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10 October 2022.

Review of McPhee Creek Pilbara Ghost bat surveys and assessment

Spencer,

Atlas Iron Pty Ltd (Atlas) have commissioned Bat Call WA with me as primary responder to complete a “peer review” of the content of several documents relating to McPhee project MNES bat presence and management (SOW (Atlas 2022a)). The SOW requests a desktop review of the baseline information, impact assessment and proposed management, and an assessment of the significance of the impacts at both a local (McPhee study area) and regional (McPhee and surrounds) scales.

The desktop review relied on the following material that were provided:

- McPhee Creek Consolidated Terrestrial Fauna Report (Biologic 2021)
- Atlas Environmental Review Document (ERD) - Chapter 12 (Atlas 2022b)
- Atlas Terrestrial Fauna Management Plan (TFMP) (Atlas 2022c).
- PSM document 3754-107R. McPhee Creek – bat caves geotechnical assessment (PSM 2022).
- Martin (2022). Roy Hill Iron Ore McPhee project; blast environmental impact assessment report.
- Project Development Area GA dated 12 April 2022.

Having completed my review of the data set I can advise the following substantial conclusions:

1. There are two bat species listed as MNES under federal and state legislation at McPhee. The Pilbara leaf-nosed bat (*Rhinonictoris aurantia*) (PLNb) and the Ghost bat (*Macroderma gigas*) (PGb). The subject of the SOW is the PGb.
2. Biologic (2021) have completed a comprehensive desk top review, field survey campaign and post survey analysis using industry standard methods and techniques for bat identification that are in accordance with current national and state guidelines. The equipment used (Songmeter SM series detectors by Wildlife Acoustics, USA) is current and provides accurate bat call recordings. Biologic have completed cave searches for PGb using internal staff and have used a subcontractor for bat call identification that is experienced and proficient in both MNES species and other bat species present at McPhee.
3. A series of PGb records were identified by Biologic from both observational records and echolocation call analysis indicating that the bats were present across the McPhee study area in small numbers. Caves where PGb presence was recorded were given usage

- classifications based on TSSC (2016), i.e., maternity, day and night that infer importance of usage.
4. Biologic (2021) has identified nine roost caves/mines that are maternity, day or potential day roosts within the study area. CMPC-03, -08, -10, -11, -12, -13, -21, -25 and -26. These classifications follow the text of TSSC (2016) that suggests that these may be critical habitat for the species. From the descriptions provided in Biologic (2021) and PSM (2022), one of these, CMPC-21, with a 2m deep chamber, does not have the characteristics to be considered a potential day roost. Following updated cave classification recommendations from Bat Call (2021) this cave is a category 4 and therefore not critical habitat. Of the remaining eight, five are assessed as isolated category 2 (or potential cat 2) caves, CMRC-08, -10, -12, -25 and -26, and are potentially critical habitat. Three others, CMPC-03, -11 and -13, are assessed as isolated cat 3 caves and are therefore not critical habitat.
 5. An assessment of the arrangement of these eight caves indicates that there are no PGB “apartment Block” (after TSSC 2016; Bat Call 2021) groupings of caves that would be designated as critical habitat.
 6. Of the five cat 2 caves, Atlas (2022c) indicates that four are proposed to be retained, with the single remaining cave, CMPC-08, being removed. This is considered to be an acceptable outcome for the long-term protection of PGB presence at McPhee Creek post mining.
 7. An assessment of the stability and resistance to internal damage and/or collapse of four caves (CMPC-10, -13, -21 and -25) has been carried out (PSM, 2022; Martin, 2022). These assessments indicate that with correct mine planning and in-ground vibration limitations, the caves will remain as viable roosts post mining.
 8. Atlas (2022b) indicates that mining operations will be carried out on a 24/7 basis and therefore the caves and any bats within proximity to mining operations may be subject to impacts such as vehicle strike, in-ground vibration, sound, artificial light and airborne dust. These impacts are recognised and addressed in Atlas (2022c). It is expected that these impacts will cause the temporary abandonment of some or all of the roosts within or immediately adjacent to the Development Envelope while operations are underway. Further, recent evidence has shown that PGB will recolonise roosts after mining operations cease as long as the caves remain in a viable condition. It is noted that temporary closure during the critical female breeding period of October to December may be required to ensure that no inadvertent loss of mothers and/or pups will occur in the event of mining activity (e.g., blasting, excavation, haulage) in proximity to caves (see further discussion below).
 9. Fencing is integral to good land and stock management in the pastoral, mining lands of the Pilbara, but it needs to be built in a manner compatible with wildlife, including Ghost bats. Recognising that the project includes pastoral lands as well as ridge lines, it is recommended that three and four strand wire fencing in the Pilbara be built according to the perceived risk area that applies. PGB in particular are known to become entangled in barbed wire fencing during commuting and/or foraging. There are numerous records of fatalities resulting from entanglement (TSSC 2016). Atlas (2022b) addresses this risk in several places, however (Atlas 2022c) does not. I consider the areas within the development envelope to have moderate to low risk of entanglement, and therefore the potential for use of barbed wire in a limited manner, together with suitable bat deflectors, is acceptable. Atlas (2022c) must be upgraded to reflect this.

Atlas (2022a), the SOW, includes four specific matters to be addressed by this review. In turn these are:

- 1. Is the level of survey undertaken in relation to the identified bat roosts (bat activity and physical characteristics), and the level of confidence in the current roost classifications, sufficient to support the environmental impact assessment?**

Biologic (2021) presented a comprehensive evaluation of the presence of PGB and their roosts at McPhee. While based on the cave classification system from TSSC (2016) that is now improved and superseded by the system from Bat Call (2021), the critical roosting habitat of the species (with a single exception being CMPC-21) has been clearly defined. As listed above, there are five critical roosting habitat caves/mines at McPhee, four of which are to be retained.

- 2. Is there a risk of impacts from groundwater drawdown on bat roosting habitat (particularly for the Pilbara leaf-nosed bat given the specific temperature and humidity requirements)?**

Based on the assessment included above the four critical habitat caves for PGB (being CMPC-10, -12, -25 and -26) are 3, >5, 1.2, and >5 km respectively from pit crests. Following extensive survey effort over many years, I assess any risk of impact to the internal microhabitats of these roosts due to water table draw down as extremely unlikely as PGB are able to persist in caves with a wide humidity envelope. As there are no permanent or regularly occupied Pilbara leaf-nosed bat (PLNb) roost caves identified at McPhee that require a specific temp/humidity microhabitat, and all PLNb records are either of foraging bats or bats taking an opportunistic roost for a single day, there will be no specific impact on that species from dewatering.

- 3. What are the cumulative impacts, and significance of the proposed loss of 13 out of 20 roosts, in relation to the viability of the local and regional populations?**

With the exception of CMPC-08, the other roosts nominated for removal are not critical habitat as defined in Bat Call (2021). Given that the landscape for over 20 km to the south, north and west of McPhee is of similar uplands and ridgelines it is expected, albeit without the benefit of surveys, that there are potential Cat 2 caves and numerous Cat 3 and Cat 4 caves, therefore any cumulative impact will be minimal. Regarding loss of foraging habitat, it has recently been shown (refer Bat Call 2021) that PGB forage out regularly to 10 and up to 15 km from their roosts, an area of over 30,000 ha and up to 70,000 ha available to bats roosting at McPhee. The loss of under 2,000 ha is not considered significant.

- 4. Is there merit in the proposal to investigate the value in blocking access to key caves during the ghost bat breeding period (October to December) to avoid any significant impacts to the species' breeding cycle from the displacement of gravid females or pups from the caves nearby active mining area?**

Two of the four Cat 2 critical habitat Caves/mines, CMPC-10 and -25, are within or immediately adjacent to the development envelope and are therefore potentially subject to impacts during the females breeding season. The third, CMPC-26 being distant from the DE and the fourth, CMPC-12, being the asbestos mine decline must remain off-limits to approach by humans. I recommend that while construction and mining operations are underway in proximity to the two caves, and the displacement of bats is considered likely, the caves be temporarily closed each female breeding season of October to December to remove any risk of loss of pups or mothers during these periods. An alternative to closing caves on an “as required” basis during single reproductive seasons, it is considered viable to close them to Ghost bat occupation while mining is carried out at the project. This viability is due to the proximity of two other major Ghost bats hubs (Warrawoona and Nullagine historic mine roosts, both within 40 km) that will allow the bats to relocate away during the mining operations and return to the retained caves once mining is completed. Recommended management mitigation measures are given in the following Table

		Recommended mitigation				
Group	Caves (categories)	Avoid Disturbing Note 1.	Entry Protocol	Blast monitoring	PGb usage monitoring	Cave may be removed
Within Development Envelope						
Isolated caves	CMPC-10 (2)	Yes	Yes	Yes	Yes	
	CMPC-03 (3)					Yes
	CMPC-08 (2)					Yes
	CMPC-13 (3)					Yes
	CMPC-21 (4)					Yes
Adjacent to or outside Development Envelope						
Isolated caves	CMPC-11 (3)					Yes
	CMPC-12 (2)		Asbestos mine			
	CMPC-25 (2)	Yes	Yes	Yes	Yes	
	CMPC-26 (2)	Yes	Yes		Yes	
Note 1: Temporary closure permitted only as required by Significant Species Management Plan.						

Best regards

Bob Bullen
Managing Director / Principal Ecologist

References

- Atlas (2022). McPhee Creek – Ghost bat desk top review. Atlas email from Spencer Shute dated 29 Sept 2022.
- Atlas (2022b). Atlas Environmental Review Document (ERD) - Chapter 12 dated 22 April 2022.
- Atlas (2022c). Terrestrial Fauna Management Plan (TFMP) Atlas document 124-EN-PLN-0008 v (2) dated 22 April 2022.
- Bat Call (2021), A review of ghost bat ecology, threats and survey requirements. Report prepared for the Department of Agriculture, Water and Environment by Bat Call WA Pty Ltd.
- Biologic (2021). McPhee Creek consolidated terrestrial fauna report. Unpublished report by Biologic Environmental Survey prepared for Roy Hill and Atlas Iron, rev 7(final) dated October 2021.
- Martin (2022). Roy Hill Iron Ore McPhee project; blast environmental impact assessment report. Unpublished report by Blast It Global dated June 2022.
- Threatened Species Scientific Committee (TSSC) (2016). Conservation advice, Macroderma gigas, Ghost bat. Australian Government Department of Environment dated 5 May 2016.