

4 TERRESTRIAL VERTEBRATE FAUNA RESULTS

4.1 DESKTOP SURVEY

Based on previous fauna records lodged within 10 km of the Project area, NatureMap indicates that up to 117 fauna species have the potential to occur, comprising of 5 amphibians, 29 reptiles, 15 mammals and 68 birds.

A search of the EPBC Act list of protected species and threatened ecological communities considered to be MNES indicated 15 fauna species of conservation significance have the potential to occur in habitats that may be present within 10 km of the Project area. The 15 species comprise 11 birds and 4 mammals.

The AoLA search indicated 225 fauna species may occur within 10 km of the Project area, comprising of seven amphibians, 26 reptiles, 13 mammals, 83 birds and 103 invertebrates.

The DPaW database search returned historical records of 34 conservation significant fauna, comprising of 20 birds, 11 mammals, two reptiles and one insect.

Conservation significant fauna identified by the searches and their likelihood of occurring in the Project area are discussed in Table 4-1.

Fauna surveys carried out in January and November of 2004 by Biota Environmental Sciences Pty Ltd (Biota) recorded five fauna taxa of conservation significance. These included *Calyptorhynchus latirostris* (Carnaby's Cockatoo), *Leipoa ocellata* (Malleefowl), *Lerista viduata* (Ravensthorpe Range Slider), *Psophodes nigrogularis* subsp. *oberon* (Western Whipbird (Mallee)) and *Macropus irma* (Western Brush Wallaby). Two species of mygalomorph spiders, *Aname mainae* and *Chenistonia tepperi*, were recorded in the Project area.

To better define and make more relevant the results of the database searches, the search radius for the NatureMap and AoLA database searches was reduced to 6 km and 5 km respectively from the Project. At this radius, 105 fauna species may occur, comprising of six amphibians, 25 reptiles, 11 mammals, 63 birds and 72 invertebrates (Appendix 9 and Appendix 10).

Excluding birds, the assimilated surveys recorded represent collections of 45% of the expected fauna species likely to be present in the project area based on the 6 km search radius.

Table 4-1: Conservation significant fauna potentially occurring in the Ravensthorpe Gold Copper Project Area

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
Birds							
<i>Apus pacificus</i>	Fork-tailed Swift	IA	IA	The Fork-tailed Swift occurs on coastal plains and sometimes foothills (DoE, 2016b). They are mostly found over dry or open habitats including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. This species is almost exclusively aerial (DoE, 2016b).	Unlikely to occur	No	There is no suitable habitat in the Project area.
<i>Ardea ibis coromanda</i>	Cattle Egret	IA	IA	The heaviest distribution of this species in WA is in the north east, and into the Northern Territory. In the non-breeding season, it can be found throughout most of Australia (DoE, 2016b).	Unlikely to occur	No	There is no suitable habitat in the Project area.
<i>Ardea modesta</i> (also known as <i>Ardea alba</i>)	Great Egret, White Egret	IA	IA	The Great Egret occupies a wide variety of wet habitats including freshwater wetlands, dams, flooded pastures, estuarine mudflats, mangroves and reefs (Morcombe, 2003). The species is also known to visit shallows of rivers, sewage ponds and irrigation areas (Pizzey & Knight, 2012).	May occur	Yes	If this species did occur it would only be as a transitory visitor foraging over the site.
<i>Botaurus poeciloptilus</i>	Australasian Bittern	EN	EN	In Western Australia the species was formerly widespread in the south-west however is now thought to only occur on the western coastal plain, southern coastal region and inland to some wetlands in the Jarrah forests (DoE, 2016b).	Unlikely to occur	No	There is no suitable habitat in the Project area.

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	EN	Carnaby's Cockatoo is a postnuptial nomad and typically moves west soon after breeding. The species nests in hollows of smooth-barked eucalypts, particularly Salmon Gum (<i>Eucalyptus salmonophloia</i>) and Wandoo (<i>E. Wandoo</i>) but is not limited to these eucalypts. Diet consists of an array of Proteaceous and Eucalypt species. Foraging habitat, including <i>Banksia</i> woodlands, is considered to be habitat critical to the survival of the species.	Previously recorded	Yes	The majority of the project area represents potential feeding habitat for this species and the project area is on the edge of the breeding range (DoE 2012)
<i>Dasyornis longirostris</i>	Western Bristlebird	VU	T	The Western Bristlebird inhabits floristically diverse low dense coastal heathland. It occurs in three distinct locations: Fitzgerald River National Park, Hassell (Cheynes) Beach/Waychinicup National Park/Two Peoples Nature Reserve, and a translocated population near Walpole, though this last population may no longer occur there. There is also a record of two Western Bristlebirds at Kundip Nature Reserve from December 2003. However, it is unknown if this record represents a permanent subpopulation or was a record of vagrant or dispersing birds (DoE, 2016b).	Unlikely to occur	No	The project area is not in the preferred range which is the deep south-west of the State where this species occupies dense thickets and heath.
<i>Falco peregrinus</i>	Peregrine Falcon	OS	Sched 7	A well-known falcon, the Peregrine inhabits a vast array of environs in Australia. Usually uncommon and migratory (Pizzey & Knight, 2012). This species lays its eggs in recesses of cliff faces, tree hollows or large abandoned nests.	Previously recorded	Yes	Individuals would forage over the site as part of a broader foraging territory. However, nesting is unlikely due to lack of suitable habitat.
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	Malleefowl habitat requirements are quite specific. The species requires unburnt mallee and woodland with low scrub and abundant litter to use in nesting mounds (Morcombe,	Previously recorded	Yes	Several inactive mounds have been located around the Project area and individuals were recorded during the present survey

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
				2003).			
<i>Merops ornatus</i>	Rainbow Bee-eater	IA	IA	The Rainbow Bee-eater is a common species which occupies numerous habitats including open woodlands with sandy loamy soil, sand ridges, sandpits, riverbanks, road cuttings, beaches, dunes, cliffs, mangroves and rainforests. The Rainbow Bee-eater avoids heavy forest that would hinder the pursuit of its insect prey (Morcombe, 2003).	Highly Likely	Yes	This species is ubiquitous across much of the south west and nests in loosened soil in spoil heaps and topsoil dumps. Therefore the Project area provides significant habitat.
<i>Motacilla cinerea</i>	Grey Wagtail	T	-	The Grey Wagtail prefers the banks and rocks of fast-running fresh water habitats. It occurs in open and forested areas but can be found anywhere during migration (Johnstone and Storr, 2004).	Unlikely to occur	No	There is no fast-running fresh water habitat available in the Project area. Though the species may move past the Project area during migration it is not likely to be recorded within the Project area
<i>Pandion haliaetus</i>	Osprey	T	-	The Osprey is found in coastal areas (Johnstone and Storr, 1998).	Unlikely to occur	No	The Project area is not close to the coast.
<i>Pezoporus occidentalis</i>	Night Parrot	EN	-	The Night Parrot requires treeless or sparsely wooded spinifex <i>Triodia</i> species near water (Johnstone and Storr, 1998).	Unlikely to occur	No	There is no habitat suitable for this species in the Project area.
<i>Psophodes nigrogularis oregon</i>	Western Whipbird (western mallee)	-	P4	The Western Whipbird is restricted to four races in small fragmented populations including Two Peoples Bay, Kangaroo Island, and 'Murray Mallee' (Pizzey & Knight, 2012). This species prefers dense long unburnt thickets of healthy shrubs, low Eucalypts and mallee trees (Pizzey & Knight, 2012).	Previously recorded	Yes	There is little evidence of recent fire in the Project area and much of the habitat is suitable for this species, in particular along the north and eastern edges of the tenement.
Reptiles							
<i>Lerista viduata</i>	Ravensthorpe Range Slider	-	P1	As with other species from the <i>Lerista</i> genus, the Ravensthorpe Range Slider is found in	Previously recorded	Yes	This species was recorded by Biota in 2004 in open mallee and very dense proteaceous

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
	skink			loose soil or sand beneath stones, logs, termite mounds etc. This species has only been recorded in the Ravensthorpe Range (Cogger, 2014).			thicket where <i>Banksia lemanniana</i> is typical and soils were skeletal pale grey to orange loamy sands with lateritic gravel.
Mammals							
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	VU	Following European settlement the range of this species contracted dramatically, from much of the continent to a small area in the south west. It currently only occurs in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008). The majority of records are found in the contiguous Jarrah forests of the south west of Western Australia (DoE, 2016b). Recent records exist within the Gngara pine forest and Walyunga National Park.	Recorded in the current survey	Yes	The heath and mallee shrubland of the Project area provides suitable habitat and individuals were recorded during the present survey.
<i>Hydromys chrysogaster</i>	Water Rat	-	P4	The Water Rat is found in a range of habitats including subalpine streams, slow inland rivers, lakes, farm dams and sheltered marine waters (Menkhorst and Knight, 2001).	May occur	Yes	This species may occur at the dams within the Kundip Mine Site.
<i>Isodon obesulus fusciventer</i>	Quenda, Southern Brown Bandicoot	-	P4	The Quenda or Southern Brown Bandicoot exists only in a fragmented distribution to its former range in southern south western and eastern Australia. It is found in forest, woodland, heath and shrub communities in these regions. Preferred habitat usually consists of a combination of sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	Likely to Occur	Yes	The heath and mallee shrubland of the Project area provides suitable habitat particularly in areas where sedges and grasses form a dense understory.
<i>Macropus eugenii derbianus</i>	Tammar Wallaby	-	P4	The Tamar Wallaby is thought to have persisted in disjunct mainland populations for up to 10,000 years however given the large scale vegetation clearing since the arrival of	Likely to Occur	Yes	This species has the potential to be cosmopolitan across the Project area when foraging, retreating to thicker heath and scrub for refuge during the day.

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
				Europeans, the range of this species has contracted. In the south-west of Western Australia, this species occurs in several reserves in the Wheatbelt and national parks in the Great Southern (Van Dyck & Strahan, 2008).			
<i>Macropus irma</i>	Western Brush Wallaby	-	P4	The Western Brush-wallaby occurs in the south-west of Western Australia. Its preferred habitat consists of open sclerophyll forest or woodland and favours open flats over scrub thickets. It is also found in larger areas of mallee and heathland in the wheat belt and is uncommon in wet sclerophyll forest (Van Dyck & Strahan, 2008). Three most commonly consumed species are <i>Cynodon dactyol</i> , <i>Nuytsia floribunda</i> and <i>Carpobrotus edulis</i> (DEC, 2006).	Previously Recorded	Yes	The preferred habitat of this species is open forests and woodlands but it also occurs in scrubby thickets, mallee and heath.
<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	EN	EN	Originally widespread, the Numbat now only persists in two remnant populations at Dryandra and Perup in Western Australia with several reintroduced populations in the Western Australian Wheatbelt (DoE, 2015).	Unlikely to occur	No	This is species would no longer be present in the region.
<i>Parantechinus apicalis</i>	Dibbler	EN	T	The Dibbler appears to be able to occupy a range of habitats. They seem to prefer vegetation with a dense canopy greater than 1 m high, unburnt for at least 10 years. In some areas, the presence of Proteaceous and Myrtaceous flowering shrubs may also be important (DoE, 2016b).	May occur	Yes	Vegetation of the Project area does not have a dense canopy. However, the proteaceous shrubs may provide suitable habitat.
<i>Phascogale calura</i>	Red-tailed Phascogale, Kenngoor	CD	CD	The Red-tailed Phascogale is found in the branches of Rock Sheoak (<i>Allocasuarina huegeliana</i>) with a tail the same colour as the exposed wood from this plant. It is restricted to areas that receive an annual rainfall of 300-	Unlikely to occur	No	There is no habitat suitable for this species in the Project area.

Species	Common Name	Cons. Code		Habitat	Likelihood of Occurrence	Habitat Requirements Met	Comments
		Cth	State				
				600 mm in isolated patches of forest. Its preferred habitat is the denser and taller communities with Wandoo and Rock Sheoak with hollows in Wandoo providing nesting sites. Information from Van Dyck & Strahan (2008).			
<i>Pseudomys occidentalis</i>	Western Mouse	-	P4	The Western Mouse is a nocturnal species that live in burrows during the day (20-30cm deep) consisting of a single vertical entrance shaft connected to a horizontal loop 2-3 metres in diameter. The nesting chamber is directly opposite the entrance. The entrance shaft is commonly located in dense leaf litter. Capture sites of the Western Mouse have long unburnt vegetation (30-50 years) with layers of extremely dense vegetation at 0.5-2.5 metres high. Dominant upperstorey includes <i>Eucalyptus</i> , <i>Isopogon</i> , <i>Acacia</i> , <i>Casuarina</i> and <i>Melaleuca</i> (Van Dyck & Strahan, 2008).	Likely to occur	Yes	Habitat for this species is described as shrublands that have not been burnt for 15-30 years on clay loams, usually with a laterite component (Lee 1995). This habitat is present.
<i>Pseudomys shortridgei</i>	Heath Mouse Dayang	VU	-	The Heath Mouse is found in lowland heath, woodlands and sclerophyll forests (AoLA, 2016). Largely confined to habitats with a mallee overstorey on variable soils including loamy-sands and sandy-loams with a laterite component, stony clays and sandy light clay on greenstone (Cooper et al. 2003; Teale et al. in prep.).	Confirmed present during the current survey	Yes	This species was captured on two occasions during the current survey. A component common to all capture sites was the presence of sedges in the understorey and that the vegetation was long unburnt (greater than 20 years) (Teale et al. in prep.).

4.2 FIELD SURVEY

4.2.1 Avifauna Records

Meliphagidae (honeyeaters and wattlebirds) were the most abundant avifauna group recorded during the survey and this is very likely a function of the structure of the vegetation with low mallee woodlands and heaths dominating as well as the abundance of Myrtaceae & subordinate Proteaceae species. A total of 301 New Holland Honeyeaters were recorded during Biotas systematic bird censuses.

The conservation significant Western Whipbird was only recorded in low woodlands and Mallee heath during the Biota survey work. Significant time invested into call playback failed to record this species again in 2016.

The full records of the avifauna census work is presented in Table 4-2.

4.2.2 Fauna Trapping

Fauna trapping and opportunistic collection recorded a total of 43 fauna species in the Project area, including 10 native and one introduced mammal, 28 reptiles and 4 amphibians.

The number of small mammal fauna captured during the surveys provides some indication of the quality of fauna habitat in the area. A total of 56 *Cercartetus concinnus* pygmy possums and 87 *Tarsipes rostratus* Honey Possums were captured in pit traps around the Project area.

Despite their apparent fragility these two species are often very commonly trapped and are therefore a good indicator of environmental health. Pygmy possums feed on pollen and nectar so an abundant population indicates a healthy biomass of Proteaceae species. Honey Possum are also a good indicator of the biomass of Proteaceae and Myrtaceae and are often most abundant in climax communities that have remained unburnt for many years (Bradshaw pers. Comm.) which matches habitat age (100 years +) estimated by Craig (2008).

The 85 individuals were captured during the Biota survey of 2004 which equates to a capture rate of almost 20%. This is four times higher than the average capture rate of a long term survey in the Augusta Scott River National Park (Bradshaw, in prep.)(Figure 4-1).

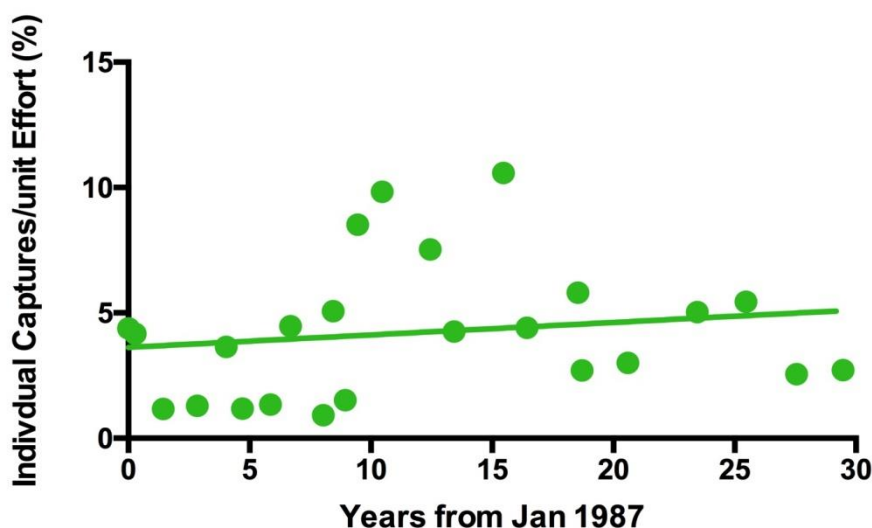


Figure 4-1: Capture Rates for Honey Possum in the Scott River National Park (Bradshaw in prep)

Capture rates for *Rattus fuscipes* were high in a number of sites over the duration of the survey. This species occupies much of the same habitat as the conservation significant *Pseudomys shortridgei* Heath Rat, of which only two specimens were captured on the most recent survey. In the Lake Magenta Nature Reserve, 93% of

P. shortridgei captures were associated with characteristics of a mixed laterite heath community representing 57 plant species and a dense structural layer up to 1.2 m (Quinlan *et al.*, 2004) with a strong preference for floristically rich regenerating heath habitat (Cockburn, 1978). There was no evidence of recent fires in the Project area and this may have been the reason for the limited captures of this species and the greater abundance of the Bush Rat.

Table 4-2: Avifauna census data

Order	Family	Species	Nomenc.x	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland					Drainage and Dampland		Opp	No of Habitats	
						East	Epla	Efal/Eple	Eflo/Esp	Eflo/Mcuc	Eflo/Mgor	Mistr	Eple/Bmed	Eocc			Espo
CASUARIIFORMES	Casuariidae	Dromaius novaehollandiae	(Latham, 1790)	Emu	6	x			x								2
GALLIFORMES	Megapodiidae	Leipoa ocellata	Gould, 1840	Malleefowl	1											x	1
	Phasianidae	Coturnix ypsilophora	Bosc, 1792	Brown Quail	8			x	x		x						3
COLUMBIFORMES	Columbidae	Phaps chalcoptera	(Latham, 1790)	Common Bronzewing	1								x				1
		Phaps elegans	(Temminck, 1809)	Brush Bronzewing	1											x	1
CAPRIMULGIFORMES	Podargidae	Podargus strigoides	(Latham, 1802)	Tawny Frogmouth	1											x	1
	Eurostopodidae	Eurostopodus argus	(Hartert, 1892)	Spotted Nightjar	1								x				1
ACCIPITRIFORMES	Accipitridae	Lophoictinia isura	(Gould, 1838)	Square-tailed Kite	3	x			x								2
		Accipiter fasciatus	(Vigors and Horsfield, 1827)	Brown Goshawk	1				x								1
CHARADRIIFORMES	Turnicidae																

Order	Family	Species	Nomenc.x	Common Name	No. Recorded	Forest/Lo w Forest		Mallee and Shrubland						Drainage and Dampland		Opp	No of Habitats
						East	Epla	Efal/Eple	Eflo/Espp	Eflo/Mcuc	Eflo/Mgor	Mstr	Eple/Bmed	Eocc	Espo		
PSITTACIFORMES		Turnix varius	(Latham, 1802)	Painted Button-quail	1				x								1
	Cacatuidae																
		Calyptorhynchus latirostris	Carnaby, 1948	Carnaby's Black-Cockatoo	13			x		x			x				3
	Psittacidae	Glossopsitta porphyrocephala	(Dietrichsen, 1837)	Purple-crowned Lorikeet	192	x		x	x	x		x	x				6
		Barnardius zonarius	(Shaw, 1805)	Ringneck	22	x		x		x			x				4
CUCULIFORMES		Purpureicephalus spurius	(Kuhl, 1820)	Red-capped Parrot	3			x				x					2
	Cuculidae																
		Chalcites lucidus	(J.F. Gmelin, 1788)	Shining Bronze-Cuckoo	5			x		x			x				3
STRIGIFORMES		Cacomantis flabelliformis	(Latham, 1802)	Fan-tailed Cuckoo	1				x								1
	Strigidae																
		Ninox novaeseelandiae	(J.F. Gmelin, 1788)	Southern Boobook	1											x	1
PASSERIFORMES	Tytonidae	Tyto javanica	(J.F. Gmelin, 1788)	Eastern Barn Owl	1						x						1
	Maluridae																
		Malurus pulcherrimus	Gould, 1844	Blue-breasted Fairy-wren	10				x	x		x					3
	Acanthizidae																0
		Sericornis frontalis	(Vigors and Horsfield, 1827)	White-browed Scrubwren	23	x		x	x	x		x					5
	Hylacola cauta	Gould, 1843	Shy Heathwren	11			x					x					2

Order	Family	Species	Nomenc.x	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland					Drainage and Dampland		Opp	No of Habitats	
						East	Epla	Efal/Eple	Eflo/Esp	Eflo/Mcuc	Eflo/Mgor	Mistr	Eple/Bmed	Eocc			Espo
		Smicrorhis brevirostris	(Gould, 1838)	Weebill	71	x	x	x	x	x		x	x				7
		Gerygone fusca	(Gould, 1838)	Western Gerygone	1	x											1
	Pardalotidae	Acanthiza apicalis	Gould, 1847	Inland Thornbill	9	x		x		x			x				4
		Pardalotus punctatus	Shaw, 1792	Spotted Pardalote	26	x	x	x	x	x		x	x				7
		Pardalotus striatus	(J.F. Gmelin, 1789)	Striated Pardalote	19	x			x	x		x	x				5
	Meliphagidae	Lichenostomus leucotis	(Latham, 1802)	White-eared Honeyeater	3					x		x	x				3
		Lichenostomus cratitius	(Gould, 1841)	Purple-gaped Honeyeater	9					x		x					2
		Anthochaera lunulata	Gould, 1838	Wattlebird	25			x		x			x				3
		Anthochaera carunculata	(Shaw, 1790)	Red Wattlebird	36	x		x	x	x		x	x				6
		Anthochaera paradoxa	(Daudin, 1800)	Yellow Wattlebird													
		Glyciphila melanops	(Latham, 1802)	Tawny-crowned Honeyeater	49			x		x		x	x				4
		Lichmera indistincta	(Vigors and Horsfield, 1827)	Brown Honeyeater	47	x		x	x	x		x	x				6
		Phylidonyris novaehollandiae	(Latham, 1790)	New Holland Honeyeater	301	x	x	x	x	x		x	x				7
		Melithreptus brevirostris	(Vigors and Horsfield, 1827)	Brown-headed Honeyeater	2			x									1
		Melithreptus chloropsis	(Gould, 1848)	Western White-naped Honeyeater	16	x				x							2
	Pomatostomidae	Pomatostomus superciliosus	(Vigors and Horsfield, 1827)	White-browed Babbler	2			x									1
		Psophodes nigrogularis	Gould, 1844	Western Whipbird	6			x	x				x				3
	Campephagidae	Coracina novaehollandiae	(J.F. Gmelin, 1789)	Black-faced Cuckoo-shrike	3	x			x								2
	Pachycephalidae																

Order	Family	Species	Nomenc.x	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland					Drainage and Dampland		Opp	No of Habitats	
						East	Epla	Efal/Eple	Eflo/Esp	Eflo/Mcuc	Eflo/Mgor	Mistr	Eple/Bmed	Eocc			Espo
		<i>Pachycephala pectoralis</i>	(Latham, 1802)	Golden Whistler	9			x		x		x	x				4
		<i>Colluricincla harmonica</i>	(Latham, 1802)	Grey Shrike-thrush	4	x						x					2
		<i>Oreoica gutturalis</i>	(Vigors and Horsfield, 1827)	Crested Bellbird	9			x	x	x			x				4
	Artamidae	<i>Artamus cyanopterus</i>	(Latham, 1802)	Dusky Woodswallow	9	x				x		x					3
		<i>Cracticus torquatus</i>	(Latham, 1802)	Grey Butcherbird	2			x				x					2
		<i>Cracticus tibicen</i>	(Latham, 1802)	Australian Magpie	1					x							1
		<i>Strepera versicolor</i>	(Latham, 1802)	Grey Currawong	28			x	x	x		x	x				5
	Rhipiduridae	<i>Rhipidura leucophrys</i>	(Latham, 1802)	Willie Wagtail	4					x	x						
	Corvidae	<i>Corvus coronoides</i>	(Vigors and Horsfield, 1827)	Australian Raven	7	x		x	x	x							4
	Monarchidae	<i>Miagra inquieta</i>	(Latham, 1802)	Restless Flycatcher	1					x							1
	Petroicidae	<i>Eopsaltria griseogularis</i>	Gould, 1838	Western Yellow Robin	2					x			x				2
		<i>Drymodes brunneopygia</i>	Gould, 1841	Southern Scrub-robin	27	x		x	x	x		x	x				6
	Timaliidae	<i>Zosterops lateralis</i>	(Latham, 1802)	Silveryeye	61			x	x	x		x	x				5
	Hirundinidae	<i>Hirundo neoxena</i>	Gould, 1842	Welcome Swallow	35			x	x	x		x	x				5
		<i>Petrochelidon nigricans</i>	Vieillot, 1817	Tree Martin	23			x				x					2
Total Number of Individuals Per Habitat					1153	19	3	28	24	30	2	23	24	0	0	4	-

Table 4-3: Fauna captured or recorded through opportunistic searching

Species	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland						Drainage and Dampland		No of Habitats	
			East	Epla	Efal/Eple	Eflo/Espp	Eflo/Mcuc	Eflo/Mgor	Mstr	Eple/Bmed	Eocc	Espo		
AMPHIBIANS														
Hylidae														
<i>Litoria moorei</i>	Motorbike Frog	1										1		1
<i>Litoria cyclorhyncha</i>		8			1			1	1					3
Myobatrachidae														
<i>Crinia pseudinsignifera</i>		2							1	1				2
<i>Lymnodynastes dorsalis</i>	Western banjo frog	1			1							1		2
<i>Neobatrachus kunapalari</i>		1								1				1
REPTILES														
Agamidae														
<i>Caimanops amphibularoides</i>		1								1				1
<i>Amphibolourus norrissi</i>		2							1					1
<i>Ctenophorus maculatus griseus</i>		4									1			1
Carphodactylidae														
<i>Underwoodisaurus milii</i>	Barking gecko	25	1		1		1	1	1					5
Diplodactylidae														
<i>Crenodactylus ocellatus</i>	Clawless gecko	17	1		1	1	1	1	1					5
Gekkonidae														
<i>Christinus marmoratus</i>	Marbled gecko	16	1			1	1	1	1	1				5
<i>Diplodactylus granariensis granariensis</i>		19	1		1	1	1	1	1					6
Pygopidae														
<i>Pygopus lepidodopus</i>	Common scaly-foot	1					1							1
<i>Delma australis</i>		3			1									1
<i>Delma fraseri fraseri</i>		2			1	1								2
<i>Aprasia repens</i>		1								1				1
Scincidae														
<i>Egernia kingii</i>	King's skink	1					1							1

Species	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland						Drainage and Dampland		No of Habitats
			East	Epla	Efal/Eple	Eflo/Espg	Eflo/Mcuc	Eflo/Mgor	Mstr	Eple/Bmed	Eocc	Espo	
<i>Tiliqua rugosa</i>	Bobtail lizard	7	1		1							1	3
<i>Acritoscincus trilineatus</i>	South west cool skink	1								1			1
<i>Hemiergis peronii</i>	Four-toed earless skink	31	1		1	1	1			1			5
<i>Morethia obscura</i>	Shrubland morethia skink	15			1	1	1			1			4
<i>Cryptoblepharus virgatus clarus</i>		28	1		1	1	1	1		1			6
<i>Hemiergis initialis initialis</i>		24	1		1	1	1			1			6
<i>Menetia greyii</i>		21	1	1	1	1	1			1			6
<i>Lerista distinguenda</i>		8	1		1					1			4
<i>Ctenotus impar</i>		3			1								1
<i>Lerista viduata</i>		1			1								1
<i>Ctenotus labillardieri</i>		1								1			1
Varanidae													
<i>Varanus rosenbergii</i>	Rosenberg's monitor	10	1		1	1				1	1		5
Boidae													
<i>Morelia spilota</i>	Carpet python	2											
Elapidae													
<i>Elapognathus coronatus</i>	Crown snake	4								1			1
<i>Parasuta gouldii</i>	Gould's hooded snake	1								1			1
<i>Pseudonaja affinis affinis</i>		2		1			1						2
MAMMALS													
Muridae													
<i>Rattus fuscipes</i>	Bush rat	42	1		1	1				1		1	6
<i>Mus musculus</i>	House mouse	27			1	1	1			1	1	1	7
<i>Pseudomys shortridgei</i>	Heath Rat	2			1								1
Dasyuridae													
<i>Dasyurus geoffroii</i>	Chuditch	1					1						1
<i>Sminthopsis crassicaudata</i>	Dunnart	1								1			1
<i>Sminthopsis griseoventer</i>	Grey-bellied Dunnart	9	1		1		1			1	1		5

Species	Common Name	No. Recorded	Forest/Low Forest		Mallee and Shrubland						Drainage and Dampland		No of Habitats
			East	Epla	Efal/Eple	Eflo/Espp	Eflo/Mcuc	Eflo/Mgor	Mstr	Eple/Bmed	Eocc	Espo	
Tarsipedidae													
<i>Tarsipes rostratus</i>	Honey possum	87	1		1	1	1			1	1		6
Macropodidae													
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	3	1		1	1	1			1	1		6
Burramyidae													
<i>Cercartetus concinnus</i>	Pygmy Possum	56	1		1	1	1			1	1		6
Canidae													
<i>Vulpes vulpes</i>	Red Fox					1							1
Tachyglossidae													
<i>Tachyglossus aculeatus</i>	Echidna		1		1								2
Total Number of Individuals Per Habitat		492	17	2	25	16	18	4	26	13	4	3	128

4.2.3 Bat Acoustic Recording

The database searches for a 10 km radius revealed that only two species of bat were likely to occur. This provides some indication of the lack of survey work done in the area as both the Biota and the APM survey both returned acoustic signatures for the same four species of bat (Table 4-4).

Table 4-4: Bat species recorded in the Ravensthorpe Gold Copper Project Area

Species	Common Name	East KU4	Ecli SM233	Eflo/Mgor KU12	Espo SM231	Eocc SM225
Vespertilionidae						
<i>Chalinolobus gouldii</i>	Gould's Wattle Bat		x	x	x	x
<i>Chalinolobus morio</i>		x	x		x	x
<i>Vespadelus regulus</i>		x	x		x	x
Molossidae						
<i>Austronomus australis</i>	White-striped Mastiff Bat		x	x	x	x

4.2.4 Conservation Significant Fauna

Table 4-5 outlines the conservation significant fauna identified from the desktop assessment and those recorded during the Biota and APM surveys.

Records of conservation significant fauna were as expected in this region as the formal database records often do not reflect what is known locally and recorded anecdotally. For example, the last formal record of Chuditch was in the mid-1990s. However, SilverLake site personal have observed individuals in the area over recent years. Therefore the capture of Chuditch on remote sensing cameras was anticipated.

Malleefowl have also been sited frequently around the RGCP over recent years. Despite the recording of a number of malleefowl (two individuals sited during the first APM survey and a further individual recorded on camera during the second survey) and despite the intensive ground search, no active Malleefowl mounds were located. The high level of individual activity on site provides certainty that the nests are local, however, some of the vegetation in some sites is so thick it is possible that mounds were missed where they occur. Management of individuals and mounds will be incorporated into the species specific fauna conservation and management plan for this species, and this will include intensive searches for mounds and activity prior to ground clearing during construction and operation.

Remote sensing cameras recorded a number of macropods moving around the site and some of the photos may potentially be of Tammar Wallaby, but as these cameras use a black light camera and the animals were recorded during the night, it is not possible to confirm presence. Nevertheless, both *Macropus eugenii* *derbianus* Tammar Wallaby and *Macropus irma* Western Brush Wallaby have been recorded as road kill on the Ravensthorpe – Hopetoun Road adjacent the RGCP. Despite the time spent on the ground during the surveys neither of these species were observed during the day, as was commonly the case for the *Macropus fuliginosus* Western Grey Kangaroo.

Carnaby's Cockatoo were neither seen nor heard during the 2016 survey despite being commonly recorded during the Biota surveys. These calls are obvious and clearly audible at all times of the day but particularly in the morning. Nesting by this species is not likely to occur in the project area due to the lack of tall timber that potentially supports nesting hollows. Trees with a diameter at breast height of greater than 500mm were not common in the Project area, due without doubt to the clear felling of larger trees in the early 1900's.

Evidence of the Southern Brown Bandicoot was ubiquitous in all areas where ground storey vegetation comprised sedges or dense low thickets. With the abundant rainfall individuals have radiated out of the Damplands and Drainage line habitats and evidence of foraging was found at a number of sites.

Table 4-5: Conservation significant fauna expected and recorded in the Ravensthorpe Gold Copper Project Area

Fauna Species	Common Name	Conservation Status		Database		Biological Surveys		
		Cwlth	State	NatureMap (6 km)	AoLA (5 km)	Biota 2004 Summer	Biota 2004 Spring	APM Winter/Spring
Birds								
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	EN	T	X		X		
<i>Falco peregrinus</i>	Peregrine Falcon	-	S4					X
<i>Leipoa ocellata</i>	Malleefowl	VU	T	X	X	X		X
<i>Psophodes nigrogularis</i> subsp. <i>nigrogularis</i>	Western Whipbird (Western Heath)	-	T	X				
<i>Psophodes nigrogularis</i> subsp. <i>oberon</i>	Western Whipbird (Mallee)	-	P4	X		X	X	
Mammals								
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	T	X				X
<i>Isodon obesulus</i> subsp. <i>fusciventer</i>	Quenda, Southern Brown Bandicoot	-	P5	X				X
<i>Macropus eugenii</i> subsp. <i>derbianus</i>	Tammar Wallaby (WA subsp.)	-	P5	X	X			
<i>Macropus irma</i>	Western Brush Wallaby	-	P4	X		X		
Reptiles								
<i>Lerista viduata</i>	Ravensthorpe Range Slider Skink	-	P1	X	X	X		

4.2.5 Fauna Habitats

Low Dense Forest/Forest

Dense low forest occurred on areas of sheet wash on a low gradient slope. Residual, quartzofeldspathic sand overlies granite rock. The highest vegetation includes Mallets of *Eucalyptus astringens*, *Eucalyptus cernua*, *Eucalyptus clivicola*, *Eucalyptus platypus* and mallees of *Eucalyptus pileata* and *Eucalyptus flocktoniae* subsp. *flocktoniae*, with tall *Melaleuca cucullata* shrubs over *Daviesia nematophylla*, *Exocarpus aphyllus*, *Melaleuca* sp. Gorse (A.S. George 7224) mid shrubs and low *Grevillea huegelii*.

In some areas there are colluvium of deeply eroded surfaces with associated minor outcrops of Sandstone and conglomerate or Cemented ironstone gravel and laterite and in areas of poor drainage the ground story can comprise almost entirely of sedges such as *Gahnia aristata*

These landforms support a complex array of fauna. All of the four species of gecko collected during the surveys (*Underwoodisaurus milii* Barking gecko, *Crenodactylus ocellatus* Clawless gecko, *Christinus marmoratus* and Marbled gecko *Diplodactylus granariensis granariensis*) were collected in this habitat, as was a suite of fossorial skinks including *Hemiergis peronei* Four-toed earless skink, *Hemiergis initialis initialis* and *Lerista distinguenda*.

Evidence of a diverse and abundant small fauna assemblage was ratified by the presence of larger predatory fauna species such as *Varanus rosenbergii* Rosenberg's monitor and Dugite *Pseudonaja affinis affinis*.

Dense and structurally diverse vegetation and floristics also provides abundant suitable habitat for smaller ground-dwelling (*Sminthopsis griseoventer* Grey-bellied Dunnart) and arboreal mammals (*Tarsipes rostratus* Honey possum and *Cercartetus concinnus* Pygmy Possum).

The Low Dense Forest/ Forest habitat was not particularly well represented within the project area with much of the project area comprising undulating landforms. However, the vast majority of this habitat (>90%) will remain undisturbed by the RGCP. Figure 4-2 illustrates the location of this habitat type in the Project area.