

Gindalbie Gold N.L.

Fauna Assessment for the Highland Chief Project

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INTRODUCTION

Bamford Consulting Ecologists were commissioned by Gindalbie Gold N.L. to prepare a desktop fauna assessment for the Highland Chief Project in the Minjar Mt Mulgine operations area, in the Murchison region. The purpose of this assessment was as follows:

- Review available fauna lists from the region and produce a list of vertebrate fauna expected to occur in the Project area;
- Identify species of conservation significance; and
- Comment upon impacts and management issues with respect to fauna.

METHODS

Study Area

The Highland Chief Project is located *ca.* 60km south of Yalgoo, at *ca.* 6 787 500mN, 495 000mE. The site lies on the transition between the South-Western and Eremaean Botanical Provinces, and vegetation associations and soils are described by Woodman Consulting. With respect to fauna, the main features of the area are that the soils are generally red silty-clays with exposed rock high in the landscape. The Highland Chief area in particular is rocky. There are some minor drainage channels. Vegetation consists largely of eucalypt low woodland with an understorey of *Acacia* and *Eremophila* species. There are also thickets of *Acacia*, *Allocasuarina* and *Melaleuca* species in run-on areas where water is concentrated, and thickets of *Allocasuarina* and *Melaleuca* species in rocky areas.

Sources of Information

This study is based on a review of published and unpublished information, and previous experience in the general region of the project area. This approach allows a list of species likely to be present to be generated, with comments on fauna habitats based on interpretation of vegetation and landscape observations provided by Woodman Consulting.

Sources of information on fauna of the area were: the WA Museum Fauna Base, Burbidge *et al.* (1989), Masters (1990), Hart, Simpson and Assoc. (2000), Baynes (2001) and personal records from the area. The search area used on the WA Museum Fauna Base extended from 29.5° S, 116.9° E in the north-west to 30.0° S, 117.4° E in the south-east.

Nomenclature is based on Aplin and Smith (2001) for reptiles, How *et al.* (2001) for mammals and Johnstone (2001) and Christidis and Boles (1994) for birds.

Assessment of Conservation Significance

The conservation status of fauna species is assessed under Commonwealth and State Acts such as the *Commonwealth Environment Protection and Biodiversity Conservation Act* (EPBC Act) 1999 and the *Western Australian Wildlife Conservation Act* 1950. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN) and reviewed by Mace and Stuart (1994). The *WA Wildlife Conservation Act* 1950 uses a set of Schedules but also classifies species using some of the IUCN categories. These categories and Schedules are described in Appendix One.

The EPBC Act also has lists of migratory species that are recognised under international treaties such as the China Australia Migratory Bird Agreement (CAMBA), the Japan Australia Migratory Bird Agreement (JAMBA) and the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals). Those species listed in JAMBA are also protected under Schedule 3 of the *WA Wildlife Conservation Act*. In addition, Environment Australia has supported the publication of reports on the conservation status of most vertebrate fauna species e.g. reptiles (Cogger *et al.* 1993), birds (Garnett and Crowley 2000), monotremes and marsupials (Maxwell *et al.* 1996), rodents (Lee 1995) and bats (Duncan *et al.* 1999); while the Threatened Species and Communities Section of Environment Australia has produced a list of Threatened Australian Fauna (Environment Australia 1999), although this list is effectively a precursor to the list produced under the EPBC Act. These publications also use the IUCN categories, although those used by Cogger *et al.* (1993) and Wager and Jackson (1993) differ in some respects as this report pre-dates Mace and Stuart's review (1994).

In Western Australia, the Department of Conservation and Land Management has produced a supplementary list of Priority Fauna, being species that are not considered Threatened under the WA Act but for which the Department feels there is cause for concern. Some Priority species, however, are also assigned to the IUCN Conservation Dependent category. Levels of Priority are described in Appendix One.

Fauna species included under conservation acts and/or agreements are formally recognised as of conservation significance under state or federal legislation. Species listed only as Priority by CALM, or that are included in publications such as Garnett and Crowley (2000) and Cogger *et al.* (1993) but not in State or Commonwealth Acts, are also of recognised conservation significance. In addition, species that are at the limit of their distribution, those that have a very restricted range and those that occur in breeding colonies, such as some waterbirds, can be considered of conservation significance, although this level of significance has no legislative or published recognition and is based on interpretation of distribution information. The WA Department of Environmental Protection (2000) used this sort of interpretation to identify significant bird species in the Perth metropolitan area as part of Perth Bushplan.

On the basis of the above comments, three levels of conservation significance are recognised in this report:

Conservation Significance (CS) 1: Species listed under State or Commonwealth Acts.

Conservation Significance (CS) 2: Species not listed under State or Commonwealth Acts, but listed in publications on threatened fauna or as Priority species by CALM.

Conservation Significance (CS) 3: Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution.

VERTEBRATE FAUNA

On the basis of known species distributions and available habitats, a total of 247 vertebrate fauna species may occur in the Mt Gibson study area, including nine frogs, 72 reptiles, 134 birds and 33 mammals (see Tables 1 – 4). Many of these species may only occur on a seasonal basis. Because this list is based on a desktop review, it almost certainly includes species that would not be found if an intensive study were carried out. Species that are considered to be extinct in the area are listed separately (Table 5).

Frogs

Nine species of frogs may occur in the study area, although all of these are only expected to be active during wet periods (either rains associated with winter cold fronts or rains associated with summer cyclones). Perhaps due to the position of the study area in the transition zone between the South-west and the Arid interior, close to the boundary of the 300 mm rainfall isohyet, the majority of frog species that may be present are close to the edge of their distribution.

Although none is considered to be threatened, seven of the frog species are considered to be of conservation significance and are discussed below.

Conservation Significance Level 3

- Water-holding Frog *Cyclorana platycephala* southern edge of distribution
- Desert Trilling Frog *Neobatrachus centralis* restricted distribution
- Kunapulari Frog *Neobatrachus kunapulari* northern edge of distribution
- Humming Frog *Neobatrachus pelabatoides* north-eastern edge of distribution
- Wilsmore's Frog *Neobatrachus wilsmorei* south-eastern edge of distribution
- Gunther's Toadlet *Pseudophryne guentheri* north-eastern edge of distribution
- Western Toadlet *Pseudophryne occidentalis* south-western edge of distribution

Significant features of the landscape for frogs will be seasonal watercourses and other locations were freshwater concentrates and therefore where frogs may breed. Frogs may therefore be sensitive to any alterations in drainage patterns.

Reptiles

On the basis of available habitats and known distributions, a total of 73 reptile species may occur in the Highland Chief area. This total does not include species known from the general region but for which suitable habitats are missing from the study area. Of the species expected to be present, 26 are considered to be of conservation significance and are discussed below.

Conservation Significance Level 1

Western Spiny-tailed Skink

Egernia stokesii badia

The Western Spiny-tailed Skink is classified as Endangered under the EPBC Act, and Vulnerable under the WA Wildlife Conservation Act and by Cogger *et al.* (1993). It is commonly associated with large trees where it shelters under loose bark, in hollow logs and in crevices (Storr *et al.* 1999).

Carpet Python (south-west race)

Morelia spilota imbricata

The Carpet Python (south-west population) is classified as Specially Protected Fauna under the WA Wildlife Conservation Act, Priority 4 by the DCLM and Vulnerable by Cogger *et al.* (1993). It is often associated with rocky areas (M. Bamford pers. obs.). The study area is at the limit of its distribution in the South-West.

Woma (south-west population)

Aspidites ramsayi

Specially Protected Fauna under the WA Wildlife Conservation Act, Priority 1 by the DCLM and Rare or Insufficiently Known by Cogger *et al.* (1993). It is associated with sandy soils (Cogger *et al.* 1993) and suitable habitat may not be present in the study area, but it has been included because of its conservation significance.

Conservation Significance Level 2

Salmon Gum Gecko

Oedura reticulata

Listed as Rare or Insufficiently Known by Cogger *et al.* (1993) and at the north-eastern edge of its range in the study area.

Conservation Significance Level 3

A large proportion of the reptile fauna that is not of listed conservation significance is of some importance because the species are on the edge of their range. This reflects the transitional position of the study area between the Bassian and Eremaean regions. Of the 21 species listed below, six have essentially Bassian distributions whereas Eremaean species are better represented.

- *Diplodactylus squarrosus* south-eastern edge of range
- *Strophurus assimilis* south-western edge of range
- *Strophurus elderi* south-western edge of range
- *Strophurus intermedius* western edge of range
- *Strophurus spinigerus* north-eastern edge of range
- *Gehyra purpurascens* south-western edge of range
- *Nephrurus vertebralis* southern edge of range

- Beaked Gecko *Rhynchoedura ornata* southern edge of range
- Barking Gecko *Underwoodisaurus milli* northern edge of range
- *Ctenophorus cristatus* western edge of range
- Lozenge-marked Dragon *Ctenophorus scutulatus* southern-edge of range
- *Tympanocryptis cephalo* southern-edge of range
- *Ctenotus severus* south-eastern edge of range
- *Hemiergis initialis initialis* northern edge of range
- *Lerista distinguenda* north-eastern edge of range
- *Varanus caudolineatus* southern edge of range
- *Varanus panoptes* southern edge of range
- *Rhamphotyphlops australis* north-eastern edge of range
- Desert Death-adder *Acanthophis pyrrhus* southern edge of range
- Gould's Snake *Parasuta gouldii* north-eastern edge of range
- Monk Snake *Parasuta monachus* southern edge of range

Significant features of the landscape for reptiles will be rare habitats, such as run-on sites and isolated rocky outcrops. Environments where moisture is concentrated, such as along creeklines, may be particularly important for supporting outlying populations of south-western (Bassian) species.

Birds

On the basis of known species distributions and available habitats, it is expected that a total of 134 bird species may occur in the study area (Table 3). Of the species expected to be present, 40 are considered to be of conservation significance and are discussed below.

Conservation Significance Level 1

Malleefowl

Leipoa ocellata

The Malleefowl is classified as Vulnerable under the EPBC Act, the WA Wildlife Conservation Act and by Garnett and Crowley (2000). It has declined due to clearing for agriculture and predation by Foxes (Garnett and Crowley 2000). There are records of the Malleefowl in the general region. It is sensitive to destruction of its nesting mounds, disturbance at its mounds and to roadkill.

Night Parrot

Pezoporus occidentalis

The Night Parrot is classified as Endangered under the EPBC Act, and as Critically Endangered under the WA Wildlife Conservation Act and by Garnett and Crowley (2000). This is an enigmatic species with very few recent confirmed sightings. It is probably extinct in the project area but the possibility that the species still occurs in the region cannot be dismissed.

Peregrine Falcon

Falco peregrinus

The Peregrine Falcon is classified as Specially Protected Fauna under the WA Wildlife Conservation Act. Individuals forage widely but nest sites, located either on cliffs or in the abandoned nests of birds such as the Australian Raven, located in large trees, are important. It is not known if the rocky areas in the region support breeding by the Peregrine Falcon.

Major Mitchell's Cockatoo

Cacatua leadbeateri

Major Mitchell's Cockatoo is classified as Specially Protected Fauna under the WA Wildlife Conservation Act. Nesting sites in eucalypt woodland or in large trees along creeklines are likely to be significant.

Fork-tailed Swift

Apus pacificus

The Fork-tailed Swift is classified as migratory under the JAMBA, CAMBA and Bonn Convention, and as such is protected under the EPBC Act. Its listing under JAMBA also means it is protected under the WA Wildlife Conservation Act. This is a highly mobile species that is largely independent of terrestrial ecosystems in the project area.

Conservation Significance Level 2

Australian Bustard

Ardeotis australis

The Australian Bustard is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000). Hunting, habitat loss and possibly predation by Foxes have contributed to its decline (Garnett and Crowley 2000).

Bush Stone-curlew

Burhinus grallarius

The Bush Stone-curlew is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000). It has declined due to land clearing and predation by Foxes (Garnett and Crowley 2000) but is still present at some locations in the Murchison, particularly along watercourses.

Masked Owl (southern)

Tyto novaehollandiae novaehollandiae

The Masked Owl is classified as Priority 3 by the DCLM and Near Threatened by Garnett and Crowley (2000). The presence of this species in the area is unlikely as the habitat descriptions suggest there are few large trees of the sort used for roosting and nesting.

Shy Heathwren (western)

Hylacola cauta whitlocki

The Shy Heathwren (western) is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000).

Rufous Fieldwren (western wheatbelt)

Calamanthus campestris montanellus

The Rufous Fieldwren (western wheatbelt) is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000).

White-browed Babbler (western wheatbelt) *Pomatostomus superciliosus ashbyi*
The White-browed Babbler (western wheatbelt) is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000).

Crested Bellbird (southern) *Oreoica gutturalis gutturalis*
The Crested Bellbird (southern) is classified as Priority 4 by the DCLM and Near Threatened by Garnett and Crowley (2000). This and the previous three species have all suffered habitat loss due to clearing for agriculture.

Conservation Significance Level 3

Approximately 28 bird species that may occur in the study area are classified in this level, mostly on the basis that they are on the edge of their distribution (see Table 3 for species). Most of these species are either arid-land species at the south-western edge of their distribution, or south-western species at the north-eastern edge of their distribution.

As with reptiles, significant features of the landscape for birds will be rare habitats. Nesting locations are likely to be particularly important for some of the species of conservation significance. These could include clifflines and large trees.

Mammals

On the basis of known species distributions and available habitats, a total of 33 mammal species may occur in the study area, including 28 native and 5 introduced species (see Table 4). A further 18 mammal species are considered to be extinct from the region (see Table 5). Species of conservation significance, including regionally extinct species, are discussed below.

Conservation Significance Level 1

All species of Conservation Significance Level 1 that may have occurred in the study area are considered to be at least locally extinct (see below).

Conservation Significance Level 2

Greater Long-eared Bat (central form) *Nyctophilus timoriensis*
The Greater Long-eared Bat (central form) is classified as Priority 4 by the DCLM and Lower Risk (Near Threatened) by Duncan *et al.* (1999).

Kultarr or Wuhl-Wuhl *Antechinomys laniger*
The Kultarr is classified as Data Deficient by Maxwell *et al.* (1996). Further research may indicate the species deserves a more significant category.

Conservation Significance Level 3

- Inland Freetail Bat *Mormopterus planiceps* * sp. 3
- Western Freetail Bat *Mormopterus planiceps* * sp. 4

The *Mormopterus planiceps* complex is currently under revision, with species boundaries still to be established (pers. comm. T. Reardon). This site may lie close to the boundary of the two taxa listed above.

- Gilbert's Dunnart *Sminthopsis gilberti* north-eastern edge of range
- White-tailed Dunnart *Sminthopsis granulipes* north-eastern edge of range
- Western Pygmy-possum *Cercartetus concinnus* northern edge of range
- Hill's Sheathtail Bat *Taphozous hilli* southern edge of range
- Gould's Long-eared Bat *Nyctophilus gouldii* northern edge of range
- Inland Forest Bat *Vespadelus baverstocki* western edge of range
- Inland Cave Bat *Vespadelus finlaysoni* southern edge of range
- Southern Forest Bat *Vespadelus regulus* northern edge of range
- Noodji *Pseudomys albocinereus* northern edge of range

Regionally Extinct Mammals

Chuditch

Dasyurus geoffroii

The Chuditch is classified as Vulnerable EPBC Act, the WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Red-tailed Phascogale

Phascogale calura

The Red-tailed Phascogale is classified as Endangered under the EPBC Act, the WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Numbat

Myrmecobius fasciatus

The Numbat is classified as Vulnerable under the EPBC Act, the WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Marl or Western Barred Bandicoot

Perameles bougainville bougainville

The Marl is classified as Endangered under the EPBC Act, the WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Bilby, Dalgyte

Macrotis lagotis

The Bilby is classified as Vulnerable under the EPBC Act, the WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Pig-footed Bandicoot

Chaeropus ecaudatus

The Pig-footed Bandicoot is classified as Extinct under the EPBC Act and by Maxwell *et al.* (1996), and Extinct in the Wild under the WA Wildlife Conservation Act.

Common Brushtail Possum (south-west taxa) *Trichosurus vulpecula hypoleucos*

The Common Brushtail Possum is classified as Lower Risk (near threatened) by Maxwell *et al.* (1996).

Woylie

Bettongia penicillata ogilbyi

The Woylie is classified as Priority 4 (Conservation Dependent) by the DCLM and Lower Risk (Conservation Dependent) by Maxwell *et al.* (1996).

Boodie, Burrowing Bettong (inland form)

Bettongia lesueur graii

Maxwell *et al.* (1996) classifies the Boodie (inland form – *B. l. graii*) as Extinct, however this form is not considered in the EPBC Act or the WA Wildlife Conservation Act. Both the EPBC and WA Wildlife Conservation Acts and Maxwell *et al.* (1996) consider other subspecies of the Boodie be Vulnerable.

Banded Hare-wallaby

Lagostrophus fasciatus

The mainland form of the Banded Hare-wallaby (*L. f. albipilis*) is classified as Extinct by Maxwell *et al.* (1996), whilst the EPBC Act and the WA Wildlife Conservation Act only list the island taxon of the species (*L. f. fasciatus*) which they consider to be Vulnerable.

Mala

Lagorchestes hirsutus

The Mala is classified as Extinct under the EPBC Act and by Maxwell *et al.* (1996), and Extinct in the Wild under the WA Wildlife Conservation Act.

Crescent Nailtail Wallaby

Onychogalea lunata

The Crescent Nailtail Wallaby is classified as Extinct under the EPBC Act, WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Black-footed Rock-Wallaby

Petrogale lateralis lateralis

The Black-footed Rock-Wallaby (also referred to as the Black-flanked Rock-Wallaby) is classified as Vulnerable under the EPBC Act, WA Wildlife Conservation Act and by Maxwell *et al.* (1996).

Long-tailed Hopping Mouse

Notomys longicaudatus

The Long-tailed Hopping Mouse is classified as Extinct under the EPBC Act, the WA Wildlife Conservation Act and by Lee (1995).

Wopilkara, Greater Stick-nest Rat

Leporillus conditor

The Wopilkara is classified as Vulnerable under the EPBC Act, the WA Wildlife Conservation Act and by Lee (1995).

Djooyalpi, Lesser Stick-nest Rat

Leporillus apicalis

The Djooyalpi is classified as Extinct under the EPBC Act, the WA Wildlife Conservation Act and by Lee (1995).

Shark Bay Mouse

Pseudomys fieldi

The Shark Bay Mouse is classified as Vulnerable under the EPBC Act and the WA Wildlife Conservation Act, whilst it is considered to be Endangered by Lee (1995).

Western Mouse

Pseudomys occidentalis

The Western Mouse is classified as Priority 4 by the DCLM and Vulnerable by Lee (1995).

The mammal fauna of the project area is notable for the number of regionally extinct species, with extinctions due to introduced predators and possibly habitat alteration due to grazing (Burbidge and McKenzie 1989). The extant mammal fauna contains a high proportion of bats, several of which are of Conservation Significance level 3, and many of these are cave-dwelling. Therefore, natural caves and also old mine workings may be significant habitat features of the project area. Introduced species, both predators and competitors such as sheep, goats and rabbits, are also likely to be important for the persistence of the remaining native mammal species.

DISCUSSION

The study area is of interest because it lies just to the north of the wheatbelt, the majority of which has been cleared for farming. This position means the area supports a large number of species at the edge of their range i.e. either arid-land species at the southern, eastern or south-eastern edge, or south-western species at the northern or north-eastern edge. Due to clearing of much of their habitat, a number of the south-western species are of conservation significance. However due to the small size of the proposed development, it is not expected that it will significantly affect most fauna species, although the influence of the project on regional land management may be important. Main management issues are as follows:

- Introduced species such as the Fox, Cat, Rabbit and Goat have had a considerable impact upon the fauna and the landscape. They should not be encouraged and control should be considered.
- Many of the species rely on tree hollows and fallen branches for shelter. Even dead trees can be an important component of the environment. Such material should not be collected for firewood. Large trees may be important nest sites for some bird species.
- Direct impacts on or disturbance of individual species should be avoided. For example, Malleefowl could be adversely affected through the disturbance or removal of their mounds. Therefore, the locations of any mounds should be recorded so that they can be avoided. Two of the largest snakes that may be present, the Carpet Python and the Woma, are both of conservation significance. Therefore, snakes should be left alone when at all possible. Sightings of the Woma should be reported to the Department of Conservation and Land Management.
- Caves and old mine workings may be important for some bat species. Disturbance of site used by bats should be minimised.

Table 1. Frogs that may occur in the Mt Gibson Study Area. Levels of Conservation Significance (CS#) are detailed in the “Assessment of Conservation Significance” section.

FROGS		Status
Myobatrachidae (burrowing frogs)		
Trilling Frog	<i>Neobatrachus centralis</i>	CS3
Kunapulari Frog	<i>Neobatrachus kunapulari</i>	CS3
Humming Frog	<i>Neobatrachus pelabatooides</i>	CS3
Shoemaker Frog	<i>Neobatrachus sutor</i>	
Wilsmore's Frog	<i>Neobatrachus wilsmorei</i>	CS3
Gunther's Toadlet	<i>Pseudophryne guentheri</i>	CS3
Western Toadlet	<i>Pseudophryne occidentalis</i>	CS3
Hylidae (tree-frogs)		
Main's Frog	<i>Cyclorana maini</i>	
Water-holding Frog	<i>Cyclorana platycephala</i>	CS3

Table 2. Reptiles that may occur in the Mt Gibson Study Area. Levels of Conservation Significance (CS#) are detailed in the “Assessment of Conservation Significance” section.

REPTILES		Status
Gekkonidae (geckos)		
Clawless Gecko	<i>Crenadactylus ocellatus</i>	
	<i>Diplodactylus granariensis</i>	
	<i>Diplodactylus maini</i>	
	<i>Diplodactylus pulcher</i>	
	<i>Diplodactylus squarrosus</i>	CS3
Tree Dtella	<i>Gehyra variegata</i>	
	<i>Gehyra pupurascens</i>	CS3
Bynoe's Gecko	<i>Heteronotia binoei</i>	
	<i>Nephurus vertebralis</i>	CS3
	<i>Oedura reticulata</i>	CS2
Beaked Gecko	<i>Rhynchoedura ornata</i>	CS3
	<i>Strophurus assimilis</i>	CS3
	<i>Strophurus intermedius</i>	CS3
	<i>Strophurus elderi</i>	CS3
Southern Spiny-tailed Gecko	<i>Strophurus spinigerus</i>	CS3
Barking Gecko	<i>Underwoodisaurus milii</i>	CS3
Pygopodidae (legless-lizards)		
	<i>Delma australis</i>	
Fraser's Legless-lizard	<i>Delma fraseri</i>	
Burton's Legless-Lizard	<i>Lialis burtonis</i>	
Common Scaley-foot	<i>Pygopus lepidopodus</i>	
Hooded Scaley-foot	<i>Pygopus nigriceps</i>	

Table 2. (cont.)

REPTILES		Status
Agamidae (dragon lizards)		
	<i>Ctenophorus cristatus</i>	CS3
	<i>Ctenophorus maculatus</i>	
Ornate Dragon	<i>Ctenophorus ornatus</i>	
Western Netted Dragon	<i>Ctenophorus reticulatus</i>	
Lozenge-marked Dragon	<i>Ctenophorus scutulatus</i>	CS3
Thorny Devil	<i>Moloch horridus</i>	
Western Bearded Dragon	<i>Pogona minor</i>	
	<i>Tympanocryptis cephalo</i>	CS3
Scincidae (skink lizards)		
	<i>Cryptoblepharus carnabyi</i>	
Fence Skink	<i>Cryptoblepharus plagioccephalus</i>	
	<i>Ctenotus mimetes</i>	
	<i>Ctenotus pantherinus</i>	
	<i>Ctenotus schomburgkii</i>	
	<i>Ctenotus severus</i>	CS3
	<i>Ctenotus uber</i>	
	<i>Egernia depressa</i>	
	<i>Egernia inornata</i>	
Western Spiny-tailed Skink	<i>Egernia stokesii</i>	CS1
Narrow-banded Sand-swimmer	<i>Eremiascincus richardsonii</i>	
	<i>Hemiergis initialis</i>	CS3
	<i>Lerista distinguenda</i>	CS3
	<i>Lerista gerrardii</i>	
	<i>Lerista macropisthopus</i>	
	<i>Lerista muelleri</i>	
Grey's Skink	<i>Menetia greyii</i>	
	<i>Morethia butleri</i>	
	<i>Morethia obscura</i>	
Blue-tongued Lizard	<i>Tiliqua occipitalis</i>	
Bobtail Lizard	<i>Tiliqua rugosa</i>	
Varanidae (monitor-lizards)		
	<i>Varanus caudolineatus</i>	CS3
Perentie	<i>Varanus giganteus</i>	
Gould's Monitor	<i>Varanus gouldii</i>	
	<i>Varanus panoptes</i>	CS3
Black-tailed Tree Monitor	<i>Varanus tristis</i>	
Boidae (pythons)		
Stimson's Python	<i>Antaresia stimsoni</i>	
Woma	<i>Aspidities ramsayi</i>	CS1
Carpet Python	<i>Morelia spilota</i>	CS1

Table 2. (cont.)

REPTILES		Status
Typhlopidae (blind-snakes)		
	<i>Ramphotyphlops hamatus</i>	
	<i>Ramphotyphlops australis</i>	CS3
	<i>Ramphotyphlops waitii</i>	
Elapidae (front-fanged snakes)		
Desert Death-adder	<i>Acanthophis pyrrhus</i>	CS3
Narrow-banded Shovel-nosed Snake	<i>Brachyuropsis fasciolata</i>	
Southern Shovel-nosed Snake	<i>Brachyuropsis semifasciata</i>	
Yellow-faced Whipsnake	<i>Demansia psammophis</i>	
Moon Snake	<i>Furina ornata</i>	
Black-naped Snake	<i>Neelaps bimaculatus</i>	
Gould's Snake	<i>Parasuta gouldii</i>	CS3
Monk Snake	<i>Parasuta monachus</i>	CS3
Mulga Snake	<i>Pseudechis australis</i>	
Ringed Brown Snake	<i>Pseudonaja modesta</i>	
Gwardar	<i>Pseudonaja nuchalis</i>	
Jan's Banded Snake	<i>Simoselaps bertholdi</i>	
Rosen's Snake	<i>Suta fasciata</i>	

Table 3. Birds that may occur in the Mt Gibson Study Area. Levels of Conservation Significance (CS#) are detailed in the “Assessment of Conservation Significance” section. “Int.” in the Status column indicates introduced species.

BIRDS		Status
Dromaiidae (emus)		
Emu	<i>Dromaius novaehollandiae</i>	
Megapodiidae (mound-builders)		
Mallee Fowl	<i>Leipoa ocellata</i>	CS1
Phasianidae (pheasants and quails)		
Stubble Quail	<i>Coturnix pectoralis</i>	
Accipitridae (kites, hawks and eagles)		
Black-shouldered Kite	<i>Elanus notatus</i>	
Square-tailed Kite	<i>Lophoictinia isura</i>	CS3
Black Kite	<i>Milvus migrans</i>	
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	
Whistling Kite	<i>Haliastur sphenurus</i>	
Spotted Harrier	<i>Circus assimilis</i>	
Brown Goshawk	<i>Accipiter fasciatus</i>	
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	
Wedge-tailed Eagle	<i>Aquila audax</i>	
Little Eagle	<i>Hieraaetus morphnoides</i>	
Falconidae (falcons)		
Peregrine Falcon	<i>Falco peregrinus</i>	CS1
Australian Hobby	<i>Falco longipennis</i>	
Grey Falcon	<i>Falco hypoleucos</i>	
Black Falcon	<i>Falco subniger</i>	
Brown Falcon	<i>Falco berigora</i>	
Nankeen Kestrel	<i>Falco cenchroides</i>	
Turnicidae (button-quails)		
Painted Button-quail	<i>Turnix varia</i>	
Little Button-quail	<i>Turnix velox</i>	
Rallidae (crakes and rails)		
Black-tailed Native-hen	<i>Gallinula ventralis</i>	
Otididae (bustards)		
Australian Bustard	<i>Ardeotis australis</i>	CS2
Burhinidae (stone-curlews)		
Bush Stone-curlew	<i>Burhinus grallarius</i>	CS2
Charadriidae (lapwings and plovers)		
Inland Dotterel	<i>Charadrius australis</i>	
Columbidae (pigeons and doves)		
Common Bronzewing	<i>Phaps chalcoptera</i>	
Crested Pigeon	<i>Ocyphaps lophotes</i>	
Diamond Dove	<i>Geopelia cuneata</i>	

Table 3. (cont.)

BIRDS		Status
Cacatuidae (cockatoos)		
Red-tailed Black-Cockatoo	<i>Calyptorhynchus banksii</i>	
Galah	<i>Cacatua roseicapilla</i>	
Western Corella	<i>Cacatua pastinator</i>	
Cockatiel	<i>Nymphicus hollandicus</i>	
Little Corella	<i>Cacatua sanguinea</i>	
Major Mitchell's Cockatoo	<i>Cacatua leadbeateri</i>	CS1
Psittacidae (lorikeets and parrots)		
Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>	CS3
Regent Parrot	<i>Polytelis anthopeplus</i>	CS3
Night Parrot	<i>Pezoporus occidentalis</i>	CS1
Budgerigar	<i>Melopsittacus undulatus</i>	
Australian Ringneck	<i>Barnardius zonarius</i>	
Scarlet-chested Parrot	<i>Neophema splendida</i>	CS3
Mulga Parrot	<i>Psephotus varius</i>	
Bourke's Parrot	<i>Neosephotus bourkii</i>	CS3
Cuculidae (cuckoos)		
Pallid Cuckoo	<i>Cuculus pallidus</i>	
Fan-tailed Cuckoo	<i>Cuculus pyrrhophanus</i>	
Black-eared Cuckoo	<i>Chrysococcyx osculans</i>	
Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>	
Strigidae (hawk-owls)		
Southern Boobook Owl	<i>Ninox novaeseelandiae</i>	
Tytonidae (barn owls)		
Masked Owl	<i>Tyto novaehollandiae</i>	CS2
Barn Owl	<i>Tyto alba</i>	
Podargidae (frogmouths)		
Tawny Frogmouth	<i>Podargus strigoides</i>	
Aegothelidae (owlet-nightjars)		
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	
Caprimulgidae (nightjars)		
Spotted Nightjar	<i>Eurostopodus argus</i>	
Apodidae (swifts)		
Fork-tailed Swift	<i>Apus pacificus</i>	CS1
Halcyonidae (forest kingfishers)		
Red-backed Kingfisher	<i>Todiramphus pyrrhopygia</i>	
Sacred Kingfisher	<i>Todiramphus sanctus</i>	
Meropidae (bee-eaters)		
Rainbow Bee-eater	<i>Merops ornatus</i>	
Climacteridae (treecreepers)		
White-browed Treecreeper	<i>Climacteris affinis</i>	CS3
Rufous Treecreeper	<i>Climacteris rufa</i>	CS3

Table 3. (cont.)

BIRDS		Status
Maluridae (fairy-wrens)		
Splendid Fairy-wren	<i>Malurus splendens</i>	
Variegated Fairy-wren	<i>Malurus lamberti</i>	
Blue-breasted Fairy-wren	<i>Malurus pulcherrimus</i>	CS3
White-winged Fairy-wren	<i>Malurus leucopterus</i>	
Pardalotidae (pardalotes)		
Striated Pardalote	<i>Pardalotus striatus</i>	
White-browed Scrubwren	<i>Sericornis frontalis</i>	CS3
Shy Heathwren	<i>Hylacola cauta</i>	CS2
Rufous Fieldwren	<i>Calamanthus campestris</i>	CS2
Redthroat	<i>Pyrrholaemus brunneus</i>	
Weebill	<i>Smicronis brevirostris</i>	
Western Gerygone	<i>Gerygone fusca</i>	
Inland Thornbill	<i>Acanthiza apicalis</i>	
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	
Slaty-backed Thornbill	<i>Acanthiza robustirostris</i>	CS3
Western Thornbill	<i>Acanthiza inornata</i>	
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	
Southern Whiteface	<i>Aphelocephala leucopsis</i>	
Meliphagidae (honeyeaters)		
Red Wattlebird	<i>Anthochaera carunculata</i>	
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	
Yellow-throated Miner	<i>Manorina flavigula</i>	
Singing Honeyeater	<i>Lichenostomus virescens</i>	
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	CS3
Yellow-plumed Honeyeater	<i>Lichenostomus ornatus</i>	CS3
Grey-fronted Honeyeater	<i>Lichenostomus plumulus</i>	CS3
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	CS3
Brown Honeyeater	<i>Lichmera indistincta</i>	
White-cheeked Honeyeater	<i>Phylidonyris nigra</i>	CS3
White-fronted Honeyeater	<i>Phylidonyris albifrons</i>	
Grey Honeyeater	<i>Conopophila whitei</i>	CS3
Black Honeyeater	<i>Certhionyx niger</i>	
Pied Honeyeater	<i>Certhionyx variegatus</i>	CS3
Crimson Chat	<i>Epthianura tricolor</i>	
White-fronted Chat	<i>Epthianura albifrons</i>	
Petroicidae (Australian robins)		
Jacky Winter	<i>Microeca leucophaea</i>	
Red-capped Robin	<i>Petroica goodenovii</i>	
Hooded Robin	<i>Melanodryas cucullata</i>	
Western Yellow Robin	<i>Eopsaltria griseogularis</i>	CS3
Southern Scrub-robin	<i>Drymodes brunneopygia</i>	CS3

Table 3 (cont.)

BIRDS		Status
Pomatostomidae (Australian babblers)		
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	CS3
White-browed Babbler	<i>Pomatostomus superciliosus</i>	CS2
Cinclosomatidae (quail-thrushes and allies)		
Chiming Wedgebill	<i>Psophodes occidentalis</i>	CS3
Chestnut Quail-thrush	<i>Cinclosoma castanotum</i>	
Chestnut-breasted Quailthrush	<i>Cinclosoma castaneothorax</i>	CS3
Neosittidae (sittellas)		
Varied Sittella	<i>Daphoenositta chrysoptera</i>	
Pachycephalidae (whistlers)		
Crested Bellbird	<i>Oreoica gutturalis</i>	CS2
Gilbert's Whistler	<i>Pachycephala inornata</i>	CS3
Golden Whistler	<i>Pachycephala pectoralis</i>	CS3
Rufous Whistler	<i>Pachycephala rufiventris</i>	
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	
Dicruridae (flycatchers)		
Restless Flycatcher	<i>Myiagra inquieta</i>	CS3
Magpie-lark	<i>Grallina cyanoleuca</i>	
Grey Fantail	<i>Rhipidura fuliginosa</i>	
Willie Wagtail	<i>Rhipidura leucophrys</i>	
Campephagidae (cuckoo-shrikes)		
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	
Ground Cuckoo-shrike	<i>Coracina maxima</i>	
White-winged Triller	<i>Lalage sueurii</i>	
Artamidae (woodswallows)		
Masked Woodswallow	<i>Artamus personatus</i>	
Black-faced Woodswallow	<i>Artamus cinereus</i>	
Little Woodswallow	<i>Artamus minor</i>	
Grey Butcherbird	<i>Cracticus torquatus</i>	
Pied Butcherbird	<i>Cracticus nigrogularis</i>	
Australian Magpie	<i>Gymnorhina tibicen</i>	
Grey Currawong	<i>Strepera versicolor</i>	CS3
Corvidae (ravens and crows)		
Australian Raven	<i>Corvus coronoides</i>	
Little Crow	<i>Corvus bennetti</i>	
Torresian Crow	<i>Corvus orru</i>	CS3
Motacillidae (pipits and true wagtails)		
Richard's Pipit	<i>Anthus novaeseelandiae</i>	
Passeridae (finches and allies)		
Zebra Finch	<i>Taeniopygia guttata</i>	

Table 3. (cont.)

BIRDS		Status
Dicaeidae (flower-peckers)		
Mistletoebird	<i>Dicaeum hirundinaceum</i>	
Hirundinidae (swallows)		
White-backed Swallow	<i>Cheramoeca leucosternus</i>	
Welcome Swallow	<i>Hirundo neoxena</i>	
Tree Martin	<i>Hirundo nigricans</i>	
Fairy Martin	<i>Hirundo ariel</i>	
Sylviidae (Old World warblers)		
Rufous Songlark	<i>Cincloramphus mathewsi</i>	
Brown Songlark	<i>Cincloramphus cruralis</i>	
Zosteropidae (white-eyes)		
Silvereye	<i>Zosterops lateralis</i>	CS3

Table 4. Mammals that may occur in the Mt Gibson Study Area. Levels of Conservation Significance (CS#) are detailed in the “Assessment of Conservation Significance” section. “Int.” in the Status column indicates introduced species.

MAMMALS		Status
Tachyglossidae (echidnas)		
Echidna	<i>Tachyglossus aculeatus</i>	
Dasyuridae (carnivorous marsupials)		
Kultarr or Wuhl-Wuhl	<i>Antechinomys laniger</i>	CS3
Ride's Ningau	<i>Ningau ridei</i>	
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	
Gilbert's Dunnart	<i>Sminthopsis gilberti</i>	CS3
White-tailed Dunnart	<i>Sminthopsis granulipes</i>	CS3
Little Long-tailed Dunnart	<i>Sminthopsis dolichura</i>	
Burramyidae (pygmy-possums)		
Western Pygmy-possum	<i>Cercartetus concinnus</i>	CS3
Macropodidae (kangaroos and wallabies)		
Euro	<i>Macropus robustus</i>	
Red Kangaroo	<i>Macropus rufus</i>	
Western Grey Kangaroo	<i>Macropus fuliginosus</i>	
Muridae (rodents)		
House Mouse	<i>Mus musculus</i>	Int.
Mitchell's Hopping-mouse	<i>Notomys mitchelli</i>	
Sandy Inland Mouse	<i>Pseudomys hermannsburgensis</i>	
Noodji or Ashy-grey Mouse	<i>Pseudomys albocinereus</i>	CS3
Emballonuridae (sheath-tail bats)		
Hill's Sheath-tail Bat	<i>Taphozous hilli</i>	CS3
Vespertilionidae (evening bats)		
Gould's Wattle Bat	<i>Chalinolobus gouldii</i>	
Chocolate Wattle Bat	<i>Chalinolobus morio</i>	
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	
Gould's Long-eared Bat	<i>Nyctophilus gouldii</i>	CS3
Greater Long-eared Bat	<i>Nyctophilus timoriensis</i>	CS2
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	
Inland Forest Bat	<i>Vespadelus baverstocki</i>	CS3
Inland Cave Bat	<i>Vespadelus finlaysoni</i>	CS3
Southern Forest Bat	<i>Vespadelus regulus</i>	CS3
Molossidae (freetail bats)		
Inland Freetail Bat	<i>Mormopterus planiceps</i> * sp. 3	CS3
Western Freetail Bat	<i>Mormopterus planiceps</i> * sp. 4	CS3
White-striped Mastiff Bat	<i>Tadarida australis</i>	

Table 4. (cont.)

MAMMALS		Status
Canidae (dogs and foxes)		
Dingo	<i>Canis familiaris dingo</i>	
Red Fox	<i>Vulpes vulpes</i>	Int.
Felidae (cats)		
Feral Cat	<i>Felis catus</i>	Int.
Bovidae (horned ruminants)		
Goat	<i>Capra hircus</i>	Int.
Leporidae (rabbits)		
European Rabbit	<i>Oryctolagus cuniculus</i>	Int.

* Species boundaries partially revised in Adams *et al.* (1988), with further revision in progress.

Table 5. Vertebrate fauna species considered extinct in the region.

		Status
Dasyuridae		
Chuditch	<i>Dasyurus geoffroii</i>	CS1
Red-tailed Phascogale	<i>Phascogale calura</i>	CS1
Myrmecobiidae (Numbat)		
Numbat	<i>Myrmecobius fasciatus</i>	CS1
Peramelidae (bandicoots and bilbies)		
Marl, Western Barred Bandicoot	<i>Perameles bougainville</i>	CS1
Bilby	<i>Macrotis lagotis</i>	CS1
Pig-footed Bandicoot	<i>Chaeropus ecaudatus</i>	CS1
Phalangeridae (brushtail-possums)		
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	CS3
Potoridae (bettongs and potoroos)		
Burrowing Bettong	<i>Bettongia lesueur</i>	CS1
Woylie	<i>Bettongia penicillata</i>	CS1
Macropods (kangaroos and wallabies)		
Banded Hare-wallaby	<i>Lagostrophus fasciatus</i>	CS1
Rufous Hare-wallaby	<i>Lagorchestes hirsutus</i>	CS1
Crescent Nailtail Wallaby	<i>Onychogalea lunata</i>	CS1
Black-footed Rock-Wallaby	<i>Petrogale lateralis</i>	CS1
Muridae (rodents)		
Long-tailed Hopping Mouse	<i>Notomys longicaudatus</i>	CS1
Pale Field Rat	<i>Rattus tunneyi</i>	
Wopilkara, Greater Stick-nest Rat	<i>Leporillus conditor</i>	CS1
Djooyalpi, Lesser Stick-nest Rat	<i>Leporillus apicalis</i>	CS1
Shark Bay Mouse	<i>Pseudomys fieldi</i>	CS1
Western Mouse	<i>Pseudomys occidentalis</i>	CS2

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APPENDIX ONE. Categories used in the assessment of conservation status.

Environmental Protection and Biodiversity Conservation (EPBC) Act and the WA Wildlife Conservation Act (categories from IUCN, based on review by Mace and Stuart (1994)).

Extinct. Taxa not definitely located in the wild during the past 50 years.

Extinct in the Wild. Taxa known to survive only in captivity.

Critically Endangered. Taxa facing an extremely high risk of extinction in the wild in the immediate future.

Endangered. Taxa facing a very high risk of extinction in the wild in the near future.

Vulnerable. Taxa facing a high risk of extinction in the wild in the medium-term future.

Near Threatened. Taxa that risk becoming Vulnerable in the wild.

Conservation Dependent. Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classed as Vulnerable or more severely threatened.

Data Deficient (Insufficiently Known). Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.

Least Concern. Taxa that are not Threatened.

WA Department of Conservation and Land Management Priority species (species not listed under the Conservation Act, but for which there is some concern).

Priority 1. Taxa with few, poorly known populations on threatened lands.

Priority 2. Taxa with few, poorly known populations on conservation lands; or taxa with several, poorly known populations not on conservation lands.

Priority 3. Taxa with several, poorly known populations, some on conservation lands.

Priority 4. Taxa in need of monitoring.