TARRAWONGA COAL MINE

THREATENED FAUNA IMPLEMENTATION PLAN

PREPARED BY
WHITEHAVEN COAL LIMITED

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EXECUTIVE SUMMARY

Tarrawonga Coal Pty Ltd (TCPL) owns the Tarrawonga Coal Mine (TCM) located approximately 42 kilometres (km) north of Gunnedah and 15 km north-east of Boggabri in the Gunnedah Basin, New South Wales (NSW). The TCM commenced operations in 2006 and an extension to the mine was approved under State (NSW) and Commonwealth Project approvals in 2013.

As part of the NSW Project approval for the TCM, TCPL will implement:

- a Rehabilitation Strategy to progressively rehabilitate the post-mine landforms and re-establish vegetation and habitat for native flora and fauna (including threatened species); and
- a Biodiversity Offset Strategy in the surrounding region with habitat for a number of threatened fauna species.

In 2014, an investigation of factors likely to enhance or impede the effective long term provision of suitable habitat(s) for threatened fauna species was undertaken by Whitehaven Coal Limited (Whitehaven) (a joint venture partner of TCPL). The provision of suitable habitats to support individual or populations of threatened species does not in itself ensure the presence of any such species in the restored or remediated landscapes in the future. However it is possible to seek to optimise the potential for such species to ultimately locate into these landscapes.

Condition 45 of TCM Project Approval (PA 11_0047) requires the investigation to include the following threatened species:

- **Threatened birds**: Turquoise Parrot (*Neophema pulchella*), Masked Owl (*Tyto novaehollandiae*), Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*), Speckled Warbler (*Chthonicola sagittata*), Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*), Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*), and Varied Sittella (*Daphoenositta chrysoptera*).
- **Threatened mammals**: Squirrel Glider (*Petaurus norfolcensis*) and Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).

Other threatened species are also covered by this investigation upon OEH's request, namely: Pale-headed Snake (*Hoplocephalus bitorquatus*), Koala (*Phascolarctos cinereus*), Large-eared Pied Bat (*Chalinolobus dwyeri*) and Corben's Long-eared Bat (Greater Long-eared Bat or South-eastern Long-eared Bat) (*Nyctophilus corbeni*).

This implementation plan was developed in accordance with Condition 45 of TCM Project Approval (PA 11_0047) to maximise the likely prospects for providing viable areas of suitable habitat for threatened fauna species on the offset areas and on the mine site. The actual return of such threatened species to these future landscapes will also depend on source populations being available away from the restored remediated landscapes and the availability of potential movement pathways for such species between potential source populations and the restored and rehabilitated landscapes.

The outcomes of this implementation plan are 'checklists' for implementing the Rehabilitation Strategy and Biodiversity Offset Strategy. The approved implementation plan will be incorporated into a revised TCM Biodiversity Management Plan and a revised TCM Rehabilitation Management Plan.

1 INTRODUCTION

1.1 BACKGROUND

The Tarrawonga Coal Mine (TCM) is an open cut coal mining operation located approximately 42 kilometres (km) north of Gunnedah and 15 km north-east of Boggabri in the Gunnedah Basin, New South Wales (NSW) (Figures 1 and 2). The TCM is owned by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Limited (Whitehaven) (70 percent [%] interest) and Boggabri Coal Pty Limited (a wholly owned subsidiary of Idemitsu Australia Resources Pty Ltd) (30% interest).

The TCM commenced operations in 2006 and an extension to the mine (i.e. the Tarrawonga Coal Project) was approved under State (NSW) and Commonwealth Project approvals in 2013. In January 2013, the Tarrawonga Coal Project was granted NSW Project approval under the NSW *Environmental Planning and Assessment Act* by the Planning Assessment Commission under delegation of the Minister for Planning and Infrastructure on 23 October 2012. The TCM was granted approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 11 February 2013 (Commonwealth Approval Decision 2011/5923).

As part of the NSW Project approval for the TCM, TCPL will implement:

- a Rehabilitation Strategy to progressively rehabilitate the post-mine landforms and re-establish vegetation and habitat for native flora and fauna (including threatened species); and
- a Biodiversity Offset Strategy in the surrounding region with habitat for a number of threatened fauna species.

Rehabilitation Strategy

Condition 40 of TCM Project Approval (PA 11_0047) requires 752 hectares (ha) of vegetation to be re-established on the post-mine landforms. An objective is to revegetate the post-mine landforms with a mixture of native woodland and forest (approximately 752 ha). The rehabilitation areas will be designed to contain habitat for native flora and fauna.

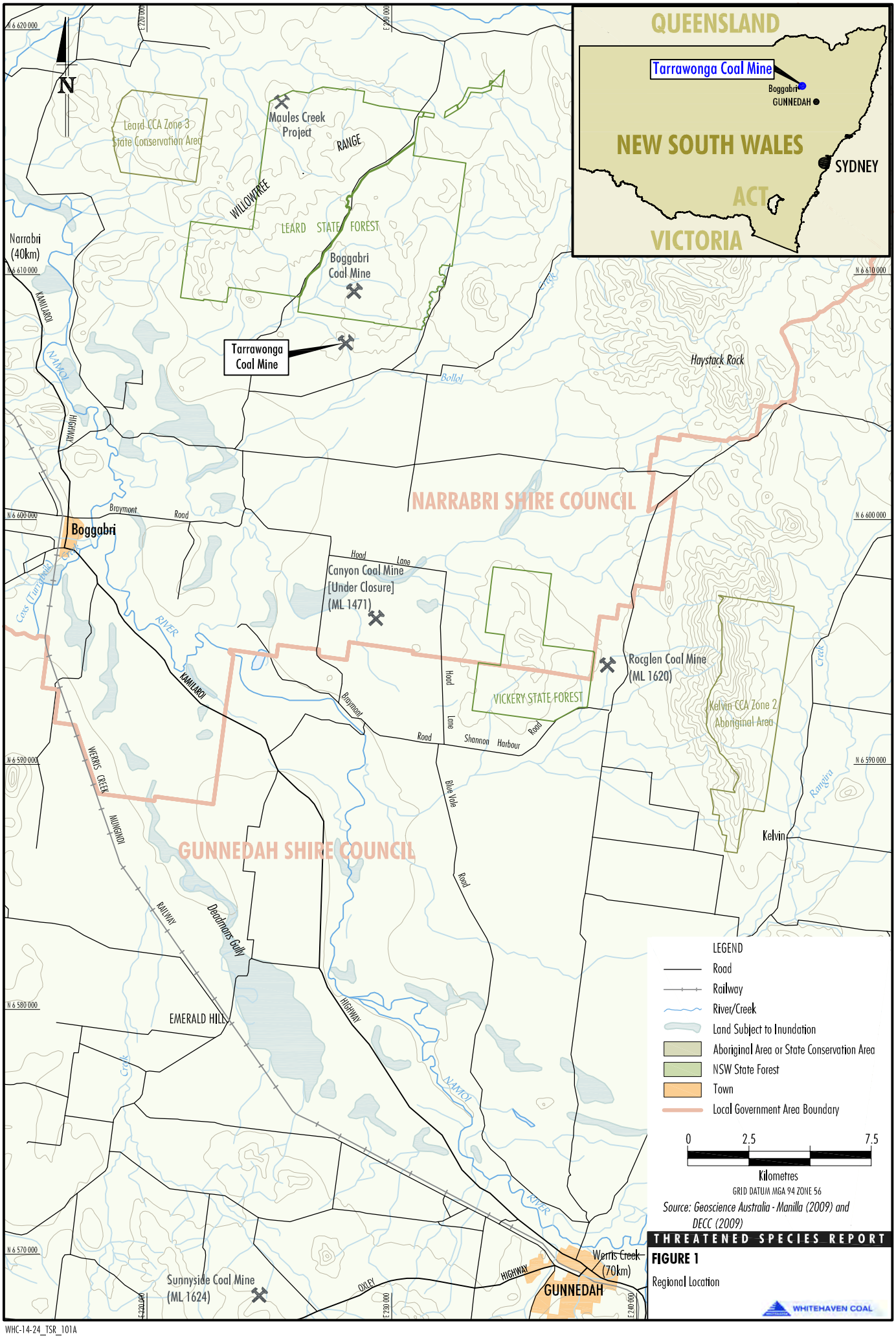
Biodiversity Offset Strategy

The biodiversity offset areas under Condition 40 of TCM Project Approval (PA 11_0047) are required to cover a minimum of 1,660 ha of land (Figure 3).

Long-term Maintenance

The long-term maintenance of Box-Gum Woodland/provision of habitat would be facilitated through:

1. long-term security of the offset areas and woodland on the rehabilitation areas by the mechanisms specified in the Project Approval (i.e. management will be required to be undertaken in accordance with a conservation agreement and/or protected area [e.g. National Park or Nature Reserve] management arrangement).
2. lodgement of conservation and biodiversity bond for the offset areas with the DP&E (noting that the bond will only be released once the offset strategy is completed generally in accordance with completion criteria).



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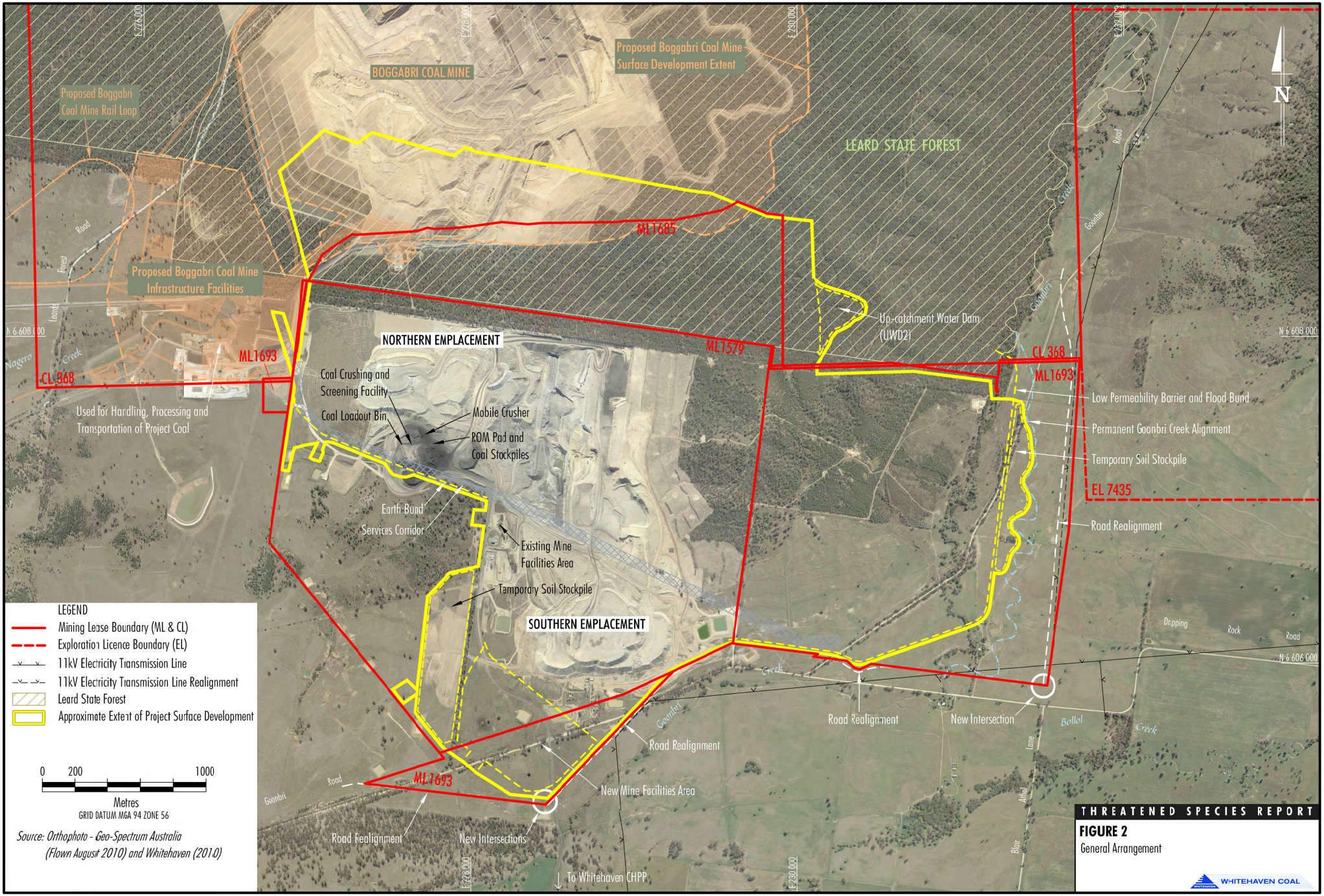

THREATENED SPECIES REPORT

FIGURE 2

General Arrangement

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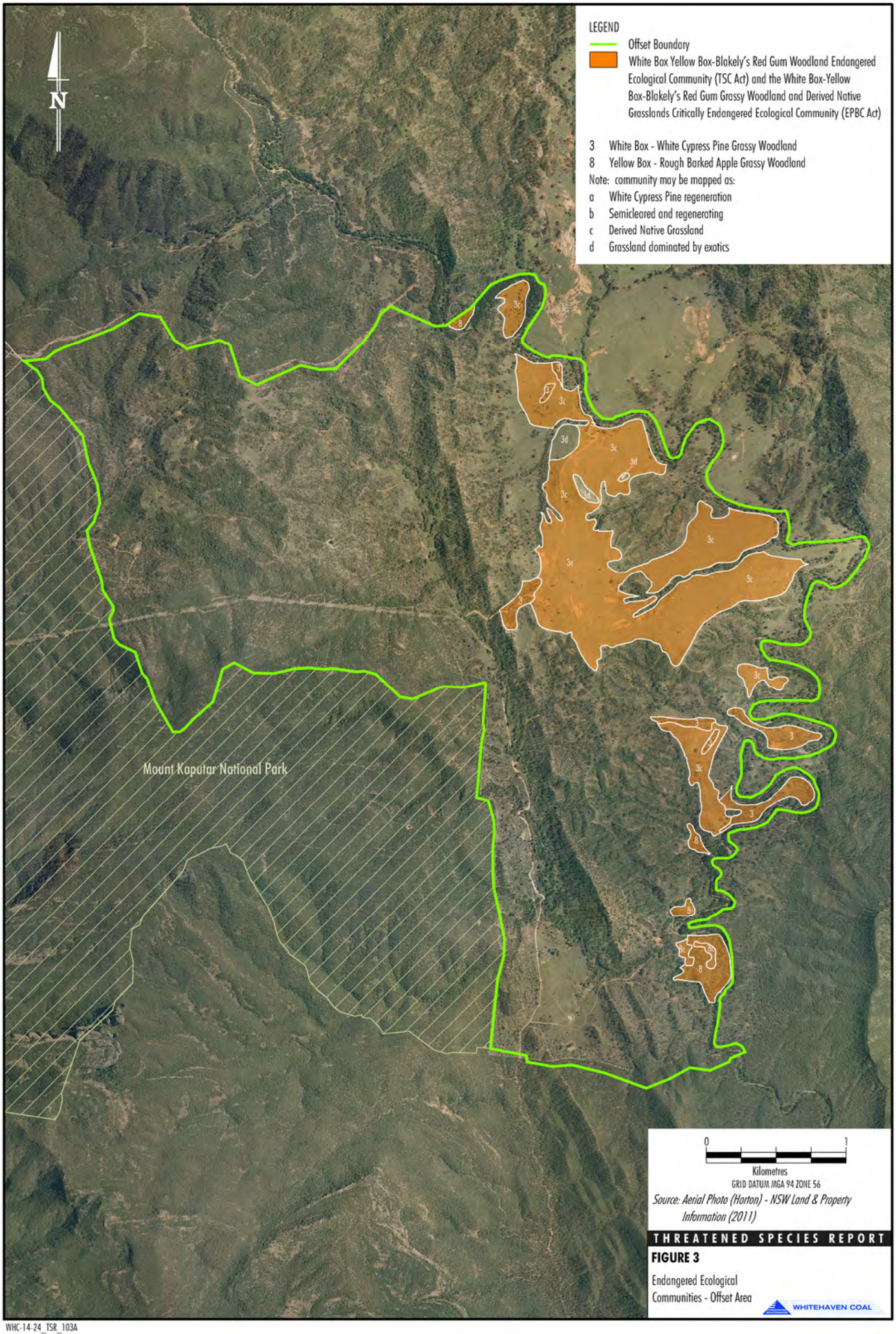

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Threatened Species Investigation

Condition 45 of TCM Project Approval (PA 11_0047) requires:

1. an investigation of factors likely to enhance or impede the prospects for providing viable areas of suitable habitat for threatened fauna species (i.e. an Investigation Report);
2. an implementation plan to maximise the likely prospects for providing viable areas of suitable habitat for threatened fauna species on the offset areas and on the mine site (i.e. an Implementation Plan – this document); and
3. revision of the Biodiversity Management Plan (BMP).

Figure 4 contains a flow diagram that shows how the Investigation Report, Implementation Plan and the BMP (and TCM Rehabilitation Management Plan [RMP]) relate to each other.

The Investigation Report (Whitehaven, 2014a; Appendix A) was prepared in 2014 and identified factors likely to enhance or impede the prospects for providing viable areas of suitable habitat for threatened fauna species. Those factors are considered in this report to maximise the likely prospects for providing viable areas of suitable habitat for threatened fauna species on the offset areas and on the mine site.

The outcome of this document is the creation of 'checklists' for implementing the Rehabilitation Strategy and Biodiversity Offset Strategy (where they relate to provision of habitat for threatened species). The approved the implementation plan will be incorporated into a revised BMP and a revised RMP.

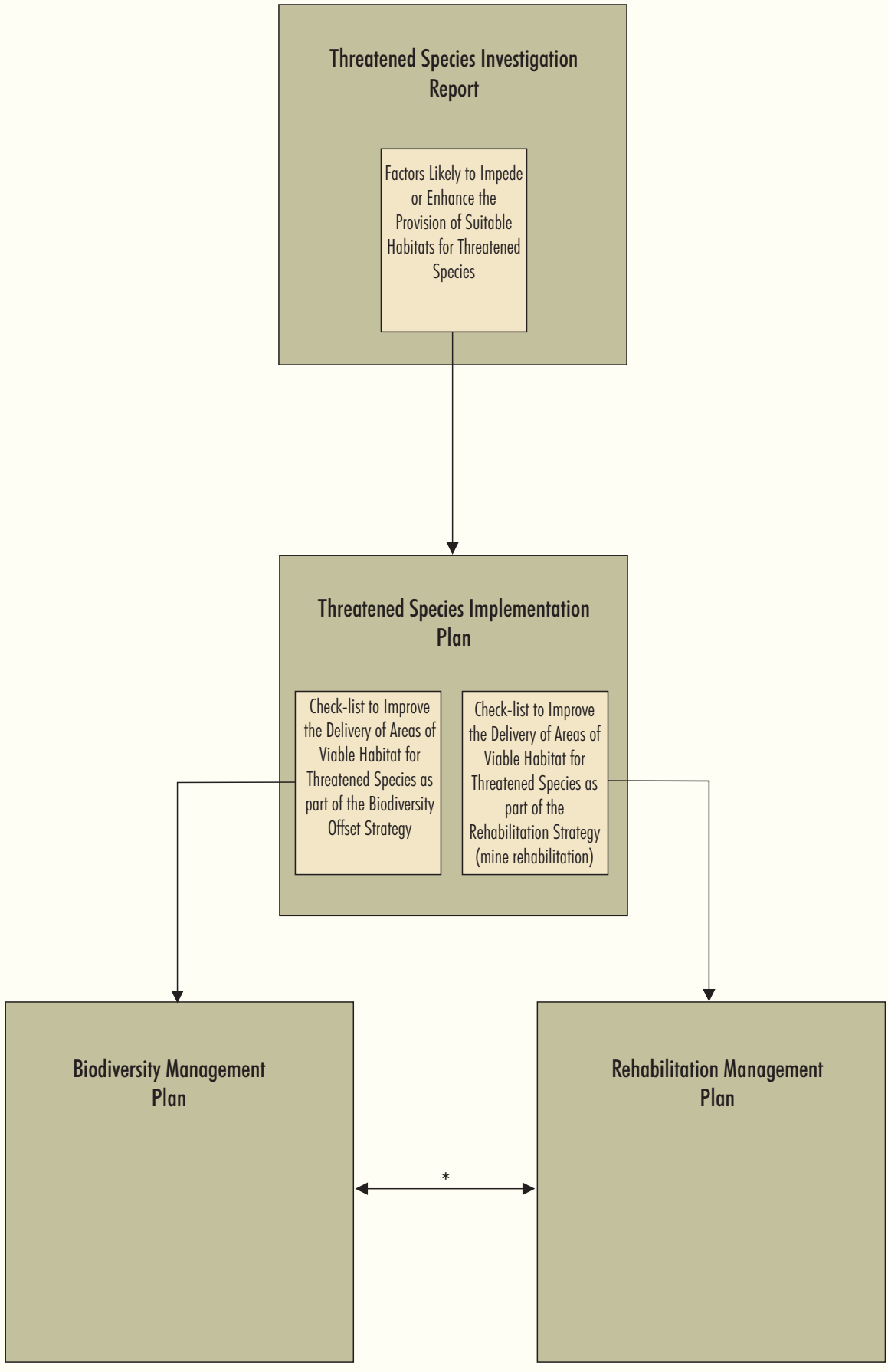
Relevant Threatened Species

Condition 45 of TCM Project Approval (PA 11_0047) requires the investigation to include the following threatened species:

- **Threatened birds**: Turquoise Parrot (*Neophema pulchella*), Masked Owl (*Tyto novaehollandiae*), Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*), Speckled Warbler (*Chthonicola sagittata*), Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*), Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) and Varied Sittella (*Daphoenositta chrysoptera*).
- **Threatened mammals**: Squirrel Glider (*Petaurus norfolcensis*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).

These species all inhabit woodland and/or forest habitats.

Other threatened species are also covered by this investigation upon OEH's request, namely: Pale-headed Snake (*Hoplocephalus bitorquatus*), Koala (*Phascolarctos cinereus*), Large-eared Pied Bat (*Chalinolobus dwyeri*) and Corben's Long-eared Bat (Greater Long-eared Bat or South-eastern Long-eared Bat) (*Nyctophilus corbeni*).



* *Integration of relevant mine rehabilitation components in the Biodiversity Management Plan.*

THREATENED SPECIES REPORT

FIGURE 4

Threatened Species Investigation and Implementation Plan

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In 2014, a second investigation was undertaken by Whitehaven into the factors likely to enhance or impede the effective restoration or re-establishment of the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland Endangered Ecological Community (Box-Gum Woodland EEC) listed under the NSW *Threatened Species Conservation Act, 1995* (Whitehaven, 2014a; Appendix A). This implementation plan recognises that many of the threatened fauna species use the Box-Gum Woodland as habitat and therefore incorporates actions aimed at enhancing prospects for the effective restoration and rehabilitation of this habitat.

The provision of suitable habitats to support individual or populations of threatened species does not in itself ensure the presence of any such species in the restored or remediated landscapes in the future. However it is possible to seek to optimise the potential for such species to ultimately locate into these landscapes. The actual return of such threatened species to these future landscapes will also depend on source populations being available away from the restored remediated landscapes and the availability of potential movement pathways for such species between potential source populations and the restored and rehabilitated landscapes.

1.2 OBJECTIVES OF THIS REPORT

The purpose of this report is to satisfy Condition 45(b) of Tarrawonga Coal Mine Project Approval (PA 11_0047) (Table 1) by providing an implementation plan to maximise the likely prospects for provision of habitat for threatened fauna species on the offset areas and the mine site.

As described in Section 1.1, the outcomes of this document are 'checklists' for implementing the Rehabilitation Strategy and Biodiversity Offset Strategy (where they relate to provision of habitat for threatened species). The approved implementation plan will be incorporated into a revised BMP and a revised RMP.

Table 1
Condition 45 of Project Approval (PA 11_0047)

Condition
45. The Proponent shall:
(a) investigate, in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term provision of suitable habitat(s) for the following species: Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Owl, Yellow-bellied Sheath Tail Bat and Squirrel Glider;
(b) within 12 months of the date of this approval (and if possible, in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to ensure delivery of suitable areas of viable habitat for the species included in (a) above, for approval by the Director-General; and
(c) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 52.

A complete list of species covered by this investigation is provided in Table 2.

Table 2
Threatened Fauna Species Relevant to the RMP and BMP

Scientific Name	Common Name	Conservation Status	
		TSC Act[1]	EPBC Act[2]
Reptiles			
Hoplocephalus bitorquatus	Pale-headed Snake	V	-
Birds			
Neophema pulchella	Turquoise Parrot	V	-
Tyto novaehollandiae	Masked Owl	V	-
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-
Chthonicola sagittata	Speckled Warbler	V	-
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-
Daphoenositta chrysoptera	Varied Sittella	V	-
Mammals			
Phascolarctos cinereus	Koala	V	V
Petaurus norfolcensis	Squirrel Glider	V	-
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-
Nyctophilus corbeni	Corben's Long-eared Bat (Listed as South-eastern Long-eared Bat under EPBC)	V	V
Chalinolobus dwyeri	Large-eared Pied Bat	V	V

[1] Threatened species listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) (September 2014).

[2] Threatened species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) (September 2014).

It has not been possible to prepare this report in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy being co-ordinated by the DP&E as it is yet to be developed. Nevertheless, this report is consistent with the intent of the Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy in that it seeks to improve the performance of the offset areas and has been prepared jointly with the Maules Creek Coal Mine.

1.3 CONSULTATION

Condition 45(b) TCM Project Approval (PA 11_0047) (Table 1) does not require consultation with stakeholders regarding this implementation plan, however, consultation was undertaken with:

- Office of Environment and Heritage (OEH);
- North West Local Land Services (formerly the Namoi Catchment Management Authority); and
- DP&E.

This implementation plan was revised in light of comments by or discussions with those stakeholders before it was submitted to DP&E for approval.

In their letter (dated 22 October 2014), OEH provided the following comments not directly related to this implementation plan:

> *OEH offers the following suggestions regarding the level of detail it expects should be included in the revisions of the RMP and BMP. This includes:*
>
> - *detailed descriptions, maps and area on each offset property for each condition state of the EEC and other vegetation types, and management area, if different*
> - *maps and area of the estimated area of habitat of each threatened species, and condition class if known*
> - *details of the presence of important structural, floristic and habitat elements present (eg caves, cliff lines, raptor nests, areas with abundant hollow-bearing trees, fallen debris, flora species specifically identified as providing habitat resources for threatened species etc.)*
> - *mapping and/or imagery and photographs which illustrate threats that can be mapped, such as weeds and erosion. Baseline data of the current extent of each threat described should also be provided (baseline information is required to assess the change in the level of the threat and to monitor success over time against relevant performance targets)*
> - *objectives for managing biodiversity values for each management area, strategies and timing to be implemented to manage biodiversity threats and to ensure that biodiversity values are improved*
> - *identified measurable performance measures and targets, how progress is to be measured and reported and at what intervals,*
> - *completion criteria for each threat in each management area eg the area or number of individuals of a weed species per management domain, based on the level of the acceptable threat. Targets should relate to actual biodiversity outcomes, including species requirements at different times, rather than simply inputs and outputs,*
> - *a risk assessment, trigger points and subsequent corrective actions to be implemented if the monitoring program identifies that the performance targets and therefore biodiversity management objectives are not being met.*

TCM would consider the above suggestions in relation to revisions to the RMP or BMP (whichever is most applicable to the individual point).

2 METHODS

This implementation plan was prepared by reviewing the factors likely to enhance the provision of habitat for threatened fauna species at the TCM and offset areas, along with the factors likely to enhance the re-establishment and restoration of Box-Gum Woodland.

3 PROPOSED ACTIONS RELATING TO FACTORS LIKELY TO IMPEDE OR ENHANCE

Box-Gum Woodland

Many of the threatened fauna species listed in Table 2 use the Box-Gum Woodland as habitat. Table 3 provides a list of proposed actions relating to each factor likely to impede or enhance the re-establishment and restoration of Box-Gum Woodland (Whitehaven, 2014b).

Threatened Species

Table 4 was developed as part of the Investigation Report (Whitehaven, 2014a; Appendix A) and it provides a summary of the following information for each threatened species:

- the species habitat requirements relevant to the Rehabilitation Strategy and Offset Strategy;
- recognised threats to the species that are relevant to the Rehabilitation Strategy or Biodiversity Offset Strategy sourced from State and/or Commonwealth recovery plans or Government Websites (e.g. OEH, 2014a; OEH, 2014b; Department of the Environment [DotE], 2014); and
- recognised recovery actions for the species that are relevant to the Rehabilitation Strategy or Biodiversity Offset Strategy sourced from State and/or Commonwealth recovery plans or Government Websites (e.g. OEH, 2014a; OEH, 2014b; DotE, 2014).

Table 5 provides a list of proposed actions relating to each factor likely to impede or enhance the provision of habitat for threatened fauna species (based on the factors identified in the Investigation Report [Whitehaven, 2014a; Appendix A]).

Table 6 provides a summary of the proposed actions in Table 5 for each relevant threatened species. The actions are separated into those relevant to the Rehabilitation Strategy and those relevant to the Biodiversity Offset Strategy.

The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide a range of habitats that can be used by threatened fauna species. As discussed Section 1.1, the provision of suitable habitats does not in itself ensure the presence of any such species in the restored or remediated landscapes in the future. However it is possible to seek to optimise the potential for such species to ultimately locate into these landscapes.

Table 3
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
1. Substrate	1a. Poor soil chemistry – depleted soil nutrients (Eddy, 2002)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Avoidance of soils with high or low pH, high salinity, low fertility or sodic soils. • Rehabilitation trials focused on soil substrate. • Nutrient management options: - Amelioration of soils with agricultural gypsum, compost (i.e. mulch saved during clearing activities) or fertilisers depending on the nutrient deficiency. - Addition of woody debris to increase carbon levels (Harmon *et al.,* 1986; Debeljak, 2006; Manning *et al.,* 2013; Goldin and Brookhouse, 2014). - Use of Biochar to increase soil carbon[1].	The RMP will: • provide parameters for the physical and chemical characteristics of topsoils and overburden based on likely suitable characteristics for establishment of Box-Gum Woodland; • provide for soil testing to be undertaken on topsoil and overburden to identify issues with physical and chemical characteristics as well as determine amelioration requirements and rates; • provide for rehabilitation trials (focusing on rehabilitation and revegetation of Box-Gum Woodland) to be undertaken on different rehabilitation substrates; • provide for selective identification and placement (burial) of soils unsuitable for use as a growth media; • describe options for ameliorating soils to improve the suitability of the soils as a growth media (e.g. amelioration with agricultural gypsum, compost [i.e. mulch saved during clearing activities] or fertilisers depending on the nutrient deficiency); • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; and • provide for selective use of slow-release native plant fertiliser (e.g. rock minerals) to promote plant growth (if required).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Limited and selective use of specific fertilisers to facilitate growth of tube stock (Eddy, 2002). • Placement of woody debris to increase carbon and moisture levels (Goldin and Brookhouse, 2014).	The BMP will provide for selective use of slow-release fertiliser to promote plant growth (if required).
	1b. Poor soil chemistry – elevated soil nutrients, salinity and acid soils (Rawlings *et al.,* 2010; Department of the Environment, Climate Change and Water [DECCW], 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Avoidance of soils with high or low pH, high salinity, low fertility or sodic soils. • Application of minimum topsoil and subsoil depths (Condition 25[c] of the Approval Decision EPBC 2011/5923). • Soil surveys and inventories prior to soil stripping (Condition 25[c] of the Approval Decision EPBC 2011/5923). • Soil handling processes for removal, storage and re-layering of topsoil and subsoil (Condition 25[d] of the Approval Decision EPBC 2011/5923). • Annual soil balances to manage soil handling. • Rehabilitation trials focused on soil substrate.	The RMP will: • provide parameters for the physical and chemical characteristics of topsoils and overburden based on likely suitable characteristics for establishment of Box-Gum Woodland; • provide for soil testing to be undertaken on topsoil and overburden to identify issues with physical and chemical characteristics as well as determine amelioration requirements and rates; • provide for selective identification and placement (burial) of soils unsuitable for use as a growth media; • describe minimum topsoil and subsoil depths for revegetation (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923); • provide for soil surveys and inventories to be undertaken prior to soil stripping (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923); • provide soil handling processes for removal, storage and re-layering of topsoil and subsoil (consistent with Condition 25[d] of the Approval Decision EPBC 2011/5923), including the length and mode of topsoil storage. This will specifically detail the stripping of topsoil likely to contain seeds; • provide for annual soil balances to be undertaken to facilitate management of soil handling; and • provide for rehabilitation trials (focusing on rehabilitation and revegetation of Box-Gum Woodland) to be undertaken on different rehabilitation substrates.

[1] Not proposed to be used due to preferential use of mulch and woody debris from clearing activities.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
1. Substrate (Cont.)	1c. Poor soil chemistry – elevated soil nutrients (Prober *et al.,* 2002; Rawlings *et al.,* 2010; DECCW, 2011)	Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• No application of fertilizers on soils with elevated concentrations of the same nutrients (Rawlings *et al.,* 2010). • Nutrient management options to lower soil nitrogen and phosphorus levels: - Crash grazing periodically to remove nutrients locked in weeds (Rawlings *et al.,* 2010)[2]. - Restriction of livestock access to limit further nutrient enrichment[3] (Rawlings *et al.,* 2010). - Hay cutting (Rawlings *et al.,* 2010)[4]. - Controlled burns (Rawlings *et al.,* 2010). - Carbohydrate addition (Rawlings *et al.,* 2010)[5]. - Topsoil removal (scalping) (cleared land only) (Gibson-Roy *et al.,* 2010; Rawlings *et al.,* 2010)[6]. - No kill and pasture cropping (Rawlings *et al.,* 2010)[7].	The BMP will: • describe the following nutrient reduction options and the relevant situations where they would be applied: - Controlled burns.
	1d. Poor soil chemistry – acid rock drainage	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Selective identification and placement (burial) of potentially acid forming interburden materials (Condition 39[c] Schedule 3 of Project Approval 11_0047). • Application of minimum topsoil and subsoil depths (Condition 25[c] of the Approval Decision EPBC 2011/5923).	The RMP will: • provide for selective identification and placement (burial) of potentially acid forming interburden materials; and • describe minimum topsoil and subsoil depths for revegetation (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923).
	1e. Erosion and sedimentation (Rawlings *et al.,* 2010; DECCW, 2011; Tongway and Ludwig, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Establishing vegetation cover as soon as practicable following disturbance. • Application of a temporary sterile cover crop, or native grass covercrop established from native hays. • Adjust seed and planting densities to maximise ground cover. • Treatment of dispersive soils and spoils. • Design of the batter slopes to be stable. • Use of structural erosion controls (e.g. channel banks, slope drains and energy dissipaters). • Exclusion of livestock (Rawlings *et al.,* 2010). • Management of pressure from feral grazing animals and native grazing animals. • Use of benign (hard rock) mulch to stabilise batter surfaces. • Ecological function analysis to identify constraints and requirements for specific management measures (Tongway and Ludwig, 2011).	The RMP will: • provide for establishing vegetation cover as soon as practicable following disturbance to minimise the potential for erosion and weeds. This will involve the application of a temporary sterile cover crop (or native grasses) using species that are not likely to impede revegetation of the Box-Gum Woodland; • provide options for remediating erosion including adjust seed and planning densities to maximise ground cover; • provide options for minimising the risk of erosion including treatment of dispersive soils and spoils, as well as use of use of structural erosion controls (e.g. channel banks, slope drains and energy dissipaters); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • consider the use of benign (hard rock) mulch to stabilise batter surfaces that has been sourced onsite (i.e. salvaged from clearing areas or from waste material); • include monitoring of landscape function; and • include provision to review the need for kangaroo control measures.
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010]) Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])	• Targeting revegetation along drainage lines. • Remediation of scalded areas. • Restriction of livestock access[8] (particularly along drainage lines) (Rawlings *et al.,* 2010). • Installation of new infrastructure in stable locations (e.g. access roads) (McIvor, 2002). • Maximised re-use of existing infrastructure (e.g. access roads) instead of creating new infrastructure. • Ecological function analysis to identify constraints and requirements for specific management measures (Tongway and Ludwig, 2011).	The BMP will: • include a visual inspection of each offset area to identify constraints and requirements for specific management measures; • describe targeted revegetation along drainage lines and scalded areas to minimise risk of erosion; • aim to locate new offset area management infrastructure (e.g. access roads) in stable locations; and • aim to maximise the re-use of existing infrastructure (e.g. access roads) instead of creating new infrastructure.

2 This method is not proposed to be undertaken as grazing livestock were removed from the offset area in 2010.
3 Grazing livestock were removed from the offset area in 2010.
4 This method is not proposed to be undertaken due to the extensive areas required to be revegetated.
5 This method is only applicable over small areas (Rawlings *et al.,* 2010) and is therefore not proposed to be undertaken due to the extensive areas required to be revegetated.
6 This method is only applicable to the cleared lands but is not proposed to be undertaken due to the extensive areas required to be revegetated and high disturbance of the technique.
7 This method is only applicable to the derived grasslands but is not proposed to be undertaken in preference of other methods.
8 Grazing livestock were removed from the offset area in 2010.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
1. Substrate (Cont.)	1f. Soil compaction – inhibits germination of seeds or growth of seedlings (Eddy, 2002; Department of Sustainability and the Environment [DSE], 2005; Rawlings *et al.,* 2010; DECCW, 2011) Also adds to water logging issues.	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Restriction of vehicle access to avoid compacting soil (Eddy, 2002; DSE, 2005). • Pre-planting site preparation (e.g. ripping) (Rawlings *et al.,* 2010). • Exclusion of livestock (Rawlings *et al.,* 2010). • Mulching (Rawlings *et al.,* 2010). • Use of spiked rollers/air jetting to aerate soils to depth of 30 cm.	The RMP will: • describe that vehicle access will be predominantly restricted to designated tracks on mine landforms that have been revegetated to minimise ground disturbance (e.g. compaction); • describe site preparation (e.g. ripping or use of spiked rollers) to reduce soil compaction impacting the success of the revegetation; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch.
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Restriction of vehicle access to avoid compacting soil (Eddy, 2002; DSE, 2005). • Restriction of livestock access[9] (Rawlings *et al.,* 2010).	The BMP will: • describe that vehicle access will be predominantly restricted to designated tracks to minimise ground disturbance (e.g. compaction); and • describe site preparation in cleared land (e.g. ripping or use of spiked rollers) and (where relevant) in derived grassland (e.g. use of spiked rollers) to reduce soil compaction impacting the success of the revegetation.
		Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])		
	1g. Ground disturbance (Eddy, 2002; Rawlings *et al.,* 2010)	Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Avoidance of revegetation techniques that involve high level of physical disturbance (i.e. cultivation, ripping and excavation) (Eddy, 2002; DECCW, 2011). • Restriction of vehicle access to avoid unnecessary ground disturbance (DSE, 2005; Eddy, 2002). • Fencing and signage.	The BMP will: • describe that vehicle access will be predominantly restricted to designated tracks to minimise ground disturbance (e.g. compaction); • describe provision of fencing and signage around the perimeter of the offset areas to exclude livestock and avoid accidental clearance; and • restrict the use of revegetation techniques that involve high level of physical disturbance in existing Box-Gum Woodland and derived grasslands.
		Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])		
	1h. Depleted soil seed bank (DECCW, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Management of topsoil seed resource. • Soil seed bank germination testing (rehabilitation trials). • Supplementary seeding/tube stock planting (Gibson-Roy *et al.,* 2010).	The RMP will: • provide soil handling processes for removal, storage and re-layering of topsoil and subsoil (consistent with Condition 25[d] of the Approval Decision EPBC 2011/5923). This will specifically detail the stripping of topsoil likely to contain seeds; • provide for soil seed bank germination testing to be undertaken on topsoil stockpiles; and • describe a contingency for supplementary seeding/tube stock planting if the regeneration from the soil seed bank is not sufficient.
		Offset Areas	• Supplementary seeding/tube stock planting.	The BMP will favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required.
	1i. Insufficient topsoil and/or topsoil depth (DECCW, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Application of minimum topsoil and subsoil depths (Condition 25[c] of the Approval Decision EPBC 2011/5923). • Soil surveys and inventories prior to soil stripping (Condition 25[c] of the Approval Decision EPBC 2011/5923). • Soil handling processes for removal, storage and re-layering of topsoil and subsoil (Condition 25[d] of the Approval Decision EPBC 2011/5923). • Annual soil balances to manage soil handling.	The RMP will: • describe minimum topsoil and subsoil depths for revegetation (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923); • provide for soil surveys and inventories to be undertaken prior to soil stripping (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923); • provide soil handling processes for removal, storage and re-layering of topsoil and subsoil (consistent with Condition 25[d] of the Approval Decision EPBC 2011/5923). This will specifically detail the stripping of topsoil likely to contain seeds; and • provide for annual soil balances to be undertaken to facilitate management of soil handling.

[9] Grazing livestock were removed from the offset area in 2010.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
1. Substrate (Cont.)	1j. Poor soil water holding capacity (Eddy, 2002)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Amelioration of soils with compost/woody debris. • Selective placement of soils. • Addition of woody debris (Harmon *et al.,* 1986; Debeljak, 2006; Manning *et al.,* 2013; Goldin and Brookhouse, 2014).	The RMP will: • describe options for ameliorating soils to improve the suitability of the soils as a growth media (e.g. amelioration with agricultural gypsum, compost [i.e. mulch saved during clearing activities] or native plant fertilisers depending on the nutrient deficiency); • provide for selective identification and placement (burial) of soils unsuitable for use as a growth media; and • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch. • describe matching flora to landform position.
	1k. Instability of the final landform	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Design of the batter slopes to be stable. • Selective placement of soils. • Use of benign (hard rock) mulch to stabilise batter surfaces.	The RMP will: • describe how the batter slopes have been designed to minimise instability of the final landform; • provide for selective identification and placement (burial) of soils unsuitable for use as a growth media; and • consider the use of benign (hard rock) mulch to stabilise batter surfaces that has been sourced onsite (i.e. salvaged from clearing areas or from waste material).
	1l. Poor drainage of the final landform (Eddy, 2002)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Design of the batter slopes to be stable. • Amelioration of soils with compost.	The RMP will • describe how the batter slopes have been designed to minimise instability of the final landform; and • describe options for ameliorating soils to improve the suitability of the soils as a growth media (e.g. amelioration with agricultural gypsum, compost [i.e. mulch saved during clearing activities] or native plant fertilisers depending on the nutrient deficiency).
	1m. Lack of soil mycorrhizae (Jasper, 2007)	Mine Rehabilitation - Establishment of Box-Gum Woodland on the post-mine landform	• Application of minimum topsoil and subsoil depths. • Soil surveys and inventories prior to soil stripping (Condition 25[c] of the Approval Decision EPBC 2011/5923). • Soil handling processes for removal, storage and re-layering of topsoil and subsoil (Condition 25[d] of the Approval Decision EPBC 2011/5923). • Use of rhizobial bacteria inoculants for acacia (CSIRO, 2005).	The RMP will: • describe minimum topsoil and subsoil depths for revegetation. • provide for soil surveys and inventories to be undertaken prior to soil stripping (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923) • provide soil handling processes for removal, storage and re-layering of topsoil and subsoil (consistent with Condition 25[d] of the Approval Decision EPBC 2011/5923), including the length and mode of topsoil storage. This will specifically detail the stripping of topsoil likely to contain seeds.
2. Clearing	2a. Incidental clearing, fragmentation and fire wood collection	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Restriction on clearing.	The RMP will describe that revegetation at the mine would not be cleared (unless for ecological thinning, maintenance or access for monitoring).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010]) Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])	• Restriction on clearing. • Restriction on fire wood collection. • Use of low disturbance methods for site preparation in derived grasslands and existing Box-Gum Woodland.	The BMP will: • describe a restriction of clearing (unless for ecological thinning of density regrowth [i.e. selective removal of regrowth trees or shrubs], maintenance or access for monitoring); • not permit firewood collection; • describe provision of fencing and signage around the perimeter of the offset areas to manage livestock (i.e. exclusion or controlled entry of livestock for specific purposes) and avoid accidental clearance; • aim to maximise the re-use of existing infrastructure (e.g. access roads) instead of creating new infrastructure; and • aim to locate new offset area management infrastructure (e.g. access roads) preferentially in cleared land.
3. Livestock	3a. Grazing by cattle – ground disturbance, remove or destroy seeds, seedlings or plantings (DSE, 2005; Rawlings *et al.,* 2010)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Fencing of areas undergoing revegetation to exclude grazing livestock and prevent grazing of seedlings (Eddy, 2002). • Maintenance of fencing used to exclude livestock.	The RMP will describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).
		Offset Areas	Grazing livestock were removed from the offset area in 2010.	Grazing livestock were removed from the offset area in 2010.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
4. Introduced flora species (weeds)	4a. Weed invasion – perennial and annual grasses, perennial herbs, annual and biennial herbs and woody weeds (DSE, 2005; Rawlings *et al.,* 2010; Gibson-Roy *et al.,* 2010; DECCW, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Weed control (Condition 25[a] of the Approval Decision EPBC 2011/5923). • Establishing vegetation cover as soon as practicable following disturbance (Condition 25[b] of the Approval Decision EPBC 2011/5923). • Application of a temporary sterile cover crop, or native grass covercrop established from native hays. • Minimal unnecessary ground disturbance that may create opportunities for weeds (Rawlings *et al.,* 2010; DECCW, 2011). • Nutrient management (e.g. exclusion of grazing livestock which add nutrients) (Prober *et al.,* 2002; Rawlings *et al.,* 2010). • General weed hygiene (e.g. avoiding driving through weed infestations) (DECCW, 2011). • Correct spacing for species when planting seedlings to avoid excessive shading (Rawlings *et al.,* 2010). • Provisions to identify new invasive plant species (e.g. weed monitoring). • Weed management options: - Physical Removal (e.g. removing weeds by felling or pulling) (Gibson-Roy *et al.,* 2010; Rawlings *et al.,* 2010). - Herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods) (DSE, 2005; Rawlings *et al.,* 2010; DECCW, 2011). • Sowing of Kangaroo Grass to outcompete annual grass weeds (Prober *et al.,* 2002; Rawlings *et al.,* 2010).	The RMP will: • describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management (consistent with Condition 25[a] of the Approval Decision EPBC 2011/5923); • provide for establishing vegetation cover as soon as practicable following disturbance to minimise the potential for erosion and weeds. This will involve the application of a temporary sterile cover crop (or native grasses) using species that are not likely to impede revegetation of the Box-Gum Woodland; • provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading; and • include sowing of Kangaroo Grass (as this species is known to out-compete annual grass weeds and provide inter tussock spaces for a diversity of ground cover species [eg. wildflowers]).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Minimal unnecessary ground disturbance that may create opportunities for weeds (Eddy, 2002; DSE, 2005; Rawlings *et al.,* 2010). • Light grazing in autumn and/or winter to reduce vigour of annual grass weeds[10] (Rawlings *et al.,* 2010).	The BMP will: • provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading; • provide the following weed management options: - Nutrient management. - Controlled burns (except in revegetation areas) during spring to reduce annual and perennial grass weeds (not broadleaf exotics). - Physical Removal (e.g. removing weeds by felling or pulling). - Herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods). • include sowing of Kangaroo Grass (as this species is known to out-compete annual grass weeds and provide inter tussock spaces for a diversity of ground cover species [eg. wildflowers]).
		Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])	• Minimal unnecessary ground disturbance that may create opportunities for weeds (Eddy, 2002; DSE, 2005; Rawlings *et al.,* 2010).	
5. Herbicide	5a. Excessive herbicides – may have a negative effects on native species (Eddy, 2002)	All areas	• Use herbicides sparingly (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods) (DSE, 2005; Rawlings *et al.,* 2010; DECCW, 2011).	The RMP and BMP will provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
6. Impacts from Animals (exotics and grazing native animals)	6a. Grazing by feral pigs and goats – remove or destroy seeds, seedlings or plantings (Eddy, 2002; Rawlings *et al.,* 2010; DECCW, 2011)	All areas	• Monitoring and control feral pigs and goats (Eddy, 2002; Rawlings *et al.,* 2010). • Use of tree guards to protect young seedlings from browsing or grazing (Rawlings *et al.,* 2010).	The RMP and BMP will: • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); and • provide an option for using tree guards to protect young seedlings from browsing or grazing native animals.

[10] Grazing livestock were removed from the offset area in 2010.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
6. Impacts from Animals (exotics and grazing native animals) (Cont.)	6b. Rabbits and hares (Eddy, 2002; DSE, 2005; DECCW, 2011)	All areas	• Monitoring and control of rabbits and hares (Eddy, 2002; DSE, 2005; Rawlings *et al.,* 2010).	The RMP and BMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
	6c. Grazing native fauna species (e.g. kangaroos) (DECCW, 2011)	All areas	• Use of tree guards to protect young seedlings from browsing or grazing (Rawlings *et al.,* 2010). • Fencing farm dams.	The RMP and BMP will provide: • an option for using tree guards to protect young seedlings from browsing or grazing native animals. • provision to review the need for kangaroo control measures.
	6d. Feral foxes (Eddy, 2002; DECCW, 2011)	All areas	• Monitoring and control of feral foxes (Eddy, 2002; Rawlings *et al.,* 2010).	The RMP and BMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
	6e. Honeybees (DECCW, 2011)	All areas	• Management of honeybees[11].	-
	6f. Deer (DECCW, 2011)	All areas	• Management of Deer.	The BMP will provide monitoring of deer and feral cats and control (if required).
	6g. Feral Cat (Eddy, 2002; DECCW, 2011)	All areas	• Management of the Feral Cat.	The BMP will provide monitoring of deer and feral cats and control (if required).
	6h. Other Invasive Fauna	All areas	• The BMP will provide provisions to identify new invasive fauna species (e.g. fauna monitoring).	The BMP will provide provisions to identify new invasive fauna species (e.g. fauna monitoring).
7. Fire	7a. Uncontrolled bushfire (DECCW, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• No controlled burns whilst vegetation is establishing. • Maintain fire breaks and access. • Assess fuel loads.	The RMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• No controlled burns whilst vegetation is establishing. • Controlled grazing to reduce biomass[12] (Rawlings *et al.,* 2010). • Assess fuel loads.	The BMP will: • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken whilst vegetation is establishing); • prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors; • schedule for maintenance of fire breaks and fire trails; and • provide a schedule for assessing fuel loads.
		Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])	• DECCW (2011) suggests fire frequency should be a minimum interval of 5 years and a maximum interval of 40 years. Rawlings *et al.,* (2010) recommends fire frequency in patches should be every 4 to 8 years. • Spring or autumn burns depending on a range of factors (Gibson-Roy *et al.,* 2010; Rawlings *et al.,* 2010). • Maintain fire breaks and access. • Assess fuel loads.	
	7b. Controlled burns – too infrequent - may result in overexposure of soil, erosive processes and weed invasion, or too frequent - may result in loss of species diversity (Gibson-Roy *et al.,* 2010; DECCW, 2011)	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• No controlled burns whilst vegetation is establishing. • Assess fuel loads.	The RMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• No controlled burns whilst vegetation is establishing. • Assess fuel loads.	The BMP will prescribe any controlled burns in patches of Box-Gum Woodland EEC (existing woodland) to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors.
		Offset Areas – Restoration of Existing Box-Gum Woodland (Condition State 1 [Rawlings *et al.,* 2010])	• DECCW (2011) suggests fire frequency should be a minimum interval of 5 years and a maximum interval of 40 years. Rawlings *et al.* (2010) recommends fire frequency in patches should be every 4 to 8 years. • Assess fuel loads. • Spring or autumn burns depending on a range of factors (Rawlings *et al.,* 2010). • Controlled burns should be undertaken in a mosaic (i.e. retain some unburned areas (DECCW, 2011). • Maintain fire breaks and access.	

[11] Not proposed.
[12] Grazing livestock were removed from the offset area in 2010.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
8. Floristics	8a. Poor diversity in the seed mix or tube stock	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Monitoring of plant growth and survival (Rawlings *et al.,* 2010). • Strategic and long term seed collection, management and storage. • Site preparation and depth of sowing seed. • Supplementary planting or reseeding of absent species.	The RMP will: • describe how the growth and survival of the vegetation sown or planted will be monitored; and • describe procedures for seed collection, management and storage following the relevant Florabank guidelines. The RMP will describe procedures for sowing seed (e.g. appropriate sowing depths).
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Favour natural regeneration over seeding or planting in the first instance followed by seeding or planting if required (McIntyre, 2002).	The BMP will: • describe procedures for seed collection, management and storage following the relevant Florabank guidelines; • describe procedures for sowing seed (e.g. appropriate sowing depths); and • favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required.
	8b. Unsuitable species in the seed mix or tube stock	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2008 in DECCW, 2011).	The RMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Favour natural regeneration over seeding or planting in the first instance followed by seeding or planting if required (McIntyre, 2002).	The BMP will: • provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source; and • favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required.
	8c. Shortage of sufficient seed or tube stock	All areas	• Review commercial seed and tube stock availability.	The RMP and BMP will describe a seed and tube stock supply strategy including calculation of the amount and species of seed and tube stock required each year and how the seed and tube stock will be sourced and managed to meet the demand.
	8d. Poor understorey diversity	All areas	• Planting of trees and shrubs at appropriate densities (DECCW, 2011). • Use local endemic (adapted) species (Eddy, 2002; Rawlings *et al.,* 2010). • Restore linkages to existing woodland patches. • Assess whether ecological thinning is necessary (Rawlings *et al.,* 2010). • Consider causing disturbance (e.g. through fire or grazing) (Eddy, 2002). • Include a wide diversity of species in the seed mix (Gibson-Roy *et al.,* 2010).	The RMP and BMP will: • provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading; • provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source; • include provision to assess vegetation density and undertake ecological thinning (e.g. through selective clearance or fire) if necessary; • provide measures to improve understorey diversity (e.g. replanting, causing disturbance through fire or grazing); and • aim to include a wide diversity of species in the seed mix.
	8e. Over-collection of seed for revegetation purposes (Eddy, 2002; DECCW, 2011)	All areas	• Review commercial seed and tube stock availability. • Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2006a; Broadhurst *et al.,* 2006b; Broadhurst *et al.,* 2008 in DECCW, 2011).	The RMP and BMP will: • describe a seed and tube stock supply strategy including calculation of the amount and species of seed and tube stock required each year and how the seed and tube stock will be sourced and managed to meet the demand; and • provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
	8f. Lack of pollinators	All areas	• Promotion of bees through provision of habitat (e.g. general revegetation and regeneration).	-

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
9. Native plant growth	9a. Poor native plant growth	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Site preparation and depth of sowing seed. • Fencing of areas undergoing revegetation to exclude grazing animals (e.g. livestock)[13]. • Management of pressure from feral grazing animals and native grazing animals. • Correct spacing for species when planting seedlings to avoid excessive shading (Rawlings *et al.,* 2010). • Supplementary seeding or planting. • Revegetation trials. • Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2008 in DECCW, 2011). • Selective use of specific fertilisers only.	The RMP will: • describe procedures for seed collection, management and storage following the relevant Florabank guidelines. The RMP will describe procedures for sowing seed (e.g. appropriate sowing depths); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading; • describe research that will aim to identify effective methodologies for achieving rehabilitation and revegetation of Box-Gum Woodland on the mine rehabilitation; • provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source; • provide for selective use of slow-release fertiliser to promote plant growth (if required) including the use of trace elements; and • include provision to review the need for kangaroo control measures.
		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Site preparation and depth of sowing seed. • Fencing of areas undergoing revegetation to exclude grazing livestock. • Management of pressure from feral grazing animals and native grazing animals. • Correct spacing for species when planting seedlings to avoid excessive shading (Rawlings *et al.,* 2010). • Supplementary seeding or planting. • Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2008 in DECCW, 2011).	The BMP will: • describe procedures for seed collection, management and storage following the relevant Florabank guidelines. The BMP will describe procedures for sowing seed (e.g. appropriate sowing depths); • provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading; • favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required; • provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source; and • include provision to review the need for kangaroo control measures.
	9b. Poor seed germination	All areas	• Supplementary seeding or planting. • Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2008 in DECCW, 2011). • Smoke water[14]. • Seed scarification for acacia or heat treatment.	• The BMP will favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required. • The RMP and BMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
	9c. Dense overstorey and midstorey revegetation (e.g. White Cypress Pine) – sometimes regeneration is too successful and trees may compete with each other for light, water and nutrients (Rawlings *et al.,* 2010; DECCW, 2011)	All areas	• Assess whether ecological thinning is necessary (Rawlings *et al.,* 2010). • Thinning with fire or manually (Rawlings *et al.,* 2010).	The RMP and BMP will include provision to assess vegetation density and undertake ecological thinning (e.g. through selective clearance or fire) if necessary.
	9d. Dense grass cover	All areas	• Consider causing disturbance (e.g. through fire or grazing) (Rawlings *et al.,* 2010).	The RMP and BMP will provide measures to improve understorey diversity (e.g. replanting, causing disturbance through fire or grazing).
	9e. Disease (e.g. *Phytophthora cinnamomi*) (DECCW, 2011)	All areas	• Hygiene protocols to minimise the risk of plant diseases (Rawlings *et al.,* 2010).	The RMP and BMP will include hygiene protocols to minimise the risk of plant diseases (i.e. restricting site access).
	9f. Fungi or pathogens – may cause germination failure (seeds) (Rawlings *et al.,* 2010).	All areas	• Preferential use of local endemic (adapted) species (Rawlings *et al.,* 2010), however use of a high quality seed source over a low quality more local seed source (Broadhurst *et al.,* 2008 in DECCW, 2011).	The RMP and BMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.

[13] Native animals would not be excluded. Feral animals would be controlled via other methods.
[14] This method is not proposed to be undertaken due to the extensive areas required to be revegetated.

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
10. Fauna habitat	10a. Lack of bush rocks (Michael *et al.,* 2011)	All areas	• Maximise salvage and reuse of bush rocks.	The RMP will describe procedures to reuse bush rocks salvaged during vegetation clearance.
	10b. Lack of fallen timber/hollow logs (DECCW, 2011)	All areas	• Maximise salvage and reuse of timber/hollow logs.	The RMP will describe procedures to reuse timber/hollow logs salvaged during vegetation clearance, including: • placement of hollow limbs or artificial hollows in some select trees without hollows; and • use of artificial stag trees on the mine rehabilitation.
	10c. Lack of structural diversity (Manning *et al.,* 2011; Michael *et al.,* 2011; Freudenberger *et al.,* 2004)	All areas	• Planting of scattered low shrubs, mid-sized shrubs and tall trees (Freudenberger *et al.,* 2004). • Maximise salvage and reuse timber/hollow logs. • Increase woodland patch size within the offset area (Prober *et al.* 2002).	• The RMP and BMP will describe that seed and tube stock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat. The RMP will: • describe procedures to reuse of bush rocks salvaged during vegetation clearance; and • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including: - placement of hollow limbs or artificial hollows in some select trees without hollows; and - use of artificial stag trees on the mine rehabilitation. • The BMP will focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity.
11. Surrounding land uses	11a. Agriculture – pesticides and herbicides	Offset Areas	• Increase woodland patch size within the offset area (Rawlings *et al.,* 2010). • Communication with surrounding land users (either NPWS or private).	The BMP will: • focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity; and • include a description of the Community Consultative Committee.
	11b. Agriculture – exotic species (including incursions of stock and feral animals)	Offset Areas	• Increase woodland patch size within the offset area (Rawlings *et al.,* 2010). • Communication with surrounding land users (either NPWS or private). • Fencing and signage. • Co-ordinated management of exotic species with surrounding land users.	
	11c. Agriculture – increased runoff	Offset Areas	• Increase woodland patch size within the offset area (Rawlings *et al.,* 2010). • Communication with surrounding land users (either NPWS or private).	
	11d. Agriculture – nutrient enrichment	Offset Areas	• Increase woodland patch size within the offset area (Rawlings *et al.,* 2010). • Communication with surrounding land users (either NPWS or private).	
12. Weather	12a. Drought	Mine Rehabilitation – Establishment of Box-Gum Woodland on the post-mine landform	• Monitoring for signs of water stress (dieback). • Management of pressure from feral grazing animals and native grazing animals. • Irrigation. • Mulch.	The RMP will: • describe how the growth and survival of the vegetation sown or planted will be monitored; • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; • include provision to review the need for kangaroo control measures; and • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).

Table 3 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Re-establishment and Restoration of Box-Gum Woodland

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
12. Weather (Cont.)		Offset Areas – Re-establishment of Box-Gum Woodland from derived grasslands (Condition State 2 [Rawlings *et al.,* 2010])	• Monitoring for signs of water stress (dieback). • Limit grazing during drought periods (DECCW, 2011). • Management of pressure from feral grazing animals and native grazing animals. • Irrigation[15]. • Mulch[16].	The BMP will: • describe how the growth and survival of the vegetation sown or planted will be monitored; • discuss an adaptive management framework and monitoring programme for the management of the Box-Gum Woodland EEC; • include provision to review the need for kangaroo control measures; and • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
	12b. Flood/major rainfall	All areas	Refer to 1d. Erosion and sedimentation.	-
	12c. Wind	All areas	• Only use healthy seedlings (Rawlings *et al.,* 2010). • Use of tree guards to protect young seedlings (Rawlings *et al.,* 2010).	• The RMP and BMP will provide an option for using tree guards to protect young seedlings from browsing or grazing native animals. • The RMP will provide for establishing vegetation cover as soon as practicable following disturbance to minimise the potential for erosion and weeds. This will involve the application of a temporary sterile cover crop (or native grasses) using species that are not likely to impede revegetation of the Box-Gum Woodland.
	12d. Climate change (DECCW, 2011)	All areas	• Restoration of Box-Gum Woodland (DECCW, 2011). • Use of genetically diverse collections of seed sourced from large and health populations. • Increase woodland patch size within the offset area (to provide links for movement of plant propagules and fauna). • Provide increased connectivity through revegetation of derived grassland.	• The BMP will focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity. • The RMP and BMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
13. Management	13a. Unclear objectives	All areas	• Define objectives (Eddy, 2002; Rawlings *et al.,* 2010). • Management for patchiness (diversity) (Rawlings *et al.,* 2010).	The RMP and BMP will: • define the objectives for the Box-Gum Woodland EEC; and • discuss an adaptive management framework and monitoring programme for the management of the Box-Gum Woodland EEC.
	13b. Lack of maintenance	All areas	• Adaptive management (Rawlings *et al.,* 2010; Tongway and Ludwig, 2011).	
	13c. Poor monitoring design (measurement of success)	All areas	• Monitor to determine effectiveness (Eddy, 2002; DECCW, 2011). • Monitoring closely linked to objectives. • Use of photo-points to monitor changes over time (Eddy, 2002).	
	13d. Unqualified personnel	All areas	• Engage suitability qualified personnel.	The RMP and BMP will describe roles for suitability qualified personnel (e.g. restoration ecologist to provide direction about the rehabilitation and restoration of the Box-Gum Woodland EEC).

Note: The highlighted rows relate only to the Rehabilitation Strategy.
Source: Whitehaven (2014b)

[15] This method is not proposed to be undertaken due to the extensive areas required to be revegetated.
[16] This method is not proposed to be undertaken due to the extensive areas required to be revegetated.

Table 4
Habitat Requirements of Threatened Fauna

Common Name	Habitat Requirements Relevant to the Rehabilitation Strategy and Offset Strategy	Threats Relevant to the Proposed Activities as Defined in the Government Guidelines	Relevant Recovery Actions Defined in the Government Guidelines
Pale-headed Snake	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 4 are relevant to this species' habitat). • This species is found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest (OEH, 2014b). In drier environments, it appears to favour habitats close to riparian areas (OEH, 2014b). • The Pale-headed Snake shelters between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees (OEH, 2014b). • The main prey of this species is tree frogs although lizards and small mammals are also taken (OEH, 2014b).	• Too frequent burning or grazing management which destroys old and dead trees and removes understorey vegetation (OEH, 2014b). • Absence of suitable prey species, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation (e.g. development of tree hollows).	• None defined (OEH, 2014b).
Turquoise Parrot	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland (OEH, 2014b). • Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter (OEH, 2014b). • Nests in tree hollows, logs or posts (OEH, 2014b).	• Lack of hollow-bearing trees (OEH, 2014b). • Degradation of habitat through heavy grazing, firewood collection and establishment of exotic pastures (OEH, 2014b). • Predation by foxes and cats (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation.	• Undertake fox and feral cat control programs in key habitat areas (OEH, 2014b). • Retain areas of open woodland with grassy under-storey and adjoining grassland (OEH, 2014b). • Protect hollow-bearing trees for nest sites. Younger mature trees should also be retained to provide replacements for the older trees when they eventually die and fall over (OEH, 2014b). • Protect sites where Turquoise Parrots forage and nest from heavy, prolonged grazing (OEH, 2014b).
Masked Owl	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Lives in dry eucalypt forests and woodlands from sea level to 1100 metres (OEH, 2014b). • A forest owl, but often hunts along the edges of forests, including roadsides (OEH, 2014b). • The typical diet consists of tree-dwelling and ground mammals, especially rats (OEH, 2014b). • Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting (OEH, 2014b).	• Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future (OEH, 2014b). • A combination of grazing and regular burning is a threat, through the effects on the quality of ground cover for mammal prey, particularly in open, grassy forests (OEH, 2014b). • Secondary poisoning from rodenticides (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Retain hollow-bearing trees as well as large, mature trees that will provide hollows in the future (OEH, 2014b). • Limit the use of pesticides used in suitable native habitat (OEH, 2014b).
Brown Treecreeper (eastern subspecies)	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range (OEH, 2014b). • Mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species (OEH, 2014b). • Also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Usually not found in woodlands with a dense shrub layer (OEH, 2014b). • Fallen timber is an important habitat component for foraging. Forage for insects and other invertebrates amongst the litter, tussocks and fallen timber, and along trunks and lateral branches. Nectar from Mugga Ironbark (*Eucalyptus sideroxylon*) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps (OEH, 2014b).	• Ongoing degradation of habitat, particularly the loss of tree hollows and fallen timber from firewood collection and overgrazing (OEH, 2014b). • Lack of regeneration of eucalypt overstorey in woodland due to overgrazing and too-frequent fires (OEH, 2014b). • Loss of ground litter from compaction and overgrazing (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation.	• Modify grazing management practices that will maintain or improve habitat values and still allow some grazing to occur at strategic times of the year (OEH, 2014b). • Do not allow further loss of dead standing or fallen timber from firewood collection or on-farm practices such as 'tidying up'; do not allow removal of hollow-bearing dead or living trees and stumps on private and public lands (OEH, 2014b). • Fencing of known habitat to protect natural features and to allow natural regeneration (OEH, 2014b). • Increase remnant size and connectivity through incentives and OEH threatened species extension services (OEH, 2014b).

Table 4 (Continued)
Habitat Requirements of Threatened Fauna

Common Name	Habitat Requirements Relevant to the Rehabilitation Strategy and Offset Strategy	Threats Relevant to the Proposed Activities as Defined in the Government Guidelines	Relevant Recovery Actions Defined in the Government Guidelines
Speckled Warbler	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Lives in a wide range of *Eucalyptus* dominated dry sclerophyll forests and woodlands that have a grassy understorey, often on rocky ridges or in gullies (Birdlife Australia, 2014; OEH, 2014a; OEH, 2014b). • Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy (OEH, 2014b). • Large, relatively undisturbed remnants are required for the species to persist in an area (OEH, 2014b). • Nest is located in a slight hollow in the ground or the base of a low dense plant, often among grass tussocks, fallen branches and other litter (OEH, 2014a; OEH, 2014b)	• Poor regeneration of grassy woodland habitats (OEH, 2014b). • Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire (OEH, 2014b). • Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation.	• Undertake fox and feral cat control programs (OEH, 2014b). • Retain dead timber on the ground in open woodland areas (OEH, 2014b). • Limit firewood collection (OEH, 2014b). • Encourage regeneration of habitat by fencing remnant stands (OEH, 2014b). • Fence suitable woodland habitats, particularly those with unimproved pasture and an intact native ground plant layer (OEH, 2014b). • Increase the size of existing remnants, planting trees and establishing buffer zones of unimproved uncultivated pasture around woodland remnants (OEH, 2014b).
Hooded Robin (south-eastern form)	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Prefers lightly wooded country, usually open eucalypt woodland, acacia shrub and mallee, often in or near clearings or open areas (OEH, 2014b). • Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses (OEH, 2014b). • Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey (OEH, 2014b).	• Modification and destruction of ground habitat through heavy grazing and compaction by stock, removal of litter and fallen timber, introduction of exotic pasture grasses and frequent fire (OEH, 2014). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation.	• Retain dead timber on the ground in open woodland areas (OEH, 2014b). • Enhance potential habitat through regeneration by reducing the intensity and duration of grazing (OEH, 2014b). • Fence habitat to protect from long-term, intense grazing (OEH, 2014b). • Increase the size of existing remnants, by planting trees and establishing buffer zones of un-modified, uncultivated pasture around woodland remnants (OEH, 2014b).
Grey-crowned Babbler (eastern subspecies)	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains (OEH, 2014b). • Open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs (OEH, 2014b). • Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses (OEH, 2014b). • Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. (OEH, 2014b).	• Heavy grazing and removal of coarse, woody debris within woodland remnants (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Retain existing woodland vegetation (OEH, 2014b). • Retain dead timber on the ground in open woodland areas (OEH, 2014b). • Encourage regeneration of habitat by fencing remnant stands (OEH, 2014b). • Increase the size of existing remnants, planting trees and establishing buffer zones of unimproved uncultivated pasture around woodland remnants (OEH, 2014b).
Varied Sittella	• Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland (OEH, 2014b). • Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy (OEH, 2014b).	• Firewood collection (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Increase the size of existing remnants by planting trees and establishing buffer zones (OEH, 2014b). • Limit firewood collection and retain dead timber in open forest and woodland areas (OEH, 2014b). • Encourage regeneration of habitat by fencing remnant stands and managing the intensity and duration of grazing (OEH, 2014b). • Control weeds in areas of known habitat (OEH, 2014b).
Koala	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 4 are relevant to this species' habitat). • Inhabit eucalypt woodlands and forests (OEH, 2014b). • Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species (OEH, 2014b). • Appropriate food trees in high densities, and floristic diversity are important for this species (Department of Environment and Climate Change, 2008). • Cypress pines and brush box are examples of shading trees necessary for the Koala (Department of Environment and Climate Change, 2008).	• Predation by feral and domestic dogs (OEH, 2014b). • Intense fires that scorch or kill the tree canopy (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable browse trees particularly in post-mine landscape.	• Undertake feral predator control (OEH, 2014b). • Apply low intensity, mosaic pattern fuel reduction burns in or adjacent to Koala habitat (OEH, 2014b). • Revegetate with suitable feed tree species and develop habitat corridors between populations (OEH, 2014b).

Table 4 (Continued)
Habitat Requirements of Threatened Fauna

Common Name	Habitat Requirements Relevant to the Rehabilitation Strategy and Offset Strategy	Threats Relevant to the Proposed Activities as Defined in the Government Guidelines	Relevant Recovery Actions Defined in the Government Guidelines
Squirrel Glider	• Box-Gum Woodland EEC is potential habitat for this species (NSW Scientific Committee, 2011) (i.e. the factors in Table 3 are relevant to this species' habitat). • Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas (OEH, 2014b). • Prefers mixed species stands with a shrub or *Acacia* midstorey (OEH, 2014b). • Diet varies seasonally and consists of *Acacia* gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein (OEH, 2014b). • Require abundant tree hollows for refuge and nest sites (OEH, 2014b).	• Loss of hollow-bearing trees (OEH, 2014b). • Loss of flowering understorey and midstorey shrubs in forests (OEH, 2014b). • Loss of hollow availability due to takeover by feral honeybees and exotic birds (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species/vegetation resources, particularly in post-mine landscape.	• Retain den trees and recruitment trees (future hollow-bearing trees) (OEH, 2014b). • Retain food resources, particularly sap-feeding trees and understorey feed species such as *Acacia* species and banksias (OEH, 2014b).
Yellow-bellied Sheathtail-bat	• Roosts singly in tree hollows and buildings. In treeless areas they are known to utilise mammal burrows (OEH, 2014b). • Forages in most habitats across its very wide range, with and without trees (OEH, 2014b).	• Loss of hollow-bearing trees (OEH, 2014b). • Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Retain stands of native vegetation, especially those with hollow-bearing trees (including dead trees), and retain other structures containing bats (OEH, 2014b). • Reduce the use of pesticides in the environment (OEH, 2014b). • Encourage regeneration and replanting of local flora species to maintain bat foraging habitat (OEH, 2014b).
Corben's Long-eared Bat (Listed as South-eastern Long-eared Bat under EPBC)	• Occurs in a range of inland woodland vegetation types, including box, ironbark and cypress pine woodlands (DotE, 2014b). • The species also occurs in Buloke woodland; Brigalow woodland; Belah woodland; Smooth-barked Apple (*Angophora leiocarpa*) woodland; River Red Gum (*Eucalyptus camaldulensis*) forests lining watercourses and lakes; Black Box (*E. largiflorens*) woodland; and dry sclerophyll forest (DotE, 2014b). • In the Hunter Valley, NSW, the species has primarily been recorded in moister woodland of various eucalypt species with a distinct shrub layer frequently adjacent to watercourses. There are a small number of records from closed forest adjacent to dry sclerophyll woodlands (DotE, 2014b). • Roosts in tree hollows, crevices, and under loose bark (OEH, 2014b).	• Loss of remnant semi-arid woodland and mallee habitat (OEH, 2014b). • Loss of hollow-bearing trees (OEH, 2014b). • Application of pesticides in or adjacent to foraging areas (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Retain remnant woodland and mallee vegetation (OEH, 2014b). • Retain hollow-bearing trees and provide for hollow tree recruitment (OEH, 2014b). • Minimise the use of pesticides in and adjacent to foraging areas (OEH, 2014b).
Large-eared Pied Bat	• This species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging (DotE, 2014b). • Roosting has also been observed in disused mine shafts, caves, overhangs and it also possibly roosts in the hollows of trees (DotE, 2014b).	• Loss of foraging habitat close to cliffs, caves and old mine workings from forestry activities and too-frequent burning, usually associated with grazing (OEH, 2014b). • Damage to roosting and maternity sites from mining operations, and recreational caving activities (OEH, 2014b). • Use of pesticides. • Disturbance to roosting areas by goats (OEH, 2014b). • Absence/lack of suitable foraging areas, particularly in post-mine landscape. • Time lapse required to reach appropriate successional stage in restoration and/or rehabilitation. • Absence of suitable prey species, particularly in post-mine landscape.	• Protect known and potential habitat from burning at too-frequent intervals (OEH, 2014b). • Avoid damage to known roosting and maternity sites from mining activities, and from recreational caving by contacting the OEH prior to activities (OEH, 2014b). • Reduce the use of pesticides and consider alternatives where available (OEH, 2014b). • Control goats to reduce disturbance to roosting sites (OEH, 2014b).

Table 5
Proposed Actions Relating to Factors Likely to Impede or Enhance the Provision of Habitat for Threatened Fauna

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
1. Adequate availability of prey species The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform, together with the salvage and re-use of logs, hollows and surface litter, will over time provide a range of suitable habitats for invertebrates and vertebrates that provide a potential source of food for various threatened fauna species. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	1a. Lack of invertebrates as a food source (Brown Treecreeper, Grey-crowned Babbler, Varied Sittella, Squirrel Glider) (OEH, 2014b)	Predominantly relevant to establishment of habitat on the post-mine landform.	• Maximise salvage and reuse of timber/hollow logs salvaged from the mine vegetation clearance activities to encourage invertebrates that provide a potential food source. • Mulching to encourage invertebrates that provide a potential food source.	• The RMP and BMP will describe procedures to reuse timber/hollow logs salvaged during vegetation clearance. • The RMP will describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch.
	1b. Lack of reptiles as a food source (Pale-headed Snake) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; and • re-establishment of habitat on cleared (former agricultural) land in the offset areas.	• Maximise salvage and reuse of bush rocks from the mine vegetation clearance activities to encourage reptiles that provide a potential food source. • Maximise salvage and reuse of timber/hollow logs from the mine vegetation clearance activities to encourage reptiles that provide a potential food source.	The RMP will: • describe procedures to reuse bush rocks salvaged during vegetation clearance. • describe procedures to reuse timber/hollow logs salvaged during vegetation clearance.
	1c. Lack of small mammals as a food source (Pale-headed Snake, Masked Owl) (DotE, 2014b; OEH, 2014b)	Predominantly relevant to establishment of habitat on the post-mine landform.	• Maximise salvage and reuse of timber/hollow logs from the mine vegetation clearance activities to encourage small mammals that provide a potential food source. • Place hollow limbs/nest boxes (in young trees without hollows) from the mine vegetation clearance activities to encourage small mammals that would provide a potential food source for predators.	The RMP will describe procedures to reuse timber/hollow logs salvaged during vegetation clearance and/or suitable nest boxes, including placement of hollow limbs or artificial hollows in some select trees without hollows and/or appropriate nest boxes.
2. Nesting (mainly birds) The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform will over time provide suitable vegetation in which some threatened fauna species may nest. Additionally, salvage and re-use of logs, hollows and surface litter could facilitate other threatened fauna species to nest in the short-term. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	2a. Lack of suitable vegetation (Masked Owl, Speckled Warbler, Grey-crowned Babbler) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas.	• As part of a diverse seed mix/tubestock planting list, plant tall tree species. • As part of a diverse seed mix/tubestock planting list, plant low, dense species (Speckled Warbler). • As part of a diverse seed mix/tubestock planting list, plant eucalypts (Masked Owl, Grey-crowned Babbler). • As part of a diverse seed mix/tubestock planting list, plant native, tussocky grasses (Speckled Warbler).	The RMP and BMP will: • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitats; • include the planting (in appropriate soil landscapes) of a variety of eucalypt species; and • include the planting of a variety of native grasses including tussock grass species.
	2b. Lack of hollows (Turquoise Parrot, Masked Owl, Squirrel Glider) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; and • restoration of existing habitat in the offset areas.	• Maximise salvage and reuse of timber/hollow logs from the mine vegetation clearance activities, including placement of hollow limbs in trees without hollows or as components of stag trees.	The RMP will describe procedures to reuse timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows.
		Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas.	• Maximise salvage and reuse of fallen timber/hollow logs from the mine vegetation clearance activities	The RMP will describe procedures to reuse fallen timber/hollow logs salvaged during vegetation clearance.
3. Flora (mainly for foraging and roosting habitat) The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform will over time provide suitable vegetation in which some threatened fauna species may forage and roost. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	3a. Lack of suitable tree species (Pale-headed Snake, Turquoise Parrot, Masked Owl, Brown Treecreeper, Speckled Warbler, Hooded Robin, Grey-Crowned Babbler, Varied Sittella, Koala, Squirrel Glider, Corben's Long-eared Bat, Large-eared Pied Bat) (Department of Environment and Climate Change, 2008; BirdLife Australia, 2014; DotE, 2014b; OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas.	• Plant eucalypts (Pale-headed Snake, Turquoise Parrot, Masked Owl, Brown Treecreeper, Speckled Warbler, Hooded Robin, Grey-crowned Babbler, Varied Sittella, Koala, Squirrel Glider, Corben's Long-eared Bat), in particular: - box, ironbark and gum species (Squirrel Glider); - White Box (*Eucalyptus albens*) (Brown Treecreeper, Grey-Crowned Babbler, Large-eared Pied Bat); - Yellow Box (*E. melliodora*) (Brown Treecreeper, Grey-Crowned Babbler, Large-eared Pied Bat); - Mugga Ironbark (*E. sideroxylon*)[1] (Brown Treecreeper); - Blakely's Red Gum (*E. blakelyi*) (Brown Treecreeper, Grey-Crowned Babbler, Large-eared Pied Bat); - stringybark species (Brown Treecreeper); - rough-barked species (Brown Treecreeper, Varied Sittella);	The RMP and BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species which are all known to occur in the Leard State Forest or offset areas, these may include: - White Box (*Eucalyptus albens*); - Yellow Box (*E. melliodora*); and - Blakely's Red Gum (*E. blakelyi*). • include the planting of *Acacia* species, including both tree and shrub varieties including tree varieties; and • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create a structurally diverse habitat.

Table 5 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Provision of Habitat for Threatened Fauna

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
3. Flora (mainly for foraging and roosting habitat) (Cont.) The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform will over time provide suitable vegetation in which some threatened fauna species may forage and roost. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	3a. Lack of suitable tree species (Pale-headed Snake, Turquoise Parrot, Masked Owl, Brown Treecreeper, Speckled Warbler, Hooded Robin, Grey-Crowned Babbler, Varied Sittella, Koala, Squirrel Glider, Corben's Long-eared Bat, Large-eared Pied Bat) (Department of Environment and Climate Change, 2008; BirdLife Australia, 2014; DotE, 2014b; OEH, 2014b) (Cont.)		- River Red Gum (*E. camaldulensis*)[1] (Brown Treecreeper, Squirrel Glider, Corben's Long-eared Bat); - smooth-barked gum species (Varied Sittella) ; and - Black Box (*E. largiflorens*)[1] (Corben's Long-eared Bat) • Plant *Acacia* tree species (Brown Treecreeper, Squirrel Glider). • Plant mallee species (Brown Treecreeper, Hooded Robin).	
	3b. Lack of suitable shrubs (Brown Treecreeper, Hooded Robin, Grey-crowned Babbler) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas.	• Plant *Acacia* shrub species (Hooded Robin). • Plant native shrubs (Brown Treecreeper). • Plant tall shrub species (Grey-crowned Babbler).	The RMP and BMP will: • include the planting of *Acacia* species, including both tree and shrub varieties including shrub varieties; • include the planting of a variety of native shrubs; and • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create a structurally diverse habitat.
	3c. Lack of suitable ground cover (Turquoise Parrot, Brown Treecreeper, Speckled Warbler, Hooded Robin, Grey-crowned Babbler) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas.	• Plant native grasses. • Plant native herbs (Turquoise Parrot). • Plant native forbs (Grey-crowned Babbler). • Correct spacing for species when planting seedlings.	The RMP and BMP will: • include the planting of a variety of native grasses, herbs and forbs. • provide application rates for seeds as well as planting densities for tubestock.
	3d. Dense shrub layer (Brown Treecreeper, Speckled Warbler) (OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas; and re-establishment of habitat on cleared (former agricultural) land in the offset areas.	• Correct spacing for species when planting seedlings.	The RMP and BMP will provide application rates for seeds as well as planting densities for tubestock.
	3e. Poor floristic diversity (Koala) (Department of Environment and Climate Change, 2008; OEH, 2014b)	Predominantly relevant to: • establishment of habitat on the post-mine landform; • re-establishment of habitat from derived grasslands in the offset areas; and re-establishment of habitat on cleared (former agricultural) land in the offset areas.	• Control for floristic diversity be means of planting a high number of both eucalypt and non-eucalypt species (Koala).	The RMP and BMP will aim to include a wide diversity of species in the seed mix.
4. Remnant Area and Ecological Connectivity The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform will over time increase the size of the existing vegetation patches. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	4a. Small patch area are size (Speckled Warbler, Grey-crowned Babbler) (OEH, 2014b)	Predominantly relevant to: • re-establishment of habitat from derived grasslands in the offset areas.	• Increase woodland patch area within the offset area (Prober *et al.,* 2002).	The BMP will focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity through revegetation to create linkages.
5. Structural Diversity The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform, together with the salvage and re-use of logs, hollows and surface litter, will over time provide a range of suitable habitats for threatened fauna species. The additional material provided in the columns to the right provide specific examples of relevant threatened fauna species and how such goals can be achieved.	5a. Lack of dead stumps or fallen timber (Turquoise Parrot, Brown Treecreeper, Speckled Warbler, Hooded Robin, Varied Sittella) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Maximise salvage and reuse of timber/hollow logs from the mine vegetation clearance activities. • Restriction on firewood collection (OEH, 2014b). • Maximise salvage and reuse of timber/hollow logs from the mine vegetation clearance activities. • Place hollow limbs in young trees without hollows.	• The BMP will not permit firewood collection. • The RMP will describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows.
	5b. Lack of tree hollows (Pale-headed Snake, Brown Treecreeper, Yellow-bellied Sheathtail-bat, Corben's Long-eared Bat) (DotE, 2014b; OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.		

Table 5 (Continued)
Proposed Actions Relating to Factors Likely to Impede or Enhance the Provision of Habitat for Threatened Fauna

Broad Factor	Factors Likely to Impede	Relevant Objective	Factors Likely to Enhance	Actions
6. Feral Animals The RMP and BMP will describe procedures to monitor, prevent and control feral animals in the ongoing restoration, replanting and remediation phase of the Project. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	6a. Loss of food sources or indirect poisoning as a results of use of pesticides, insecticides or herbicides (Masked Owl, Yellow-bellied Sheathtail-bat, Large-eared Pied Bat) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Limit use of pesticides used in suitable native habitat (OEH, 2014b). • Use herbicides sparingly (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods) (DSE, 2005; Rawlings *et al.,* 2010; DECCW, 2011).	The RMP and BMP will: • provide methods for the safe use of pesticides; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
	6b. Competition with introduced Honeybees/exotic birds for nectar, pollen and tree hollows (Squirrel Glider) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Management of Honeybees[2]. • Management of exotic bird species.	• The RMP and BMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
	6c. Predation by feral animals (including foxes, cats, exotic birds and dogs) (Turquoise Parrot, Speckled Warbler, Koala) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Undertake feral predator control.	As above.
	6d. Disturbance to roosting sites by goats (Large-eared Pied Bat) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Monitoring and control feral pigs and goats (Eddy, 2002; Rawlings *et al.,* 2010).	As above.
7. Weeds The RMP will describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management. The additional material provided in the columns to the right , provide specific examples of relevant threatened fauna species and how such goals can be achieved.	7a. Invasion of weeds, resulting in loss of important food plants (Varied Sittella) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Weed control (Condition 25[a] of the Approval Decision EPBC 2011/5923).	• The RMP will describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management (consistent with Condition 25[a] of the Approval Decision EPBC 2011/5923).
8. Regeneration The restoration of native vegetation communities in the offset areas and revegetation of the post mine landform, together with the salvage and re-use of logs, hollows and surface litter, will over time provide a range of suitable habitats for threatened fauna species. The additional material provided in the columns to the right, provide specific examples of relevant threatened fauna species and how such goals can be achieved.	8a. Poor regeneration of habitat (Speckled Warbler) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Encourage regeneration by fencing (OEH, 2014b). • Undertake new plantings (OEH, 2014b), • Reduce intensity of grazing (OEH, 2014b).	• Encouraging regeneration of native fauna habitat is an aim of the RMP and BMP through measures such as fencing, planting and grazing management.
9. Management See additional description provide in column one above.	9a. Too frequent grazing management (Pale-headed Snake, Turquoise Parrot, Masked Owl, Brown Treecreeper, Speckled Warbler, Hooded Robin, Grey-crowned Babbler, Varied Sittella, Large-eared Pied Bat) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• Fencing of areas undergoing revegetation to exclude grazing livestock and prevent grazing of seedlings (Eddy, 2002). • Maintenance of fencing used to exclude livestock. • Restriction of livestock access to maintain ground cover and diversity of native plants. • Low stocking rates.	• The RMP and BMP will describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).
	9b. Too frequent burning management (Pale-headed Snake, Masked Owl, Speckled Warbler, Koala, Large-eared Pied Bat) (OEH, 2014b)	Relevant to the post-mine landforms and the offset areas.	• No controlled burns whilst vegetation is establishing. • Assess fuel loads. • DECCW (2011) suggests fire frequency should be a minimum interval of 5 years and a maximum interval of 40 years. Rawlings *et al.,* (2010) recommends fire frequency in patches should be every 4 to 8 years. • Controlled burns should be undertaken in a mosaic (i.e. retain some unburned areas (DECCW, 2011).	• The RMP and BMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing). • The BMP will prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas).

[1] This species has not been recorded in the surrounds of the area to be rehabilitated and is therefore not proposed to be planted.

[2] Not proposed.

Table 6
A Summary of Actions Relevant to Threatened Fauna

Scientific Name	Common Name	Conservation Status		General Aim	Actions Relevant to the Rehabilitation Strategy	Actions Relevant to the Biodiversity Offset Strategy
		TSC Act[1]	EPBC Act[2]			
Reptiles						
Hoplocephalus bitorquatus	Pale-headed Snake	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will • describe procedures to maximise salvage and reuse timber/hollow logs from the mine vegetation clearance activities to encourage prey for this species; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).	The BMP will • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe management of livestock to maintain ground cover and diversity of native plants; and • prescribe any controlled burns in patches of Box-Gum Woodland EEC (existing woodland or derived grassland) to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas).
Birds						
Neophema pulchella	Turquoise Parrot	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of a variety of native grasses; • include the planting of a variety of native herbs; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • provide application rates for seeds as well as planting densities for tubestock.	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of a variety of native grasses; • include the planting of a variety of native herbs; • not permit firewood collection; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe management of livestock to maintain ground cover and diversity of native plants; and • provide application rates for seeds as well as planting densities for tubestock.
Tyto novaehollandiae	Masked Owl	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • provide methods for the safe use of pesticides; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing); • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).	The BMP will: • provide methods for the safe use of pesticides; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe management of livestock to maintain ground cover and diversity of native plants; • prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas); • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing); • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).

Table 6 (Continued)
A Summary of Actions Relevant to Threatened Fauna

Scientific Name	Common Name	Conservation Status		General Aim	Actions Relevant to the Rehabilitation Strategy	Actions Relevant to the Biodiversity Offset Strategy
		TSC Act[1]	EPBC Act[2]			
Birds (Cont.)						
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: – White Box (*Eucalyptus albens*); – Yellow Box (*E. melliodora*); and – Blakely's Red Gum (*E. blakelyi*). • include the planting of *Acacia* species, including both tree and shrub varieties including tree varieties; • provide application rates for seeds as well as planting densities for tubestock; • include the planting of a variety of native shrubs; • include the planting of a variety of native grasses; and • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: – White Box (*Eucalyptus albens*); – Yellow Box (*E. melliodora*); and – Blakely's Red Gum (*E. blakelyi*). • include the planting of *Acacia* species, including both tree and shrub varieties including tree varieties; • l include the planting of a variety of native shrubs; • include the planting of a variety of native grasses; • not permit firewood collection; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe management of livestock to maintain ground cover and diversity of native plants.
Chthonicola sagittata	Speckled Warbler	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting of a variety of native grasses including tussock grass species; • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing); • provide application rates for seeds as well as planting densities for tubestock; and • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat.	The BMP will: • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting of a variety of native grasses including tussock grass species; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity; • not permit firewood collection; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe management of livestock to maintain ground cover and diversity of native plants; • prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas);

Table 6 (Continued)
A Summary of Actions Relevant to Threatened Fauna

Scientific Name	Common Name	Conservation Status		General Aim	Actions Relevant to the Rehabilitation Strategy	Actions Relevant to the Biodiversity Offset Strategy
		TSC Act[1]	EPBC Act[2]			
Birds (Cont.)						
Chthonicola sagittata (Cont.)	Speckled Warbler					• describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing); and • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of *Acacia* species, including both tree and shrub varieties including shrub varieties; • include the planting of a variety of native grasses; • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • provide application rates for seeds as well as planting densities for tubestock.	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of *Acacia* species, including both tree and shrub varieties including shrub varieties; • include the planting of a variety of native grasses; • not permit firewood collection; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe management of livestock to maintain ground cover and diversity of native plants.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: – White Box (*Eucalyptus albens*); – Yellow Box (*E. melliodora*); and – Blakely's Red Gum (*E. blakelyi*). • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting of a variety of native grasses; • include the planting of a variety of native forbs; and • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: – White Box (*Eucalyptus albens*); – Yellow Box (*E. melliodora*); and – Blakely's Red Gum (*E. blakelyi*). • describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat; • include the planting of a variety of native grasses; • include the planting of a variety of native forbs; • focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe management of livestock to maintain ground cover and diversity of native plants.

Table 6 (Continued)
A Summary of Actions Relevant to Threatened Fauna

Scientific Name	Common Name	Conservation Status		General Aim	Actions Relevant to the Rehabilitation Strategy	Actions Relevant to the Biodiversity Offset Strategy
		TSC Act[1]	EPBC Act[2]			
Birds (Cont.)						
Daphoenositta chrysoptera	Varied Sittella	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management (consistent with Condition 25[a] of the Approval Decision EPBC 2011/5923); and • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: – rough-barked species; and – smooth-barked species. • not permit firewood collection; • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe management of livestock to maintain ground cover and diversity of native plants.
Mammals						
Phascolarctos cinereus	Koala	V	V	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); and • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); and • prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas).
Petaurus norfolcensis	Squirrel Glider	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch; • the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of *Acacia* species, including both tree and shrub varieties including tree varieties; and • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • include the planting of *Acacia* species, including both tree and shrub varieties including tree varieties; and • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • provide methods for the safe use of pesticides; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).	The BMP will: • provide methods for the safe use of pesticides; • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods); and • not permit firewood collection.

Table 6 (Continued)
A Summary of Actions Relevant to Threatened Fauna

Scientific Name	Common Name	Conservation Status		General Aim	Actions Relevant to the Rehabilitation Strategy	Actions Relevant to the Biodiversity Offset Strategy
		TSC Act[1]	EPBC Act[2]			
Mammals (Cont.)						
Nyctophilus corbeni	Corben's Long-eared Bat (Listed as South-eastern Long-eared Bat under EPBC)	V	V	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows; • provide methods for the safe use of pesticides; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species; • provide methods for the safe use of pesticides; and • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	The restoration of native vegetation communities in the offset areas and/or revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide potential habitat for this species including its required food and breeding resources. The additional material provided in the columns to the right, provide specific examples of how such goals can be achieved.	The RMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, including White Box (*Eucalyptus albens*) and Yellow Box (*E. melliodora*); • provide methods for the safe use of pesticides; • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods); • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); and • describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).	The BMP will: • include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, including White Box (*Eucalyptus albens*) and Yellow Box *(E. melliodora*); • provide methods for the safe use of pesticides; • provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods); • describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes); • describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding); • describe management of livestock to maintain ground cover and diversity of native plants; and • prescribe any controlled burns in patches of Box-Gum Woodland EEC to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas).

[1] Threatened species listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) (September 2014).

[2] Threatened species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) (September 2014).

4 IMPLEMENTATION PLAN

There are two parts to the implementation plan:

- the first part of the implementation plan relates to the mine rehabilitation (Rehabilitation Strategy) (Table 7); and
- the second part of the implementation plan relates to the offset areas (Biodiversity Offset Strategy) (Table 8).

The investigation has resulted in the identification of 16 individual actions relating to the Rehabilitation Strategy (Table 7) and 15 individual actions relating to the Biodiversity Offset Strategy (Table 8). Once approved by Department of Planning and Environment (DP&E), the actions in Table 7 will be addressed in a revised RMP and the actions in Table 8 will be addressed in a revised BMP (Figure 4).

The actions listed in Table 7 will apply to different situations associated with rehabilitation of the mine disturbance areas. For example, some actions may be relevant to the revegetation of less disturbed areas (such as the soil stockpile locations or infrastructure areas) and others would be relevant to the revegetation of more disturbed areas (such as the backfilled mine void and waste dumps). The application of the actions will be described in the RMP.

Similarly, all of the actions listed in Table 8 may not necessarily apply across the entire offset area and will depend on the situation such as the current condition of the vegetation. For example, weed control may only be relevant to particular weed infested areas. Particular actions may also be trialled in certain areas to determine which are more effective. The application of the actions will be further detailed in a revision to the BMP.

The actions listed in Tables 7 and 8 are not necessarily the only actions that will be considered in the future to improve the prospects of the Rehabilitation Strategy and Biodiversity Offset Strategy. Actions may be modified over time to adapt to management outcomes, new threatening processes (e.g. a new weed incursion) or to apply new techniques and technologies. Any changes will be facilitated through revisions to the BMP.

As stated in Section 3, the restoration of native vegetation communities in the offset areas and revegetation of the post mine landform, together with the provision of supplementary habitat resources, will over time provide a range of habitats that can be used by threatened fauna species. The provision of suitable habitats does not in itself ensure the presence of any such species in the restored or remediated landscapes in the future. However it is possible to seek to optimise the potential for such species to ultimately locate into these landscapes.

Table 7
Implementation Plan for Provision of Habitat for Threatened Fauna on Mine Rehabilitation

Actions for Implementing the Rehabilitation Strategy in the RMP	
Seed and Tubestock Supply	
1.	The RMP will describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create a structurally diverse habitat.
Revegetation	
2.	The RMP will describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).
3.	The RMP will include the planting of a variety of native grasses including tussock grass species.
4.	The RMP will include the planting of Acacia species, including both tree and shrub varieties.
5.	The RMP will include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: - White Box (*Eucalyptus albens*); - Yellow Box (*E. melliodora*); and - Blakely's Red Gum (*E. blakelyi*).
6.	The RMP will include the planting of a variety of native shrubs.
7.	The RMP will include the planting of a variety of native herbs.
8.	The RMP will include the planting of a variety of native forbs.
9.	The RMP will provide application rates for seeds as well as planting densities for tubestock.
Habitat Features	
10.	The RMP will describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including placement of hollow limbs or artificial hollows in some select trees without hollows.
11.	The RMP will describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch.
Feral Animal Management	
12.	The RMP will provide methods for the safe use of pesticides.
13.	The RMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
Weed Management	
14.	The RMP will describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management (consistent with Condition 25[a] of the Approval Decision EPBC 2011/5923).
15.	The RMP will provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
Fire Management	
16.	The RMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).

Table 8
Implementation Plan for the Provision of Habitat for Threatened Fauna in the Offset Areas

Actions for Implementing the Biodiversity Offset Strategy in the BMP
Revegetation , Seeds and Tubestock
1. The BMP will describe that seed and tubestock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat.
2. The BMP will include the planting of *Acacia* species, including both tree and shrub varieties.
3. The BMP will include the planting (in appropriate soil landscapes) of a variety of box, ironbark and gum eucalypt species, these may include: - White Box (*Eucalyptus albens*); - Yellow Box (*E. melliodora*); and - Blakely's Red Gum (*E. blakelyi*).
4. The BMP will include the planting of a variety of native shrubs.
5. The BMP will include the planting of a variety of native grasses, including tussock grass species.
6. The BMP will include the planting of a variety of native herbs.
7. The BMP will include the planting of a variety of native forbs.
8. The BMP will focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity.
Habitat Features
9. The BMP will not permit firewood collection.
Grazing Management
10. The BMP will describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).
Weed Management
11. The BMP will provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
Feral Animal Management
12. The BMP will provide methods for the safe use of pesticides.
13. The BMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
Fire Management
14. The BMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken whilst vegetation is establishing).
15. The BMP will prescribe any controlled burns in patches of Box-Gum Woodland EEC (existing woodland or derived grasslands) to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors (except in revegetation areas).

[1] This species will be planted as a dominant species within woodland habitat.

As recognised in Section 3, many of the threatened fauna species that are the subject of this report (and listed in Table 2) use the Box-Gum Woodland as habitat. The Box-Gum Woodland EEC Implementation Plan (Whitehaven, 2014b) identified 47 individual actions relating to the Rehabilitation Strategy (Table 9) and 39 individual actions relating to the Biodiversity Offset Strategy (Table 10). Once approved by DP&E, these actions will also be incorporated into the relevant plans as described in the Box-Gum Woodland EEC Implementation Plan (Whitehaven, 2014b).

Table 9
Implementation Plan for Re-establishing Box-Gum Woodland in the Mine Rehabilitation Phase

Actions for Implementing the Rehabilitation Strategy in the RMP
Planning
1. The RMP will define the objectives for the Box-Gum Woodland EEC.
2. The RMP will discuss an adaptive management framework and monitoring programme for the management of the Box-Gum Woodland EEC.
3. The RMP will include monitoring of landscape function.
4. The RMP will describe roles for suitability qualified personnel (e.g. restoration ecologist to provide direction about the rehabilitation and restoration of the Box-Gum Woodland EEC).
Landform Design
5. The RMP will describe how the batter slopes have been designed to minimise instability of the final landform.
Soil Stripping and Handling
6. The RMP will provide for soil surveys and inventories to be undertaken prior to soil stripping (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923).
7. The RMP will provide for selective identification and placement (burial) of potentially acid forming interburden materials.
8. The RMP will provide for selective identification and placement (burial) of soils unsuitable for use as a growth media.
Soil Stripping and Handling (Continued)
9. The RMP will provide soil handling processes for removal, storage and re-layering of topsoil and subsoil (consistent with Condition 25[d] of the Approval Decision EPBC 2011/5923). This will specifically detail the stripping of topsoil likely to contain seeds.
10. The RMP will provide for annual soil balances to be undertaken to facilitate management of soil handling.
11. The RMP will provide options for minimising the risk of erosion including treatment of dispersive soils and spoils, as well as use of use of structural erosion controls (e.g. channel banks, slope drains and energy dissipaters).
12. The RMP will describe minimum topsoil and subsoil depths for revegetation (consistent with Condition 25[c] of the Approval Decision EPBC 2011/5923).
13. The RMP will describe the incorporation of vegetative material (cleared at the mine site) into the soil used for rehabilitation or as mulch.
Soil Testing
14. The RMP will provide parameters for the physical and chemical characteristics of topsoils and overburden based on likely suitable characteristics for establishment of Box-Gum Woodland.
15. The RMP will provide for soil testing to be undertaken on topsoil and overburden to identify issues with physical and chemical characteristics as well as determine amelioration requirements and rates.
Soil Amelioration
16. The RMP will describe options for ameliorating soils to improve the suitability of the soils as a growth media (e.g. amelioration with agricultural gypsum, compost [i.e. mulch saved during clearing activities] or native plant fertilisers depending on the nutrient deficiency).
Surface Preparation
17. The RMP will describe site preparation (e.g. ripping or use of spiked rollers) to reduce soil compaction impacting the success of the revegetation.
18. The RMP will consider the use of benign (hard rock) mulch to stabilise batter surfaces that has been sourced onsite (i.e. salvaged from clearing areas or from waste material).
Research Trials
19. The RMP will describe research that will aim to identify effective methodologies for achieving rehabilitation and revegetation of Box-Gum Woodland on the mine rehabilitation.
20. The RMP will provide for soil seed bank germination testing to be undertaken on topsoil stockpiles.
21. The RMP will provide for rehabilitation trials (focusing on rehabilitation and revegetation of Box-Gum Woodland) to be undertaken on different rehabilitation substrates.

Table 9 (Continued)
Implementation Plan for Re-establishing Box-Gum Woodland in the Mine Rehabilitation Phase

Actions for Implementing the Rehabilitation Strategy in the RMP
Seed and Tube Stock Supply
22. The RMP will describe procedures for seed collection, management and storage following the relevant Florabank guidelines. The RMP will describe procedures for sowing seed (e.g. appropriate sowing depths).
23. The RMP will describe a seed and tube stock supply strategy including calculation of the amount and species of seed and tube stock required each year and how the seed and tube stock will be sourced and managed to meet the demand.
24. The RMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
Revegetation
25. The RMP will provide for establishing vegetation cover as soon as practicable following disturbance to minimise the potential for erosion and weeds. This will involve the application of a temporary sterile cover crop (or native grasses) using species that are not likely to impede revegetation of the Box-Gum Woodland.
26. The RMP will provide options for remediating erosion including adjust seed and planning densities to maximise ground cover.
27. The RMP will describe that vehicle access will be predominantly restricted to designated tracks on mine landforms that have been revegetated to minimise ground disturbance (e.g. compaction).
28. The RMP will provide for selective use of slow-release native plant fertiliser to promote plant growth (if required).
29. The RMP will describe a contingency for supplementary seeding/tube stock planting if the regeneration from the soil seed bank is not sufficient.
30. The RMP will provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading.
31. The RMP will provide measures to improve understorey diversity (e.g. replanting, causing disturbance through fire or grazing).
32. The RMP will describe that revegetation at the mine would not be cleared (unless for ecological thinning, maintenance or access for monitoring).
33. The RMP will include provision to assess vegetation density and undertake ecological thinning (e.g. through selective clearance or fire) if necessary.
34. The RMP include sowing of Kangaroo Grass (as this species is known to out-compete annual grass weeds and provide inter tussock spaces for a diversity of ground cover species [eg. wildflowers]).
35. The RMP will describe that seed and tube stock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat.
36. The RMP will provide an option for using tree guards to protect young seedlings from browsing or grazing native animals.
37. The RMP will describe how livestock will be excluded from areas undergoing active revegetation (i.e. planting or seeding).
38. The RMP will describe how the growth and survival of the vegetation sown or planted will be monitored.
39. The RMP will aim to include a wide diversity of species in the seed mix.
40. The RMP will include hygiene protocols to minimise the risk of plant diseases (i.e. restricting site access).
41. The RMP will include provision to review the need for kangaroo control measures.
Habitat Features
42. The RMP will describe procedures to reuse of bush rocks salvaged during vegetation clearance.
43. The RMP will describe procedures to reuse of timber/hollow logs salvaged during vegetation clearance, including: - placement of hollow limbs or artificial hollows in some select trees without hollows; and - use of artificial stag trees on the mine rehabilitation.
Feral Animal Management
44. The RMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
Weed Management
45. The RMP will describe procedures to prevent, monitor and control weeds. The RMP will also describe relevant targets and performance indicators for weed management (consistent with Condition 25[a] of the Approval Decision EPBC 2011/5923)
46. The RMP will provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
Fire Management
47. The RMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken on the mine rehabilitation whilst vegetation is establishing).

Source: Whitehaven (2014b)

Table 10
Implementation Plan for the Box-Gum Woodland in the Offset Areas

Actions for Implementing the Biodiversity Offset Strategy in the BMP	
Planning	
1.	The BMP will define the objectives for the Box-Gum Woodland EEC.
2.	The BMP will discuss an adaptive management framework and monitoring programme for the management of the Box-Gum Woodland EEC.
3.	The BMP will include a visual inspection of each mapped vegetation management unit in each offset area to identify constraints and requirements for specific management measures.
4.	The BMP will describe targeted revegetation along drainage lines and scalded areas to minimise risk of erosion.
5.	The BMP will aim to maximise the re-use of existing infrastructure (e.g. access roads) instead of creating new infrastructure.
6.	The BMP will aim to locate new offset area management infrastructure (e.g. access roads) preferentially in cleared land.
7.	The BMP will aim to locate new offset area management infrastructure (e.g. access roads) in stable locations.
8.	The BMP will describe provision of fencing and signage around the perimeter of the offset areas to exclude livestock and avoid accidental clearance.
9.	The BMP will describe roles for suitability qualified personnel (e.g. restoration ecologist to provide direction about the rehabilitation and restoration of the Box-Gum Woodland EEC).
Surface Preparation	
10.	The BMP will describe site preparation in cleared land (e.g. ripping or use of spiked rollers) and (where relevant) in derived grassland (e.g. use of spiked rollers) to reduce soil compaction impacting the success of the revegetation.
11.	The BMP will restrict the use of revegetation techniques that involve high level of physical disturbance in existing Box-Gum Woodland and derived grasslands.
Revegetation, Seeds and Tube Stock	
12.	The BMP will describe a seed and tube stock supply strategy including calculation of the amount and species of seed and tube stock required each year and how the seed and tube stock will be sourced and managed to meet the demand.
13.	The BMP will describe procedures for strategic and long term seed collection, management and storage following the relevant Florabank guidelines. The BMP will describe procedures for sowing seed (e.g. appropriate sowing depths).
14.	The BMP will favour natural regeneration in the derived grasslands and woodland areas over seeding or planting in the first instance followed by seeding or planting if required.
15.	The BMP will provide for the preferential use of local endemic (adapted) species, however consideration would be given to the use of a high quality seed source further from the site over a low quality more local seed source.
16.	The BMP will provide application rates for seeds as well as planting densities for tube stock to avoid excessive shading.
17.	The BMP will focus on increasing woodland patch size within the offset area and aim to enhance ecological connectivity.
18.	The BMP will describe that seed and tube stock used in revegetation will include a variety of grasses, low shrubs, mid-sized shrubs and tall trees to create structurally diverse habitat.
19.	The BMP include sowing of Kangaroo Grass (as this species is known to out-compete annual grass weeds and provide inter tussock spaces for a diversity of ground cover species [eg. wildflowers]).
20.	The BMP will aim to include a wide diversity of species in the seed mix.
21.	The BMP will include provision to review the need for kangaroo control measures.
Maintenance	
22.	The BMP will include provision to assess vegetation density and undertake ecological thinning (e.g. through selective clearance or fire) if necessary.
23.	The BMP will provide measures to improve understorey diversity (e.g. replanting, causing disturbance through fire or grazing).
24.	The BMP will provide for selective use of slow-release native plant fertiliser to promote plant growth (if required).
25.	The BMP will provide an option for using tree guards to protect young seedlings from browsing or grazing native animals.
26.	The BMP will describe how the growth and survival of the vegetation sown or planted will be monitored.
27.	The BMP will include hygiene protocols to minimise the risk of plant diseases (i.e. restricting site access).
28.	The BMP will describe a restriction of clearing (unless for ecological thinning, maintenance or access for monitoring).

Table 10 (Continued)
Implementation Plan for the Box-Gum Woodland in the Offset Areas

Actions for Implementing the Biodiversity Offset Strategy in the BMP
Habitat Features
29. The BMP will not permit firewood collection.
Weed Management
30. The BMP will provide the following weed management options and the relevant situations where they would be applied: - Nutrient management (e.g. exclusion of grazing livestock which add nutrients). - Controlled burns during spring to reduce annual and perennial grass weeds (not broadleaf exotics). - Physical Removal (e.g. removing weeds by felling or pulling). - Targeted and timely herbicide application.
31. The BMP will provide methods for the use of herbicides (minimised through spot-spraying, basal spraying, stem injection or cut and paint application methods).
Feral Animal Management
32. The BMP will describe procedures to prevent, monitor and control feral animals (including feral pigs, goats, rabbits and foxes).
Fire Management
33. The BMP will describe measures to prevent fires, such as maintaining fire breaks and access (i.e. no controlled burns would be undertaken whilst vegetation is establishing).
34. The BMP will prescribe any controlled burns in patches of Box-Gum Woodland EEC (existing woodland) to be no less than 5 years and then to occur in spring or autumn burns depending on a range of factors.
35. The BMP will schedule for maintenance of fire breaks and fire trails.
36. The BMP will provide a schedule for assessing fuel loads.
37. The BMP will provide an option for using controlled grazing to reduce biomass or controlled burns of derived grasslands.
General
38. The BMP will describe that vehicle access will be predominantly restricted to designated tracks to minimise ground disturbance (e.g. compaction).
39. The BMP will include a description of the Community Consultative Committee.

Source: Whitehaven (2014b)

5 CONCLUSION

This implementation plan has been developed to maximise the likely prospects for the provision of suitable habitats for threatened fauna on the offset areas and on the post mining landform. The investigation has resulted in the identification of 16 individual actions relating to the Rehabilitation Strategy and 15 individual actions relating to the Biodiversity Offset Strategy. The approved implementation plan will be incorporated into a revised TCM BMP and a revised RMP.

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