Memorandum

Date	24 November 2022
To	Mariam Ismail, Chris Serginson
From	Matthew Love
CC	Tanya Carroll, Sonya Close, George Watson
Subject	Thirteen Creek and Davidson Creek – Additional Targeted Greater Bilby Assessment

Purpose

BHP Western Australian Iron Ore (BHP WAIO) commissioned Astron Environmental Services (Astron) to conduct a Targeted Matters of National Environmental Significance (MNES) vertebrate fauna survey covering the Thirteen Creek and Davidson Creek general locality (hereafter referred to as the Study Area). This Study Area is located approximately 67.5 km east of the Newman township in the Pilbara region of Western Australia and covers an area of approximately 10,387 hectares.

During the survey, historical unconfirmed diggings from one MNES species the greater bilby (*Macrotis lagotis*) was recorded within the Study Area (Astron 2022). Approximately 10 diggings were recorded within a 10 m radius from the base of an *Acacia* shrub within a Hardpan Plain habitat (Plate 1 - Plate 4). Diggings were old, and no burrows or other secondary signs of bilbies including scats or tracks were noted in the vicinity of the diggings or throughout the Study Area. The closest previous record of greater bilby to the Study Area occurs approximately 5 km west of the northern section of the Study Area (Astron 2022). This was the inactive burrow first recorded in 2018 (Biologic Environmental Survey 2018), re-assessed in 2019 (GHD Pty Ltd 2019) and again in 2020 (GHD Pty Ltd 2020) with no activity recorded.

Plate 1: Historical Greater Bilby diggings (Astron 2022).

Plate 2: Historical Greater Bilby diggings (Astron 2022).

Plate 3: Historical Greater Bilby diggings (Astron 2022).

Plate 4: Historical Greater Bilby diggings (Astron 2022).

The greater bilby is listed as 'Vulnerable' under Western Australia's *Biodiversity Conservation Act 2016* (BC Act) and nationally this species is also listed as 'Vulnerable' under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Internationally, this species is listed as Vulnerable on the IUCN Red List of Threatened Species.

The greater bilby once occurred across most arid and semi-arid areas of mainland Australia. In Western Australia bilbies are now largely restricted to the Gibson, Little Sandy and Great Sandy Deserts as well as parts of the Pilbara, Dampierland, Central Kimberley and Ord-Victoria Plains Bioregions. Populations known from the Pilbara Bioregion have been recorded in the Hamersley Range area, along the Fortescue River and north-east of Shay Gap. Within the Pilbara Bioregion the bilby mainly occupies sandy areas in dune systems, along drainage systems, sandplain or rocky loam plains or undulating hills habitat.

Bilbies are solitary, nocturnal animals. They usually shelter in burrows during the day and intermittently at night for refuge. Burrows can be 3 m deep, and some are complex systems with multiple entrances and interconnecting burrows. An individual bilby may regularly utilize over a dozen burrows within its home range. The species is highly mobile and have been recorded using burrows over 2 km apart on consecutive days. Studies on the home range size of bilbies range from 1 km^2 to over 3 km^2 (Pavey 2006).

The greater bilby is a highly mobile species, which may be driven by the availability of resources but can also persist in areas of low productivity (Southgate and Carthew 2007, Southgate et al. 2007 and Southgate et al 2018). Bilbies are omnivorous and many utilise an array of food resources over the landscape depending on seasonal availability and fire history. Food sources include, but are not limited to, grass, sedge seeds, ants, fungi, termites, beetles, insect larva and spiders. Some plant species are utilised to harvest insect larvae by bilby and in the Pilbara include *Acacia bivenosa*, *A. colei*, *A. dictyophleba*, *A. melleodora*, *A. stellaticeps*, *A. trachycarpa*, *A. trachycarpa* – dwarf variant and *Senna notabilis* (Southgate et al 2018).

Due to the historical diggings recorded by Astron (2022) and in order to establish a greater understanding of this species presence within the Study Area, long-term targeted motion cameras were set by BHP WAIO Biodiversity personnel at the digging location to record this species potential presence.

Methods

Five motion cameras (Reconyx HP2X Hyperfire 2) were spatially spread at the historical digging location found by Astron (2022); details can be viewed within Table 1. The unbaited cameras were set from the 27th April 2022 until the 18th October 2022 resulting in a total of 870 camera trap nights.

Table 1. Site details of the motion camera traps set at the greater bilby historical diggings.

Site ID	Location	Date - Start	Date - End	Camera Nights	Photo
CAM1	Latitude 23°24'25.92" S Longitude 120°31'7.21' E	27/04/22	18/10/22	174	
CAM2	Latitude 23°24'25.98" S Longitude 120°31'7.03' E	27/04/22	18/10/22	174	
CAM3	Latitude 23°24'26.24" S Longitude 120°31'6.92' E	27/04/22	18/10/22	174	
CAM4	Latitude 23°24'25.52" S Longitude 120°31'6.55' E	27/04/22	18/10/22	174	
CAM5	Latitude 23°24'25.42" S Longitude 120°31'7.47' E	27/04/22	18/10/22	174	

Results

No greater bilbies were recorded from the 870 camera traps nights conducted at the site.

A total of 31 non-target vertebrate fauna species were recorded within the Study Area, comprising of four reptiles, 20 birds and seven mammals (including three introduced species) (Table 2). One species of significance was recorded during this survey: brush-tailed mulgara (*Dasycercus blythi*) (Priority 4). The mulgara was recorded on 23 occasions from four out of the five cameras set during the assessment.

A total of 10 of the non-target vertebrate fauna species recorded within the Study Area were not recorded during the fauna assessment conducted by Astron (2022). This comprised of three reptiles, five birds and two mammals, of which none were of significance.

Table 2. Non-target vertebrate fauna observations recorded within the Study Area.

Scientific name	Common name	Native / Introduced
Reptile		
Ctenophorus nuchalis	Central netted dragon	Native
Ctenotus pantherinus	Leopard skink	Native
Pseudechis australis	Mulga snake	Native
Varanus gouldii	Gould's sand monitor	Native

Scientific name	Common name	Native / Introduced
Bird		
Acanthagenys rufogularis	Spiny-cheeked honeyeater	Native
Artamus cinereus	Black-faced woodswallow	Native
Artamus minor	Little woodswallow	Native
Artamus personatus	Masked woodswallow	Native
Coracina maxima	Ground cuckoo-shrike	Native
Cracticus tibicen	Australian magpie	Native
Epthianura tricolor	Crimson chat	Native
Gavicalis virescens forresti	Singing honeyeater	Native
Geopelia cuneata	Diamond dove	Native
Grallina cyanoleuca	Magpie-lark	Native
Malurus lamberti assimilis	Purple-backed fairywren	Native
Malurus leucopterus leuconotus	White-winged fairywren	Native
Melopsittacus undulatus	Budgerigar	Native
Mirafa javanica	Horsfield's Bushlark	Native
Oreoica gutturalis	Crested Bellbird	Native
Pachycephala rufiventris rufiventris	Rufous whistler	Native
Rhipidura leucophrys leucophrys	Willie wagtail	Native
Stipiturus ruficeps	Rufous-crowned Emu-wren	Native
Synoicus ypsilophora	Brown quail	Native
Taeniopygia guttata	Zebra finch	Native
Mammal		
Camelus dromedarius	*Camel	Introduced
Canis familiaris familiaris	*Dog/dingo	Introduced
Dasycercus blythi (P4)	Brush-tailed mulgara	Native
Dasykaluta rosamondae	Little red kaluta	Native
Felis catus	*Cat	Introduced
Notomys alexis	Spinifex hopping mouse	Native
Osphranter rufus	Red kangaroo	Native

NB: The species highlighted in grey represent records that were not recorded during the fauna assessment conducted by Astron (2022).

Recommendations

Greater bilbies move in response to foraging opportunities or conditions (Southgate and Carthew 2007, Southgate et al. 2007 and Southgate et al 2018). If the historical diggings recorded by Astron (2022) were in fact the greater bilby then potentially this species may have only been present when the foraging conditions presented this opportunity. Astron (2022) undertook extensive survey effort within the Study Area to provide an indication of greater bilby presence, including 16 targeted 2 ha plot searches and 11 camera trapping nights at three locations, across Hardpan Plain and Mulga Woodland habitat. This effort along with 870 camera trapping nights deployed by BHP WAIO suggests this species does not occur within the Study Area in a permanent fashion or may only be present when foraging conditions are optimal on a periodical basis. In addition, Astron (2022) denote that no critical denning and foraging habitat was identified for the greater bilby within the Study Area. Critical greater bilby denning and foraging habitat typically consists of sandplains, spinifex dominated interdune corridors, salt-lakes surrounded with samphire (*Halosarcia* spp.) and/or Melaleucas or paleo-drainage systems within individual home ranges (Pavey 2006). The lack of critical habitat and the low number of records within the general Jimblebar and Caramulla area is also reflective of the low likelihood of detection and further reinforces that if present at all, only a small, low-density population may occur and may utilise the Study Area depending upon resource availability.

Yours sincerely

Matthew Love
Specialist Biodiversity
0409 776 063

References

Astron Environmental Services (2022). Thirteen & Davidson Creek Targeted Matters of National Environmental Significance Fauna Survey, unpublished report Prepared for BHP Western Australian Iron Ore.

Biologic Environmental Survey. (2018). Caramulla Level 1 Vertebrate Fauna Assessment. Unpublished report prepared for BHP Billiton Iron Ore Pty Ltd.

GHD Pty Ltd. (2019). Jimblebar East and Caramulla Fauna Survey. Unpublished report prepared for BHP Billiton Iron Ore Pty Ltd.

GHD Pty Ltd. (2020). Jimblebar Targeted Ghost Bat Survey. Unpublished report prepared for BHP Billiton Iron Ore Pty Ltd.

Pavey, C. (2006) National Recovery Plan for the Greater Bilby Macrotis lagotis. Northern Territory Department of Natural Resources, Environment and the Arts.

Southgate, R., and Carthew, S. (2007). Post-fire ephemerals and spinifex fuelled fires: a decision model for bilby habitat management in the Tanami Desert, Australia. International Journal of Wildland Fire 16, 741–754.

Southgate, R., Paltridge, R., Masters, P., and Carthew, S. (2007). Bilby distribution and fire: a test of alternative models of habitat suitability in the Tanami Desert, Australia. Ecography 30, 759–776

Southgate, R., Dziminski, M., Partridge, R., Schubert, A., and Gaikhorst, G. (2018) Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground based techniques and asserting absence. Australian Mammalogy.