

29th June 2017

Natassja Bell
Senior Approvals Advisor
Atlas Iron Limited
Level 18, 300 Murray Street, Perth WA 6000

Dear Natassja,

As requested, please find a summary below of our current understanding of the importance and classification of cave CO-CA-03 for the Pilbara Leaf-nosed Bat (*Rhinonictus aurantius*).

The cave CO-CA-03 was first identified and surveyed with a SM2 echolocation recorder for a total of eight nights during the Phase 1 vertebrate fauna survey in February – March 2014 (MWH 2016). The Pilbara Leaf-nosed Bat was recorded on every night, with a total of 192 passes. The first and last passes occurred >30 minutes before/after civil twilight suggesting the cave was being used as a Nocturnal Refuge for the species (i.e. not being used as a diurnal roost; (Bat Call 2016a). Given that the unit recorded the Pilbara Leaf-nosed Bat on every night of this survey, there is no reason to suspect that the unit was not collecting accurate results. During the dry season, approximately March to August, individuals aggregate in caves that retain a suitably warm, humid microclimate throughout the year; however, individuals disperse from these main colonies during the wet season, approximately September to February, when suitably humid caves are more widely available (Armstrong 2001, Bullen and McKenzie 2011, Churchill 1991). While survey guidelines do not recommend a specific survey season for the species, they do highlight that different caves may be available for use by the species depending upon seasonal changes in their microclimate (DEWHA 2010, DoE 2016). Consequently, the timing of the survey (end of the Pilbara wet season), was appropriate for surveying the species, with the survey coinciding with when the species would utilise a greater number of caves in the landscape due to them having seasonally warmer and more humid microclimates.

During the Phase 2 survey in October 2016, the cave was surveyed for an additional five nights (MWH 2016). The species was recorded on each night with the number of passes varying from 230-1,557 with an average of 806 (± 242.4) (Bat Call 2016b). The timing of first and last call occurred close to civil twilight and was consistent with this cave being used for diurnal roosting on each of these nights (Bat Call 2016b). Additionally, approximately 10 individuals were visually seen in this cave on the 29th September 2016 (MWH 2016). The presence of roosting individuals in Phase 2, but the lack of such individuals in March 2014, suggests that the cave represents, at a minimum, a Transitory Diurnal Roost (as defined by; DoE 2016) or a satellite of the permanent roost at CO-CA-01 (Bat Call 2016b). However, because the species was recorded roosting during the breeding season, the cave was classified as a Non-Permanent Breeding Roost (as defined by; DoE 2016) – a roost with “evidence of usage during some part of the 9-month breeding cycle (July–March), but not occupied year-round; considered as critical habitat that is essential for both the daily and long-term survival of the PLNB”.

The cave CO-CA-03 was recently re-visited on 31 May 2017 during the establishment of an automated solar powered SM2 unit at the cave. The solar powered unit was installed so that baseline echolocation data could be collected over a continuous duration as SM2 internal batteries only last for 4-5 nights. The unit was established on a tripod within the cave pointing towards a constriction that opens up to a chamber where the bats are believed to have been roosting. During this establishment, the cave was inspected for the presence of Pilbara Leaf-nosed Bats, in particular the crevice deep in the cave where the bats had previously been recorded during the Phase 2 survey. No Pilbara Leaf-nosed Bats were observed in the cave during this site visit.

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The data from this solar powered unit was collected after a period of 10 nights (31st May – 10th June) and analysed by Bat Call WA (Bat Call 2017)(**Appendix A**). Although the gain settings on the unit meant that weak Pilbara Leaf-nosed Bat calls could not be detected (i.e., the total number of PLNB calls is likely to be an underestimation), the unit operated successfully over the duration of the survey period. This meant that analysis of the calls was able to determine the timing of first and last calls which is important to determine roost status. Calls were recorded on all ten nights of the survey and averaged approximately 900 calls per night which is higher than the 2014 survey results and similar to those of the Phase 2 survey in 2016. On most nights, the earliest calls were approximately 30 minutes after dusk which indicates that no Pilbara Leaf-nosed Bats were roosting within the cave, however on the 9th June, a small number of calls were detected at dawn and then at dusk the following evening (Bat Call 2017). This indicated that a few Pilbara Leaf-nosed Bats, probably less than five, roosted diurnally at the cave on that day (Bat Call 2017). The majority of the calls over the survey period showed a unimodal pattern which is typical of a preferred foraging cave with the majority of calls occurring around midnight (Bat Call 2017). This pattern of use during this most recent survey reaffirm the conclusion above that cave CO-CA-03 is a satellite roost of the permanent diurnal roost CO-CA-01. **This means that the cave does not meet the criteria of a Permanent Breeding Roost, but instead meets the criteria of a Non-Permanent Breeding Roost.** A summary of bat activity and observations at CO-CA-03 and CO-CA-01 since the Phase 1 2014 survey is provided in Table 1.

Table 1. Summary of Pilbara Leaf-nosed Bat Records at Cave CO-CA-01 and CO-CA-03

Cave	Pilbara Leaf-nosed Bat Records					
	2014 (Feb-Mar)	2014 (May to August)	2015 (July)	2016 (July)	2016 (Sep)	2017 (June)
CO-CA-01 (Permanent breeding roost)	Observations: 200+ Average no. of passes: 11.5* Temporal use: Diurnal roosting (14 nights)	Average no. of passes: 2,725 (± 157.9) Temporal use: Diurnal roosting (105 nights)	Average no. of passes: 751.1 (± 118.8) Temporal use: Diurnal roosting (9 nights)	Observations: 407 to 600 Average no. of passes: 2,071 (± 239.5) Temporal use: Diurnal roosting (7 nights)	Average no. of passes: 171 (± 70.8)^ Temporal use: Diurnal roosting (5 nights)	Average no. of passes: 500^ Temporal use: Diurnal roosting (10 nights)
CO-CA-03 (Non-Permanent breeding roost)	Average no. of passes: 24 Temporal use: Nocturnal refuge (8 nights)	-	-	-	Observations: 10 Average no. of passes: 806 (± 242.4) Temporal use: Diurnal roost (5 nights)	Observations: 0 Average no. of passes: 900^ Temporal use: Nocturnal refuge, with the exception of one day of diurnal roosting (< 5 individuals). (10 nights)

* Unit only recorded for first half hour each night.

^ High gain setting on this unit may have underestimated the total number of PLNB calls.

The patterns of use of CO-CA-03 by the Pilbara Leaf-nosed Bat will continue to be monitored by the solar powered SM2 unit deployed at the cave. Data from this unit will provide additional information on the seasonal importance of this cave for the species (dry season vs wet season) and a clearer understanding of its classification depending upon its use during the 9-month breeding cycle.

Yours sincerely



Paul Bolton

Stantec Australia Pty Ltd

References

- Armstrong, K. N. (2001) The distribution and roost habitat of the Orange Leaf-nosed Bat, *Rhinonycteris aurantius*, in the Pilbara region of Western Australia. *Wildlife Research* 28: 95-104.
- Bat Call, WA. (2016a) *Corunna Downs Project, Pilbara WA, Phase 1, February to March 2014. Echolocation Survey of Bat Activity.*, Unpublished report prepared for MWH Global.
- Bat Call, WA. (2016b) *Corunna Downs Project, Pilbara WA, Phase 2, September to October 2016. Echolocation Survey of Bat Activity.*, Unpublished report prepared for MWH Global.
- Bat Call, WA. (2017) *Corunna Downs Project, Pilbara WA, May to June 2017. Echolocation Survey of Bat Activity at caves CO-CA-01 and CO-CA-03.*, Unpublished report prepared for MWH Global.
- Bullen, R. D. and McKenzie, N. L. (2011) Recent developments in studies of the community structure, foraging ecology and conservation of Western Australian bats. In: B. Law, P. Eby, D. Lunney and L. Lumsden (eds) *The Biology and Conservation of Australasian Bats*. Royal Zoological Society of NSW, Mosman, New South Wales, pp 31-43
- Churchill, S. K. (1991) Distribution, abundance and roost selection of the Orange Horseshoe-bat, *Rhinonycteris aurantius*, a tropical cave-dweller. *Wildlife Research* 18: 343-353.
- DEWHA, Department of Environment, Water, Heritage and the Arts. (2010) *Survey Guidelines for Australia's Threatened Bats* Commonwealth of Australia, Canberra, Australian Capital Territory.
- DoE, Department of the Environment. (2016) *Conservation Advice: Rhinonycteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat* Commonwealth of Australia, Canberra, Australian Capital Territory.
- MWH, Australia. (2016) *Corunna Downs Project: Terrestrial Vertebrate Fauna Survey*, Unpublished report prepared for Atlas Iron Limited.

Appendix A: Atlas Iron Limited Corunna Downs Project, Pilbara WA, May to June 2017. Echolocation Survey of Bat Activity at caves CO-CA-01 and CO-CA-03.