



# **Ravensthorpe Gold Project**

## **Fauna Management Plan**

**June 2019**

**Project Number: TE19017**

#### DOCUMENT CONTROL

Version	Description	Date	Author	Reviewer
0	Draft for DWER	November 2018	APM	APM
0a	Internal Review	11/06/2019	SS	GB
1b	Released to Client and DWER	11/06/2019	SS	GB

Signature



for P. Bennett, ACH Minerals Pty Ltd

# Summary

<b>Title of Proposal</b>	Ravensthorpe Gold Project
<b>Proponent Name</b>	ACH Minerals Pty Ltd (ACH)
<b>Ministerial Statement No.</b>	Not applicable
<b>Purpose of EMP</b>	Requirement of Environmental Scoping Document (Item 27)
<b>Key environmental factor</b>	Terrestrial fauna
<b>Condition clause(s)</b>	Not applicable
<b>Key provisions (targets)</b>	<ul style="list-style-type: none"> <li>• Develop and implement a Ground Disturbance Permit (GDP) system prior to the commencement of construction (No clearing of fauna habitat outside disturbance footprint).</li> <li>• Replace potential habitat logs during rehabilitation to provide fauna habitat (All rehabilitation areas to contain habitat logs and branches).</li> <li>• Potential malleefowl habitat will be intensively searched for mounds prior to clearing (No disturbance of active malleefowl mounds).</li> <li>• Speed limits will be implemented for light vehicles in operational areas and the internal (within Kundip Mine Site) site access roads (No fauna strikes on roads).</li> </ul>

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# 1 Context, Scope and Rationale

## 1.1 Proposal

ACH Minerals Pty Ltd (ACH) proposes to develop the Ravensthorpe Gold Project (the Project), located within the Fitzgerald subregion of the Esperance bioregion, as defined by the Interim Biogeographic Regionalisation for Australia. The Project is situated approximately 550 kilometres (km) southeast of Perth, and 17 km southeast of the town of Ravensthorpe, as shown in **Figure 1-1**.

The Project has an expected life of mine (LOM) of approximately 8 years and will comprise:

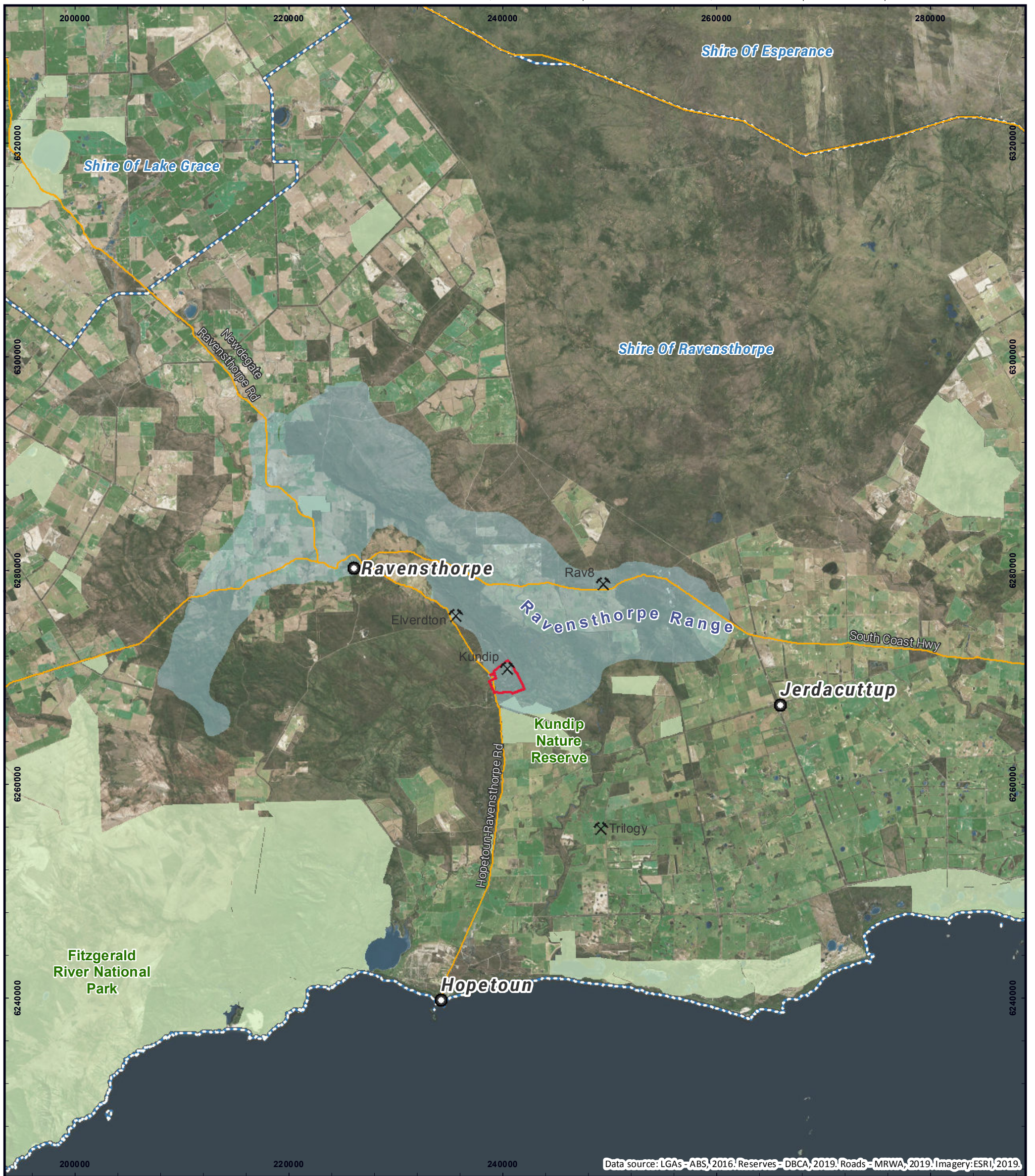
- Open pit and underground mining;
- Storage of waste rock in two permanent landforms;
- Processing of ore and storage of tailings in a permanent landform;
- Mine dewatering; and
- Supporting infrastructure.

The project footprint will be 244.7 ha which includes 49.3 ha of historical mining disturbance and additional native vegetation clearing of 195.4 ha (all within a Development Envelope of 428.4 ha) (**Figure 1-2**).

The Project expects to produce almost 0.5 million ounces of gold, 0.4 million ounces of silver and over 11,300 tonnes (t) of copper.

The Project area contains both high quality native vegetation and historic mining legacies. Upon completion of the Project, it is proposed that the disturbed area, including the historic legacies, will be rehabilitated to native vegetation (apart from the pits, which will remain as voids).





Data source: LGAs - ABS, 2016. Reserves - DBCA, 2019. Roads - MRWA, 2019. Imagery: ESRI, 2019.

- Ravensthorpe Gold Project Area
- Local Government Area Boundary
- Mine Site
- DBCA Managed Lands
- Townsite
- Major Road

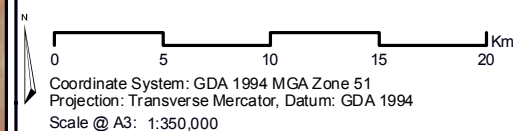
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## REGIONAL LOCATION

### Ravensthorpe Gold Project ERD

#### ACH Minerals Pty Ltd



Prepared:	F Walker
Reviewed:	G Barrett
Checked:	A Mack
Project No:	TE19017
Revision:	A
Date:	24/05/2019

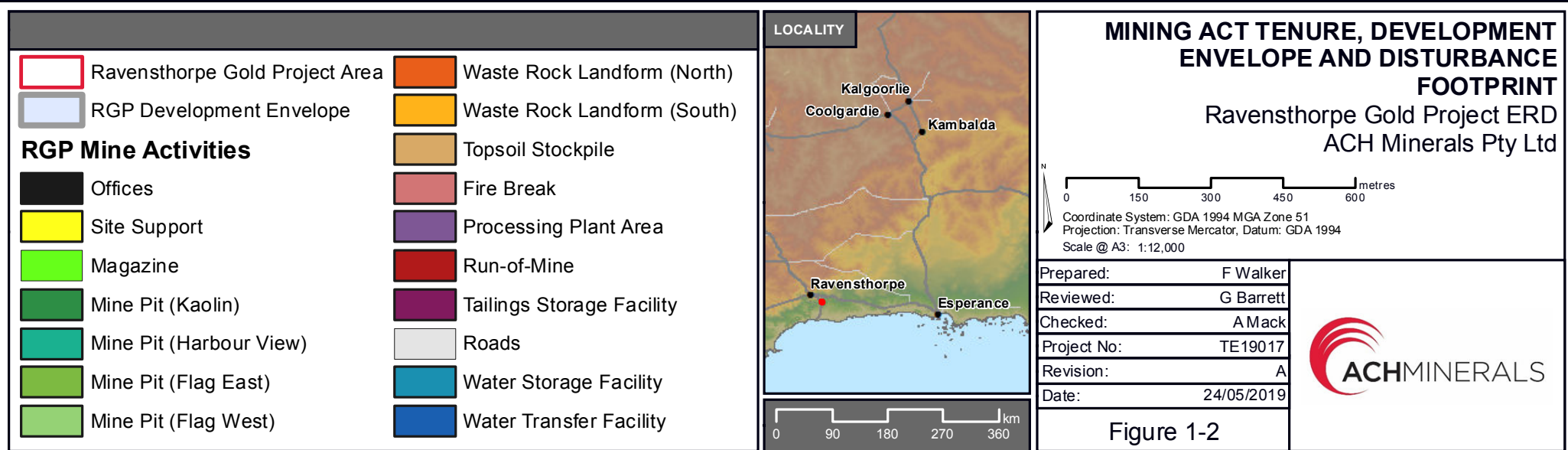
Figure 1-1







Data source: Tenements - DMIRS, 2019; Roads - MRWA, 2019; Imagery: Landgate, 2016.







## 1.2 Key Environmental Factor

The environmental factor potentially impacted by the Project and the possible direct and indirect impacts on this factor, are listed in Table 1-1.

**Table 1-1: Ravensthorpe Gold Project – terrestrial fauna – potential impacts**

Environmental Factor	Potential Impacts
Terrestrial Fauna	<ul style="list-style-type: none"><li>• Reduction and/or fragmentation of fauna habitat through clearing;</li><li>• Impacts on fauna of conservation significance;</li><li>• Vehicle strike causing injury or death of local fauna;</li><li>• Impacts from exposure to cyanide present in TSF;</li><li>• Increase in the abundance of introduced fauna impacting native fauna through increased predation or competition for resources;</li><li>• Altered fire regime;</li><li>• Mine site lighting altering natural behaviour; and</li><li>• Noise and vibration causing general stress and masking acoustic signals between individuals.</li></ul>

## 1.3 Condition Requirement

This management plan is a requirement of an Environmental Scoping Document and has been produced for the purpose of impact assessment. It has not been prepared to meet the requirements of any Ministerial Statement condition requirements.

## 1.4 Rationale and Approach

### 1.4.1 Survey and study findings

Comprehensive baseline biological assessments of the PRP project area were undertaken by Biota Environmental Sciences Pty Ltd (**Biota**) during May and November 2004 (Biota Environmental Sciences 2004, 2005). While these surveys were conducted some time ago, the surveys were conducted using methodologies consistent with current practice. The surveys targeted mammals, herpetofauna and birds and helped form the basis for further surveys undertaken for the Ravensthorpe Gold Project. The Biota surveys also included invertebrates (potential short range endemic (**SRE**) species).

For the current proposal, three terrestrial fauna surveys were undertaken by Animal Plant Mineral Pty Ltd (**APM**) (**Appendix A**). All surveys were conducted with reference to the EPA guidelines listed above or a relevant previous version. A summary of the survey effort for the Project area is provided in **Table 1-2**.



**Table 1-2: Terrestrial fauna surveys undertaken for the Ravensthorpe Gold Project**

Date	Purpose	Survey Effort
August 2016	Spring survey targeting conservation significant fauna previously recorded or highly likely to occur within the Project Area.	Desktop assessment (EPBC Protected Matters Search Tool, NatureMap, Atlas of Living Australia (AoLA), and DPaW databases).
June and October 2017	<p>Targeted surveys focussed primarily on assessing the presence/absence of Heath Mouse (<i>Pseudomys shortridgei</i>), Chuditch (<i>Dasyurus geoffroii</i>), Western Whip Bird (Mallee) (<i>Psophodes nigrogularis</i> subsp. <i>oberon</i>), Western Bristlebird (<i>Dasyornis longirostris</i>) and Western Ground Parrot (<i>Pezoporus flaviventris</i>).</p> <p>Site wide assessment to locate trees of a suitable diameter and/or containing hollows suitable for significant Black Cockatoo breeding.</p>	<p>Field methods used were:</p> <ul style="list-style-type: none"> <li>Transect observations;</li> <li>Aluminium box traps;</li> <li>Cage traps;</li> <li>Pit traps;</li> <li>Funnel traps;</li> <li>Turtle traps;</li> <li>Thermal trigger fauna cameras;</li> <li>Acoustic recording devices; and</li> <li>Opportunistic observations.</li> </ul>

The surveys included database searches undertaken in 2016. An additional database search of DBCA records was undertaken in March 2019 to ensure recent changes to this database were incorporated.

#### 1.4.2 Fauna habitats

Three broad fauna habitats were identified by APM as occurring within the Project Area (**Figure 1-3; Table 1-3**).

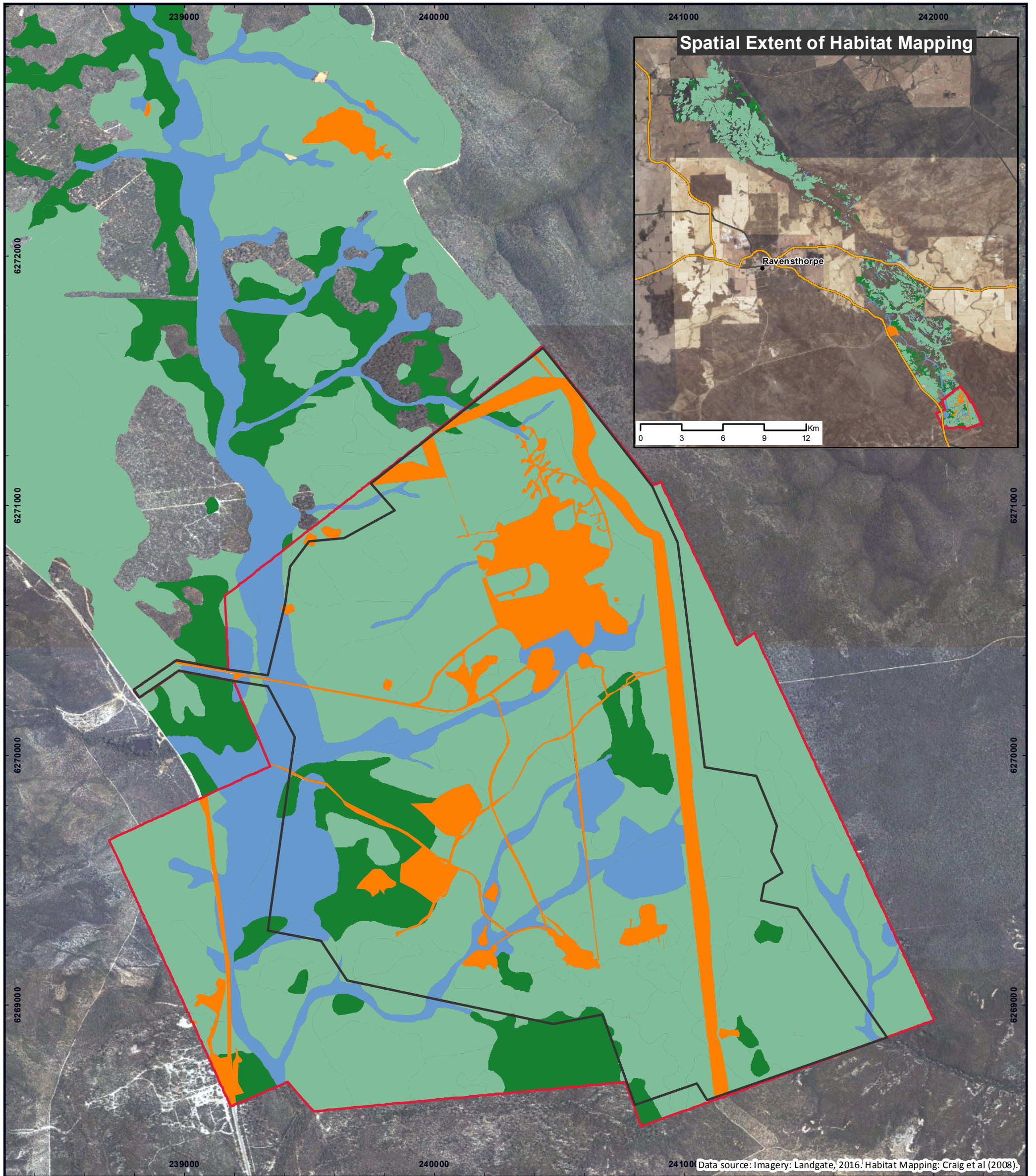
#### 1.4.3 Terrestrial fauna

Combined database searches indicate that a total of 193 vertebrate fauna species are expected to occur within 10 km of the Project Area, comprising 127 birds, 26 mammals, seven amphibians and 33 reptiles. This database search area encompasses a significant proportion of the Ravensthorpe Range and extends as far north as the South Coast Highway. The databases also recorded 97 invertebrate species.

The surveys undertaken by APM recorded 101 vertebrate fauna species – 54 birds, 12 mammals, six amphibians and 29 reptiles. This represents more than 50 % of the fauna species recorded in the broad database searches. A listing of all vertebrate fauna recorded is provided in **Appendix A**.

**Table 1-4** provides a summary of species richness within each of the different habitats of the Project Area. Vertebrate fauna species richness within the Project area has appeared to be highest within Low Woodland Mallee and Heath habitat with a total of 96 species recorded in this habitat type, which is also the most widespread habitat within the RGP. Damplands and Drainage areas have displayed the lowest species richness with a total of 16 vertebrate fauna taxa recorded.

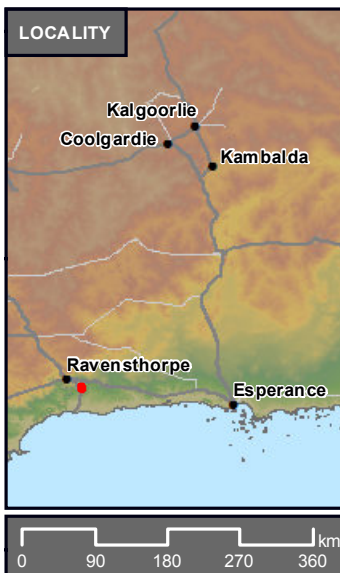




- Ravensthorpe Gold Project Area
- RGP Development Envelope

#### Fauna Habitats

- Completely Degraded
- Damplands and Drainage Habitat
- Low Dense Forest / Forest Habitat
- Low Woodland Mallee and Heath Habitat



### FAUNA HABITATS

#### Ravensthorpe Gold Project ERD

#### ACH Minerals Pty Ltd

0 150 300 450 600 metres  
Coordinate System: GDA 1994 MGA Zone 51  
Projection: Transverse Mercator, Datum: GDA 1994  
Scale @ A3: 1:15,000

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Reviewed:	G Barrett
Checked:	A Mack
Project No:	TE19017
Revision:	A
Date:	24/05/2019

Figure 1-3







**Table 1-3: Fauna habitats within the RGP development envelope**

Habitat	Description	Area (ha)	%
Damplands and Drainage Lines	Features a eucalypt overstorey over a diverse myrtaceous middle storey. Sedges, grasses and herbs are a common ground storey component.	49.1	11.5
Low Dense Forest/ Forest	Occurs on areas of sheet wash on low gradient slopes. Overstorey features mallees with <i>Melaleuca</i> and others shrubs. In areas of poor drainage the ground storey can comprise almost entirely of sedges such as <i>Gahnia aristata</i> .	33.0	7.7
Low Woodland Mallee and Heath	Features a broad variety of eucalypt species and occurs over all rises and hills. Also features a diverse proteaceous and myrtaceous shrub layer. The predominant fauna habitat within the Project Area.	280.8	65.5
Disturbed areas	Historical mining disturbance, access roads and other cleared or degraded areas.	65.5	15.3
<b>Total</b>		<b>428.4</b>	<b>100.0</b>

**Table 1-4: Vertebrate fauna – species richness within habitats - RGP**

Fauna Group	Species Richness			
	Low Dense Forest / Forest	Low Woodland Mallee and Heath	Damplands and Drainage	All habitats
Birds	23	49	3	56
Reptiles	12	27	2	29
Amphibians	0	5	2	6
Mammals	8	15	9	22
<b>Total</b>	<b>43</b>	<b>96</b>	<b>16</b>	<b>113</b>

Both bird and reptile species have been richest within low woodland and low forest, possibly reflective of preferred habitat for nesting, foraging, and shelter.

Three introduced species – feral cat, red fox and house mouse – were recorded during surveys. The feral cat was recorded by APM while the fox was recorded by Biota in 2004. There is little doubt, however, that both are likely to occur within the Project Area from time to time. Control efforts occurring elsewhere may have an impact – both species are Medium priorities in Ravensthorpe Shire's Biosecurity Management Strategy (McQuoid 2017).



Based on database searches and field surveys, a total of 38 species of vertebrate fauna of conservation significance potentially occur or occur within the Project Area. In considering the habitat preferences of each species, the likelihood of that species occurring in the Project Area can be attributed. Likelihood values of low, moderate or high were applied in each case. When habitat is considered, 20 species were recorded as having a low likelihood of occurrence. These species were not recorded during the field surveys and may not have suitable habitat within the Project Area. The remaining 18 species with a moderate or high likelihood of occurrence are listed in **Table 1-5**.

**Table 1-5: Commentary on conservation significant vertebrate fauna with a moderate or high likelihood of occurrence within the RGP Project Area**

Species	Common Name	Conservation Status		Likelihood of occurrence	Comments
		Cth	WA		
<i>Apus pacificus</i>	Fork-tailed Swift	IA	IA	Moderate	A migratory species which is almost exclusively aerial. Not recorded during surveys but could occur in Project Area from time to time.
<i>Ardea modesta</i>	Eastern Great Egret	IA	-	Moderate	Not recorded in Project Area but could occur as a transitory visitor when water containment structures are in place.
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	EN	High	Occurs within the Project Area where there is suitable foraging habitat. A survey failed to identify any trees with hollows that could be used for nesting. The nearby Cocanarup Timber Reserve is a known breeding site for the species and has been recorded near the Ravensthorpe Nickel Project (Stantec 2019).
<i>Falco peregrinus</i>	Peregrine Falcon	-	OS	Moderate	One record within Low Woodland Mallee and Heath. Pits could provide nesting habitat.
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	High	No active or recently active mounds recorded during surveys but is known from the local area and may occur within the Project Area at times.
<i>Merops ornatus</i>	Rainbow Bee-eater	M	-	High	Not sighted within Project Area but suitable habitat present.
<i>Pezoporus flaviventris</i>	Western Ground Parrot	CR	CR	High	Not recorded during surveys but suitable habitat is present within the Project Area.
<i>Psophodes nigrogularis oberon</i>	Western Whipbird (Mallee)	VU	P4	High	Recorded in the Project Area and also known from the Kundip Nature Reserve. Suitable habitat present in Project Area.
<i>Acanthophis antarcticus</i>	Southern Death Adder	-	P3	Moderate	Not recorded in Project Area but is known from the Ravensthorpe Range. Is cryptic and suitable habitat is present.
<i>Lerista viduata</i>	Ravensthorpe Range Slider	-	P1	High	One individual trapped during surveys. Known from Kundip Nature Reserve. Suitable habitat present and likely to occur in Project Area at times.
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	VU	High	Known across the Ravensthorpe Range and occurs within the Project Area where there is suitable foraging habitat (Low Dense Forest / Forest).

Species	Common Name	Conservation Status		Likelihood of occurrence	Comments
<i>Hydromys chrysogaster</i>	Water Rat/ Rakali	-	P4	Moderate	Not recorded during surveys but suitable habitat (Damplands and Drainage) is present within the Project Area.
<i>Isodon fusciventer</i>	Quenda, Southern Brown Bandicoot	-	P4	High	Not sighted during surveys but diggings recorded in all three habitats within the Project Area.
<i>Notamacropus eugenii derbianus</i>	Tammar Wallaby	-	P4	High	Known to occur locally and has been recorded in the Kundip Nature Reserve. Suitable habitat present in Project Area and is likely to occur at times.
<i>Notamacropus irma</i>	Western Brush Wallaby	-	P4	High	Not recorded in Project Area but known to occur locally. Suitable habitat is present in the Project Area and this species is likely to occur from time to time.
<i>Parantechinus apicalis</i>	Dibbler	EN	EN	Moderate	Sighted at Kundip mine site in 1986 but not recorded since. Suitable habitat present within the Project Area.
<i>Pseudomys occidentalis</i>	Western Mouse	-	P4	High	Known from the Ravensthorpe Range but not recorded in surveys of the Project Area. Suitable habitat (Low Woodland Mallee and Heath) present. Has been recorded near the Ravensthorpe Nickel Project (Stantec 2019).
<i>Pseudomys shortridgei</i>	Heath Mouse, Dayang	EN	VU	Moderate	Not recorded in surveys of the Project Area but suitable habitat (Low Woodland Mallee and Heath) present. Recorded near Ravensthorpe Nickel Project (Stantec 2019).

Biota recorded a range of invertebrate species in their 2004 survey. With reference to this work and other survey information from the region, only one potential short range endemic species (**SRE**) has been identified from the Project Area— a land snail from the genus *Bothriembryon*. Land snails are among the group of invertebrates that are considered to be SRE candidates. A single specimen was collected by Biota in Low Dense Forest/Forest habitat outside of the Development Envelope. The specimen was not known to the WA Museum.





#### 1.4.4 Key assumptions and uncertainties

The following key assumptions underlie this plan:

- Surveys have adequately characterised the terrestrial fauna of the Project Area.
- No species is restricted to the Project Area.

Uncertainties in regard to terrestrial fauna are:

- Eighteen species of conservation significance have been recorded as having a moderate or high likelihood of occurrence. Other species of conservation significance could occur in the Project Area from time to time.
- A land snail from the genus *Bothriembryon* has been recorded in the Project Area but it is unclear whether it is a short range endemic species- further survey is required.
- The extent to which rehabilitation can restore the habitat value of existing vegetation for terrestrial fauna.

#### 1.4.5 Management approach

The management provisions set out in this document are based and developed around the mitigation hierarchy of avoid, minimise and rehabilitate to ensure impacts to terrestrial fauna have been avoided or reduced to as low as reasonably practicable.

Potential impacts have been identified based on extensive experience in relation to mine site management. Many of the management provisions are commonly used in mine sites across Western Australia. Other provisions are tailored for the particular circumstances that occur at RGP.

#### 1.4.6 Rationale of choice of provisions

Land clearing to establish the mine will unavoidably result in loss of fauna habitat. ACH has considered an approach whereby this impact is minimised through:

- 'Tweaking' of the disturbance footprint to avoid or minimise impacts where possible;
- Using strict controls over land clearing activity to ensure it is undertaken in a manner that ensures there is no 'overclearing' and that indirect impacts are avoided; and
- Rehabilitation of disturbed land with restoration of fauna habitat values in mind.

### 1.5 Index of Biodiversity Surveys for Assessments

The biological surveys supporting this FVMP were completed prior to the introduction of Index of Biodiversity Surveys for Assessments (IBSA) requirements. All future biodiversity survey reports submitted at any point in the assessment and compliance process under Part IV of the *Environment Protection Act 1986* will be accompanied by an IBSA data package.



## 2 EMP Provisions

This section sets out management-based provisions for identified environmental factors in tabulated form. The Provisions are detailed in **Table 2-1**.



**Table 2-1: Provisions to meet objectives for Terrestrial Fauna**

Terrestrial Fauna			
<b>Environmental Factor:</b> Terrestrial fauna			
<b>EPA Objective:</b> To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.			
<b>Outcome:</b>			
<ul style="list-style-type: none"> <li>Loss of fauna habitat is restricted to that required for implementation of the Project.</li> <li>Rehabilitation of disturbed areas considers measures that encourage recolonization by fauna.</li> </ul>			
<b>Key environmental values:</b>			
<ul style="list-style-type: none"> <li>Conservation significant fauna and habitat required to support local populations of those fauna.</li> <li>Connectivity of vegetation and habitat to the Kundip Nature Reserve to the south and proposed nature reserves adjacent the Kundip site.</li> </ul>			
<b>Key impacts and risks:</b>			
<ul style="list-style-type: none"> <li>Reduction and/or fragmentation of fauna habitat.</li> <li>Vehicle strike (fauna deaths, injuries).</li> <li>Increase in introduced fauna (predation and competition).</li> <li>Altered fire regime (foraging and/or nesting habitat reduction or loss).</li> <li>Mine site lighting (behavioural changes).</li> <li>Noise and vibration (behavioural changes).</li> <li>Exposure to TSF cyanide and fauna entrapment (fauna deaths, injuries).</li> </ul>			
Management-based provisions			
Management actions	Management targets	Monitoring	Reporting
<b>Vegetation clearing</b> <ul style="list-style-type: none"> <li>Develop and implement a Ground Disturbance Permit (GDP) system prior to the commencement of construction</li> <li>Spotter/GPS or environmental officer supervision when clearing adjacent to a TEC/PEC or priority flora</li> <li>Clearly delineate areas to be cleared</li> <li>Vegetation will be progressively cleared to prevent soil erosion, dust generation and weed introduction/colonisation</li> </ul>	<ul style="list-style-type: none"> <li>No unauthorised clearing to take place</li> <li>No clearing to take place outside of the approved areas</li> <li>No clearing of fauna habitat outside disturbance footprint</li> <li>No adverse impacts to vegetation/habitat health beyond areas approved for clearing</li> <li>No material introduction or spread of environmental weeds to disturbed areas</li> </ul>	<ul style="list-style-type: none"> <li>GDP data collection and Internal audits</li> <li>Survey data and aerial imagery</li> <li>Vegetation health monitoring</li> <li>Weed monitoring</li> <li>Internal audits (against approved design)</li> </ul>	<ul style="list-style-type: none"> <li>Annual Environmental Reports (DMIRS)</li> <li>Mine Rehabilitation Fund (DMIRS)</li> <li>Compliance Annual Report (DWER)</li> <li>Internal record keeping and reporting including incident reports</li> </ul>
<ul style="list-style-type: none"> <li>Land clearing will be undertaken progressively and incrementally as required during construction, in order to minimise the pressure on the carrying capacity of native vegetation surrounding the site.</li> </ul>	<ul style="list-style-type: none"> <li>Land clearing will be undertaken within the innermost sections of the Disturbance Footprint first to encourage the movement of any fauna out of the site and into adjacent vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Ground Disturbance Permits will stipulate daily clearing limits.</li> <li>Incident report register</li> </ul>	<ul style="list-style-type: none"> <li>Internal record keeping and reporting.</li> <li>Exceedance of daily limit reported as incident.</li> <li>Reporting of annual clearing in AER</li> <li>All clearing non-compliance reported in the Annual Environmental Review.</li> </ul>
<b>Rehabilitation</b> <ul style="list-style-type: none"> <li>Stockpile all potential habitat logs greater than 30 cm during clearing and store immediately adjacent to cleared areas.</li> <li>Replace potential habitat logs during rehabilitation to provide fauna habitat.</li> </ul>	<ul style="list-style-type: none"> <li>All rehabilitation areas to contain habitat logs and branches.</li> <li>Density of habitat logs in rehabilitated area to be more than was present within Project Area prior to clearing (utilise all cleared fallen logs that were not previously fallen and usable as habitat).</li> </ul>	<ul style="list-style-type: none"> <li>Photo monitoring of areas to be cleared.</li> <li>Location of stockpiles will be provided in GDP.</li> <li>An environmental representative to be present during clearing works.</li> <li>Habitat areas to be surveyed before clearing and after rehabilitation to ensure habitat log density is higher than density prior to clearing.</li> </ul>	<ul style="list-style-type: none"> <li>Internal record keeping and reporting.</li> <li>Reporting of rehabilitation progress in AER.</li> <li>Record keeping of clearing and stockpiling as part of the GDP process.</li> </ul>
<ul style="list-style-type: none"> <li>Cleared land that is no longer being used will be progressively rehabilitated to re-establish and reconnect habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation to commence on unused cleared land within 2 years.</li> <li>No disconnected habitats by time of closure.</li> </ul>	<ul style="list-style-type: none"> <li>Annual rehabilitation inspections and audits.</li> <li>Photo monitoring of rehabilitation sites.</li> <li>Maintain a rehabilitation schedule.</li> </ul>	<ul style="list-style-type: none"> <li>Reporting of rehabilitation progress in AER.</li> </ul>

Terrestrial Fauna			
<b>Chuditch</b> Potential Chuditch habitat (particularly 'Low Dense Forest/Forest' habitat) will be searched for denning sites prior to clearing. If active denning sites are identified, a trapping program will be implemented to allow the relocation of resident Chuditch.	No clearing of active Chuditch den sites until relocation is completed.  No deaths of Chuditch during clearing works.	Pre-clearing Chuditch surveys/trapping will be conducted by the Project Environmental Officer.	Outcomes data reported annually to DBCA. AER.
<b>Malleefowl</b> Potential Malleefowl habitat will be intensively searched for mounds prior to clearing.	No disturbance of active malleefowl mounds.	Pre-clearing Malleefowl surveys will be conducted by specialised environmental consultants.	Outcomes data reported annually to DBCA. AER.
If active malleefowl mounds are located, area will be designated a No-Go Zone, and a 100 m buffer set around the mound.  Active mounds will be left until after dispersal of young, and when mound becomes inactive.	No disturbance of active malleefowl mounds.	Pre-clearing Malleefowl surveys will be conducted by specialised environmental consultants.  Incident report register.	Clearing within < 100 m of Malleefowl mound to be recorded as incident. AER.
<b>Bothriembryon</b> Undertake a further survey for this potential short range endemic invertebrate.	Survey conducted within first year of operation.	-	Report provided to WA Museum.
<b>Vehicle strike</b> Speed limits will be implemented for light vehicles in operational areas and the internal (within Kundip Mine Site) site access roads. These areas will be limited to 40 kph at all times.	No reports of personnel exceeding speed limits. No fauna strikes on roads.	All personnel to report observations of speeding. Monthly revision of fauna strikes will inform any potential revision of speed limits (i.e. if a location or season is particularly risky and warrants a reduced speed limit).	All fauna strikes will be reported as environmental incidents and investigated. Cases of personnel exceeding the speed limit will be dealt with accordingly.
All employees will be required to record and report any <sup>1</sup> fauna strikes.	All fauna strikes will be recorded. Appropriate additional management strategies can be implemented if fauna strikes occur.	Internal audits and inspections. A database of fauna deaths will be maintained by the site environmental team. Incident report register.	Any failures to report fauna strikes will be dealt with accordingly. AER. Incident Reporting.
Warning signs will be erected on appropriate roads, warning road users of the possible presence of Chuditch, Malleefowl and Carnaby's Cockatoo.	No fauna strikes of Chuditch, Malleefowl or Carnaby's Cockatoo.	Internal audits and inspections.	All fauna strikes of Chuditch, Malleefowl and Carnaby's Cockatoo will be reported as environmental incidents and immediately investigated as a priority.
Roadkill will be removed to at least 10 m into surrounding vegetation, when safe to do so, by designated personnel to avoid further strikes of fauna feeding on carcasses.	No roadkill left to remain on road verges.	Site Environmental Officer to liaise with designated personnel to report removal of roadkill from roads.  Regular inspection of mine site roads.	Internal record keeping and reporting. Fauna strike report procedure will contain requirement to remove from road
<b>Sightings</b> All employees will be required to complete fauna sighting forms for live Chuditch, Malleefowl and Carnaby's Cockatoo.	Keep an up-to-date database of fauna presence and distribution.  Target all management strategies for fauna effectively.	Internal audits and inspections. Establish a Fauna Sighting and Fatality Register.	Outcomes data reported annually to DBCA. Internal record keeping and reporting. Review of Fauna Sighting and Fatality Register.

<sup>1</sup> No fauna strikes – This management action refers only to avifauna or non-volant (non-flying) fauna greater than 250 grams. It is not possible, nor is it practical, to be aware of or record the death of fauna smaller than a large rat. All non-volant conservation significant fauna known to occur in the Project Area are greater than 250 grams with the exception of conservation significant rodents that are impossible for non-experts to identify from the introduced house mouse, and the Ravensthorpe Slider, which is also impossible for a non-experts to identify. Therefore, a commitment to report the deaths of these species would be impractical.



## Terrestrial Fauna

<b>Training</b> Site induction to emphasize that all native fauna have right-of-way, where possible and safe to do so. Similarly, site inductions to explain that Carnaby's Cockatoos forage on roadsides and are slow to take flight, so are prone to vehicle strike.	No fauna strikes.	Initial inductions for all new personnel and daily prestart meetings to reinforce rules for driving.	Internal record keeping and reporting. Review of prestart content. Review of safety assessments.
Site inductions to introduce personnel to local conservation significant fauna, and signage displayed in crib rooms and notice boards, to ensure all personnel can identify all larger conservation significant species.	Effective and accurate reporting of species identity, including road kill, during fauna records.	Initial inductions for all new personnel and daily prestart meetings to reinforce description of conservation significant species	Review of prestart content.
Personnel will be inducted regarding the key risk times for vehicle strike to fauna (e.g. dusk and dawn).	No fauna strikes (particularly crepuscular species, such as Western Grey Kangaroo, Tammar Wallaby, Brush Wallaby)	Inductions and daily prestart meetings to reinforce rules for driving.	Internal record keeping and reporting. Review of prestart content. Review of safety assessments.
Where possible, all non-essential movement along the haul road/public roads will be scheduled to take place during the day.	No nocturnal fauna strikes.	Internal audits and inspections.	Internal record keeping and reporting.
<b>Introduced fauna</b> Develop and implement an introduced predator control program, including a \$10,000 p.a. contribution to local fox baiting strategy.	Reduction in measured activity of introduced fauna. Alleviate predation pressure applied to Chuditch, Malleefowl, Quenda and Western Ground Parrot.	All sighting of foxes, and feral cats to be reported to Site Environmental Officer. Regular monitoring of introduced predator abundance, via surveys, or bait uptake. Records of introduced fauna to be kept in a Fauna Sighting and Fatality Register through sightings, injured or killed fauna.	Annual reporting to Government. Internal record keeping. Liaison with DBCA. Review of Fauna Sighting and Fatality Register. To display best practise, all sightings can be uploaded to the 'FeralScan' app, a national introduced species mapping resource.
No domestic animals will be allowed onsite.	No further introductions of any non-native fauna.	Internal audits and inspections, and inductions.	Internal record keeping and reporting.
<b>Altered fire regime</b> Staff will be trained in the use of fire extinguishers and will be fitted to all vehicles.	Reduce time allowed for fires to spread (reducing intensity and duration). Increase awareness of fire management and the potential causes and signs of risk. Fire emergency response to be included as part of the induction and training process. Checking extinguisher expiry date included on vehicle prestart check list. Engage service provider to monitor and perform maintenance of extinguishers.	Monitoring achieved through incident reporting. Incident report register. Internal audits and inspections. Vehicle prestart. Include fire consultant report in safety reporting.	Internal record keeping and reporting. Auditing of fire related incidents.
A Hot Work Permit system will be developed and implemented.	Reduced fire risk from hot works. No incidents associated with spot fires.	Internal audits and inspections. Incident report register.	Incident reporting
Access roads will be managed to facilitate the control of wild fires, both inside the Project area and into the adjacent proposed Conservation Reserve and Kundip Nature Reserve.	Allow fast and safe vehicle access for firefighting equipment. Reduce size and severity of fires	Liaison with local fire management and DBCA to monitor access roads.	Audit review of fire protocols. Internal record keeping.
The existing firebreak will be maintained around the mine site boundary in an engagement with DBCA during and after completion of mining works (at closure).	Reduced size and severity of fires.	Liaison with local fire management and DBCA to maintain firebreak	Stakeholder consultation register to be maintained.
Vehicles will be required to remain on established tracks and roads only and will be instructed to avoid leaving vehicles idling over vegetation, regrowth or dry grass, in the summer months.	No accidental fires caused by vehicles. Increased awareness in the risks and potential accidental causes of fire.	Incident report register.	Incident reporting

Terrestrial Fauna			
<b>Lighting</b> Lighting will be designed in accordance with AS 4282-1997: Control of Obtrusive Effects of Outdoor Lighting Guidelines.	Compliance with AS 4282-1997 Guidelines.	Lighting structures will be inspected to verify compliance with AS 4282-1997	Lighting constructions that do not comply with the Australian standard will be reported and rectified.
Lighting will be used only for required operational areas, all light sources will be aimed towards to work area, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over.	No areas to be unnecessarily illuminated to limit extent of light emittance.	Quarterly internal audits and inspections. Monitor safety incident reports for issues relating to lighting.	Internal record keeping and reporting.
Where possible, lighting will be the minimum wattage, whilst not compromising safety or OH&S requirements.	Lighting to not exceed unnecessary wattage to remain as least obtrusive as possible to surrounding habitats.	Internal audits and inspections. Monitor safety incident reports for issues relating to lighting.	Internal record keeping and reporting.
Noise and vibration			
Noise emissions will comply with Environmental Protection (Noise) Regulations 1997.	Minimise the disturbance to fauna caused by loud noise and vibrations. Compliance with Environmental Protection (Noise) Regulations 1997.	Internal audits and inspections. Incident reporting.	Annual reporting to Government. Non-compliance reported as incident.
Maintain equipment such that all noise emitting equipment is fully serviceable and working to the correct specifications.	Limit unnecessary noise occurring due to worn or badly maintained machinery	Regular servicing of vehicles and machinery to include check of vehicle noise output. Update vehicle maintenance schedule.	Vehicle maintenance data sheets. Internal record keeping and reporting.
Where possible, all non-essential movement along the haul road/public roads will be scheduled to take place during the day.	Avoid disruption of nocturnal species.	Internal audits and inspections.	Internal record keeping and reporting.
Fauna entrapment and poisoning			
Fauna egress will be installed on all lined ponds and excavations, even if temporary.	All fauna that enter ponds and excavations can escape. No fauna entrapment in ponds and excavations.	Internal audits and inspections. Regulator inspection of mine site and egress. Incident report register.	All cases of fauna entrapment/deaths to be recorded and reported as an environmental incident.
The WSF and process ponds will be enclosed by a fence to exclude all terrestrial fauna, to avoid entrapment. Fencing will be tall enough to exclude large macropods (e.g. Western Brush Wallaby) and contain a 'skirt' of fine mesh around 30 cm in height to exclude digging mammals (e.g. Quenda) and discourage smaller animals. 'Ringlock'-style stock fencing will be avoided, as macropods can become entangled	Exclude all terrestrial animals from surface water, to avoid poisoning and entrapment	Internal audits and inspections by all personnel. Regulator inspections of ponds by Environmental Officer. Incident report register.	All cases of fauna incursion or entrapment resulting in deaths to be recorded and reported as an environmental incident.
Fauna egress will be installed on all corners of small water storage structures and along the length of large structures (evaporation pond).	All fauna that enter ponds and excavations can escape.	Regular inspections of WSF. Internal audits and inspections. Incident report register.	All cases of fauna incursion or entrapment resulting in deaths to be recorded and reported as an environmental incident.
The cyanide concentration in the TSF will be maintained at below 50 mg/L, which is deemed a safe level for wildlife.	Tailings is maintained at a concentration that is safe for wildlife (particularly birds).	Online tails cyanide analyser.	Environmental Officer to report exceedances at weekly management meetings.





### **3 Adaptive Management and Review of the Fauna Management Plan**

Given the potential for negative direct and indirect impacts on fauna of conservation significance and fauna habitat, the management approach will remain adaptive. The management plan will be reviewed and revised under the following conditions:

- If monitoring results indicate that management targets are not being achieved;
- If new information is discovered during construction, operations or closure;
- Where any significant changes to project design or operation have occurred; and
- Where it has been longer than 12 months since the last revision.



## 4 References

Animal Plant Mineral Pty Ltd (2018). Ravensthorpe Gold Project Biological Survey. Unpublished report for ACH.

Bennelongia (2018a). Desktop Assessment of Subterranean Fauna at the Ravensthorpe Gold Project. Unpublished report produced for ACH.

Bennelongia (2018b). Mt Cattlin Project. Level 1 Survey for Stygofauna. Unpublished Report for Galaxy Resources Ltd.

Biota Environmental Sciences Pty Ltd (2004). Fauna and Fauna Assemblages of the Kundip and Trilogy Study Sites. Unpublished report for Tectonic Resources NL.

Outback Ecology (2010). Subterranean fauna desktop risk assessment. Unpublished report for Tectonic Resources NL.



# Appendix A: APM Biological Survey