Honey Possum
(*Tarsipes rostratus*)
Habitat Assessment

Alacer Gold Corporation

Higginsville Gold Operations

March 2012

Version 2

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Cover Photo: Honey Possum – Eagle Bay (G. Harewood 2005)

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The Author will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

EXECUTIVE SUMMARY

This report details the results of a honey possum (*Tarsipes rostratus*) habitat assessment of an area of land at Higginsville, Western Australia (Figures 1 & 2).

The aim of the report is to determine the likelihood of honey possums actually being present in the area and to identify any issues relating to potential impacts on its conservation status that may arise as a consequence of mining and exploration activities in the general area.

The results suggest that the species is unlikely to be found in the area despite previous reports of its presence. This conclusion is supported by the fact that:

- Higginsville is about 136 km north of the closest "official" documented record of the species (see Figure 3).
- Vegetation and landforms present in the Higginsville area do not match the documented habitat requirements of the species.
- While it is not possible to prove or disprove the authenticity of previous identifications of honey possums in the area, as no specimens appear to have been retained by the original observer, the finding of several pygmy possum remains at the same location (coupled with the known distribution and habitat preferences of both species) suggests that all previous observations/reports of honey possums have in fact been of pygmy possums. This is also supported by the fact that the reported description of specimens previously observed included comments that their tail was "serrated". Honey possums do not have a serrated tail or anything that could be mistaken for such whereas pygmy possums have a series or annuli (rings) around their tail which could be described as "serrations".

Both the honey possum and the pygmy possum are common across their entire range (excluding areas such as the wheatbelt which has been mostly cleared). Because they are widespread and generally common neither species is listed as threatened under state or federal law and neither is listed by the DEC as a Priority species, further testimony to the fact they are not considered of special conservation significance.

It is therefore concluded that any future proposed exploration or development within the Higginsville area is extremely unlikely to be of a nature or scale that could possibly have a detrimental effect on the conservation status of either species, locally or regionally.

It is recommended that enquiries be initiated to have the pipeline cylinders that remain along the road between Higginsville and the pumping station removed as soon as possible as they are acting as pit traps for native wildlife.

1. INTRODUCTION

This report details the results of a honey possum (*Tarsipes rostratus*) habitat assessment of an area of land at Higginsville, Western Australia. The area of interest is located about 50 kilometres north of Norseman and is centred at approximately 31.742400°S and 121.679520°E (Figures 1 & 2).

The assessment was initiated after reports of honey possums being previously recorded in the area raised concerns with members of the public and some mining regulatory authorities. The aim of the report is to determine the likelihood of honey possums actually being present in the area and to identify any issues relating to potential impacts on its conservation status that may arise as a consequence of mining and exploration activities in the general area.

The reports of honey possums at Higginsville were made by a previous resident of the site who lived in the area during the 1970's. Quite a few specimens were found in disused "pipeline cylinders" (small sections (~80cm) of old pipeline about 20cm in diameter placed upright in the ground originally to support an above ground water pipeline) along the road from Higginsville to a water pumping station about 6km west. The animals had climbed into the cylinders but were not able to get out and eventually would die if not rescued. The description of the animals found is limited to "the possum I used to catch had a serrated tail used for grasping branches". A more recent visit to the area (about 2009) by the same person again found another dead specimen identified as a honey possum within one of the pipeline cylinders.

2. SCOPE OF WORKS

The scope of works has been defined by Alacer Gold as:

<u>Desktop Study</u>

- A species profile and a map of where honey possums are normally found in WA.

<u>Field Work</u>

- Site inspection within a ½ day period to assess habitat and any evidence of the species presence. No trapping required.

<u>Report</u>

The report is to include as a minimum:

- Consultants qualifications
- Details on the area of investigation including a map, area climate, vegetation and other relevant biogeographical information.

Legend

Survey Area

0 5 10

Kilometres

MGA Zone 51

Fauna Survey

DRAWN: G Harewood

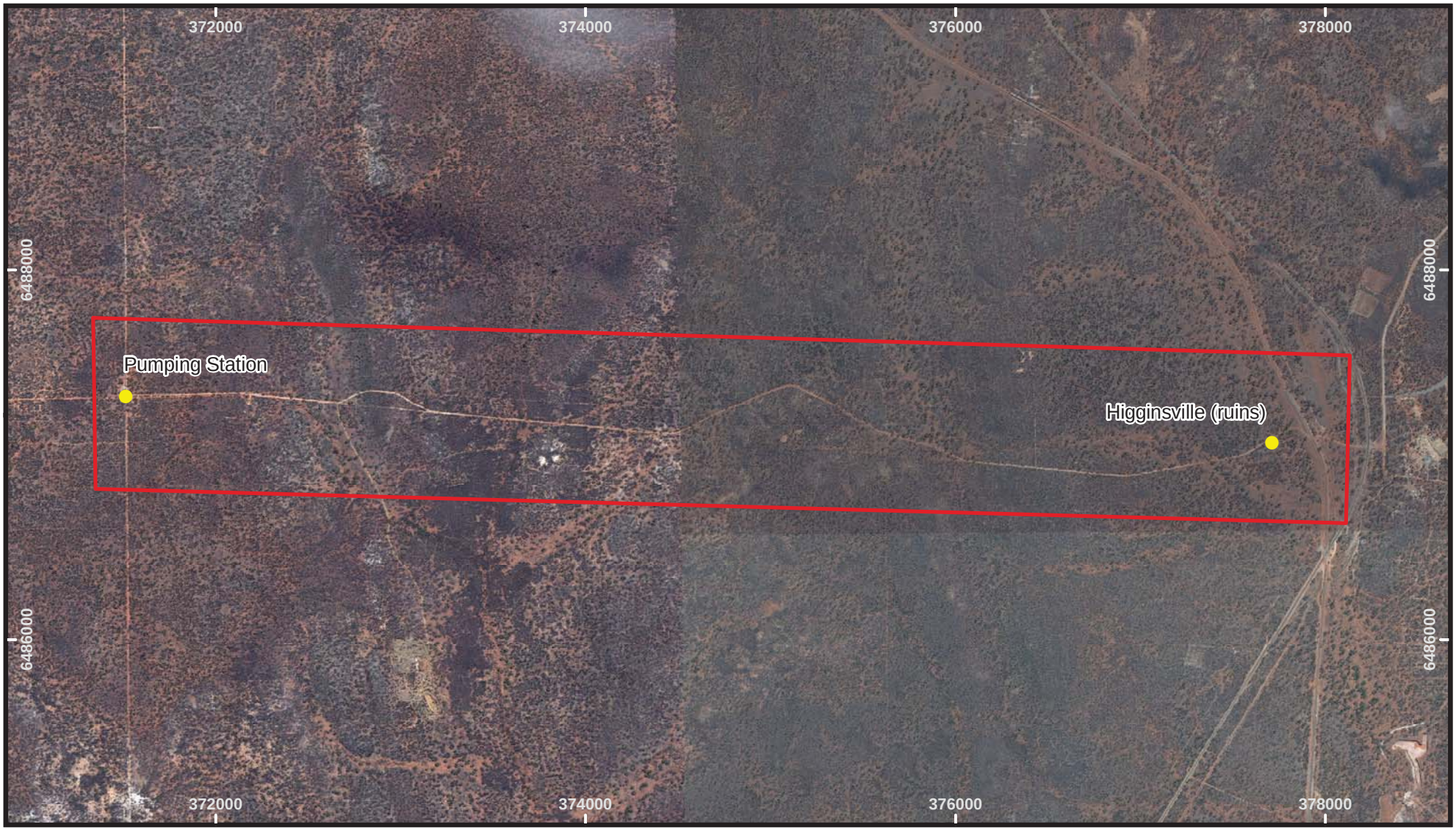
DATE : Feb 2012

SCALE: 1:250,000

Alacer Gold Corporation
Higginsville

Study Area and Surrounds

Figure: 1



Legend

Survey Area

N

0 500 1,000 1,500 2,000

Metres

MGA Zone 51

Fauna Survey

DRAWN:G Harewood

DATE : Feb 2012

SCALE: 1:30,000

Alacer Gold Corporation

Study Area Air Photo

Figure: 2

- Discussion and conclusion based on the results of the field assessment and literature search.

3. METHODOLOGY

3.1 DESKTOP STUDY

3.1.1 Database Searches

A searches of the Department of Environment and Conservation's (DEC's) NatureMap Database (combined data from DEC, Western Australian Museum and Birds Australia) was undertaken to obtain a listing of mammal species previously recorded in the Higginsville area. The database search area encompassed a 40km radius around a central point just east of Higginsville (DEC 2012).

3.1.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publically available and could not be referenced. The most significant of those available have been examined for records of honey possum captures. The reports referred to included:

- Duncan, S., Traill, B.J., and Watson, C. (2006). Vertebrate Fauna of the Honman Ridge- Bremer Range District, Great Western Woodlands, Western Australia.

- How, R.A., Newbey, K. R., Dell, J., Muir, B.G., and Hnatiuk, R.J. (1988). The Biological Survey of the Eastern Goldfields of WA - Pt 4: Lake Johnston – Hyden Study Area. Records of the WAM, Supplement 30: 1 – 233.

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It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

3.1.3 Existing Publications

The following publications represent the main references for compiling the species profile for the honey possum:

- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Third Edition, Oxford University Press, Melbourne.
- Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition. Queensland Museum.

3.2 FIELD WORK

Field survey work was carried out by Greg Harewood (B.Sc. Zoology) within a one day period on the 9 February, 2012. Greg Harewood has twenty five years' experience working as an Environmental Scientist, Zoologist and Geologist. He has carried out numerous fauna surveys (Level 1 and 2), habitat impact assessments and targeted surveys throughout Western Australia including the South West, Pilbara and Goldfields. He is a member of the Environmental Consultants Association of Western Australia.

3.2.1 Habitat Assessment

The habitat assessment was limited to general observations on landforms and the vegetation units/structure present along the road between Higginsville and the pumping station. The main aim of the habitat assessment was to determine if the landforms and vegetation appeared, in general, to be suitable for honey possums to utilise based on a comparison with documented habitat descriptions.

3.2.2 Opportunistic Fauna Observations

No targeted searches for live honey possums were carried out as it would be unlikely one would be found (even if present). As they are normally captured during fauna surveys in pit traps, the field survey concentrated on inspecting as many of the pipeline cylinders still present as possible given this is where specimens had originally been observed in the past.

4. RESULTS

4.1 DESKTOP STUDIES

4.1.1 Species Profile

Honey Possum (*Tarsipes rostratus*)

<u>Description</u>

Unmistakable; tiny mammal with elongated muzzle and 3 longitudinal brown stripes. Fur grizzled greybrown above grading to rufous on flanks and cream

below. Distinct dark brown central stripe from behind ears to base of tail; outer 2 stripes less distinct and pale brown. Tail thin, slightly > than head body length (Menkhorst and Knight 2011).

Females are larger than males. The eyes are close together, directed upwards and forwards. The tail is long, tapering and prehensile. One of the few truly nectarivorous mammals, it has a long, pointed snout and an elongate, protrusible, brush-tipped tongue with which it probes flowers for its exclusive diet of nectar and pollen. It is notable for having fewer teeth than other marsupials (Van Dyck & Strahan 2008).

No reference to the honey possum having a "serrated tail" was found during the literature search.

Conservation status

Locally common (Menkhorst and Knight 2011). At present, the Honey Possum is common in limited winter rainfall areas of sandplain heathland, rich in plant species of the family Proteaceae. Provided that large areas of this habitat are maintained in reasonable succession, the species appears to be secure, despite predation by the Fox and Cat (Van Dyck & Strahan 2008).

Because the species is common it is not listed as threatened under either the Western Australian *Wildlife Conservation Act (1950)* or the Commonwealth *Environment and Biodiversity Conservation Act 1999*. The honey possum is also not listed as a Priority species by the DEC.

Distribution

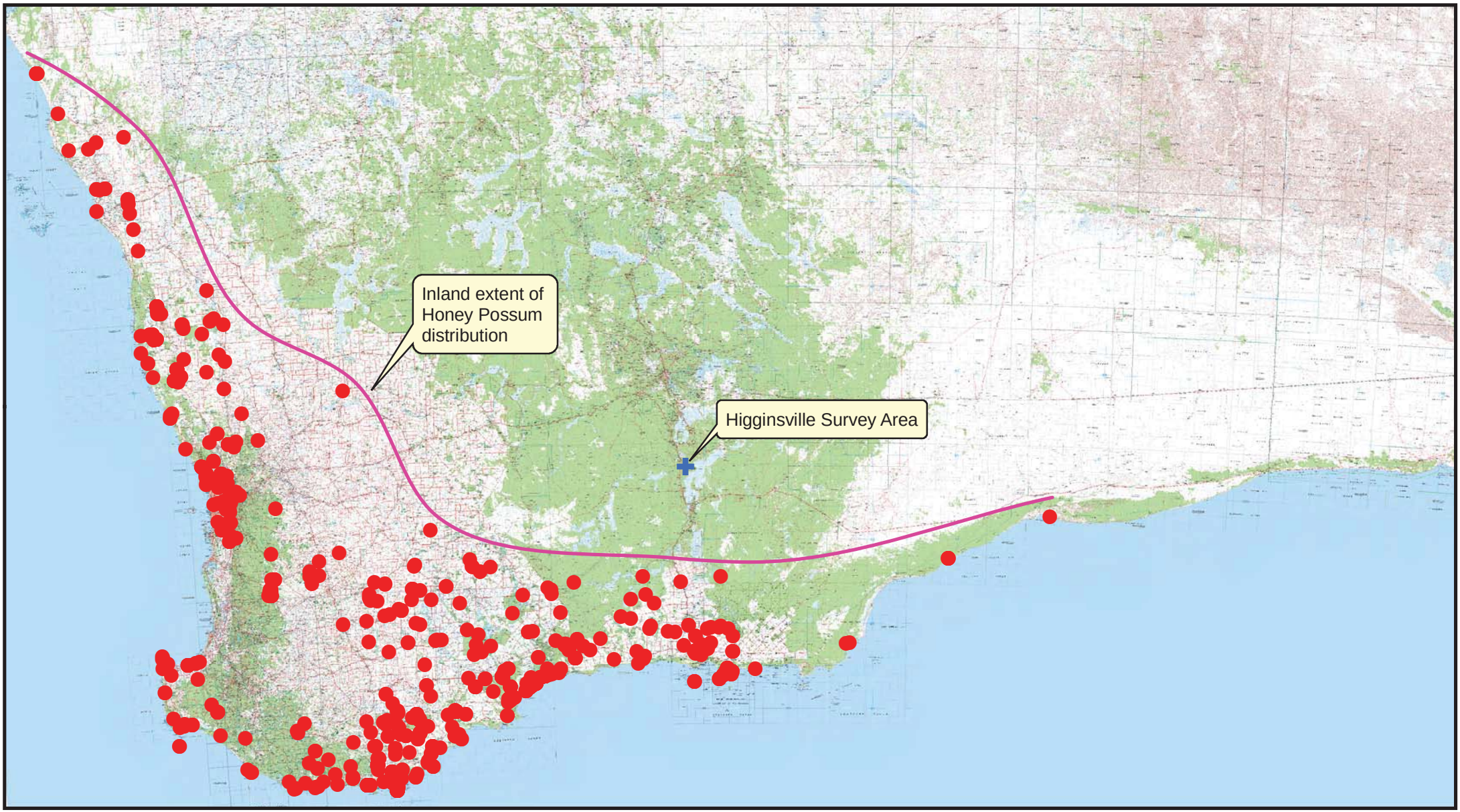
Coastal south west W.A. from Kalbarri to Eyre (Menkhorst and Knight 2011). The honey possums documented distribution does not extend as far north as Higginsville. The DEC NatureMap database search lists 10 mammal species having been previously recorded within 40km of Higginsville, with the honey possum not being listed (Appendix A). No other published data was found to suggest honey possum had ever been recorded in the area. The closest NatureMap records are 136km south (Figure 3) (DEC 2012). The closest fauna survey results available (Western Wildlife 2006 – survey between Lake Cowan and Lake Lefroy) did not capture any honey possums.

Habitat

Floristically rich heath generally found on sandplains. Needs diversity of shrubs to provide year-round nectar (Menkhorst and Knight 2011).

Ecology

Nocturnal but partly diurnal; terrestrial and arboreal; feeds solely on nectar and pollen; agile and fast moving, darts between blossoms; confiding when feeding.



Legend

- DEC NatureMap Honey Possum records

0 100 200 300 400 500

Kilometres

Fauna Survey

DRAWN:G Harewood

DATE : Feb 2012

SCALE: 1:6,000,000

Alacer Gold Corporation
Higginsville

NatureMap Honey Possum Records

Figure: 3

Shelters in tree hollow, old bird's nest or other cranny; frequently becomes torpid in cold weather. Breeds throughout year; up to 4 litters of 2-4 young may be raised per year (Menkhorst and Knight 2011)

Most of the day is spent in sleep, except in cooler weather. It does not make a permanent nest but may shelter in abandoned bird nests or the hollow trunks of grasstrees. In cold weather, or when food is scarce, it frequently becomes torpid: captive animals often huddle together to conserve heat. There is no obvious breeding season, but there are three peaks of breeding with the highest number of births around January-February, June-July and September- October. Females with pouch-young are found throughout the year, but predominantly in early autumn, winter and spring when pollen and nectar are most abundant. (Van Dyck & Strahan 2008).

It feeds exclusively on nectar and pollen. There is no evidence that insects form a part of the normal diet. (Van Dyck & Strahan 2008).

4.1.2 Existing Environment

Biogeography

The project area is situated within the south west margin of the Coolgardie IBRA biogeographic region (Cowan 2001) and is part of the COO3 Eastern Goldfields subregion (Cowan 2001). The Coolgardie bioregion is described as being a:

"Granite strata of Yilgarn Craton with Archaean Greenstone intrusions in parallel belts. Drainage is occluded. Mallees and scrubs on sandplains associated with lateritised uplands, playas and granite outcrops. Diverse woodlands rich in endemic eucalypts, on low greenstone hills, valley alluvials and broad plains of calcareous earths. In the west, the scrubs are rich in endemic Proteaceae, in the east they are rich in endemic acacias. Arid to Semi-arid Warm Mediterranean." (Thackway and Cresswell, 1996; IBRA, 2000).

The subregion lies on the Yilgarn Craton's 'Eastern Goldfields Terrain'. This area is characterised by gently undulating plains interrupted in the west with low hills and ridges of Archean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan 2001).

Vegetation and Landsystems

Broad scale vegetation mapping by Beard (1990) shows the general area to be comprised predominantly of Eucalypt woodlands. Sparser woodlands, characterised by an understorey of bluebush and salt bush become evident in areas where soils become more calcareous (Beard 1990).

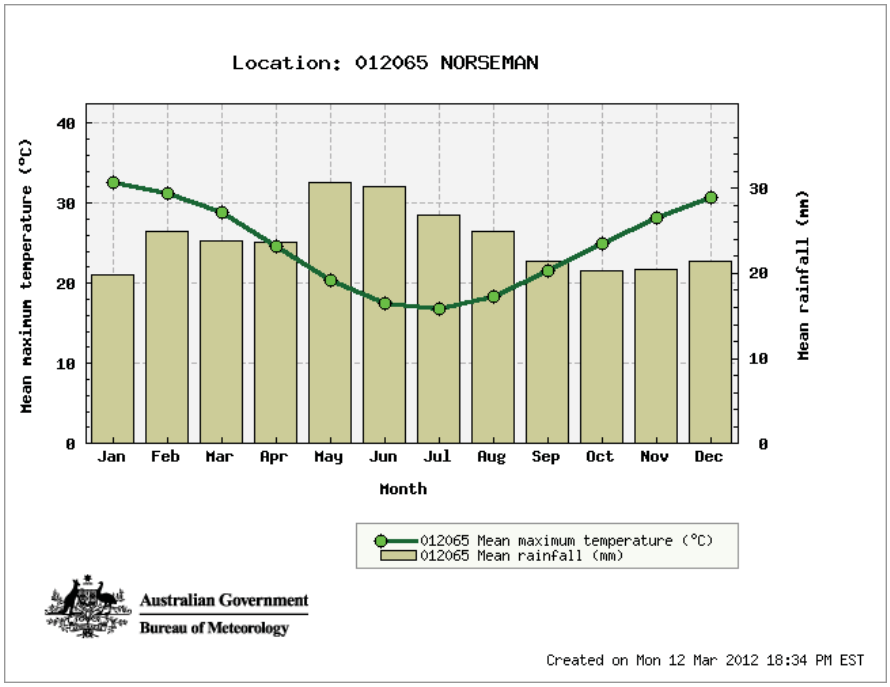
Two Landsystems are present in the area these being:

- Graves Land System - Basalt and greenstone rises and low hills supporting eucalypt or acacia woodlands with prominent saltbush and bluebush understoreys. Makes up most of the investigation area.

- Gumland Land System - Extensive alluvial plains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys.

Climate

The area has hot, dry summers which alternate with cool winters. The climate is very dry and hot with the possibility of precipitation in any month though rainfall is deficient in all seasons.



4.2 SITE SURVEYS

4.2.1 Habitat Assessment

The vegetation along the pipeline track was found to be consistent with published descriptions for the general area and consists of eucalyptus and acacia woodlands/tall shrublands over an understorey of shrubland to low shrubland with defining species in various densities. The main landforms consist of gentle rises and low hills with rocky to loamy soil which slope down to calcareous rich alluvial plains.

While no detailed flora survey was carried out no areas of "floristically rich heath" were evident and no sandplains are present suggesting habitat in the area is unsuitable for honey possums. The following pictures illustrate the nature of the vegetation present in the area investigated.

Plate 1: Eucalypt woodland over low open shrubland

Plate 2: Eucalypt open woodland over open shrubland

Plate 3: Low eucalypt woodland over tall open shrubland

Plate 4: Eucalypt woodland over open shrubland

Plate 5: Low Eucalypt woodland over low open shrubland

Plate 6: Open tree mallee over tall open shrubland

4.2.2 Opportunistic Fauna Observations

The field survey found the old pipeline cylinders along various sections of the road between Higginsville and the pumping station. The inspection of the pipeline cylinders revealed the presence in many of a range of fauna species that had climbed into the cylinders and died. The photographs below illustrate the layout of the cylinders along one section of the road and an example of the dead animals present.

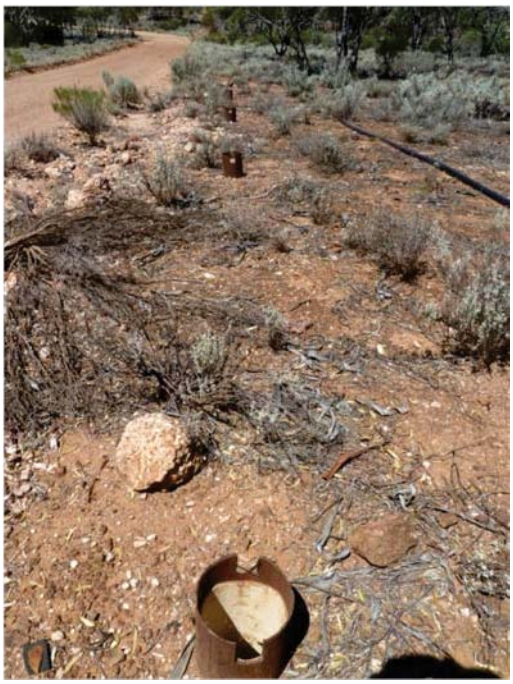


Plate 7: Pipeline cylinders along pumping station track

Plate 8: Contents of a pipeline cylinder showing skin and skeletal remains of various fauna species

No honey possum remains were found in any of the cylinders but of main interest was the finding of several dead pygmy possums (*Cercartetus concinnus*). The specimens collected were highly decomposed but were identified by their characteristic skull and dentition, examples of which are provided below.

Plate 9: Remains of a pygmy possum found within a pipeline cylinder

Plate 10: Skull of a pygmy possum found within a pipeline cylinder

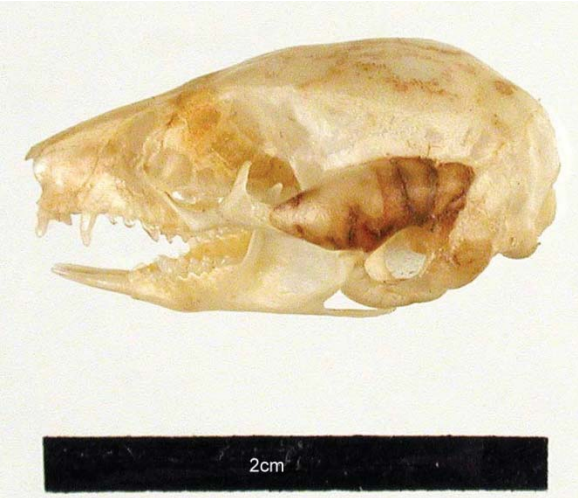


Plate 11: Skull of a pygmy possum (Victoria Museum)

The skull of a honey possum is very different to a pygmy possum, and is characterised by a very elongate shape and a lack of teeth, as illustrated below. No examples of these were found within the pipeline cylinders.

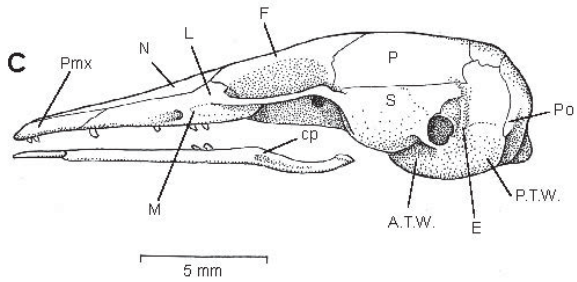


Plate 12: Skull of a honey possum (Russel & Renfree 1987)

5. DISCUSSION

The results of the honey possum habitat assessment at Higginsville suggest that the species is unlikely to be found in the area despite previous reports of its presence. This conclusion is supported by the fact that:

- Higginsville is about 136 km north of the closest "official" documented record of the species.

- Vegetation and landforms present in the Higginsville area do not match the documented habitat requirements of the species.

- While it is not possible to prove or disprove the authenticity of previous identifications of honey possums in the area, as no specimens appear to have been retained by the original observer, the finding of several pygmy possum remains at the same location (coupled with the known distribution and habitat preferences of both species) suggests that all previous observations/reports of honey possums have in fact been of pygmy possums. This is also supported by the fact that the reported description of specimens previously observed included comments that their tail was "serrated". Honey possums do not have a serrated tail or anything that could be mistaken for such whereas pygmy possums have a series or annuli (rings) around their tail which could be described as "serrations".

Both the honey possum and the pygmy possum are common across their entire range (excluding areas such as the wheatbelt which has been mostly cleared). Because they are widespread and generally common neither species is listed as threatened under state or federal law and neither is listed by the DEC as a Priority species, further testimony to the fact they are not considered of special conservation significance.

It is therefore concluded that any future proposed exploration or development within the Higginsville area is extremely unlikely to be of a nature or scale that

could possibly have a detrimental effect on the conservation status of either species, locally or regionally.

It is recommended that enquiries be initiated to have the pipeline cylinders that remain along the road between Higginsville and the pumping station removed as soon as possible. These appear to have been acting as pit traps for several decades and have inadvertently resulted in the death of hundreds of native animals. This will continue on for many more decades unless they are manually removed. It is unclear whose responsibility this is (presumably a state government department) but it is suggested that Alacer at least report the issue to the DEC and/or any other government authority that may be able to take action.

6. BIBLIOGRAPHY

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APPENDIX A

DEC NATUREMAP DATABASE SEARCH RESULTS

NatureMap - Higginsville - Mammals

Created By Greg Harewood on 20/02/2012

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Species Group	Mammals
Method	'By Circle'
Centre	121°40' 50" E,31°44' 32" S
Buffer	40km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	24086	*Cercartetus concinnus (Western Pygmy-possum)*			
2.	24153	*Isoodon obesulus subsp. fusciventer (Quenda)*		P5	
3.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
4.	24223	*Mus musculus (House Mouse)*			
5.	24096	*Ningaui yvonneae (Southern Ningaui)*			
6.	24229	*Notomys mitchellii (Mitchell's Hopping-mouse)*			
7.	24232	*Pseudomys bolami (Bolam's Mouse)*			
8.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
9.	24109	*Sminthopsis dolichura (Little long-tailed Dunnart)*			
10.	24114	*Sminthopsis hirtipes (Hairy-footed Dunnart)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.