid Bronze Azure monitoring transects at Barbalin Nature Reserve. The new transect (E) is in the remnant vegetation between transects A and B.

Table 1. Locations surveyed for *Camponotus* ants south & north of Mukinbudin.

ID	Location/Tenure	Reserve No.	Other ID/Comment	Result
	Mukinbudin and South			
1	Mukinbudin Shire Reserve/golf course		Fid#58	nil
2	Cookinbin NR	C 31629	14314 ; salt affected	nil
3	Brown Road – UCL (1km from Pope Road)		29009, Pin974127	nil
4	Lake Campion Nature Reserve: Lake Brown South road.	C 24789	Near Bulyeranging Hill *E. sargentii* in area	nil
5	Lake Campion Nature Reserve: Eagle Rock – off Brown Road	C 24789	Ogyris amaryllis observed.	nil
6	Water Reserve (cnr Masters and Jolly rd)	C 10463		nil
7	Unnamed NR	A 46004	*Predominantly Allocasurina campestris*.	nil
8	Unnamed NR	A16932	Predominantly *Allocasurina campestris*.	nil
9	Unnamed NR	A 11522	Salmon gum/Gimlet on sandy clay.	nil
10	Nukarni NR	C 28406		nil
	Mukinbudin and North			nil
1	Wundowlin NR	A31715	Eucalypt woodland/shrubland	nil
2	Wilgoyne Road (1km East of Mukinbudin/Bonnie Rock rd)		Eucalypt woodland	nil
3	Beebeegnying NR	A26911	Mallee / Acacia/Allocasuarina	Nil
4	Unmanaged Reserve	20685	Eucalypt / Mallee / shrubland	Nil
5	North Bonnie Rock NR	A29303	Open Mallee, sandy gravel	Nil
6	North Bonnie Rock NR	A29303	Acacia shrubland - shallow soils over granite	Nil
7	Unmanaged Reserve	30876	Heath over yellow sand and laterite gravel.	Nil
8	Lake Brown and Sprigg rd corner			Nil
9	UCL :GPS 50J 0642029;UTM 6620274		Mixed Eucalypt woodland mallee and shrubland	Nil
10	Jouerdine NR	C37034	Open shrubland and mallee over loamy red soil.	Nil
11	Jouerdine NR	C37034	Same NR further south.	Nil
12	Unmanaged Reserve	20530		Nil
13	Jouerdine and Unmanaged Reserve	C37034/20530	Creek Crossing	Nil
14	Un-named NR	A23991		Nil
15	Elsewhere Rd 2km east of Rabbit proof fence Road		Open Gimlet / Eucalyptus woodland	Nil
16	Elachbutting NR	A23339	Patchy eucalyptus woodland	Nil
17	Geeraning NR	A23338	Mainly Acacia shrubland	nil
18	Unmanaged Reserve	C27863	Eucalypt / mallee / shrublaqnd	nil
19	Unmanaged Reserve	C21604	Gimlet / Eucalyptus woodland	nil
20	Un-named NR	A38574	Mallee / Acacia/Allocasuarina	nil
21	Un-named NR	A 24534	Acacia / Allocasuarina	nil

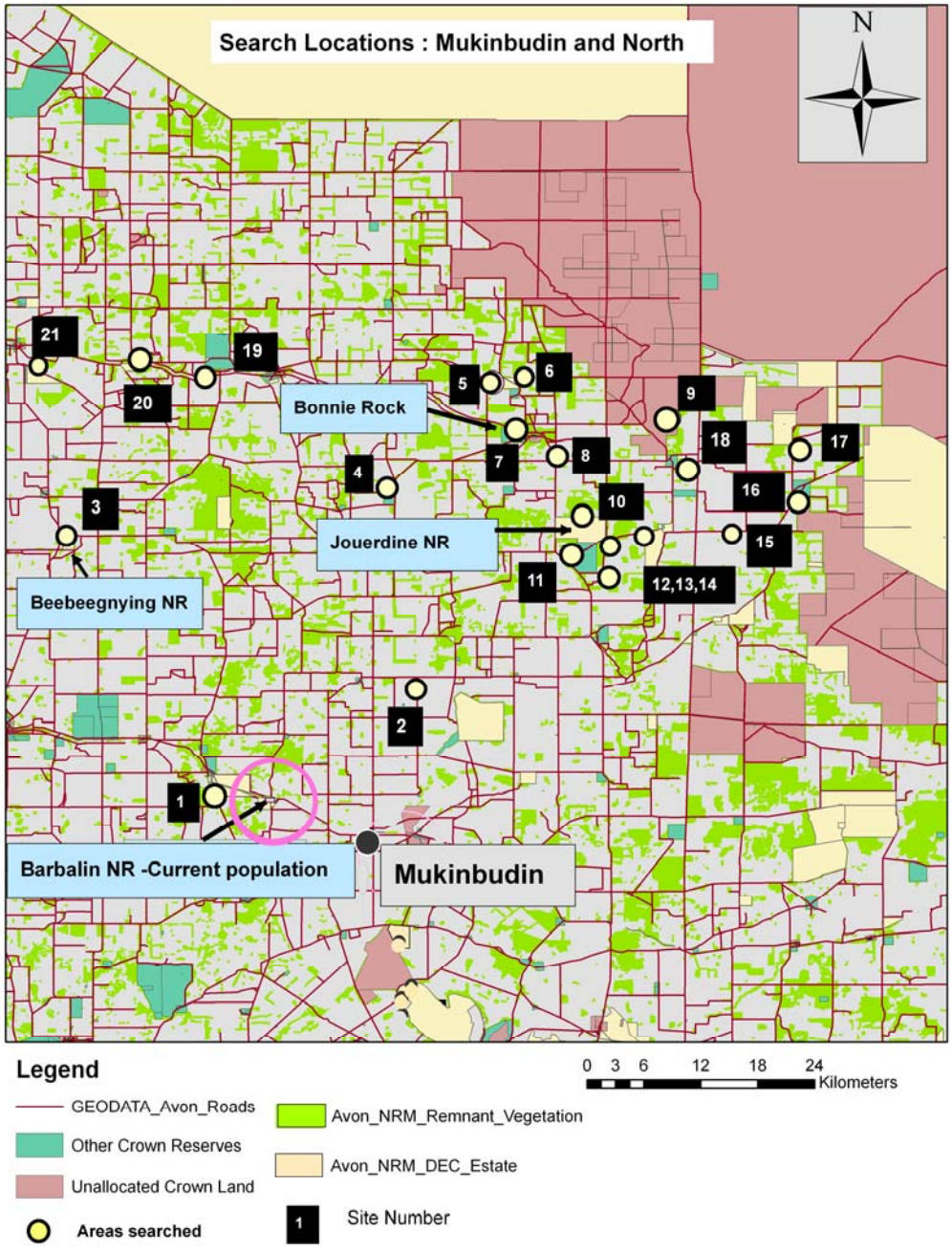

Figure 3 – Locations surveyed for *Camponotus terebrans* ant colonies north of Mukinbudin.

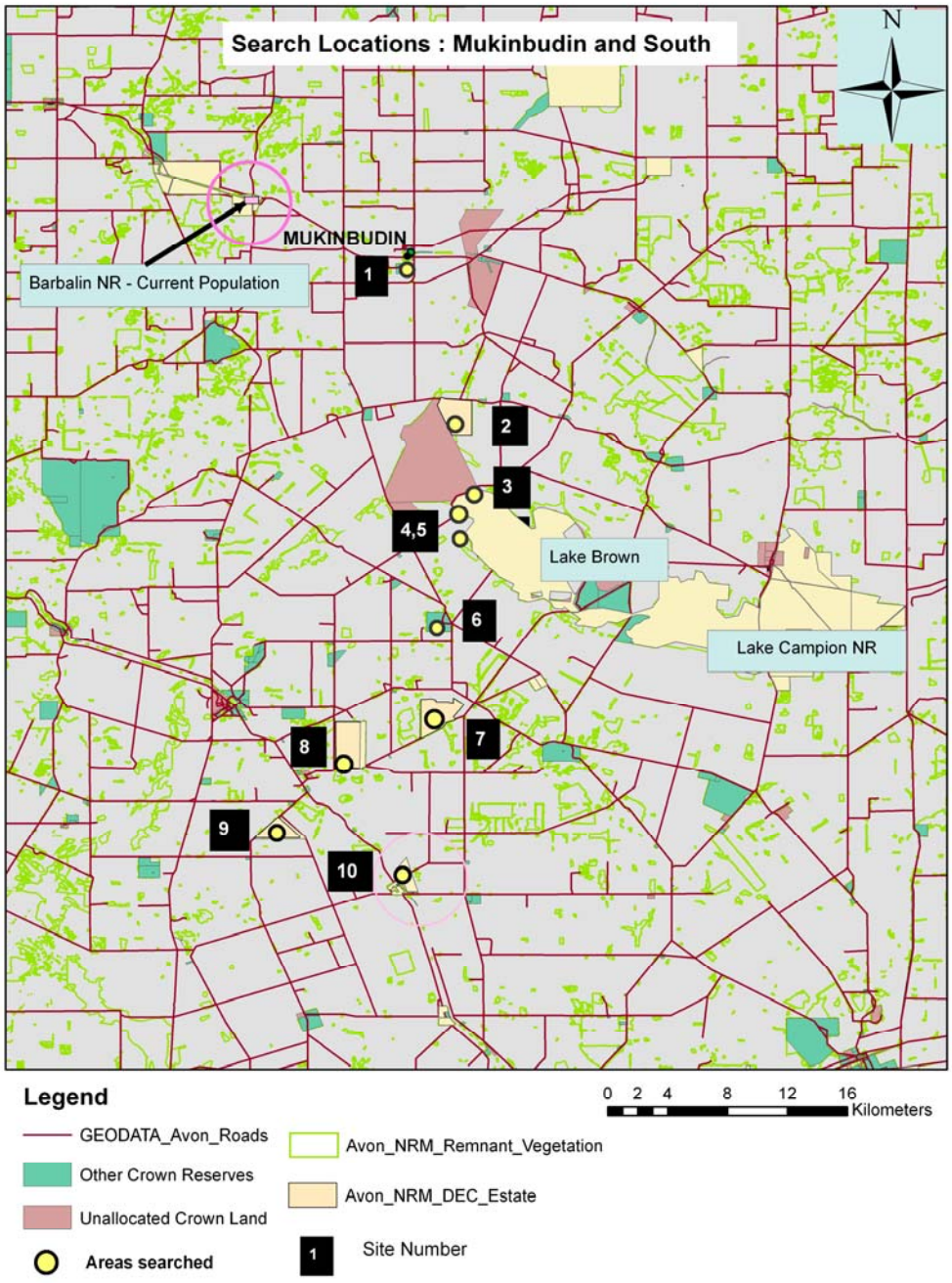

Figure 4 – Locations surveyed for *Camponotus terebrans* ant colonies south of Mukinbudin.

Figure 5 – Members of the Mukinbudin Conservation Group at Barbalin Nature Reserve. Left – Right: Sue McGrath, Dawn Lancaster, Joan Hobbs, Hilary West, Clare Smith.

Figure 6 – Photographing female Arid Bronze Azure butterfly at very close quarters.

Figure 7 - Female Arid Bronze Azure *Ogyris subterrestris petrina* (Photo: Sue McGrath)