

PANDANUS
SOLUTIONS

BAUXITE HILLS MINE

SIGNIFICANT SPECIES MANAGEMENT PLAN

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Declaration of accuracy

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Bauxite Hills Significant Species Management Plan, to satisfy requirements of both EPBC approval ref. 2014/7305 and EPBC 2015/7538 is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
 - (a) Section 490 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
 - (b) Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) where the person knows the information or document is false or misleading.
 - (c) The above offences are punishable on conviction by imprisonment, a fine or both.

Signed



Full name (please print)

Colleen Fish

Organisation (please print)

Metro Mining Ltd.

Date 07/08/17

EXECUTIVE SUMMARY

The Bauxite Hills Mine (BHM), is a proposed open cut bauxite mining operation located north of Weipa, on the western side of Cape York and adjacent to the Skardon River. The closest settlement to the BHM is Mapoon.

As part of its commitment to the management of EPBC listed species identified as having potential to be impacted by the project, Metro Mining Limited (and its subsidiary Gulf Alumina Ltd) has committed to the development of Significant Species Management Plans (SSMP) for specific EPBC listed species as identified in approval EPBC 2014/7305 and approval EPBC 2015/7538.

Approvals 2014/7305 and 2015/7538 have been approved under the following controlling provisions;

- Listed threatened species and communities (sections 18 & 18A), and
- Listed migratory species (sections 20 & 20A)

This SSMP is the primary tool for managing the potential and actual risks to terrestrial significant species identified as having potential to occur and be impacted during activities associated with the Bauxite Hills Mine (BHM).

A total of nine threatened terrestrial fauna species and one threatened flora species were identified from the EPBC Act searches conducted for both the Skardon River and Bauxite Hills approvals. Of these, six terrestrial fauna species and one flora species are the subject of this significant species management plan

These species are:

- Red Goshawk (*Erythrorchis radiatus*),
- Golden-shouldered Parrot (*Psephotus chrysopterygius*),
- Masked Owl (northern subspecies) (*Tyto novaehollandiae kimberlii*),
- Northern Quoll (*Dasyurus hallucatus*),
- Bare rumped Sheath-tail Bat (*Saccolaimus saccolaimus*),
- Black-footed tree rat (*Mesembriomys gouldii rattoides*), and
- Chocolate Tea Tree Orchid (*Dendrobium johannis*)

The only EPBC Act listed threatened fauna species identified during field surveys was the Black-footed tree rat. Likelihood of occurrence for terrestrial fauna species is based on the general habitat requirements of a species or community, habitat representation in the survey area, records of known occurrence and knowledge of distribution where:

- Unlikely: the site is outside the species known range or there are no recent records or suitable habitat present on the site or directly adjacent to the site.
- Possible: suitable habitat occurs within or adjacent to the site and the site is within the known distribution of the species however there are no known records in the area and the species was not recorded during the field investigations.
- High: Suitable habitat occurs within or adjacent to the site and the site is within the known distribution of the species and the species has previously been recorded within the vicinity of the site however it has not been recorded recently or during site investigations.
- Confirmed: Known to occur on the site through direct observation within or immediately adjacent to the site.

To assist in assessing the likelihood of occurrence, locations of fauna sightings and museum records were obtained from the Atlas of Living Australia, Queensland Museum fauna record databases and previous studies undertaken on the BHM area between 2010 and 2015. Likelihood of occurrence was determined for the species utilising the site for any purpose, including overflying. The BHM area has a number of small wetlands in proximity, and several wetland species have been observed overflying, but not actually utilising any habitats within the BHM area.

Of the EPBC Act listed species, only the Black-footed tree rat was confirmed, no other species were confirmed or have a high likelihood of occurrence on site, but it was possible that some species did occur on or adjacent to the proposed site due to the availability of suitable habitat.

Of the listed species identified, the Golden shouldered parrot was considered most unlikely to occupy the area on the basis of the currently known distribution of the species although DoE habitat modelling for this species encompasses the Project area.

During the EIS process and subsequent development of the management documentation for the site, a number of potential impacts of the BHM on the listed significant species have been identified and these are detailed in the species description sections of this report.

A set of management measures is also proposed within this document to specifically address each of the identified potential impacts. In general, the management actions can be summarised as follows:

- Pre-clearing assessments of all areas prior to disturbance to ensure species are not present in areas to be impacted by the BHM,
- A set of preventative management actions focussing on pests, weeds, invasive species and fire as a way of ensuring remnant habitat and regenerating habitat is capable of supporting the significant species,
- A focus on encouraging the species to return to disturbed sites following decommissioning and rehabilitation, and

- A detailed set of management responsibilities with actions within this plan that includes all personnel present on the BHM site and also raises the general awareness and importance of the significant species.

Metro Mining, and specifically the BHM aim to meet the following performance goals:

1. Primary performance goals

- No net loss of roosts / dens used by significant species,
- No direct mortality of significant species due to clearing operations, or operation of the mine,
- Rehabilitated habitat is suitable habitat for significant species likely to occur in the area,
- No infestations of weed species, pests or invasive species will become established on the BHM mining lease in numbers greater than that found in pre-mine surveys, and
- Retained habitat will be maintained in a pre-mining approval condition for the life of the project

The likelihood and potential consequences of each impact, once mitigation measures are accounted for, were assessed both in the project EIS phase and as part of the development of this management document using qualitative risk assessment methodology as per the Australian government's guidelines supplied by the department, DoTE (2017).

All risk assessments conducted to date have identified an overall low residual risk to all of the identified species for all of the potential impacts identified.

1. INTRODUCTION

A total of eight threatened (critically endangered, endangered, vulnerable) terrestrial fauna species were investigated for the BHM study area during pre-approval surveys (Gulf Alumina Ltd (2016), Metro Mining Limited (2016)). One EPBC listed plant species was also identified as occurring within the project area, adjacent to planned disturbance areas.

Only one EPBC Act listed threatened fauna species, the Black-footed tree rat, was positively identified during field surveys.

Likelihood of occurrence for listed species is based on the general habitat requirements of a species or community, habitat representation in the survey area, records of known occurrence and knowledge of distribution where:

- Unlikely: the site is outside the species known range or there are no recent records or suitable habitat present on the site or directly adjacent to the site.
- Possible: suitable habitat occurs within or adjacent to the site and the site is within the known distribution of the species however there are no known records in the area and the species was not recorded during the field investigations.
- High: Suitable habitat occurs within or adjacent to the site and the site is within the known distribution of the species and the species has previously been recorded within the vicinity of the site however it has not been recorded recently or during site investigations.
- Confirmed: Known to occur on the site through direct observation within or immediately adjacent to the site.

To assist in assessing the likelihood of occurrence, locations of fauna sightings and museum records were obtained from the Atlas of Living Australia, Queensland Museum fauna record databases and studies undertaken on the BHM area between 2010 and 2015. Likelihood of occurrence was determined for the species utilising the site for any purpose, including overflying. The BHM area has a number of small wetlands in proximity, and several wetland species have been observed overflying, but not actually utilising any habitats within the BHM area.

Of the EPBC Act listed species investigated, only the Black-footed tree rat was confirmed on site, no other species were confirmed or have a high likelihood of occurrence on site, but it was possible that some species may occur on or adjacent to the site due to the availability of suitable habitat, these were; the Red Goshawk, Masked owl, Northern quoll, Spectacled flying fox, Bare-rumped Sheath-tail bat, False water rat, Chocolate Tea-tree Orchid and the Eastern curlew.

The golden shouldered parrot was considered unlikely to occupy the area on the basis of the currently known distribution of the species although DoEE habitat modelling for this species encompasses the Project area.

Following conclusions of the two Environmental Impact Studies covering the project area for the Bauxite Hills Mine, the commonwealth government issued first a conditional approval under the EPBC

Act 1999 for the Skardon River deposits (EPBC 2014/7305) and then an additional approval under the EPBC Act 1999 for the Bauxite Hills deposits (EPBC 2015/7538).

These approvals compel Metro Mining Limited to conduct a number of activities, including the development of a Species Management Plan detailing how the mining operations will manage the following significant species:

- Red Goshawk
- Masked owl
- Bare-rumped sheath-tail bat
- Northern quoll,
- Golden shouldered parrot,
- Black footed tree rat, and
- Chocolate tea tree orchid

This Significant Species Management Plan has been developed to address the requirements of the Species Management Plan as referenced in approval EPBC 2014/7305, (Appendix one of this document) and EPBC 2015/7538 (Appendix two).

2. PROJECT DESCRIPTION

2.1. Location

The project is referred to as the Bauxite Hills Mine (BHM). The BHM is located on Cape York Peninsula, in the Parish of Skardon within the Cook Shire. The mine site is located approximately 85km North of Weipa, with the closest settlement, the Aboriginal Community of Mapoon situated approximately 15 km to the southwest of the mine site.

The BHM involves the construction and operation of an open cut bauxite mine in western Cape York Peninsula. The BHM involves mining a collection of bauxite ore bodies (Figure one) of around 100 million tonnes (Mt) and is anticipated to initially produce 3 million tons per annum (Mtpa) bauxite suitable as direct shipping ore (DSO), which is expected to rise to 6 Mtpa subject to market conditions. DSO does not require beneficiation of the bauxite and hence beneficiation and associated tailings management are not part of the BHM.

The BHM area involves clearing of approximately 2800 ha of vegetation. Conventional open cut mining will be carried out after removing the topsoil and subsoil. Mining will occur 24 hours per day, 7 days per week. Mining of DSO bauxite is planned to occur during the dry season with shut down during heavy rain periods of the wet season, approximately 3 months from January to March. The mine life is currently predicted to be 18 years.

The bauxite ore will be mined and transported to a screening and stock pile facility at the Port of Skardon River. The bauxite product will be barged to bulk carrier vessels in deep water approximately 15 km beyond the mouth of the river for export.

Project Overview - Figure One



2.2.Project Phases

2.2.1.Construction, operation and rehabilitation phases

This management plan is structured to address the three main project phases of an operating mine, namely the: construction, operation and rehabilitation phases. These phases are consistent with common mining methodology and upon commencement of bauxite extraction activities, will occur concurrently as the mine progresses.

The activities within each phase are listed below:

- Construction phase: mobilisation to site, site preparation and infrastructure establishment, construction of roads and tracks, progressive clearing of vegetation throughout life of mine (note: this includes decommissioning the former Kaolin mine operations and construction of new mining camp (accommodation) and infrastructure),
- Operation phase: extraction of bauxite, potential ripping / screening, transportation and loading product,
- Rehabilitation phase: rehabilitation will be progressive through the life of the mine including: placing of fill, moving of topsoil, final profiling, seeding and revegetation, removal of site infrastructure and final maintenance treatments. Final rehabilitation (decommissioning) of the site is expected to occur approximately five years post the last ore mined, dependant on site operational decommissioning constraints and seasonal access issues.

2.2.2.Mining Methodology

The mining activities have been designed to minimise movement and handling of topsoil in accessing the DSO. Where possible, stripped topsoil will be placed directly onto previously mined pits and all storage of materials (ore, overburden and topsoil) will be minimised.

The aim of the mining process is to facilitate rehabilitation that closely follows the progression of the active mining pit, with progressive rehabilitation occurring throughout the life of the BHM.

The mining method will be open cut mining utilising front end loaders and trucks for hauling. The material does not need any drilling and blasting; however, some ripping of cemented ore or overburden by dozers is likely to be required. Front end loaders will be used for loading due to their high manoeuvrability. Bauxite will be crushed and screened in-pit before haulage to the ROM stockpile using road train trucks.

Any overburden present will be initially stored ex-pit, with in-pit overburden storage expected to commence within the first six months of production. The overburden volume is low for this deposit and it is not expected to represent an issue in terms of waste storage or required capacity of mining equipment. The first shipment of bauxite is planned for October 2018.

The mobile plant and equipment for both project construction and operational activities were sized to support a maximum production rate of 6 Mtpa.

2.2.3.Mine Sequencing

The main features of the proposed mining sequence are outlined below:

1. Pre-clearance survey of area for significant fauna and cultural heritage. This will also involve the relocation of fauna, habitat features or cultural relics. Once cleared, vegetation will be inspected by environmental staff to identify vegetation suitable to be placed directly onto rehabilitated areas to provide initial habitat and assist with soil erosion control.
2. Vegetation will be cleared and stockpiled in windrows along the boundary of the cleared area. Where possible, native seed will be collected for the rehabilitation program directly in front of the clearing process or on adjacent undisturbed tenure (depending on seasonality of seeding). A small number of larger trees with hollows will be felled and placed at a later date in the rehabilitation area for fauna habitat. Vegetation that is not used in the rehabilitation or waste management processes will be wind-rowed and burned, with the burnt material incorporated into topsoil stockpiles.
3. Topsoil will be stripped, leaving the exposed bauxite to be mined. Where possible topsoil will be translocated directly to an area for rehabilitation, or, in the event an area is not available, it will be stockpiled in accordance with the rehabilitation plan,
4. Grade control drilling will be conducted as a quality control and mine planning tool prior to overburden stripping (if required),
5. Removal of Overburden. Overburden thickness varies between 0.2 to 0.6 metres (m) over the majority of the deposit. Some small areas have an overburden thickness of between 0.8 to 1.5 m. For the initial operation, overburden material will be stored in stockpiles near the operating pit and then used for land profiling once mining has been completed in an area.
6. Bauxite mining activities will occur using a truck and shovel methodology. Final equipment details will be determined by the contract mine operator; however, excavation of the bauxite is expected to utilise CAT992K front end loaders with 12 m³ bucket capacity. No drilling or blasting is required and most of the ore will be free dug; some ripping may be required in areas of cemented bauxite,
7. Stage one rehabilitation will involve the contouring of the pit walls, overburden placement and contouring, replacement of the topsoil, along with supplementary seeding, fertilising (if required) and surface stabilisation, and
8. Stage two rehabilitation will involve maintenance and habitat amelioration treatments such as supplementary seeding and planting, hollow log or habitat creation and follow up fertiliser application.

3. SIGNIFICANT SPECIES WITHIN THE PROJECT AREA

The potential impacts of the mining operation on the local populations of significant species in the BHM has been well documented, risk assessed and discussed within the EIS documentation, (Metro Mining Ltd (2016), Gulf Alumina Ltd (2016)).

As part of developing this plan, species specific risk assessments were conducted (Appendix three) and these risk assessments formed the basis of the risk management assessment table, in the Risk management section below.

The following species description outline the following essential information for all personnel charged with managing the significant species on the Bauxite Hills Bauxite Project.

The risk management actions contained in each species description are outlined further within the Management activities section.

3.1. Bare-rumped Sheathtail Bat

Within Australia, the Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus nudicluniatus*) is a poorly known species of insectivorous bat that inhabits tropical eucalyptus woodland and possibly rainforest in the coastal lowlands of north-eastern Queensland and the Top End of the Northern Territory. It prefers open woodlands, particularly Poplar Gum (*E. platyphylla*) woodland, and tall open forest. A national recovery plan for the species exists (Schulz and Thomson, 2007).

The Bare-rumped Sheathtail Bat closely resembles a related species, *Saccolaimus flaviventris*, and a large number of museum specimens are misidentified as the latter species (Milne et al. 2009). Many individuals have white spots on their dorsal fur and/or hairless areas on the rump (features lacking in *S. flaviventris*), although these features are also not always present (Milne et al. 2009). The most diagnostic morphological character separating the two species is the distance between the upper canines, which is less than 5.7mm in the Bare-rumped Sheathtail Bat (Milne et al. 2009). Flight call characteristics overlap considerably between the two species, and these constitute an unreliable character with which to identify the species (Milne et al. 2009), discussed further below.

Bare-rumped Sheathtail Bats roost in small colonies (3 to 40 individuals) in hollows of old trees, buildings and shallow caves (Schulz and Thomson 2007; Csorba et al. 2008). Maternity roost sites can contain 100 individuals (Milne et al. 2009). All roost sites recorded in Australia were in hollows of large eucalypts (Woinarski and Winderlich 2014). Most roosts are located in hollows at 10-15m in height with a roost entrance 6 to 7m above the ground.

Breeding is thought to occur from November to April (Milne et al. 2009).

They emerge early in the evening, fly high and fast, and forage above the forest canopy for aerial insects and foraging may also occur closer to the ground in open habitats such as grassy beach dunes or clearings (Csorba et al.; Schulz and Thomson 2007; Milne et al. 2009). *Saccolaimus spp.* are also very capable of fast flight with limited manoeuvrability, and benefit from open conditions created by fires (Inkster-Draper et al. 2013).

Detection of the species is very difficult; they generally fly too high to be caught in harp traps or mist nets, and their echolocation calls cannot be distinguished from that of similar species (such as *S. flaviventris* and *S. mixtus* that were found in the BHM area). The only viable ways to survey for presence of the species is through targeted tree hollow searches or by shooting foraging individuals (Milne et al. 2009). Neither survey methodology is practical or desirable for a vulnerable species.

3.1.1. Habitat Requirements

In Queensland, most records of the species are from open eucalyptus tall forest in coastal lowlands. Elsewhere in its distribution, it inhabits a wide range of habitats, from dense tropical moist forest and swamps to modified habitats including agricultural areas and plantations (Csorba et al. 2008; Milne et al. 2009; Woinarski and Winderlich 2014).

Most records of foraging individuals are from lowland *Eucalyptus* woodlands and forests (canopy height of 8-20 m), near the coast, rivers or swamps (Schulz and Thomson 2007; Milne et al. 2009). A large number of records are from forests adjacent to open habitats such as wetlands, sand dunes and salt marshes (Milne et al. 2009).

Roost sites have been recorded in deep tree hollows in *E. platyphylla*, *E. miniata* and *E. tetradonta*. In all cases, the diameters of the hollow trunks were large (18-40 cm diameter), as were the diameters of the entrance holes, which were often the broken apex of the trunk (Schulz and Thomson 2007).

The best-documented Australian maternal roost site (Howard Springs, Northern Territory) was a dead, hollow tree surrounded by *E. tetradonta* / *E. miniata* woodland with an average canopy height of 20 m. The dead tree stood 12 m tall, and had lost all its branches. The crown had broken off, leaving a single large (25cm diameter) opening at the top of the trunk (Milne et al. 2009).

Given the species' propensity to forage in open airspace well above the canopy over a variety of habitats, foraging habitat, (regardless whether it is cleared land or rehabilitation) for the species is unlikely to limit populations.

For the purposes of this SSMP, roost sites, including breeding sites, are likely to be the most limiting factor for the species within the project area.

3.1.1.Cape York Distribution

The distribution of the Bare-rumped Sheathtail bat within Australia is poorly known, and confused by past misidentifications. Records exist from the east coast of Queensland between Ayr and Cooktown, with one isolated specimen from Coen (Schulz and Thomson 2007).

The species also occurs in coastal Papua New Guinea, and it is possible that the Queensland population is continuous with the New Guinean population (Schulz and Thomson 2007). The population in the Northern Territory and northern Western Australia may be isolated from the Queensland population (Schulz and Thomson 2007; Milne et al. 2009).

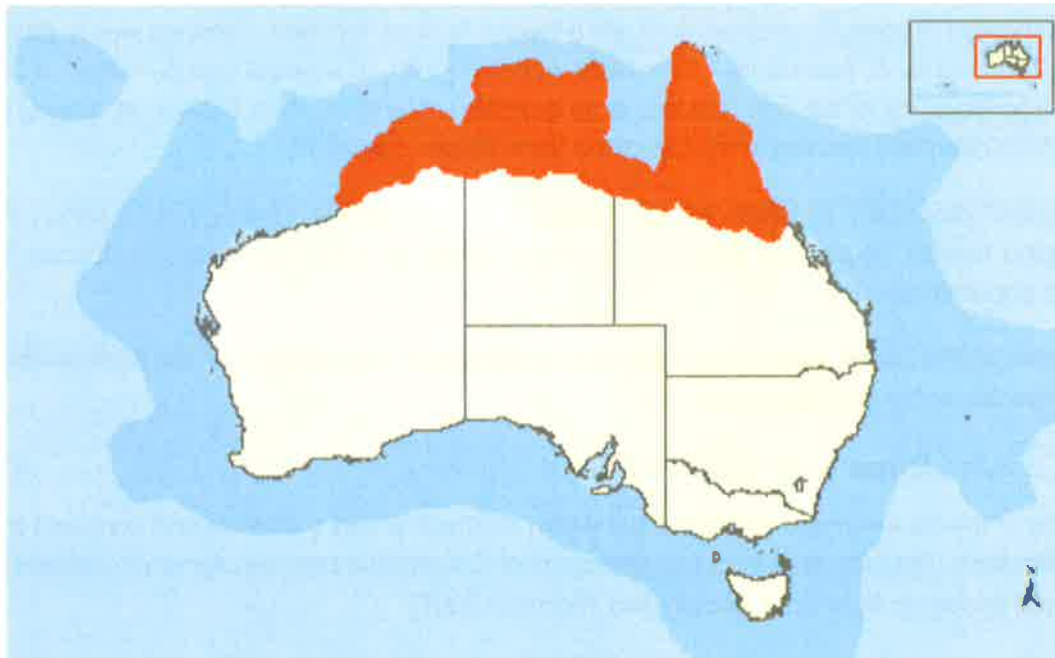
The theoretical potential distribution of the Queensland population was modelled, based on climatic variation at sites where the species has been recorded (Schulz and Thomson 2007). This predicted that the Bare-rumped Sheathtail Bat is restricted in Queensland to a narrow coastal band between Iron Range and Ayr (Schulz and Thomson 2007).

Competition with similar species may also limit populations locally; within Australia, *S. mixtus* appears to outcompete *S. saccolaimus* in the coastal woodlands of northern and western Cape York Peninsula (Queensland Government 2014).

The BHM is outside the known distribution of the Bare-rumped Sheathtail Bat (Schulz and Thomson 2007). Potential habitat for the species (coastal *E. tetradonta* forest adjacent to riparian habitats, vine forest and sand dunes) exists in the BHM area; however, there are no records of the species from the west coast of Cape York Peninsula, and predictive modelling (based primarily on climatic variables) suggests that the local environment is outside the known range of habitats utilised by the species in Queensland (Schulz and Thomson 2007).

In the unlikely event that Bare-rumped Sheathtail Bats do occur in the vicinity of the BHM, they are likely to be part of a connected population across western Cape York Peninsula, as the habitat present in this region is continuous at this point in time.

FIGURE TWO - BARE-RUMPED SHEATHTAIL BAT DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.1.2.Threats

Csorba et al. 2008, recorded that there are no major threats to this widespread and adaptable species globally. However, documented threats to the species in Australia include:

- Clearance of coastal tropical woodland and changes to fire regimes (Duncan et al. 1999; Woinarski and Winderlich 2014),
- Vegetation change due to saltwater intrusion and invasion by exotic plant species (e.g., *Mimosa pigra*) may affect habitat suitability (Schulz and Thomson 2007),
- Invasion by exotic grasses (changing fire regimes) may affect fire intensities, which could damage roost trees (Woinarski and Winderlich 2014), and
- Competition for hollows e.g. the common myna *Acridotheres tristis*, or native birds that have benefited as a result of urban/agricultural environments (e.g. rainbow lorikeet *Trichoglossus haematodus* and the sulphur-crested cockatoo *Cacatua galerita*) and introduced insects (e.g. feral bees), (Schulz and Thomson 2007).

3.1.3.Project Area Survey

Due to the project's staged development phases, two different EIS survey campaigns were undertaken for the entire project area, along with a number of specialised and targeted searches for particular species.

3.1.3.1.Skardon River Deposit EIS

For the Skardon River deposits, (Gulf Alumina Ltd 2016) a total of ten full-spectrum, SM2+BAT Song Meters were set in a range of broad vegetation groups within or immediately outside the boundary of

the Project area. Between six to ten continuous nights passive recordings were obtained from each of the units.

In addition to the passive surveys, ~ 2 hours of active acoustic surveys were conducted along vehicular tracks in the southern section of the Project area. All call analysis was conducted by a recognised expert on bat call analysis who has an extensive library of reference calls from the Cape York Bioregion. No bare-rumped sheath-tail bats were detected during surveys.

3.1.3.2. Bauxite Hills Deposit EIS

Detailed Dry Season fauna assessments (November 2014) and wet season assessments (February 2015) were carried out across the BHM area for the Bauxite Hills Deposits, (Metro Mining Ltd 2016).

Assessment consisted of eight traditional trapping sites (eg. Elliot, pitfall, funnel traps and observational recordings), two separate locations for harp traps and anabars recorders, and five observational sites which were selected outside of the dominate REs, based on presence of preferred habitat for targeted fauna species such as the Bare-rumped Sheath-tail bat.

Analysis of the call pass files collected during the surveys recorded one possible call signature for the Bare-rumped Sheath-tail bat. As detailed above, call recording analysis is not sufficient to distinguish the species from two other similar species *S. flaviventris* and *S. mixtus*.

It is important to note that no *E. platyphylla* woodlands (the preferred habitat of the species) are present within the project area, suitable foraging habitat, and larger hollow bearing eucalypts such as *E. tetradonta* do occur throughout the project area.

3.1.4. Potential impacts and management measures

The following section details the activities that occur at each phase of the projects development, and the anticipated impact that would have on the species both without controls and then, the proposed management action to reduce the risk of that activity.

An individual risk assessment for the Bare-rumped Sheath-tail bat is detailed in Appendix two and summarised in the following impacts and management measures sections below

3.1.5. Construction Phase - Potential Impacts

3.1.5.1. Clearing of possible roost sites

Hollow trees contained within the mine footprint will be cleared prior to extraction of bauxite. The likelihood of these providing a roost site for the Bare-rumped Sheath-tail Bat is very low, considering the low probability that the species occurs in the region.

However, in the unlikely event that a roost site for Bare-rumped Sheath-tail Bats is removed, this impact is likely to persist in the long-term, as hollow development in trees regenerating in mined land is likely to take at least 50 years (Woinarski and Westaway 2008).

3.1.5.2. Direct mortality

In the unlikely event that roosts are removed as part of construction, any bats present within them may suffer injury or death during the felling of the tree. This potential impact persists in the short-term, only during the construction phase.

3.1.5.3.Habitat loss

In the unlikely event that Bare-rumped Sheathtail Bats forage in the BHM area, minor loss of foraging habitat is expected to occur during the clearing of forest prior to mining. Clearing of the disturbance area will be progressive over the life of the BHM. The species feeds in open airspace above the canopy, and utilises gaps in the forest, including man-made gaps (Schulz and Thomson 2007; Csorba et al. 2008).

Consequently, the total area of possible foraging habitat will not be reduced, but the quality may or may not be reduced (eg. reduced abundance of aerial insect prey, or changes in insect type). This reduction in aerial insect abundance is expected to be negligible as sources of insect prey from the adjacent remnant vegetation (and wetland systems) as well as insects attracted to the rehabilitating environment will most likely replace any prey lost due to clearing activities.

3.1.6.Construction Phase - Management Measures

3.1.6.1.Clearing of possible roost sites and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016). Any trees with hollows exceeding 20 cm diameter will be assessed. The detection of any Bare-rumped Sheathtail Bats on-site will trigger corrective actions.

The detection of Bare-rumped Sheathtail Bats will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the site Manager. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

The BHM has committed in its Environmental Authority to progressive rehabilitation and the retention of remnant vegetation outside of its operations and this will ensure that a source of insect prey remains available to foraging bats.

3.1.7.Operational Phase - Potential Impacts

3.1.7.1.Weeds

No declared weeds have been identified on site to date. Earthworks and vehicular traffic during operations have the potential to introduce exotic grasses into neighbouring remnant forests within the BHM area which may proliferate, and potentially affect fire regimes. Fires of excessive intensity can destroy dead trees favoured by Bare-rumped Sheathtail Bats as roost sites. The impacts of weeds are reversible in the short-term, but may require intensive management efforts for this to be achieved.

3.1.8.Operational Phase - Management Measures

3.1.8.1.Weeds

A Weed Management Plan will be prepared, which describes all monitoring and auditable performance measures. This will include annual weed surveys. The detection of declared weeds on-site, as well as species that affect fire regimes (e.g., Gamba Grass, Mission Grass and Grader Grass), will trigger corrective actions.

Additionally, a vehicle inspection and decontamination procedure will occur prior to entry to the site of any vehicle intending to take work or traverse the area. This will allow for the early detection of weed species (and potential plant pathogens), prior to entry to the site.

3.1.9.Rehabilitation Phase - Potential Impacts

3.1.9.1.Weeds

Invasion of rehabilitated areas by exotic weeds may block the regeneration of native vegetation communities. Weeds may indirectly increase the risk of intense fires, slow the development of hollows at the site, or indirectly reduce the abundance of aerial insects originating from the BHM area due to reduced plant diversity (Knops et al. 1999; Rossiter et al. 2004). The impacts of weeds are reversible in the short-term, but may require intensive management efforts for this to be achieved.

3.1.9.2.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

3.1.10.Rehabilitation Phase - Management Measures

3.1.10.1.Weeds

A Weed Management Plan will be prepared, which describes all monitoring and auditable performance measures. This will include annual weed surveys. The detection of declared weeds on-site, as well as species that affect fire regimes (e.g., Gamba Grass, Mission Grass and Grader Grass), will trigger corrective actions.

Additionally, a vehicle inspection and decontamination procedure will occur prior to entry to the site of any vehicle intending to take work or traverse the area. This will allow for the early detection of weed species (and potential plant pathogens), prior to entry to the site.

3.1.10.2.Rehabilitation failure

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during annual assessments of rehabilitation are described in the Mine Rehabilitation Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

3.1.11.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

Management measures for each significant species have been detailed in their respective document section, and summarised in Table two - management measures.

3.2.Red Goshawk

The Red Goshawk is a solitary and secretive bird that is generally silent. Even when nesting, Red Goshawks are inconspicuous; they do not usually reveal themselves by flying off in alarm when approached (Aumann and Baker-Gabb 1991). The Red Goshawk is very sparsely dispersed across approximately 15 percent of primarily coastal and near-coastal Australia from the Kimberley in Western Australia to north-eastern New South Wales (Blakers et al. 1984, Aumann and Baker-Gabb 1991, Barrett et al. 2003).

Czechura et al (2011) found that following field surveys, it was estimated that there were 10-30 pairs of Red Goshawks in southern Queensland (Czechura 1996, Stewart and Hobson 2002), 35-40 pairs in northern Queensland (Czechura and Hobson 2000), and 60-70 pairs for Cape York Peninsula (Czechura 2001) and possibly five pairs in the Mt Isa Inlier Bioregion.

Debus et al. (1993) considered north-east Queensland (north of 20°S) and eastern Cape York Peninsula to be the strongholds for the species in eastern Australia, and this has been corroborated by extensive field surveys (Czechura and Hobson 2000, Czechura 2001).

3.2.1.Habitat Requirements

Red Goshawks generally avoid very densely vegetated or very open habitats, but will hunt along ecotones between such habitats and woodlands or forests.

Resident pairs of red Goshawks prefer intact, extensive woodlands and forests with a mosaic of vegetation types that are open enough for fast manoeuvring flight (Marchant and Higgins 1993). These favoured areas contain permanent water, are relatively fertile and biologically rich with large populations of birds.

In northern Queensland, red Goshawks are mainly associated with extensive, uncleared, mosaics of native vegetation, especially riparian vegetation, open forest and woodland (Czechura and Hobson 2000) that contain a mix of eucalypt, ironbark and bloodwood species.

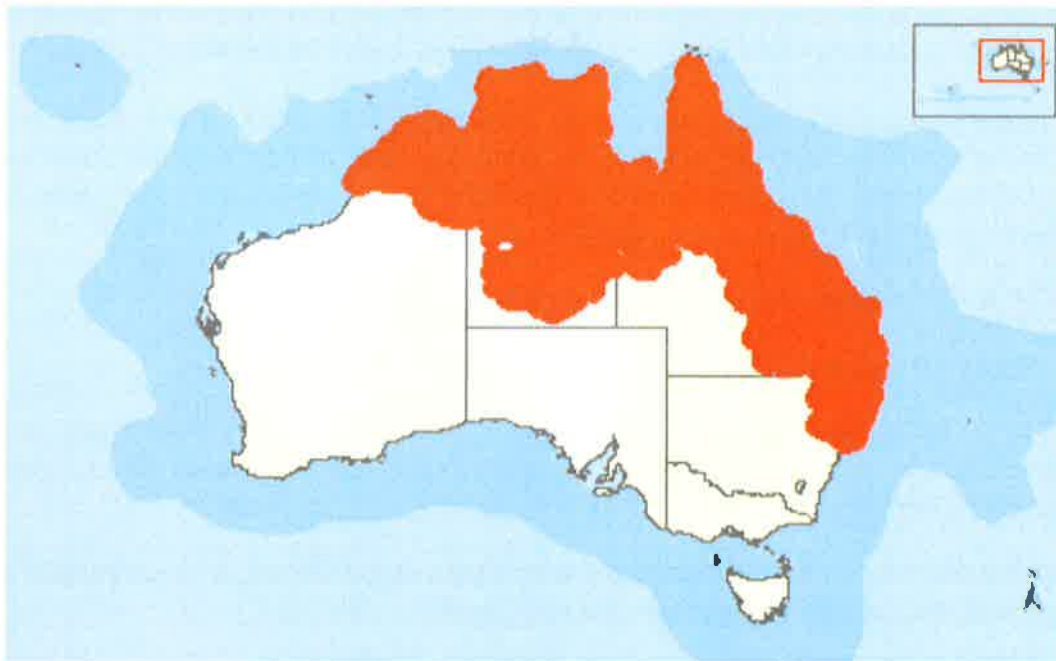
All identified nest trees have been within 1 km of permanent water, often adjacent to rivers or clearings, and usually the tallest (mean height = 31 m) and most massive trees (Aumann and Baker-Gabb 1991, Czechura 2001).

3.2.2.Cape York Distribution

On Cape York Peninsula, red Goshawks are mainly found in vegetation types dominated by northern stringybark *Eucalyptus tetrodonta*, bloodwoods *Corymbia spp.* or paperbarks *Melaleuca spp.* (Czechura 2001).

Czechura and Hobson (2000) concluded that the Gulf Plains (where the BHM is located) do not appear to be suitable for the birds, but because of the presence of localised suitable habitat (the lower Leichhardt River), it is possible that a small number of red Goshawks may be present there. A breeding record c.300 km inland near the upper reaches of the Leichhardt River (Barrett et al. 2003) supports this notion, in (Baker-Gabb 2012).

FIGURE THREE - RED GOSHAWK DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.2.3.Threats

As will all species, habitat loss due to clearing activities is a threat. In particular, removal of suitable roost trees, and changes to the structure and species composition of the foraging habitat will also influence species presence.

However, disturbance to nesting birds is unlikely to be a problem because Red Goshawks are very tolerant of moderate numbers of people visiting their nest sites (Aumann and Baker-Gabb 1991),

Vegetation thickening is likely to have reduced prey availability and hence Red Goshawk densities over large areas of mainland northern Australia (Baker-Gabb 2012).

3.2.4.Project area survey

Due to the projects staged development phases, two different EIS survey campaigns were undertaken for the entire project area, along with a number of specialised and targeted searches for particular species.

3.2.4.1.Skardon River Deposit EIS

Targeted diurnal bird surveys were undertaken in September 2014 across the BHM area around camera trapping and songmeter locations. No red Goshawk individuals, or their distinctive large stick nests, were observed during the survey period. There is the potential for Red Goshawks to forage

within the BHM area; however, it is unlikely that suitable nesting habitat is present within the majority of the site given the lack of suitable tall trees located within one km of permanent water.

Nesting habitat, (which is typically the tallest trees adjacent to rivers and creeks), is located along the Skardon River. The majority of the mining footprint will not be significant habitat to the Red Goshawk with any critical habitat protected within the proposed buffered zones.

3.2.4.2.Bauxite Hills Deposit EIS

Detailed Dry Season fauna assessments (November 2014) and wet season assessments (February 2015) were carried out across the BHM area for the Bauxite Hills Deposits, (Metro Mining Ltd 2016).

assessment consisted of eight traditional trapping sites (eg. Elliot, pitfall, funnel traps and observational recordings), two separate locations for harp traps and anabas recorders, and five observational sites which were selected outside of the dominate REs, based on presence of preferred habitat for targeted fauna species such as the Red Goshawk.

No Red Goshawk were recorded during the the survey periods.

3.2.5.Potential impacts and management measures

The following section details the activities that occur at each phase of the projects development, and the anticipated impact that would have on the species both without controls and then, the proposed management action to reduce the risk of that activity.

An individual risk assessment for the Red Goshawk is detailed in Appendix two and summarised in the following impacts and management measures sections below

3.2.5.1.Construction Phase - Potential Impacts

3.2.5.1.1.Clearing of possible foraging habitat

As determined in the two EIS studies, no suitable roost habitat was identified within the clearing footprint. There is some limited potential that the clearing footprint contains suitable foraging habitat for the Red Goshawk.

3.2.5.1.2.Direct mortality

In the unlikely event that roosts are removed as part of construction, any Red Goshawks present may suffer injury or death during the felling of the tree. This is a highly unlikely potential impact.

3.2.5.1.3.Habitat loss

In the unlikely event that Red Goshawk forage in the BHM area, minor loss of foraging habitat is expected to occur during the clearing of forest prior to mining. Clearing of the disturbance area will be progressive and occur at staged rate over the life of the BHM.

This reduction in foraging habitat is expected to be negligible as sources of insect prey from the adjacent remnant vegetation (and wetland systems) as well as insects attracted to the rehabilitating environment will most likely replace any prey lost due to clearing activities.

3.2.5.2.Construction Phase - Management Measures

3.2.5.2.1.Clearing of possible foraging habitat and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016). Any trees with nests of Red Goshawk that are found on-site will trigger corrective actions

3.2.5.2.2.Habitat loss

The detection of Red Goshawk will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the Environmental Officer. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

The BHM has committed to progressive rehabilitation and the retention of remnant vegetation outside of its operations and this will ensure that a source of insect prey remains available to foraging bats.

3.2.5.3.Operational Phase - Potential Impacts

3.2.5.3.1.Disturbance

Critical roosting habitat has been determined to not occur within the project clearing boundaries. as discussed above, roosting is generally in very large trees, around watercourses and this vegetation will be excluded from the mining footprint. It is very unlikely that roosts will be disturbed due to the mining project.

3.2.5.4.Operational Phase - Management Measures

3.2.5.4.1.Disturbance

In the unlikely event that roosts are located in remnant forest adjacent to areas being mined, an exclusion zone will be established around the nest until all chicks have fledged. As described above for this species, minor nest disturbance is unlikely to have an influence on breeding success. The effect of any potential disturbance is expected to be short-term, lasting for the operational phase of the project.

3.2.5.5.Rehabilitation Phase - Potential Impacts

3.2.5.5.1.Rehabilitation failure and forest structural change

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

It is possible however, that the initial stages of the rehabilitation will be unsuitable foraging habitat for the Red Goshawk due to the plants at a young stage of their lifecycle and therefore no covering canopy and a very dense shrub and understory layer.

3.2.5.6.Rehabilitation Phase - Management Measures

3.2.5.6.1.Rehabilitation failure and forest structural change

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during annual assessments of rehabilitation are described in the Mine Rehabilitation Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

3.2.6.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

3.3.Masked Owl

The Masked Owl *Tyto novaehollandiae* (Stephens, 1826) is a well-defined species, with a highly fragmented distribution including south-western Australia, Tasmania, south-eastern and eastern Australia, north-eastern Queensland, the monsoonal tropics of the north of the Northern Territory and Kimberley, and southern New Guinea (Higgins 1999).

Within Australia, four or five subspecies are recognised: *T. n. novaehollandiae* from south-western Australia and south-eastern Australia as far north as south-eastern Queensland; *T. n. castanops* from Tasmania; *T. n. kimberli* from mainland northern Australia; and *T. n. melvillensis* from the Tiwi Islands, Northern Territory, (Woinarski, J.C.Z. 2004).

3.3.1.Habitat Requirements

Masked Owls are restricted to open forests and savanna woodlands of northern Australia with very few records across its very broad range.

Based on compilation of records from 1998-2002, the New Atlas of Australian Birds (Barrett et al. 2003) reported it from only one 1/4o grid cell (from a total of about 130) in northern Western Australia, two (of a total of about 320) in the Top End of the Northern Territory, one on the Barkly Tableland, and five in northern Queensland. The circumscription of this distribution is confused by (i) a number of dubious or at least unconfirmed records away from its main range (Higgins 1999), such as on the south-west of Cape York Peninsula and in semi-arid Northern Territory; and (ii) whether or not the northeast Cape York Peninsula population is recognised as subspecifically distinct.

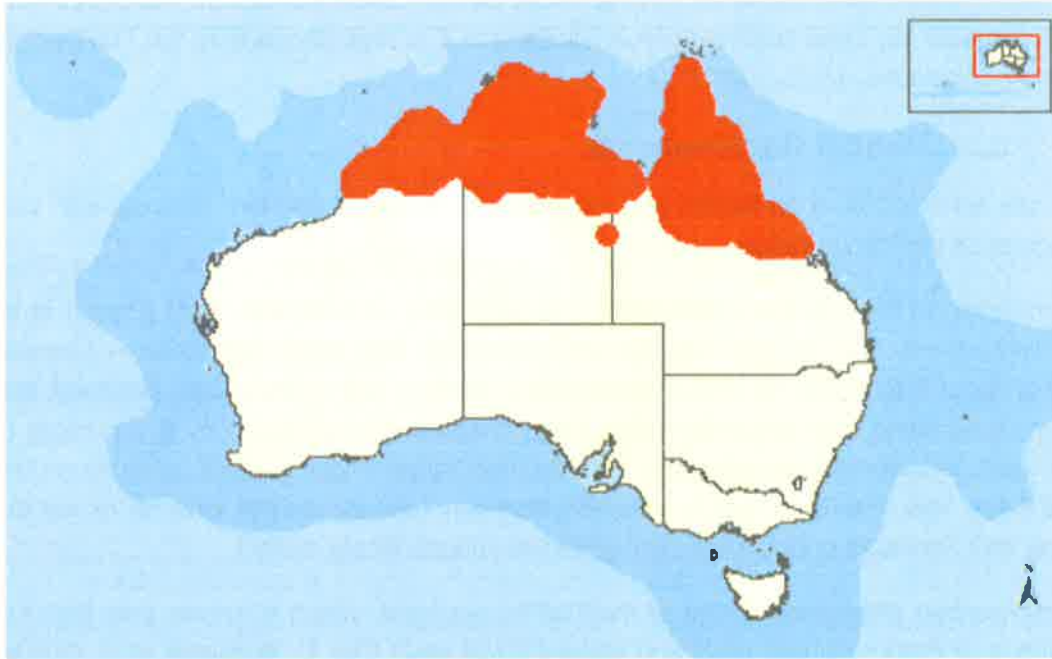
The most circumscribed distribution is that of the Tiwi masked owl, which is known only from the paired Tiwi islands of Bathurst (1693 km²) and Melville (5788 km²) (Fig. 1). Woinarski et al. (2003a) provided some more detailed information on its range on these islands, noting it to be reasonably widespread on both islands, particularly in the higher rainfall areas of north-west Melville Island, where eucalypt forests are tallest and there are many small patches of monsoon rainforest.

There are too few records of the northern Australian mainland subspecies of masked owl to characterise habitat, but it is dependent on relatively large tree hollows in sclerophyll forest and woodland with a grassy understorey or with a mosaic of sparse and dense ground cover. Preferred roosting sites are in tree hollows, caves or dense foliage 3 – 8 m above the ground. The species occurs across tropical Australia and west to the Kimberley with Townsville being the most southern range.

3.3.2.Cape York Distribution

As described above, the Masked Owl is thought to inhabit the Cape York area, however records are not reliable to confirm the presence or absence of this species, or indeed a potential subspecies (Woinarski J.C.Z. 2004).

FIGURE FOUR - MASKED OWL DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.3.3.Threats

For the masked owl (both subspecies), the main ecological features relevant to management are (i) a large home range (and hence low population density); (ii) requirements for large trees with large hollows for nesting; and (iii) diet largely comprising mammals.

More acutely, in parts of the Queensland range (particularly around horticultural areas) the broad-scale application of the rodenticide Klerat may have led directly to mortality of masked owls (Nielsen 1996; Young and De Lai 1997), although the link is unproven (Garnett and Crowley 2000). This pesticide is now banned (Garnett and Crowley 2000).

3.3.4.Project area survey

Due to the projects staged development phases, two different EIS survey campaigns were undertaken for the entire project area, along with a number of specialised and targeted searches for particular species.

3.3.4.1.Skardon River Deposit EIS

Targeted call playback surveys did not confirm presence of the species during surveys in 2010 or 2015. The species is sedentary and territorial, therefore more likely to be identified during surveys should it be present. It is a specialised predator of small mammals thought to hunt preferentially within riverine gallery forests where prey is more abundant.

Surveys identified a paucity in small to medium prey mammal availability across the site through spatial and temporal surveys (2010-2015). This would not promote habitat utilisation for large predatory owl species such as the masked owl. With the exception of Namaleta Creek in the south of the site, all major riparian and riverine habitats occur outside of proposed areas of clearing on the Skardon River, which is identified as more suitable foraging habitat for this species. The species is potentially less selective about its nesting sites, however there is some research to suggest that it will only utilise *E. tetradonta* woodland areas in ecotones around preferable habitats (riparian forest etc.).

The woodland that will be cleared for the BHM footprint (approx. 1800 ha) does contain suitable nesting habitat, however there are large tracts of continuous habitat surrounding the BHM footprint available to the species. There is no loss of foraging habitat to the species as these areas are protected within the proposed buffer zones.

3.3.4.2. Bauxite Hills Deposit EIS

Detailed Dry Season fauna assessments (November 2014) and wet season assessments (February 2015) were carried out across the BHM area for the Bauxite Hills Deposits, (Metro Mining Ltd 2016).

Assessment consisted of eight traditional trapping sites (eg. Elliot, pitfall, funnel traps and observational recordings), two separate locations for harp traps and anabat recorders, and five observational sites which were selected outside of the dominate REs, based on presence of preferred habitat for targeted fauna species such as the Masked Owl.

No Masked Owl were recorded during the the survey periods.

3.3.5. Potential impacts and management measures

The following section details the activities that occur at each phase of the projects development, and the anticipated impact that would have on the species both without controls and then, the proposed management action to reduce the risk of that activity.

An individual risk assessment for the Masked Owl is detailed in Appendix two and summarised in the following impacts and management measures sections below

3.3.5.1. Construction Phase - Potential Impacts

3.3.5.1.1. Clearing of possible roost sites and direct mortality

Hollow trees contained within the mine footprint will be cleared prior to extraction of bauxite. There is potential for clearing of large hollow trees to affect this species.

In the unlikely event that roosts are removed as part of construction, any owls present within them may suffer injury or death during the felling of the tree. This potential impact persists in the short-term, only during the construction phase.

3.3.5.1.2. Habitat loss

This species has been known to forage in cleared areas and cane fields so immediate habitat loss may indeed initially benefit this species. However, over time, loss of habitat overall will reduce the potential habitat utilised by this species and may impact on the species.

3.3.5.2. Construction Phase - Management Measures

3.3.5.2.1. Clearing of possible roost sites and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016). Any trees with hollows exceeding 20 cm diameter will be assessed. The detection of any Masked Owls on-site will trigger corrective actions

3.3.5.2.2. Habitat loss

The detection of Masked Owls will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the site Manager. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

The BHM has committed to progressive rehabilitation and the retention of remnant vegetation outside of its operations and this will ensure that a source of insect prey remains available to foraging bats.

Additionally, the BHM will investigate installing suitable artificial roosts adjacent to the project clearing areas (and monitor these for owls (scat collection)) to facilitate any nocturnal hunting of cleared areas by Masked Owls.

3.3.5.3. Operational Phase - Potential Impacts

3.3.5.3.1. Direct Mortality

As described in the current management plans for the species, the Masked Owl can suffer secondary poisoning effects due to predation of prey species that have ingested commercial poisons (eg. rodent baiting). Therefore some potential exists for impact on this species during the entire project life of the BHM, but more specifically, the greater risk lies during the operational phase.

3.3.5.3.2. Disturbance

In the unlikely event that roosts are located in remnant forest adjacent to areas being mined, roosting individuals may experience elevated stress. The effect of disturbance is short-term, lasting for the operational phase of the project.

3.3.5.3.3. Changes to fire regime

As with all of the significant species identified in this plan, there is some potential for altered fire regimes to facilitate change to the remnant vegetation over time in a number of ways; firstly, there may be a prevalence of fire, reducing biodiversity and structure (especially tree hollows) of the surrounding forest, secondly, infrequent fire may allow the prevalence of woody species and allow weeds to have an impact and thirdly, an increase in fire intensity (ie fire at peak dry periods) would also change the forest type and potentially damage the shallow soils.

3.3.5.4. Operational Phase - Management Measures

3.3.5.4.1. Direct Mortality

As part of the pest and weed management plan, rodent baits and similar pesticides that may impact on the Masked Owl will not be used in rehabilitation activities or any outside locations. Baits and

insecticide use will be restricted to inside enclosed buildings such as offices, crib rooms and associated buildings of the accommodation camp.

3.3.5.4.2.Disturbance

The detection of Masked Owls will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the Environmental Officer. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

3.3.5.5.Rehabilitation Phase - Potential Impacts

3.3.5.5.1.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

3.3.5.6.Rehabilitation Phase - Management Measures

3.3.5.6.1.Rehabilitation failure

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during annual assessments of rehabilitation are described in the Mine Rehabilitation Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

3.3.6.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

3.4.Northern Quoll

The northern quoll *Dasyurus hallucatus* is a marsupial and a member of the *Dasyuridae* family. There are six species in the genus *Dasyurus*. Unfortunately the distribution and/or abundance of all four Australian species has declined since European settlement, with three of the four quoll species now listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The northern quoll previously occurred across most of the northern third of Australia, but its range has significantly declined over the past century (Braithwaite and Griffiths 1994), with declines particularly in lowland areas and/or the semi-arid inland fringes of its range (e.g. the south-west Kimberley (McKenzie 1981); Purnululu National Park in south-east Kimberley (Woinarski 1992)). The species previously extended into the northern parts of the Great Sandy Desert in Western Australia, but has not been seen in that area since 1931 (Burbidge and McKenzie 1983).

The current distribution is discontinuous across northern Australia, with core populations in rocky and/or high rainfall areas. In Queensland, some populations of northern quolls have persisted following colonisation by cane toads. These areas include, but are not restricted to, upland rocky areas (Cape Cleveland/Mt Elliott, Mareeba, Crediton, Eungella, Clarke Range) and several coastal sites (Cleveland, Cape Upstart, Cape Gloucester, Condor Range) in north and central Queensland (Threatened Species Scientific Committee 2005, Ball pers. comm. 2008).

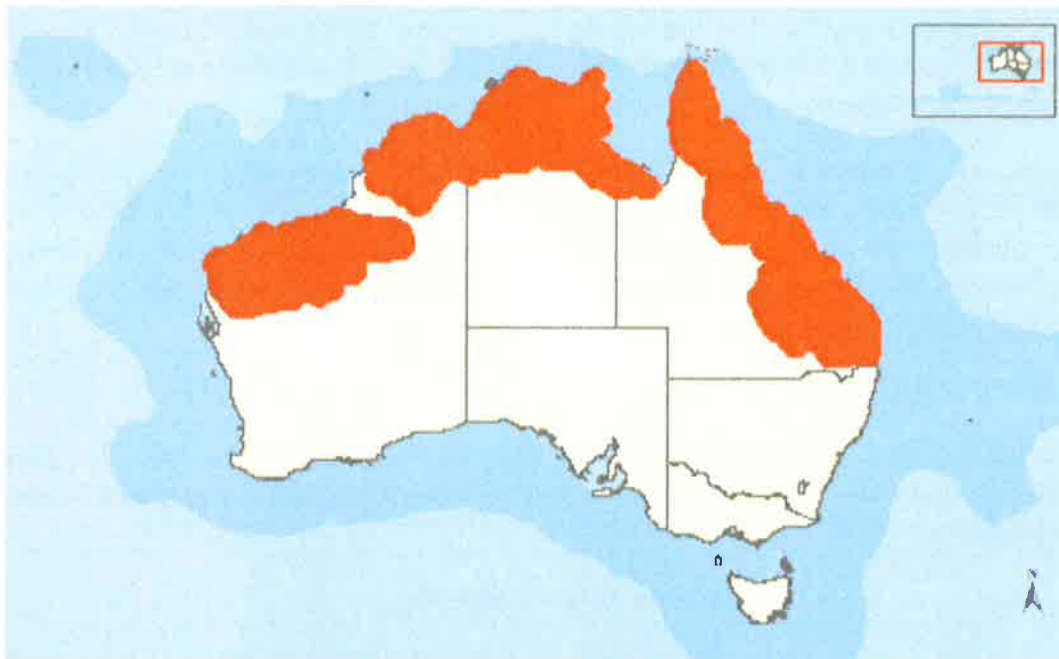
3.4.1.Habitat Requirements

Northern quolls do not have highly specific habitat requirements. They occur in a variety of habitats across their range. They are opportunistic foragers that feed on a broad range of items switching dietary resources according to season and availability (Pollock 1999, Oakwood 2000, 2008a). Daytime den sites provide important shelter and protection for northern quolls from predators and weather. However, shelter sites are also non-specific; rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings have all been recorded (Dixon and Huxley 1985, Braithwaite 1990, Oakwood 2002).

3.4.2.Cape York Distribution

The Northern Quoll was common in the Weipa region prior to the arrival of cane toads (Winter and Atherton 1985). It was regularly observed in a range of habitats, including *Eucalyptus tetradonta* open forest, dunefield woodlands, eucalypt woodlands adjacent to gallery forest, a paperbark woodland in a sinkhole, and on grassy foredunes (Winter and Atherton 1985). Surveys were conducted over 72 days throughout the wet season, dry season and post-wet season and a total of 14 detections occurred (Winter and Atherton 1985). All individuals detected were north or north-west of the Embley River catchment. Drastic, immediate declines in quoll abundance were noted upon the arrival of cane toads to the Weipa-Mapoon area (Braithwaite and Griffiths 1994). These declines were so serious that Northern Quolls were thought to have become extinct on Cape York Peninsula (Woinarski et al. 2008). Recent detection of a sizeable population just north of Weipa suggests that the species continues to persist locally. Contemporary populations of Northern Quoll tend to be confined to unburnt, rugged, rocky areas near water (Woinarski et al. 2008).

FIGURE FIVE - NORTHERN QUOLL DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.4.3.Threats

Cane toads are currently considered the main threat to northern quoll populations in parts of their range within Australia. The Draft Threat abatement plan for cane toads (DEWHA 2010) identifies a high negative population level threat to northern quolls from the cane toad and identifies responses to the threat focusing on northern quolls. The material in this recovery plan is consistent with the recommendations of the threat abatement plan for cane toads. Death by ingestion of cane toad toxin is considered the most immediate threat to northern quolls in the Northern Territory and Western Australia.

Northern quoll populations have survived in some areas alongside toads in northern and central Queensland (Braithwaite and Griffiths 1994, Burnett 1997, Woinarski et al. 2008; Figure 1). These populations typically occur in small, high altitude areas associated with rocky habitats and in some coastal areas of central to northern Queensland. Recent analyses indicate that northern quoll declines in Queensland have mainly been in lowland and flatter (less rugged) areas (Woinarski et al. 2008).

Feral predators may have impacts on quoll populations through competition for food or direct predation, and these impacts may be exacerbated after fire (Oakwood 2004). The National Recovery Plan for the western quoll lists both predation and competition from feral cats and foxes as threats contributing to the decline of that species (Orell and Morris 1994) and the National Threat Abatement Plan for Cats lists competition as a factor impacting on spot-tailed quoll populations (Biodiversity Group Environment Australia 1999). Being the smallest quoll species in Australia, northern quolls are probably most vulnerable to direct predation by these feral predators, but competition for prey may also be an important factor.

The opportunistic nature of the northern quoll diet makes them less vulnerable to starvation, and their vertebrate prey are probably more exposed and easier to catch after fire (Oakwood 2000).

The greatest threat posed by fire may be increased predation of quolls after removal of cover. When fire has removed the ground cover, quolls are more vulnerable to predators such as dingos, cats and raptors (Oakwood 2004). This may particularly be the case in habitats without rocky outcrops where quolls rely on tree hollows or hollow logs for daytime shelter, as frequent fires are likely to reduce the availability of hollow logs.

The semelparous (reproducing only once in a lifetime) nature of the life history of some northern quoll populations may render them particularly susceptible to local extinction when those populations become isolated. Northern quolls breed only once per year (Oakwood 2000). In populations in Kakadu National Park studied by Oakwood, males died after the mating season, reducing the populations to adult females and young (Oakwood 2000).

3.4.4. Project area survey

Due to the projects staged development phases, two different EIS survey campaigns were undertaken for the entire project area, along with a number of specialised and targeted searches for particular species.

3.4.4.1. Skardon River Deposit EIS

A total of 51 survey sites were selected within and directly adjacent to the BHM area. Survey sites were allocated to different BVGs based on the relative area of each unit within the Project area. A total of 50 camera traps were used for the camera trapping survey. Camera traps were active for a period of at least 10 days. A total of 616 camera trap nights were undertaken between 17 September 2014 and 4 October 2014. Of the 43 camera traps successfully set across the site to capture images, no Northern Quolls were identified.

The Northern Quoll was considered unlikely to occur on the BHM area due to the absence of complex rocky outcrops, known refugial habitat for the species and the fact that the species was believed to have become locally extinct on Cape York Peninsula following the arrival of cane toads in the early 1990's.

However a population was discovered 100 km to the south of the BHM area in 2013. On the basis of this rediscovery, it is possible for Northern Quolls to recolonise their historical range, which includes the Project area. If the species was found in the Project area it would have the potential to utilise the entire site (2,800 ha BHM footprint) due its ability to utilise a large variety of habitat structures for nesting and denning and to forage over several kilometres in a single night.

3.4.4.2. Bauxite Hills Deposit EIS

Detailed Dry Season fauna assessments (November 2014) and wet season assessments (February 2015) were carried out across the BHM area for the Bauxite Hills Deposits, (Metro Mining Ltd 2016).

Assessment consisted of eight traditional trapping sites (eg. Elliot, pitfall, funnel traps and observational recordings), two separate locations for harp traps and anabas recorders, and five observational sites which were selected outside of the dominate REs, based on presence of preferred habitat for targeted fauna species such as the Northern Quoll.

No Northern Quoll were recorded during the survey periods.

3.4.5. Potential impacts and management measures

The following section details the activities that occur at each phase of the projects development, and the anticipated impact that would have on the species both without controls and then, the proposed management action to reduce the risk of that activity.

An individual risk assessment for the Northern Quoll is detailed in Appendix two and summarised in the following impacts and management measures sections below

3.4.5.1.Construction Phase - Potential Impacts

3.4.5.1.1.Clearing of Den sites

Within the BHM there is a scarcity of potential den sites and a distinct lack of rock piles and caves.

Indeed the likelihood of a suitable denning site is very low, considering the low probability that the species is still present in the region.

However, in the unlikely event that a den site for the Northern Quoll is removed, this impact is likely to persist in the long-term, as suitable rock piles or caves would be removed due to the mining process.

3.4.5.1.2.Direct mortality

In the unlikely event that dens are removed as part of construction, any animals present within them may suffer injury or death during clearing. This potential impact persists in the short- term, only during the construction phase.

3.4.5.1.3.Habitat loss

In the unlikely event that Northern Quolls forage in the BHM area, minor loss of foraging habitat is expected to occur during the clearing of forest prior to mining. Clearing of the disturbance area will be progressive and occur at steady rate over the life of the BHM (2,800 ha in total).

Northern Quolls are known to forage over a extremely large area and across many different habitats so it is very unlikely that clearing will impact on any potential Northern Quolls in the BHM area.

3.4.5.1.4.Pests (cane toads and feral cats)

Clearing and disturbance of vegetation during the construction phase is a known attractant of several pest animals which may impact on the Northern Quoll. Feral cats are attracted to disturbance and refuse created by people and are thus, without appropriate controls in place, expected to increase in density during the construction phase. Feral cats prey directly on Northern Quolls and compete with them for prey.

Cane toads are already prolific within the disturbance zone (especially the abandoned Kaolin workings) but could potentially increase in numbers with substrate alteration. Ingestion of cane toads is a significant threat to Northern Quolls and increase in cane toad density will increase potential for ingestion in the unlikely case that Northern Quolls are foraging within the site. The impact of pest animals on any Northern Quolls within the site will be long-lasting, as the eradication of both feral cats and cane toads has proved almost impossible in many areas of mainland Australia.

3.4.5.2.Construction Phase - Management Measures

3.4.5.2.1.Clearing of den sites and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active dens/nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016). Any trees with hollows exceeding 20 cm diameter will be assessed as will any located rock piles or caves. The detection of any Northern Quolls on-site will trigger corrective actions

3.4.5.2.2.Habitat loss

The detection of Northern Quolls will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the Environmental Officer. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

The BHM has committed to progressive rehabilitation and the retention of remnant vegetation outside of its operations and this will, in time, make suitable foraging habitat for Northern Quolls

3.4.5.2.3.Pests (cane toads and feral cats)

As part of the BHM Pest and Weed management plan, specific attention will be given to reducing the potential for feral cats and, to a lesser extent, cane toads impacting on potential recolonising Northern Quolls.

Additionally, as part of the rehabilitation management plan, specific attention will be directed to reducing the potential habitat within the abandoned kaolin clay mining voids and associated infrastructure as well as reducing areas for the cane toads to breed.

3.4.5.3.Operational Phase - Potential Impacts

3.4.5.3.1.Mortality due to site activities

There is some potential for site activities, especially haul roads and site access roads to increase the potential for vehicle interaction with Northern Quolls. The Northern Quoll is mostly active during the twilight and night hours and could interact with traffic during that time due to decreased driver visibility.

As per the Masked Owl, some potential also exists for secondary poisoning of Northern Quolls to occur due to ingestion of poisoned prey such as rodents.

3.4.5.4.Operational Phase - Management Measures

3.4.5.4.1.Mortality due to site activities

Driver education, a traffic management plan and increased lighting will be used to reduce the potential for vehicle collisions with wildlife.

As part of the pest and weed management plan, strict controls will be placed on the use of rodent baits and similar pesticides that may impact on the Northern Quoll.

3.4.5.5.Rehabilitation Phase - Potential Impacts

3.4.5.5.1.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

Rehabilitation, by its very nature starts, takes place after the replacement of topsoil and other measures as identified above. The replacement of potential hollow logs, rock piles and other potential denning sites will therefore take a significant number of years to develop naturally and therefore, the impact of the loss of potential den sites will be present for a long period, well after mining is concluded.

3.4.5.6.Rehabilitation Phase - Management Measures

3.4.5.6.1.Rehabilitation failure

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during annual assessments of rehabilitation are described in the Mine Rehabilitation Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

Should Northern Quolls be identified in the area, there is potential for the creation of artificial den sites within the rehabilitation. In other areas of Australia, artificial caves or dens, have been created with some success within previously mined areas. Salvaged logs and branches can be scattered or they can be piled together along with rocks and soil to provide dens (Gleeson and Gleeson 2012). Such dens are provided at a density of three to five per hectare across rehabilitating mine pits at the Boddington Bauxite Mine in Western Australia to provide habitat for the threatened Chuditch (*Dasurus geoffroii*) (Brennan et al 2005).

3.4.6.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

3.5. Golden Shouldered Parrot

The golden-shouldered parrot *Psephotus chrysopterygius* (Gould 1858) is one of three small granivorous parrots that nest in termite mounds (antbeds). Common name synonyms most frequently used for the species are the golden-winged and ant-bed parrot (Higgins 1999). Golden-shouldered parrots are restricted to Cape York Peninsula, far north Queensland. Their distribution once covered most of Cape York Peninsula (McLennan 1923; Thomson 1935; Weaver 1982; Garnett and Crowley 1997, 1999), but is now restricted to two small areas.

The population is probably fewer than 2000 individuals and its range contracted by 2.6% between 1992 and 1998 (Garnett and Crowley 2002).

Golden-shouldered parrots nest in the terrestrial mounds of grass-feeding termites. In the area around Artemis, most nests are built in the conical mounds of *Amitermes scopulus*, although the magnetic mounds of *A. laurensis*, and, occasionally the bulbous mounds of *Nasutitermes triodeae* are also used. Parrots on Bulimba Station and Staaten River National Park mostly nest in the domed mounds of *Amitermes vitiosus* (Garnett and Crowley 2002).

3.5.1. Habitat Requirements

The Golden-shouldered parrot has very unique and critical habitat requirements and although the parrots occupy a range of habitats, only a subset of these is thought to be irreplaceable within its life history (Garnett and Crowley 2002).

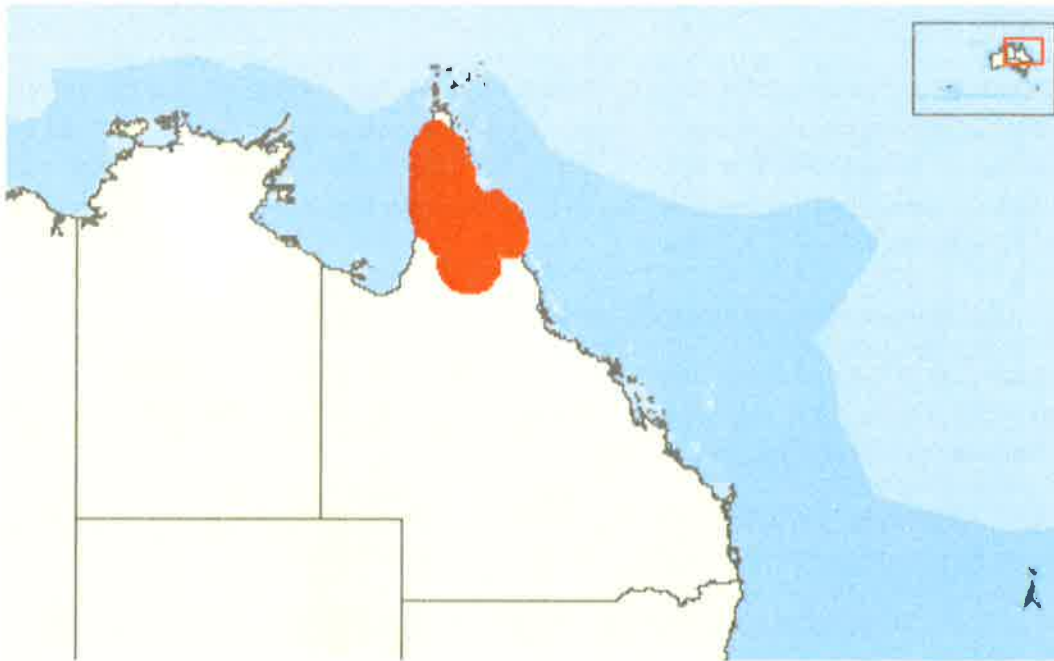
In the wet season the parrots appear to require the gravelly slopes of quartzite gravel that occur in association with metamorphic rocks and granites. These areas are refuges early in the wet season when most fallen seed has germinated and no storm-burnt seed is available on the flatter country. Seed on the gravels appears to germinate less readily because it is less vulnerable to early saturation. The other critical habitat is that used by the parrots for breeding (Garnett and Crowley 2002).

Nesting requirements are also very specific as the parrots require termite mounds, particularly those of *Amitermes scopulus* in the Morehead population and *A. vitiosus* in the Staaten population. These mounds primarily occur along grassy drainage flats fringed by woodland, although they are also present on the gravel slopes (Garnett and Crowley 2002).

3.5.2. Cape York Distribution

The golden-shouldered parrot occurs in the headwaters of the Morehead River and adjacent westward flowing streams (Morehead population) and the upper tributaries of the Staaten River (Staaten population). The range of the Morehead population is currently about 1380 km². Until 1998, it was still contracting, at least along its eastern boundary for which detailed distributional data is available. The Staaten population is currently thought to be contained in an area of about 300 km² west of the Lynd River in the headwaters of Cockburn, Back and White Horse creeks (Garnett and Crowley 2002).

FIGURE SIX - GOLDEN SHOULDERED PARROT DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.5.3.Threats

Predation appears to be the immediate cause of decline, possibly in combination with a shortage of food in the early wet season. Both threats have come about as a result of a change in fire regime, particularly in combination with cattle grazing. One result of the change in fire regime has been an increase in the density of woody plants, notably broad-leaved ti-tree *Melaleuca viridiflora*. This appears to have increased the vulnerability of birds to predation during the wet season and while nesting. The second effect has been the development of a coarser mosaic of burning histories, which is thought to decrease the chances of dispersing parrots finding suitable habitat in the wet season. Cattle affect the parrot by reducing seed production by wet season grasses and reducing the fuel load, particularly in the habitat used by the parrots when breeding.

3.5.4.Project area survey

Due to the projects staged development phases, two different EIS survey campaigns were undertaken for the entire project area, along with a number of specialised and targeted searches for particular species.

3.5.4.1.Skardon River Deposit EIS and Bauxite Hills Deposit EIS

Fauna surveys were undertaken in June 2010 (dry season generic survey), September / October 2014 (targeted surveys) and February 2015 (wet season generic survey). Surveys were undertaken using a variety of methods (e.g. trapping, motion cameras, ultrasonic bat detection, diurnal searches and nocturnal searches) over the whole Project area.

Two distinct fauna methodologies were employed during field surveys on site, generic fauna surveys and targeted fauna surveys. Generic fauna surveys were undertaken in general accordance with the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland developed by the Department of

Science, Information Technology, Innovation and the Arts (DSITIA, 2012a) with the aim of characterising the faunal values of the Project site, rather than to provide a comprehensive survey of all fauna that has the potential to occur on the site over time. These guidelines have been approved by the Federal DoE.

Specific targeted surveys for the Golden-shouldered parrot were not undertaken due to the very unlikely potential for the species to occur in either of the EIS survey locations. If the Golden-shouldered parrot were present in either EIS study area, both the generic survey methodology and targeted searches for other significant species would have provided ample opportunity for detection of the species, if it was present.

3.5.5.Potential impacts and management measures

The following section details the activities that occur at each phase of the projects development, and the anticipated impact that would have on the species both without controls and then, the proposed management action to reduce the risk of that activity.

An individual risk assessment for the Golden Shouldered Parrot is detailed in Appendix two and summarised in the following impacts and management measures sections below

3.5.5.1.Construction Phase - Potential Impacts

3.5.5.1.1.Clearing of possible feeding and nest sites

Due to the highly specific nesting requirements of this species, It is extremely unlikely that the clearing activities will impact on this species. However, as nesting resources (and specific food source) is a limiting factor, clearing is the only possible impact of operations on this species.

However, in the unlikely event that feeding and nesting resources for this species are removed, the impact is likely to persist in the long-term, as termite mound development and development of specific grasslands would be an extremely long term aspirational goal for the rehabilitation.

3.5.5.2.Construction Phase - Management Measures

3.5.5.2.1.Clearing of possible feeding and nest sites

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016).

The detection of Golden-shouldered parrots will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the site Manager.

No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

3.5.5.3.Operational Phase - Potential Impacts

Due to the extremely specific diet and nesting requirements, once clearing has been undertaken, there is a very negligible likelihood that ongoing operations would have any impact on the Golden-shouldered parrot.

3.5.5.4.Operational Phase - Management Measures

As with all species addressed in the SSMP, all employees, visitors and the like will be aware of the significance of the Golden-shouldered parrot. Therefore, if there is any remote likelihood that the species is encountered on site, it will be appropriately addressed through the site procedures and measures detailed above.

3.5.5.5.Rehabilitation Phase - Potential Impacts

3.5.5.5.1.Weeds

Invasion of rehabilitated areas by exotic weeds may block the regeneration of native vegetation communities. Weeds may indirectly increase the risk of intense fires, slow the development of native grassland species at the site, or increase woody species displacing native grasses. The impacts of weeds are reversible in the short-term, but may require intensive management efforts for this to be achieved.

3.5.5.5.2.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

3.5.5.6.Rehabilitation Phase - Management Measures

3.5.5.6.1.Weeds

A Weed Management Plan, along with a Fire Management Plan will be prepared, which describes all monitoring and auditable performance measures, as well as measures to maintain existing fire regimes.

This will include annual weed surveys. The detection of declared weeds on-site, as well as species that affect fire regimes (e.g., Gamba Grass, Mission Grass and Grader Grass), will trigger corrective actions.

Additionally, a vehicle inspection and decontamination procedure will occur prior to entry to the site of any vehicle intending to take work or traverse the area. This will allow for the early detection of weed species (and potential plant pathogens), prior to entry to the site.

3.5.5.6.2.Rehabilitation failure

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during annual assessments of rehabilitation are described in the Mine Rehabilitation Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

3.5.6.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The

Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

3.6.Black-footed Tree-rat

The Black-footed Tree-rat (north Queensland) is a nocturnal medium-sized native mammal and one of the largest rodents in Australia (Friend, 1987; Northern Territory Department of Land and Resource Management, 2012). It is a solid rodent with long shaggy medium grey to black fur on top, pale underside, large black ears and a distinctive long hairy tail with terminal white brush (Northern Territory Department of Land and Resource Management, 2012).

3.6.1.Habitat Requirements

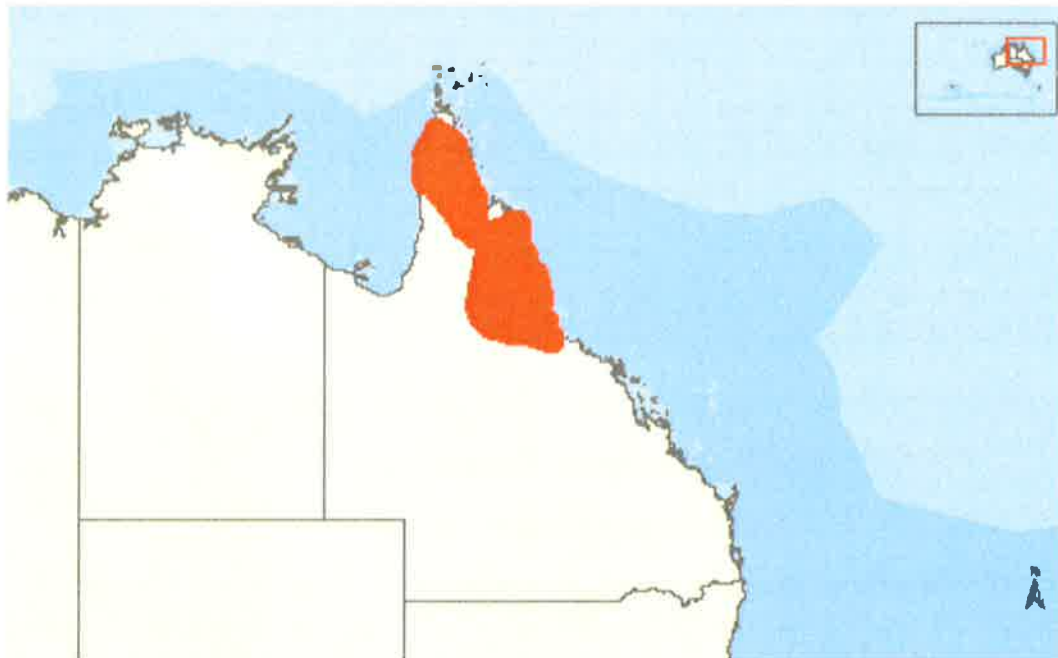
Information on the ecology of the full species is derived from studies of other subspecies. The Black-footed Tree-rat is a nocturnal rodent that dens mostly in tree hollows, but occasionally in dense foliage (notably of *Pandanus*), and occasionally in buildings. Most knowledge of its ecology derives from studies of the Kimberley and mainland Northern Territory subspecies (notably Friend & Taylor, 1985; Friend, 1987; Rankmore, 2006). It forages on the ground and in trees, and individuals may make movements of at least 500 m from roost sites to foraging areas (Friend et al., 1992). The diet comprises mostly fruits (including of the tough *Pandanus spiralis*) and seeds, but also includes some invertebrates, flowers and grass (Morton, 1992; Rankmore, 2006; Rankmore & Friend, 2008).

Breeding may occur throughout the year, but in the most intensively-studied population (in the Northern Territory) peaked in August-September (Friend, 1987; Rankmore, 2006). Litter size is small (one to three young), and gestation period is 43–44 days, the longest recorded for an Australian rodent (Crichton, 1969). The generation length is taken here to be two years, recognising young reach reproductive maturity at about three months (Crichton, 1969), and longevity is probably three to five years.

3.6.2.Cape York Distribution

The distribution of the Black-footed Tree rat (north Queensland) is poorly known. It has been recorded mostly from *Eucalypt* forests and woodlands (but not rainforests) around Mareeba (Burnett, 2001), but there are records sparsely across Cape York Peninsula (Watts & Aslin, 1981; Dixon & Huxley, 1985), including recent records from Mungkan Kandju National Park and the Australian Wildlife Conservancy's Piccaninny Plains and Brooklyn wildlife sanctuaries (J. Kanowski, Australian Wildlife Conservancy, pers. comm.).

FIGURE SEVEN - BLACK-FOOTED TREE-RAT DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.6.3.Threats

Little is known about the threats to the species however there has been a sharp decline in sightings in areas with modified fire regimes, habitat loss and degradation, feral cat predations and clearing for pastoral activities and changes in fire regime are the most likely causal factor of this decline (Winter & Atherton, 1985).

3.6.4.Project area survey

Recorded adjacent to Project area by RPS in October 2014 during intensive infrared camera trapping targeting quolls for the SRBP.

Possible habitat, including denning habitat consisting of *E. tetradonta* woodlands and tree hollows exist within the Project area and the SRBP area. The species may also utilise adjacent *Melaleuca* swamps to the BHM such as Big Footprint Swamp.

3.6.4.1.Skardon River Deposit EIS

One Black-footed Tree-rat has been recorded on a remote camera trap during a SRBP survey in September 2014. Habitat for this species also includes RE 3.5.2 although it may prefer *Eucalypt* habitat closer to waterways. The species is also known to utilise tree hollows as daytime roost sites.

3.6.4.2.Bauxite Hills Deposit EIS

The Black-footed Tree-rat was not recorded during the Bauxite Hills EIS despite extensive trapping across the area. The nearest record to the Project area appears to be a 2004 EHP record located approximately 30 km east of Weipa.

3.6.5.Potential impacts and management measures

It is unlikely an important population exists in the area. The project requires the clearing approximately 2500 ha of Darwin Stringybark woodland (RE 3.5.2). This habitat remains widespread in the surrounding region with a further 44,280 ha located within a 20 km radius of the Project area.

The habitat the species is considered more likely to occur in *Eucalypt* woodlands close to watercourses/low-lying areas which will remain largely undisturbed by clearing and will remain connected to similar vegetation beyond the BHM boundary.

Tree clearing activities will require the presence of a fauna spotter to check tree hollows prior to clearing. Should any individuals be located during pre-clearance activities they will be relocated to suitable adjacent habitats by a qualified environmental practitioner/fauna spotter.

The project is unlikely to lead to a long-term decrease in the size of an important population.

3.6.5.1.Construction Phase - Potential Impacts

3.6.5.1.1.Clearing of Den / Nest sites

As mentioned above, it is unlikely that den or nests will be present in the project area. Should a den or nest be disturbed by clearing activities there is potential for mortality of both adults and potential young. The likelihood of a suitable denning site is very low, considering the low probability that the species is both within the mine clearing areas and indeed within the *E. tetradonta* forest type.

There will be however, a limited amount of clearing associated for the port infrastructure that may be potential habitat for this species (an ecotone beside Skardon River)

3.6.5.1.2.Direct mortality

In the unlikely event that dens / nests are disturbed as part of construction, any animals present within them may suffer injury or death during clearing. This potential impact persists in the short- term, only during the construction phase.

3.6.5.1.3.Habitat loss

Minor loss of foraging habitat is expected to occur during the clearing of forest prior to mining. Clearing of the disturbance area will be progressive and occur at steady rate over the life of the BHM (2,800 ha in total).

3.6.5.1.4.Pests (cane toads and feral cats)

Clearing and disturbance of vegetation during the construction phase is a known attractant of several pest animals which may impact on the Black-footed Tree-rat. Feral cats are attracted to disturbance and refuse created by people and are thus, without appropriate controls in place, expected to increase in density during the construction phase. Feral cats are believed to prey directly on Black-footed Tree-rats.

Cane toads are already prolific within the disturbance zone (especially the abandoned Kaolin workings) but could potentially increase in numbers with substrate alteration. A direct causal link between the presence of Cane toads and a subsequent decline of Black-footed Tree-rats has not been substantiated and it is believed that Cane toads pose a minor or indirect threat to the species.

3.6.5.2.Construction Phase - Management Measures

3.6.5.2.1. Clearing of den sites and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if active dens/nests/breeding places for EPBC threatened species are found. The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016). Any trees with hollows exceeding 20 cm diameter will be assessed as will any dense stands of *Pandanus spp.*. The detection of any Black-footed Tree-rats on-site will trigger corrective actions

3.6.5.2.2. Habitat loss

The detection of Black-footed Tree-rats will trigger the cessation of all clearing works on-site and the notification of both the Queensland Department of Environment and Heritage Protection (EHP) and the Commonwealth DoTE by the Environmental Officer. No additional clearing works will occur until the management plan is reviewed, in consultation with State and Commonwealth departments.

The BHM has committed to progressive rehabilitation and the retention of remnant vegetation outside of its operations and this will, in time, make suitable habitat for Black-footed Tree-rats, especially in low seasonally inundated areas within the rehabilitation that may develop into a wetland ecotone type vegetation.

3.6.5.2.3. Pests (cane toads and feral cats)

As part of the BHM Pest and Weed management plan, specific attention will be given to reducing the potential for feral cats and, to a lesser extent, cane toads impacting on potential recolonising Black-footed Tree-rats

Additionally, as part of the rehabilitation management plan, specific attention will be directed to reducing the potential habitat within the abandoned kaolin clay mining voids and associated infrastructure as well as reducing areas for the cane toads to breed.

3.6.5.3. Operational Phase - Potential Impacts

3.6.5.3.1. Mortality due to site activities

There is some potential for site activities, especially haul roads and site access roads to increase the potential for vehicle interaction with Black-footed Tree-rats. The species is mostly active during the twilight and night hours and could interact with traffic during that time due to decreased driver visibility.

As per many of the significant species included in this SSMP, some potential also exists for poisoning of Black-footed Tree-rats to occur due to ingestion of rodenticide poisons.

3.6.5.4. Operational Phase - Management Measures

3.6.5.4.1. Mortality due to site activities

Driver education, a traffic management plan and increased lighting will be used to reduce the potential for vehicle collisions with wildlife.

As part of the pest and weed management plan, strict controls will be placed on the use of rodent baits and similar pesticides that may impact on the Black-footed Tree-rat.

3.6.5.5.Rehabilitation Phase - Potential Impacts

3.6.5.5.1.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region by other companies over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

3.6.5.6.Rehabilitation Phase - Management Measures

3.6.5.6.1.Rehabilitation failure

Progressive and effective rehabilitation of mine areas will limit the length of time possible foraging habitat may be removed as a result of the BHM. Methodologies to be applied during assessments of rehabilitation are described in the Rehabilitation Management Plan. Failure of rehabilitation sites to meet completion criteria will trigger corrective actions.

Given Black-footed Tree-rats have been identified in the area, Metro Mining will investigate the potential for the creation of artificial den / nest sites within the rehabilitation.

3.6.6.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

3.7.Chocolate Tea-tree Orchid

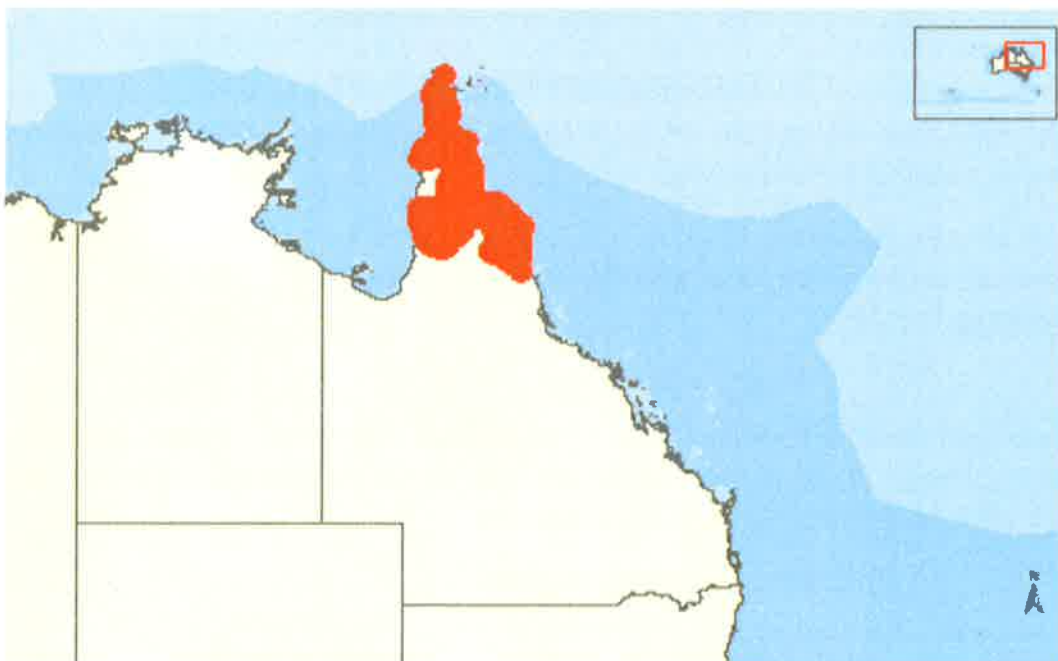
The Chocolate Tea-tree Orchid (*Dendrobium johannis*) is a common orchid species of open, humid habitats and is often found on trees growing in or close to swamps and in pockets of monsoon forest (Queensland Herbarium 1997).

During recent surveys individual orchids of similar habit to this species were identified in fringing paperbark woodlands and mangrove margins. However all specimens were infertile at the time of survey. It is likely these orchids are The Three Lamellas *Dendrobium* (*D. trilamellatum*) which has recently been split from Chocolate Tea Tree Orchid (*D. johannis*). To confirm the species identification flowering material is needed from March-July period (DotE, 2015).

3.7.1.Cape York Distribution

The species is known to occur on Cape York Peninsula from around Coen north to the tip. It prefers open, humid habitats and is often found on trees growing in or close to swamps and in pockets of monsoon forest (Queensland Herbarium 1997). It has been recorded growing on Broad-leaved Tea-tree (*M. viridiflora*) in Melaleuca floodplain woodland and semi-evergreen vine thicket on a stabilised sand dune.

FIGURE EIGHT - CHOCOLATE TEA-TREE ORCHID DISTRIBUTION (SOURCE DOEE WEBSITE 1 AUGUST 2017)



3.7.2.Threats

Threats to the species are not well documented but thought to be habitat degradation and loss and collection of the plant by orchid enthusiasts.

3.7.3.Project area survey

3.7.3.1.Skardon River Deposit EIS

During the Skardon River EIS, no Chocolate Tea-tree Orchids were identified as being present within the EIS survey area, despite records indicating there was suitable habitat located in buffer zones and remnant vegetation.

3.7.3.2.Bauxite Hills Deposit EIS

During dry season vegetation surveys in November 2014 a number of suspected *Dendrobium* orchid species were identified on the edge of Big Footprint Swamp and on the northern boundary of MLA 20676 (Figure 5-7) in *Melaleuca* and mangrove fringing communities. All *Dendrobium* specimens were infertile at the time of survey therefore future identification will need to be confirmed during flowering periods. Based on the habit and form of the individuals encountered it is considered more likely these species were the common *Dendrobium trilamellatum*.

3.7.4.Potential impacts and management measures

The proposed action is not expected to result in a decrease to individual or orchid populations as no orchids were found within the proposed impact areas, and a minimum of 300 m buffer is proposed to these records. The proposed action will only result in minor impacts to habitat for these species such as wetlands including melaleuca and mangrove fringing communities.

3.7.4.1.Construction Phase - Potential Impacts

3.7.4.1.1.Direct mortality from clearing

Clearing for the Project will only remove 7.8 ha of *Melaleuca* dominated habitat (RE 3.3.49 and 3.3.12), which may contain individual Orchids.

These areas will be subject to an inspection by a qualified environmental specialist prior to clearing. Where individuals are identified they will be translocated to similar habitat elsewhere, where possible within the Project area boundary.

3.7.4.1.2.Habitat loss

As stated above, it is unlikely that the Chocolate Tea-tree Orchid is present in the mining areas for the project, however some 7.8 ha of potential habitat is anticipated to be cleared to accommodate project infrastructure, especially around the port facilities.

3.7.4.1.3.Fire regime change

As with all of the significant species addressed for the BHM, changes to the fire regimes of the project area have been identified as a potential risk to the ongoing survival of this species across Cape York.

3.7.4.2.Construction Phase - Management Measures

3.7.4.2.1.Clearing and direct mortality

The BHM will engage a suitably qualified fauna spotter and catcher to supervise all clearing of native vegetation, including measures to be taken if Chocolate Tea-tree Orchids are located within clearing areas.

The spotter and catcher will utilise pre-disturbance survey methodology in accordance with the approved Methodology for Habitat Assessment for EPBC Act Listed Threatened Fauna, (dated 18 November 2016), which is also a suitable search technique for vegetation survey. Any trees with orchids present will be inspected, and if deemed the species located is most likely a Chocolate Tea-tree Orchids, then it will be removed and relocated to either an adjacent habitat and/or suitable rehabilitation (of an advanced age and suitable vegetation type).

As this orchid is very similar to at least another three species found in the BHM area, an optimal survey period will be between March and July to allow for the presence of flowers.

Removal will take place as part of the clearing process and be supervised by either the spotter / catcher or site environmental scientist. A site procedure to improve chances of a successful relocation will be developed in conjunction with appropriate experts in epiphytic plant translocation.

Once an orchid has been relocated, its health will be monitored to ensure its continued survival in its relocated habitat.

3.7.4.2.2.Habitat loss

As per the measures above, all located individuals will be relocated to suitable habitat if found in the clearing area.

3.7.4.2.1.Fire regime change

As part of the BHM Land Use Management Plan, (as part of both Department of Environment and Heritage Protection licences for the project) Fire management of the entire project area will be actively undertaken in conjunction with the Traditional Owners.

The LUMP will determine appropriate burning regimes for all remnant and rehabilitation areas and ensure that appropriate fire regimes will be maintained in the project areas to protect both site assets and preserve the biological integrity of remnant vegetation.

3.7.4.3.Operational Phase - Potential Impacts

3.7.4.3.1.Loss of rescued individuals

There is potential for relocated Chocolate Tea-tree Orchids to suffer mortality during or post the relocation process due to drying out of individuals, physical damage or indeed selection of unsuitable habitat.

3.7.4.4.Operational Phase - Management Measures

3.7.4.4.1.Loss of rescued individuals

All relocated or rescued Chocolate Tea-tree Orchids will be monitored by either the spotter / catcher or the site environmental scientist to ensure their establishment in their new habitat. Relocation of epiphytic plants is quite a common practice both within the horticultural industry and especially within orchid collectors and a site procedure and training will be developed with assistance from a suitably qualified arborist and with advice from the Queensland Herbarium.

As part of the re-establishment process, individuals might receive treatment with stress reduction fertilisers, application of humic material such as sphagnum moss or mulch and potentially additional watering to allow for appropriate establishment.

3.7.4.5.Rehabilitation Phase - Potential Impacts

3.7.4.5.1.Rehabilitation failure

BHM has committed to ongoing and progressive rehabilitation. The risks of rehabilitation failure for the area are low, due to successful rehabilitation of similar habitat within the region over a number of years. Failure of the rehabilitation would be of a temporary nature and amelioration treatments would be expected to rectify any issues within the short term.

3.7.4.6.Rehabilitation Phase - Management Measures

3.7.4.6.1.Rehabilitation failure

Due to the nature of the proposed rehabilitation, some areas of the rehabilitated pits will potentially develop into suitable habitat for the Chocolate Tea-tree Orchid due to the substrate being wetter than surrounding rehabilitated areas.

All rehabilitated pits will contain swales and low areas that will retain more moisture and may prove more suitable for *Melaleuca* species to develop, thus creating potential host trees for the orchids. Indeed where rehabilitated pits are adjacent to ephemeral creeks and wetlands, low points will be created adjacent to these features.

3.7.5.Residual risk assessment

The likelihood and potential consequences of each potential impact, once mitigation measures are accounted for, were assessed using qualitative risk assessment methodology recommended by The Australian Government's Environmental Management Plan Guidelines and addressed in both EIS documents.

4. RISK MANAGEMENT

As described above the significance of the Bauxite Hills Bauxite Project on the potential significant species for the area has been detailed within both EIS documents (Metro Mining Ltd 2016, and Gulf Alumina Ltd 2016).

As summary of all potential risks to significant species identified for the project area (and surrounds) is presented in Table One - Risk Assessment and Management Actions.

Detailed risk assessments and risk management assessments for all of the significant species, using the tables provided to Metro Mining by the department in the EPBC 2014/7305 and EPBC 2015/7538 guidance material is found in Appendix three.

All species were assessed by suitably qualified individuals, using the Commonwealth Government's Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. This guideline is a tool used to determine whether an action is likely to have a significant impact on a Critically Endangered species and if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population,
- Reduce the area of occupancy of the species,
- Fragment an existing population into two or more populations,
- Adversely affect habitat critical to the survival of a species,
- Disrupt the breeding cycle of a population,
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,
- Result in invasive species that are harmful to the species becoming established in its habitat,
- Introduce disease that may cause the species to decline, and
- Interfere with the recovery of the species

All actions associated with the BHM are expected to have a low risk of impact to all of the species identified as being of interest within the Bauxite Hills Bauxite Mining Project boundary.

This Significant Species Management Plan details specific actions and responsibilities for the management of EPBC listed species across the project area and these are detailed in Table One - Risk Assessment and Management

If all performance targets of this management plan are met, the BHM is not expected to trigger any of the definitions of a significant impact listed above.

4.1.BHM Risk Management System

Metro Mining, as the parent company of Gulf Alumina, is developing an Environmental Management System (EMS) in accordance with ISO 14000 standards. The EMS will cover all of the operations at the Bauxite Hills Mine, including Gulf Alumina tenements. The EMS is proposed to be implemented by the end of 2017.

Incorporated into the EMS will be the range of management plans that Metro Mining has committed to in the Skardon River Project and Bauxite Hills Project EIS's, as well as the specific management plans listed as conditions in the EA and more importantly, this SSMP.

Table One - RISK ASSESSMENT AND
MANAGEMENT

Objective	Event or circumstance	Likelihood	Consequence	Risk	Management measures	Residual risk	Monitoring	Trigger	Corrective actions
Retain undisturbed habitat in original condition	Clearing occurs outside approved areas	Likely	Major	High	<p>All clearing to be approved and surveyed as per the DEHP licence and through approval for the DEHP controlled project plan of operations</p> <p>All areas to be cleared are appropriately survey controlled and demarcated with clearing flagging tape</p> <p>Timber to be retained for rehabilitation to be wind rowed along clearing boundary as physical barrier</p> <p>All clearing to require pre-clearing approval from spotter catcher, ensuring boundary clearly defined</p>	Low	<p>Bi-annual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist for flora and fauna</p> <p>Pre-clearing hollows surveys and cultural heritage clearance</p> <p>Remote monitoring cameras deployed at above sites annually on a seasonal rotational basis (6 months per year, "wet/dry" periods)</p> <p>Survey pickup of clearing limits by surveyor or satellite monitoring</p>	<p>Changes to forest structure outside of natural variation</p> <p>Accidental clearing of excluded vegetation</p> <p>Any negative changes in presence / absence records</p>	<p>Notification of authorities and rehabilitation of cleared area</p> <p>Review of Offsets Management Plan</p>

Table One - RISK ASSESSMENT AND
MANAGEMENT

Impacted by weeds	Highly Likely	Major	High	<p>Weed control protocol for all equipment entering site including pre-disembark inspections, "no clearance no site access" rules for all machinery coming to site (whether new or serviced)</p> <p>Weed monitoring of all cleared areas, rehabilitation and remnant areas to be done prior to seeding to allow for weed control activities</p> <p>Weed control equipment to be kept on site at all times and form part of the rehabilitation team objectives</p> <p>Weed control to also be a consideration of the bushfire management plan for remnant areas</p> <p>Land Use Management Plan including weeds, pest and fire management is required under the State EA and will be implemented accordingly</p>	Low	<p>Bi-annual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist</p> <p>Operational weed controls and inspections as part of regular environmental observations</p>	<p>Increases in weed numbers or discovery of "new" weed species</p>	<p>Immediate weed control of area using appropriate methods (spraying, slashing or fire)</p>
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Changes to fire regime, (timing, intensity and frequency)	Likely	High	High	<ul style="list-style-type: none"> Existing fire management regime to be retained in conjunction with local TO's and Mapoon Land and Sea Rangers All hot work on site to require permit before proceeding First response fire management equipment to be retained on site for duration of the project Key personnel to be trained in bushfire response Land Use Management Plan including weeds, pest and fire management is required under the State EA and will be implemented accordingly All zones to be managed for fire on a risk and ecological basis, with scheduled fuel reduction and ecological burns conducted in the early dry or early wet season Fire to be excluded from young rehabilitation for a period of at least 10 years 	Low	<ul style="list-style-type: none"> Block fuel assessments completed as per Qld forestry or DEHP guidelines Hot work permits to be audited Fire history and project fuel assessment to be monitored using drone 	<ul style="list-style-type: none"> Escaped fire from site Excessive grass growth or weed proliferations Analysis of block history show fire frequency or intensity changed from historical 	<ul style="list-style-type: none"> First response fire fighting Review of LUMP Review and development of additional fire breaks
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Impacted by pests	Highly Likely	Moderate	High	<p>Control of cats, dogs, pigs, horses and cattle through a Land Use Management Plan and undertaken by the rehabilitation team</p> <p>Any non-native bee hives discovered during surveys of pre-clearing or remnant vegetation to be destroyed or removed by local apiarists</p> <p>Where practicable, cane toad reduction activities to occur in free standing water onsite (tadpole and adult traps deployed in pits and drains during wet season)</p>	Low	<p>Bi-annual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist for flora and fauna</p> <p>Remote monitoring cameras deployed at above sites annually on a seasonal rotational basis (6 months per year, "wet/dry" periods)</p>	Changes in abundance or type	Increased control activities
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Table One - RISK ASSESSMENT AND MANAGEMENT

Dust / light / noise or vibration effects remnant	Highly Likely	Minor	Medium	<ul style="list-style-type: none"> Buffer zones maintained near sensitive areas such as riparian zones or significant water courses In pit watering and watering of haul roads during dry season Water sprays at port areas for dust Lighting plan to minimise environmental impacts incorporated into infrastructure design and operation No blasting required for mining operations 	Low	<ul style="list-style-type: none"> Bi-annual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist Dust and noise monitoring undertaken and reported as required in the State Environmental Authority 	Changes to forest structure or vegetation	Review and modify dust control or lighting plan
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Mine infrastructure and clearing acts as a barrier to species movement	Possible	Major	High	<ul style="list-style-type: none"> Connectivity of habitat addressed in the EIS and managed through buffer zones and the offsets management plan Keep roadside free of vegetation to allow animals to be seen All pits and excavations to have pit exits created or to be monitored daily by spotter catcher and closed as soon as practicable. All pipelines to be supported off-ground to allow passage of fauna 	Low	<ul style="list-style-type: none"> Daily inspection of roads and linear infrastructure to include employee fauna awareness Establish a road kill and sightings register to determine fauna hot spots Ensure all vehicles have additional lighting apart from standard for night time work 	<ul style="list-style-type: none"> Trapped fauna Increases in road kills 	<ul style="list-style-type: none"> Rescue of fauna Improved visibility of roadsides Assess additional controls (eg fencing) in identified fauna hotspots
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Table One - RISK ASSESSMENT AND
MANAGEMENT

No direct mortality of sig species individuals	Species impacted during initial clearing activities	Likely	Major	High	<p>Pre-clearing surveys undertaken to determine species presence at appropriate timing, prior to clearing in accordance with approved procedure</p> <p>Clearing procedure involves clearing around hollow trees first, tapping hollow trees to determine occupation, clean felling of trees and immediate inspection</p> <p>Clearing to occur as sequentially as Possible and new pit development clearing to be progressive over a period of days</p> <p>All clearing to occur in dry season, outside of known breeding season</p>	Low	<p>Pre clearing hollows surveys</p> <p>Pre clearing survey data review annually and operationally for presence / absence</p>	Species found	Modify pre-clearance survey methodology and or frequency
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Species impacted during mine operational activities	Possible	Major	High	<p>All personnel on site awareness for significant species and notification procedure if found</p> <p>Speed limits set and maintained on site</p> <p>Mine infrastructure and waste managed as per site licence (DEHP licence controls)</p> <p>All waste and chemicals on site kept within approved areas and in accordance with AS1940</p> <p>No new landfills on site and existing landfill to be closed as soon as practicable</p> <p>No rodent baiting outside of enclosed areas and removal of poisoned individuals if found</p>	Low	<p>Presence or absence of fauna noted by site personnel</p> <p>Inspections of chemical stores and waste issues</p>	Species presence	Incident investigation procedure to determine root cause
Species impacted during decommissioning	Unlikely	Major	High	<p>All infrastructure inspected prior to decommissioning to determine if fauna are present</p>	Low	Inspection	Species presence	Species relocated or encouraged to relocate prior to decommissioning

Table One - RISK ASSESSMENT AND MANAGEMENT

Species impacted during rehabilitation phase	Unlikely	Major	High	<p>All rehabilitation activities to occur during daylight (overburden and topsoil movement can occur 24/7)</p> <p>No chemicals other than fertiliser or specific weed controls to be applied to rehabilitated areas</p> <p>No rodenticides to be used to protect broadcast seed</p> <p>Any rescued and relocated Chocolate tea tree orchids to be monitored during dry season for plant health</p>	Low	<p>Presence or absence of fauna noted by site personnel</p> <p>Monthly relocated orchid inspections (if applicable)</p>	<p>Species presence</p> <p>Orchid mortality</p>	Incident investigation procedure to determine root cause
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Table One - RISK ASSESSMENT AND MANAGEMENT

Rehabilitated habitat is suitable for significant species	Failure of specific plant species required by species during lifecycle	Possible	Major	High	Plant species selection based on pre-mining assessments and reference vegetation types (as per DEHP licence rehabilitation management plan) Local provenance seed and material to be used on site Cover crop only to be sourced from outside the project area Host plant species (Chocolate Tea Tree Orchid) specifically planted in pit low points (seasonally inundated)	Low	Initial establishment monitoring to occur at 18months to 2 years Following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25)	Absence of key plant species	Tube stock plant out or re-seeding of required species
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Failure of rehabilitation to develop appropriate forest structure to support sig species	Possible	Major	High	<ul style="list-style-type: none"> Plant species selection based on pre-mining assessments and reference vegetation types Local provenance seed and material to be used on site Additional fauna recolonisation methods deployed in each mined pit including: standing stag trees, log piles, rock piles (if available cap rock), drainage banks and hollows in post mining topography, owl roosts and litter) Species specific artificial hollows installed in 10 yr+ rehabilitation 	Moderate	<ul style="list-style-type: none"> Initial establishment monitoring to occur at 18 months to 2 years Following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25) Wildlife cameras to be deployed during early wet season through to early dry in rehabilitation areas as per above sequencing 	No presence of fauna or prey species on site	<ul style="list-style-type: none"> Install further fauna recolonisation measures such as further log piles and artificial hollows (species specific designs)
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Table One - RISK ASSESSMENT AND
MANAGEMENT

Rehabilitation encourages competitive species at the expense of significant species	Possible	High	Medium	<p>Plant species selection based on pre-mining assessments and reference vegetation types</p> <p>Local provenance seed and material to be used on site</p> <p>Fauna habitat measures as species specific as Possible (namely artificial hollows)</p>	Low	<p>Initial establishment monitoring to occur at 18 months to 2 years</p> <p>Following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25)</p> <p>Wildlife cameras to be deployed during early wet season through to early dry in rehabilitation areas as per above periods</p>	<p>Increases in competitive species (eg. red goshawk = corvids, Masked Owl = other owl species, Quolls = feral cats, etc)</p>	<p>Pest and weed control</p> <p>In extreme cases, application for a wildlife management permit to reduce numbers if evidence of extreme competition observed</p>
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Table One - RISK ASSESSMENT AND MANAGEMENT

Mining activities result in no increase in competitive pest species	Operational activities favour other species	Possible	High	Medium	<ul style="list-style-type: none"> No feeding of wildlife allowed by site personnel Site induction awareness program on value of significant species Monitoring of remnant and rehabilitation for increases in other wildlife species 	Low	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Remnant vegetation monitoring program Monitoring reveals increases in competitive species 	<ul style="list-style-type: none"> Increases in competitive species (eg. red goshawk = corvids, Masked Owl = other owl species, Quolls = feral cats, etc) 	<ul style="list-style-type: none"> Pest and weed control In extreme cases, application for a wildlife management permit to reduce numbers if evidence of extreme competition observed
	Pest management of mine site inadequate	Possible	High	Medium	<ul style="list-style-type: none"> Pest and weed management program in place and active controls being employed Active control of cats, dogs and pigs on mine site Active monitoring and control around port, camp and waste disposal areas 	Low	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Daily inspections of operational areas Wildlife cameras installed at waste disposal areas Monitoring for remnant areas reveals pest issues 	<ul style="list-style-type: none"> Increase in pest species or presence of "new" species for area detected 	<ul style="list-style-type: none"> Improve or increase pest management activities

5. PERFORMANCE TARGETS and OBJECTIVES

The SSMP has been developed to ensure that a series of outcomes for the species in the BHM approval are met. These performance targets are based on the targets outlined in the various species management plans and recovery plans, adapted to meet the objectives of approvals EPBC 2014/7305 and EPBC 2015/7538 and meet the conditions within that approval.

Whilst management actions for each species are specific, the performance targets for all of the significant species identified for the BHM are the same. These are as follows:

- No net loss of roosts / dens used by significant species,
- No direct mortality of significant species due to clearing operations, or operation of the mine,
- Rehabilitated habitat is potentially suitable habitat for significant species likely to occur in the area,
- No infestations of weed species, pests or invasive species will become established on the BHM mining lease in numbers greater than that found in pre-mine surveys, and
- Retained habitat will be maintained in a pre-mining approval condition for the life of the project

As part of assigning risk management actions and tasks to site personnel, an detailed implementation schedule has been prepared and forms the basis for goal setting and task assignment across the Bauxite Hills Bauxite Project. This is presented in the supplied DoEE format as Table Two - Implementation Schedule.

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Retain undisturbed habitat in original condition - no clearing outside of approved areas	<ul style="list-style-type: none"> All clearing to be approved and surveyed as per the DEHP licence and through approval for the DEHP controlled project plan of operations All areas to be cleared are appropriately survey controlled and demarcated with clearing flagging tape Timber to be retained for rehabilitation to be wind rowed along clearing boundary as physical barrier All clearing to require pre-clearing approval from spotter catcher, ensuring boundary clearly defined 	<ul style="list-style-type: none"> All project areas, all mine clearing boundaries for survey control Remnant health surveys in remnant vegetation ecotypes outside of disturbance areas Remote cameras to be deployed at some locations as vegetation surveys 	<ul style="list-style-type: none"> Survey control is already in place and ongoing Biannual survey of reference plots (in remnants) and original vegetation transects scheduled for dry season 2019 Remote cameras to be deployed at end of dry season 2019 	<ul style="list-style-type: none"> Survey pickup post clearing matches planned disturbance, no deleterious significant difference between pre and post clearing detected Vegetation surveys reveal no significant deviation or change in original EIS ecotype Remote cameras detect fauna species identified in EIS surveys in same locations and similar numbers 	<ul style="list-style-type: none"> Biannual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist for flora and fauna Remote monitoring cameras deployed at above sites annually on a seasonal rotational basis (6 months per year, "wet/dry" periods) Survey pickup of clearing limits by surveyor or satellite monitoring
Retain undisturbed habitat in original condition - not impacted by weeds	<ul style="list-style-type: none"> Weed control protocol for all equipment entering site including pre-disembark inspections, "no clearance no site access" rules for all machinery coming to site (whether new or serviced) Weed monitoring of all cleared areas, rehabilitation and remnant areas to be done at the end of the wet season, prior to seeding to allow for weed control activities Weed control equipment to be kept on site at all times and form part of the rehabilitation team objectives Weed control to also be a consideration of the Land Use Management Plan for remnant areas 	<ul style="list-style-type: none"> All equipment coming to site is to be inspected prior to disembarking at port area Remnant vegetation surveys in remnant vegetation ecotypes outside of disturbance areas Weed control to be deployed where needed (eg along tracks and trails within remnant vegetation) 	<ul style="list-style-type: none"> Biannual survey of reference plots (in remnants) and original vegetation transects scheduled for dry season 2019 	<ul style="list-style-type: none"> Post weed control surveys to determine effectiveness of control, no increase in weed abundance or species Vegetation surveys reveal no significant deviation or change in original EIS ecotype and no significant increase in weed species 	<ul style="list-style-type: none"> Post control vegetation assessment for weed control success Biannual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Retain undisturbed habitat in original condition - no change to fire regime (season, intensity, frequency)	Existing fire management regime to be retained in conjunction with local TO's and Land and Sea Rangers	All remnant vegetation, areas to be mined and rehabilitation to be divided into management blocks or units as part of land use	As required	Percentage burn targets achieved Aerial analysis reveals no change in fire regimes across remnants	Block fuel assessments completed as per Qld forestry or DEHP guidelines Hot work permits to be audited Fire history and project fuel assessment to be monitored using drone
	All hot work on site to require permit before proceeding	management plan (as per EA EPML00967013 and EPML003398515) and hazard reduction burns for ecological			
	First response fire management equipment to be retained on site for duration of the project	maintenance and threat mitigation performed in the cool periods of the year			
	Key personnel to be trained in bushfire response				
	Land Use Management Plan (including fire management) to include all of project areas and demarcate fire management blocks and breaks. All zones to be managed for fire on a risk and ecological basis, with scheduled fuel reduction and ecological burns conducted in the early dry or early wet season				
	Fire to be excluded from young rehabilitation for a period of at least 10 years				

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Retain undisturbed habitat in original condition - not impacted by pests	<ul style="list-style-type: none"> Control of cats, dogs, pigs and cattle through the Land Use Management Plan undertaken by the rehabilitation team Any non-native bee hives discovered during surveys of pre-clearing or remnant vegetation to be destroyed or removed by local apiarists Where practicable, cane toad reduction activities to occur in free standing water onsite (tadpole and adult traps deployed in pits and drains during wet season) 	<ul style="list-style-type: none"> Controls eg bait and trapping stations as required in Professional shooting may be deployed in areas where pests are prevalent and safety considerations allow 	<ul style="list-style-type: none"> At identified locations during the dry season for dogs, cats and pigs Cane Toad control during the wet season 	<ul style="list-style-type: none"> Abundance of pests maintained at low levels and as a minimum decreased from current levels as recorded in wildlife camera surveys 	<ul style="list-style-type: none"> Biannual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist for flora and fauna Remote monitoring cameras deployed at above sites annually on a seasonal rotational basis (6 months per year, "wet/dry" periods)
Retain undisturbed habitat in original condition - not impacted Dust / Light / Noise or Vibration	<ul style="list-style-type: none"> Buffer zones maintained near sensitive areas such as riparian zones or significant water courses In pit watering and watering of haul roads during dry season Water sprays at port areas for dust 	<ul style="list-style-type: none"> Buffer zones around pits and infrastructure 	<ul style="list-style-type: none"> Visual inspection during dry season Biannual survey of reference plots 	<ul style="list-style-type: none"> Vegetation surveys reveal no significant deviation or change in original EIS ecotype 	<ul style="list-style-type: none"> Biannual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Retain undisturbed habitat in original condition - mine infrastructure and clearing acts as a barrier to species movement	<ul style="list-style-type: none"> Connectivity of habitat managed through the off-sets management plan Fauna crossing areas kept free of roadside vegetation to allow animals to be seen All pits and excavations to have pit exits created or to be monitored daily by spotter catcher and closed as soon as practicable. All pipelines to be supported off-ground to allow passage of fauna 	Entire project area	As required by activity, but generally at all times	No recorded significant species mortality due to site activities	<ul style="list-style-type: none"> Daily inspection of roads and linear infrastructure to include employee fauna awareness Report road kill and fauna sightings as environmental incidents determine fauna hot spots Ensure all vehicles have additional lighting apart from standard for night time work
No direct mortality of significant species individuals during clearing activities	<ul style="list-style-type: none"> Pre-clearing surveys undertaken to determine species or habitat presence prior to clearing in accordance with approved procedure Clearing to occur as sequentially as possible and new pit development clearing to be progressive over a period of days All clearing to occur in dry season, outside of known breeding season 	All areas prior to clearing	As required, prior to clearing	<ul style="list-style-type: none"> No significant species found in clearing areas No recorded significant species mortality due to clearing 	<ul style="list-style-type: none"> Pre clearing surveys are a monitoring activity in themselves Pre clearing survey data review annually and operationally for presence / absence

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
No direct mortality of significant species individuals during mine operational activities	<ul style="list-style-type: none"> All personnel on site awareness for significant species and notification procedure if found Speed limits set and maintained on site Mine infrastructure and waste managed as per site licence (DEHP licence controls) All waste and chemicals on site kept within approved areas and as per AS1940 No landfill on site and existing landfill to be closed as soon as practicable No rodent baiting outside of enclosed areas and removal of poisoned individuals if found 	<ul style="list-style-type: none"> At initial inductions either prior to entering site or within first day of coming onto site Waste and chemical locations clearly outlined in plan of operations for EA EPML00967013 and EPML003398515 Access to rodent baiting strictly controlled by site Environmental Scientist 	At all times	<ul style="list-style-type: none"> All site personnel inducted, no induction no work No mortality of significant species recorded 	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Daily inspections of chemical stores and waste issues
No direct mortality of significant species individuals during decommissioning	<ul style="list-style-type: none"> All infrastructure inspected prior to decommissioning to determine if fauna are present 	As required	As required	<ul style="list-style-type: none"> No significant species found in infrastructure No recorded significant species mortality due to demolition Significant species relocated if found 	Inspection

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
No direct mortality of significant species individuals during rehabilitation	<ul style="list-style-type: none"> All rehabilitation activities to occur during daylight (overburden and topsoil movement can occur 24/7) No chemicals other than fertiliser or specific weed controls to be applied to rehabilitated areas No rodenticides to be used to protect broadcast seed Any rescued and relocated Chocolate Tea Tree orchids to be monitored during first dry season for plant health 	All rehabilitated areas	During rehabilitation activities	No mortality of significant species due to rehabilitation activities	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Monthly relocated orchid inspections (if applicable)
Rehabilitated habitat is suitable for significant species - failure of specific plant species required in life cycle	<ul style="list-style-type: none"> Rehabilitation plant species selection based on pre-mining assessments and reference vegetation types (as per DEHP licence rehabilitation management plan) Local provenance seed and material to be used on site Cover crop only to be sourced from outside the project area Host plant species (Chocolate Orchid) specifically planted in pit low points (seasonally inundated) 	All rehabilitated areas	Seed selected prior to rehabilitation as outlined in rehabilitation management plan in EA EPML00967013 and EPML003398515	Final rehabilitation success (at certification) against criteria as per condition G1 of EA EPML00967013 and EPML003398515	<ul style="list-style-type: none"> Initial establishment monitoring to occur at 18months to 2 years Following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25)

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Rehabilitated habitat is suitable for significant species - failure of rehabilitation to develop appropriate forest structure	<ul style="list-style-type: none"> Plant species selection based on pre-mining assessments and reference vegetation types Local provenance seed and material to be used on site wherever possible Additional fauna recolonisation methods deployed in each mined pit including: standing stag trees, log piles, rock piles (if available cap rock), drainage banks and hollows in post mining topography, owl roosts and litter) Species specific artificial hollows installed in 10 yr+ rehabilitation 	All rehabilitated areas	<ul style="list-style-type: none"> Seed selected prior to rehabilitation as outlined in rehabilitation management plan in EA EPML00967013 and EPML003398515 All fauna recolonisation encouragement treatments to be placed early in the rehabilitation process and designed for significant species 	<ul style="list-style-type: none"> Final rehabilitation success (at certification) against criteria as per condition G1 of EA EPML00967013 and EPML003398515 Wildlife camera data demonstrate return of significant species to rehabilitation 	<ul style="list-style-type: none"> Initial establishment monitoring to occur at 18months to 2 years Following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25) Wildlife cameras to be deployed during early wet season through to early dry in rehabilitation areas as per above sequencing

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Rehabilitated habitat is suitable for significant species - rehabilitation encourages competitive species	<ul style="list-style-type: none"> Plant species selection based on pre-mining assessments and reference vegetation types Local provenance seed and material to be used on site wherever possible Fauna habitat measures as species specific as possible (namely artificial hollows) 	All rehabilitated areas	<ul style="list-style-type: none"> Seed selected prior to rehabilitation as outlined in rehabilitation management plan in EA EPML00967013 and EPML003398515 All fauna recolonisation encouragement treatments to be placed early in the rehabilitation process and designed for significant species 	<ul style="list-style-type: none"> Final rehabilitation success (at certification) against criteria as per condition G1 of EA EPML00967013 and EPML003398515 Wildlife camera data demonstrate return of significant species to rehabilitation and expected numbers of competitive species 	<ul style="list-style-type: none"> initial establishment monitoring to occur at 18months to 2 years following initial establishment, rehabilitation success to be monitored every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25) wildlife cameras to be deployed during early wet season through to early dry in rehabilitation areas as per above periods
Mining activities result in no increase in competitive species - operational practices favour competitive species	<ul style="list-style-type: none"> No feeding of wildlife allowed by site personnel Site induction awareness program on value of significant species Monitoring of remnant and rehabilitation for increases in other wildlife species 	All project areas	<ul style="list-style-type: none"> At all times Site induction process annual and reinforced through monthly toolbox sessions with information on significant species regularly included As per rehabilitation management plan 	<ul style="list-style-type: none"> No increases in competitive species around mine operational area 	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Remnant vegetation monitoring program Monitoring reveals increases in competitive species

Table Two - IMPLEMENTATION SCHEDULE

Management objective	Management measures	Where	Timing	Performance criteria	Monitoring Activity
Mining activities result in no increase in competitive species - pest management of mine site inadequate	<ul style="list-style-type: none"> Pest and weed management program in place and active controls being employed Active control of cats, dogs and pigs on mine site Active monitoring and control around port, camp and waste disposal areas 	<ul style="list-style-type: none"> At selected control points around site (eg waste sites, accommodation village, tracks and trails) 	<ul style="list-style-type: none"> Year round around mine infrastructure on a monthly basis 	<ul style="list-style-type: none"> Abundance of pests and weeds maintained at low levels and as a minimum decreased from current levels as recorded in wildlife camera surveys and both remnant and rehabilitation monitoring programs 	<ul style="list-style-type: none"> Presence or absence of fauna noted by site personnel Daily inspections of operational areas Wildlife cameras installed at waste disposal areas Monitoring for remnant areas reveals pest issues

6. MANAGEMENT ACTIONS

There are a number of activities and actions that will be undertaken at the BHM to reduce and mitigate potential impacts on the EPBC significant species. These actions and requirements were outlined in both sets of EIS documentation, and have been presented here to detail to describe what actions Metro Mining will undertake to address the risks. These impacts have also been summarised in the Risk assessment and management table (Table One) above.

The likelihood and potential consequences of each impact, once mitigation measures are accounted for, were assessed both in the project EIS phases and as part of the development of this management document using qualitative risk assessment methodology as per the Australian government's guidelines supplied by the department, DoTE (2017).

Individual species risk assessments can be found in the respective species-specific sections of this SSMP.

All risk assessments conducted to date have identified an overall low residual risk to all of the identified species for all potential impacts identified.

6.1.Land clearing

The most significant potential impact to significant species across the project area is land clearing. A number of controls are in place to manage the clearing process. There are two key management processes associated with site clearing, namely the protection of areas not meant to be cleared (such as remnants and buffers) and the additional searching and clearance of fauna from areas to be cleared (in direct mortality section below)

All mine planning and approvals include management signify and endorsement of the plan of operations, which is the planning instrument of site environmental Authority (EA EPML00967013 and EPML03398515).

Compliance with the plan of operations is audited by the Department of Environment and Heritage Protection and internal using Metro Mining's environmental management system.

Post planning process, clearing is survey controlled with remnant areas being demarcated on operation plans and in the field using flagging tape.

Additional controls to prevent unapproved clearing will include additional signage or fencing, and will also involve the wind rowing of cleared timber adjacent to the remnant to provide a physical barrier as well as future habitat material for use in the rehabilitation process.

6.2.Habitat fragmentation and connectivity

Connectivity across the broader project area has been considered in terms of habitat connections and broader corridors with regional linkages beyond the boundaries of the project area. Within the project area connectivity is strongly linked to riparian corridors associated with the Skardon River and its tributaries, as well as contiguous tracts of woodland. The project site is dominated by eucalyptus

woodlands that transition to Melaleuca forests and wetlands through to estuarine mangrove forests fringing tributaries of the Skardon River. Vegetation within the site has contiguous linkages to large tracts of Eucalypt woodlands in the south and west that then transition to coastal vegetation communities.

The primary areas of impact on connectivity within the project area as a result of mining and infrastructure clearing, include:

- Loss of connectivity within previous continuous bands of terrestrial vegetation in MLA 20676 associated with the establishment of the BH1 mine area. This would result in the remaining woodlands becoming narrower and more isolated from large, contiguous tracts of vegetation to the east of the Project area. However there will be fringes of woodland retained along the boundary of BH1 to allow fauna to move through these woodlands to riparian vegetation along the Skardon River tributaries to similar habitats in the east;
- Loss of connectivity between riparian corridors and wetland areas in the south of MLA 20676, and between MLA 20676 and riparian and wetland habitats to the west; and
- Reduced connectivity of riparian corridors along the lower Skardon River associated with the construction of mine areas and haul roads. Fauna movement along this corridor and access for less mobile species to aquatic habitats would be restricted. The haul roads also increases the potential for interaction between vehicles and fauna.

Habitat fragmentation and loss of connectivity will be of a temporal nature with the aim of the rehabilitation program to revegetate the area to similar vegetation types. A Rehabilitation Management Plan (RMP) has been developed as part of approval EA EPML00967013 and EPML03398515 and it sets out rehabilitation methodology and practices, as well as completion criteria for the project area. The RMP will also include active measures to encourage the return of significant species to disturbed areas and facilitate the movement of species between remnant areas, restoring habitat connectivity.

6.3.Direct fauna mortality

Direct mortality of native fauna may occur as a result of the project during habitat clearing (particularly where large tree hollows occur), through vehicle collisions and excavations.

- Mortality during habitat clearing will be managed through the presence of a qualified fauna spotter and pre-clearing survey for significant species as per the approved survey methodology as required by approvals EPBC 2014/7305 and EPBC 2015/7538. As well as pre clearing surveys, the fauna spotter will also be present during the clearing activities to provide swift response should species be encountered.
- It is anticipated that vehicle collisions may pose a long-term risk to local native fauna and these will be managed by a number of measures. All personnel present on site will have awareness of the risks to wildlife associated with vehicle operation on the mine site, especially during the night periods. Where required, advisory signage may be erected to further alert drivers to the risks to wildlife and all road verges will be kept clear of vegetation to improve visibility.

- All pits and excavations will have pit exits and / or a fauna spotter undertaking inspections on a regular basis whilst the pit is exposed. All linear infrastructure will be raised off the ground where practicable to facilitate fauna movement.

6.4.Dust

Increased dust resulting from excavations, topsoil stripping, vehicle movement, open-cut mining activities and construction of infrastructure has the potential to impact flora and fauna within the project area throughout construction and operation. Dust generation has the potential to smother plants, reducing photosynthesis and resulting in decreased vegetation condition or the death of vegetation. Increased dust can result in respiratory issues in fauna, adverse impacts on plant photosynthesis and productivity.

Project activities likely to generate dust include mining, waste rock stockpiling, vehicle movements, stockpiling (e.g. topsoil, spoil, product bauxite), and bauxite transport (e.g. haul trucks, etc.).

Air quality modelling for the project shows the highest daily dust deposition will occur at the mine village (located 300 m from operational areas on the Project site), with a total deposition of 58.7 mg/m²/day. This is approximately half of the recommended Air Quality Objectives set under State legislation and is not anticipated to significantly impact fauna and flora within the study area.

Nonetheless, should dust deposition monitoring show a potential impact, additional controls that will be applied include deploying water sprays or tankers to wet down haul roads and areas where dust liftoff is an issue.

6.5.Noise

Understanding of the impacts of noise on fauna is limited. There are no current government policies or guidelines that recommend thresholds or limits in relation to fauna. Noise may adversely affect wildlife by interfering with communication, masking the sound of predators and prey, causing stress or avoidance reactions, and in some cases may lead to changes in reproductive or nesting behaviour. Excessive noise may lead some species to avoid noisy areas, potentially resulting in the fragmentation of species habitat.

The general consensus that terrestrial fauna will avoid any industrial plant or construction area where noise or vibration presents an annoyance to them. Additionally, many animals react to new noise initially as a potential threat, but quickly 'learn' that the noise is not associated with a threat. Increased noise from operation of machinery and vehicle traffic has the potential to disturb terrestrial fauna species and impact on feeding and breeding behaviour. In general, increased activity levels are likely to result in reduced fauna activity around work areas.

Noise will be generated by the project through the use of machinery, plant, vehicles, and blasting. The generation of construction and operational noise will be in areas surrounded by intact woodland and wetlands. Fauna species that occur on the site are expected to leave the immediate area of noise impact. During operation the species may become habituated to adjacent habitat following completion of construction disturbance.

6.6.Light

During the dry season it is proposed that mining operations will be continuous operating 24 hours a day. Therefore lighting will be required at night associated with the mine areas, associated infrastructure such as MIA and accommodation camp, and haul roads. Headlights and flashing lights associated with vehicle movements will also contribute. Combined, these sources would also be expected to result in 'sky glow' or the general lightening of the night sky.

Light spill has the potential to impact on nocturnal terrestrial fauna species by disrupting feeding or breeding behaviour and reducing effective ranges. This is likely to be more pronounced in open woodland than light near mangroves as they are denser and light cannot penetrate.

Conversely, increased light will attract insects which may be beneficial for some species. Bats are solely nocturnal, highly mobile (i.e. more likely to come into contact with artificial lights) and forage at a height where light spill is most likely. As such, this group of mammals may be disproportionately affected by artificial lighting. Some species, which are not light adverse, would benefit from lighting due to an associated increase in insect abundance. Other species are light averse, and in some cases even small amounts of light may impinge on activity. Studies done in urban areas has shown that responses to artificial lighting by bats is species specific.

6.7.Vibration

Traditional hard rock mines often employ extensive blasting as part of the mining process. The Bauxite Hills Mine will not require blasting due to its geology. Some cemented bauxite is present on site but this will be addressed using rippers on either excavator or dozer equipment.

As a result, no blasting will occur as a result of this project and port development.

6.8.Traffic

The traffic generation associated with the BHM has the potential to impact terrestrial flora and fauna in the following ways:

- Mortality resulting from vehicle collision;
- Dust generation, which has the potential to smother roadside plants thereby affecting vegetation condition and reducing available habitat and food resources; and
- Noise disturbance which can disrupt fauna behaviour.

Direct fauna mortality associated with vehicle movement on haul roads and access roads has the potential to impact on a number of fauna species. Reptile species are most at risk as they may use road verges as habitat, or look to cross haul roads therefore are susceptible to collision as they are less mobile than other species. Vehicles will also be using haul roads at night in the dry season therefore collision with nocturnal species may occur.

The highest risk of direct fauna mortality is likely to be associated with vehicles travelling along the haul road to the barge load out facility. This risk is heightened due to its proximity to riparian corridors and wetlands associated with the Skardon River. Reduced speeds on all haul roads should be implemented to minimise the risk of vehicle collision. Provision of directed lighting onto the road also increases visibility for the driver and reduces the risk of startling animals crossing the road at night.

6.9.Increased fire risk

The BHM has the potential to increase fire risk associated with the operation of vehicles, and activities undertaken by site personnel (e.g. welding, cigarette butts). Uncontrolled fires have the potential to alter ecosystem characteristics and directly and indirectly impact on ecological values in the Project area. Vegetation communities such as Melaleuca wetlands are sensitive to fire and wildfires should be avoided.

Hazard reduction burning, fire breaks and exclusion areas will be put in place as part of the Land Use Management Plan (LUMP), a requirement of EA EPML00967013 and EPML03398515.

Appropriately trained personnel will, in conjunction with the Traditional Owners of the BHM area, conduct fuel hazard and risk assessments and conduct risk reduction and ecological burns where required. As part of this commitment, key personnel will be trained in first response to fires and appropriate fire management equipment will be maintained on site for the duration of the project.

To prevent accidental ignition of fires, all hot work on site will require additional permitting that will ensure adequate fire protection is in place before work commences. Fire management on the BHMP area will be tailored to ensure:

- Risk to personnel and equipment is managed
- Developing rehabilitation is not put at risk by uncontrolled fire
- Retained habitat values are not compromised by changes to fire regime, and
- Rehabilitation is resilient and able to withstand a fire regime similar to the surrounding undisturbed vegetation communities

6.10.Pest fauna and weeds

The risk impact of pests and weeds on the BHM area is a key consideration in the management of significant species for the projects duration.

Pests, such as cats, dogs, pigs, cane toads and wild cattle can have a deleterious effect on the EPBC listed species and they must be managed to ensure that those impacts are reduced to an acceptable level.

Control of vertebrate pests will form part of the Land Use Management Plan (LUMP), a requirement of EA EPML00967013 and EPML03398515. The LUMP will ensure that pests are managed appropriately and humanely across all parts for the project area during all stages of the project life cycle.

Control methods will vary but may include one if not all of the following; trapping, baiting or shooting. These controls will be employed by site in conjunction with the traditional owners for the project area.

Special attention will be given to the control of cats and cane toads, two key threatening process for both the Northern Quoll and the Black Footed Tree Rat.

Similarly, weed control using a variety of control techniques will form part of the LUMP. The aim of weed control for BHM is to both reduce the effect of existing weeds on the environment and prevent the introduction of new weed species to the area.

A strict vehicle inspection program will ensure that all vehicles are clean and inspected prior to work being conducted on site.

6.11.Erosion and sediment runoff

Land clearing will occur during the construction and operation phases of the Project as a result of clearing of mining areas, and construction of ancillary infrastructure (e.g. haul roads, barge loading facility etc.). Clearing of remnant vegetation will be required across the mining footprint and will occur in a staged process as the mine progresses. The effects of land clearing relevant to the aquatic ecological values of the BHM area may include:

- Increased erosion of soils and runoff to adjacent environs;
- Loss of land stabilisation and riparian filtration functions; and
- Loss of habitat, loss of connectivity between habitat areas and associated diminished fauna movement.

As part of the rehabilitation management plan, all rehabilitated pits will be internally draining or diverted to nearby riparian vegetation through a series of sediment control structures.

Roadside and hardstand runoff will be managed for the effects of stormwater and, where possible, runoff will be directed away from key wetlands.

6.12.Habitat rehabilitation

As part of the rehabilitation management plan, a requirement of EA EPML00967013 and EPML03398515, additional habitat creation will occur in rehabilitated areas throughout its regeneration stages.

At the time of initial planting, standing hollow trees, log piles and roosts will be constructed inside every rehabilitated pit. Timber salvaged from clearing activities and set aside (as boundary protection - see above) will be used for this purpose and where cemented overburden is prevalent, artificial dens may be constructed out of waste cap rock.

Later in the rehabilitation development, artificial hollows, tailored for the individual species present on site may be installed to ensure dispersing animals have access to shelter.

6.13.Offsets Management Plan

As part of both approvals EPBC 2014/7305 and EPBC 2015/7538 should significant species habitat be found within the approved clearing areas, appropriate offsets must be made to accommodate species needs as per an approved Offsets Management Plan (OMP).

An OMP for the BHM is currently being prepared and will detail appropriate indirect offsets that will ensure greater conservation outcome for the species and offset any impact the project would have on the species within the project area.

7. MANAGEMENT ROLES AND RESPONSIBILITIES

Once operational, the Bauxite Hills Mine will be a 24 hours and day, 7 days a week operation over the dry season, supervised by a Site General Manager with corporate support from Metro Mining Ltd based in Brisbane. The Mine will be non-operational over the wet season and maintained by a small maintenance crew over this time.

The Site General Manager, will be responsible for the management and performance of all personnel across all management disciplines including operations, safety and environment. When fully operational, BHM is expected employ up to 200 people with a 30% indigenous workforce target and around 80 people on site at any one time.

All BHM employees and contractors are required to demonstrate responsible environmental stewardship and key personnel will have specific requirements with relation to the implementation of the SSMP. This is dealt with specifically below:

7.1.Site General Manager

The Site General Manager has ultimate responsibility for management of the entire site, including environmental commitments, such as the SSMP.

As the most senior person on site, the Site General Manager will have ultimate decision for the more critical components of this plan, such as any potential ceasing of operations due to the discovery of the listed species in the mine path.

Ultimately, the Site General Manager has to ensure that all personnel associated with this SSMP, such as the Site Environmental Officer has the necessary tools and training to undertake their roles and meet their obligation under this plan.

7.2.Site Environmental Officer

The Site Environmental Officer is the person on site with the key responsibilities for implementation of this plan. The Site Environmental Officer will be responsible for the implementation of all of the BHM environmental management plans, including the SSMP.

To maximise the effective implementation of the SSMP, the Site Environmental Officer will be responsible for:

- Providing resources and equipment to meet objectives of the SSMP
- Initiating reviews of SSMP when required
- Reporting non-compliances and environmental incidents

- Observing and informing the Site General Manager regarding general environmental performance of the SSMP
- Implementing environmental monitoring programs including management of buffer / remnant areas
- Supervision of the Ecologist / Fauna Spotter and providing environmental oversight for all clearing and construction activities
- Implementation of the SSMP objectives of the rehabilitation program (such as habitat recreation)
- Implementation of the Pest and Weed Management Plan and the Fire Management Plan
- Maintaining site records, and
- Daily / monthly / annual reporting.

The Site Environmental Officer is also responsible for identifying training and awareness needs so that all BHM personnel receive an appropriate level of training to understand and implement the requirements of the SSMP.

To achieve this, the Site Environmental Officer will use a combination of training and communication tools including:

- Site induction: this will provide all personnel and visitors to the site with a thorough understanding of the environmental values of the site, the SSMP framework and a general overview of the objectives of the SSMP. The induction will provide staff with an understanding of the general environmental duty, incident reporting requirements and set standards of environmental performance required.
- Toolbox talks: the toolbox talks will provide specific aspects of the SSMP relevant to the activities being undertaken by that work group. These will inform the operational methodology and provide staff with appropriate management strategies to manage potential environmental impacts. Toolbox talks are also an excellent mechanism to keep all personnel on site up to date with monitoring results and any changes that flow from the plan audit and review process
- The use of flyers, posters or alerts on notice boards and prominent locations around site for general awareness
- Hard copy: Copies of the SSMP available in the crib hut and main office, and
- On-line Environmental alerts system: An electronic environmental alert system is provided to all personnel to provide instantaneous updates of current issues across the BHM. Should any harm mitigation measures outlined in the SSMP be required it will be delivered via this system.

7.3. Corporate Environment Manager

The Corporate Environment Manager will be responsible for developing and implementing the overarching Environmental Management System, to coordinate regulatory and corporate reporting

requirements, and to ensure site audits are undertaken as required to meet compliance and continual improvement objectives.

7.4.Site Ecologist / Spotter Catcher

To maximise the effective implementation of the SSMP, the Site Ecologist / Spotter Catcher will be responsible for:

- Implementing and undertaking the pre-clearing assessment (including construction excavations and the like), and
- Following site procedures should a significant species be discovered in the clearing area

7.5.All Personnel

The Environmental Protection Act 1994 states that all personnel present on site have a general environmental duty. This means that everyone (including inducted visitors) is responsible for the actions they take that affect the environment.

Staff will be responsible for:

- Carrying out environmental management activities as directed by the Site Environmental Officer,
- Notifying the Site General Manager of any environmental incidents,
- Notifying the Site General Manager of any non-conformances,
- Participating in induction processes and daily tool box talks to build a suitable understanding of site environmental values.

8. MONITORING AND CORRECTIVE ACTIONS

Table three below provides an overview of monitoring requirements and corrective actions to assess the effectiveness of the mitigation measures implemented during all Project phases.

Corrective actions will be adapted where they do not resolve identified issues to ensure the ongoing minimisation of impacts to the significant species.

Monitoring activities will be focussed on the higher risk activities of land clearing and associated activities within that process such as the operation of earthworks machinery. These activities, although assessed in each species risk assessment below as low, due to the unlikely occurrence of the species in the project area, are still the most likely to cause some impact to the species should they be found within the project area.

Pre-disturbance clearance surveys are already in place before clearing activities are undertaken in either the construction or operational phases of the project and already operating to a protocol in accordance with the approval and specifically, conditions 2, 3 and 4.

To evaluate the effectiveness of the monitoring activities, trigger levels and corrective actions Metro Mining will:

- Conduct internal and third party audits to formally assess the level of compliance with both regulatory requirements and with company procedures. Audit outcomes will be used to develop / alter corrective actions that may include changes to this plan and / or other procedures.
- Analyse all relevant data collected during pre-clearing surveys for negative and/or undesirable trends that may be prevented by procedural changes or by implementing another measure or process.

Table Three - MONITORING SCHEDULE

Monitoring Activity	Management Questions	Parameters measured	Survey / Monitoring guidelines	Where	When	Reliability
Biannual survey of rehabilitation reference plots (as determined in rehabilitation management plan) and original EIS vegetation survey transects by suitable qualified ecologist for flora and fauna	<ul style="list-style-type: none"> Are remnant areas remaining in pre mining conditions? Are weeds increasing? 	Vegetation transect and plot monitoring as per methodology from Herbarium and in line with requirements of the RMP	Queensland Herbariums methodology for the survey and mapping of regional ecosystems and vegetation communities in Queensland, version 3.2 or subsequent revisions	All remnant or offset areas within project boundary	Biannually	Very high
Remote monitoring cameras deployed at undisturbed sites annually on a seasonal rotational basis (6 months per year, "wet/dry" periods)	<ul style="list-style-type: none"> Is there a change in species presence / absence and abundance in undisturbed remnants? Are competitive species numbers increasing? Are pest species an issue? 	Infrared cameras triggered by movement	As per manufacturers specification and designed for statistically significant number of replicates with each block	All remnant or offset areas within project boundary	Biannually and for key six month period	Moderate
Survey pickup of clearing limits by surveyor or satellite monitoring	<ul style="list-style-type: none"> Is the company operating inside its approved clearing areas? 	GPS survey control of all boundaries	As per national survey guidelines	All pit extents and infrastructure corridors	As required	Very high
Pre-clearing surveys	<ul style="list-style-type: none"> Are significant species or habitat present in areas to be cleared? Are pest and weed species present in areas to be cleared? 	Presence / absence and abundance	As per Commonwealth approved Methodology EPBC 2015/7538 condition 2,3 and 4 and EPBC 2014/7305 condition 2, 3 and 4	All areas to be cleared	As required	Very High

Table Three - MONITORING SCHEDULE

Monitoring Activity	Management Questions	Parameters measured	Survey / Monitoring guidelines	Where	When	Reliability
Block fuel and hazard assessments	What is the bush fire risk of particular areas?	Dry weight of material, type of material, type of fuels present in the vegetation, soil moisture index and other parameters	Completed as per nationally accredited forest fuel assessment protocols as prescribed by Qld forestry or DEHP (Parks)	All remnant or offset areas within project boundary	As required	High
Hot work permits to be audited as required in the site Health and Safety Management System	Are personnel complying with procedures to reduce the risk of accidental fires?	Permit conditions adhered too and followed	Permit requirements	Wherever hot work is to occur	As required in HSMS and as part of random work inspection process	Moderate
Fire history and project fuel assessment to be monitored using drone	What is happening to the fire regimes of remnant areas?	Using air mapping determine the fire frequency and % burnt of an area	As per software parameters, ground truth with post burn assessments from competent individuals	All remnant or offset areas within project boundary	As required	Moderate
Daily inspection of roads and linear infrastructure to include employee fauna awareness	Are significant species present? Are numbers of competitive species increasing due to the mines activities?	Visual assessment of presence	N/A	All areas where personnel are present or do inspections	Daily	Moderate
Report road kill and fauna sightings as an environmental incident	Are significant species present? Are numbers of competitive species increasing due to the mines activities?	Visual assessment of presence	N/A	All areas where personnel are present or do inspections	Daily or are notified	Low

Table Three - MONITORING SCHEDULE

Monitoring Activity	Management Questions	Parameters measured	Survey / Monitoring guidelines	Where	When	Reliability
Pre clearing survey data review annually and operationally for presence / absence	<p>Are significant species present?</p> <p>Are numbers of competitive species increasing due to the mines activities?</p> <p>Is our assessment methodology and process effective?</p>	Annual audit of pre-clearing assessments	analysis of instances where significant species was found during clearing and not during pre-clearing survey	All areas to be cleared	Annually	Moderate
Inspections of chemical stores and waste issues as part of standard operations	Are site activities impacting significant species?	Presence / absence	N/A	All site storages and waste areas	Anytime	Low
Demolition of infrastructure fauna inspection	Are significant species present in abandoned or obsolete infrastructure?	Presence / absence	N/A	Visual inspection prior to decommissioning	As required	Very high
Relocated orchid inspections (if applicable)	Are Chocolate Tea Tree Orchids surviving translocation?	Health assessment and visual signs of plant stress	N/A	Relocated individuals	As required	High
Rehabilitation monitoring - initial establishment monitoring	<p>Are significant species present in early rehabilitation?</p> <p>Are weeds establishing?</p>	Visual assessment of presence	Visual assessment during flora surveys	young rehabilitation	to occur at 18months to 2 years	Moderate

Table Three - MONITORING SCHEDULE

Monitoring Activity	Management Questions	Parameters measured	Survey / Monitoring guidelines	Where	When	Reliability
Long term rehabilitation monitoring - rehabilitation success against criteria outlined in rehabilitation management plan - requirement of DEHP licence	<ul style="list-style-type: none"> Are significant species returning to the rehabilitation? Are competitive species numbers increasing? Are pest and weed species an issue? 	All components of the rehabilitation to meet objectives and criteria outlined in condition G1 and in line with rehabilitation management plan	Queensland Herbarium's methodology for the survey and mapping of regional ecosystems and vegetation communities in Queensland, version 3.2 or subsequent revisions	All rehabilitated areas	To be monitoring every odd year for 5 years and every 5 years after that until application made for certification (ie. 3, 5, 10, 15, 20, 25)	Very high
Wildlife cameras to be deployed during early wet season through to early dry in rehabilitation areas	<ul style="list-style-type: none"> Are significant species returning to the rehabilitation? Are competitive species numbers increasing? Are pest species an issue? 	Presence / absence and abundance	As per manufacturers specification and designed for statistically significant number of replicates with each rehabilitation block	Completed rehabilitation	As part of the long term rehabilitation monitoring at 3, 5, 10, 15, 20 year intervals until application made for rehabilitation certification	Moderate
Presence or absence of pest fauna noted by site personnel as part of normal operations	<ul style="list-style-type: none"> Are pest fauna numbers increasing? 	Presence / absence and abundance	N/A	All areas where personnel are present or do inspections	As required	Low

9. DOCUMENT CONTROL

Metro Mining Limited have a document control system that encompasses the entire business and will be implemented for the BHM.

All site specific environmental documentation is to be managed by the Site Environmental Officer, reporting directly to the Site General Manager. All corporate environmental documentation is to be managed by the Corporate Environment Manager.

No other staff are authorised to make changes to BHM environmental documentation. Hard copies of SSMP will be kept onsite. It is the responsibility of the Site Environmental Officer to ensure that the latest plans are being implemented.

10. ENVIRONMENTAL TRAINING

Environmental training will be facilitated through site inductions and tool box talks. The site induction will be provided to all staff and visitors and include the following:

- Identification of site environmental values and risks
- An understanding the requirements of all environmental management plans, including the SSMP
- Roles and responsibilities with regards to environmental compliance
- Environmental incident identification and response including emergency response procedures
- Site environmental controls, and
- Potential consequences of not meeting environmental responsibilities

11. EMERGENCY CONTACTS AND PROCEDURES

Emergency contacts and procedures are found in the following BHM documents:

- Plan of Operations
- Health and Safety Management Plan
- Emergency response plan.

Where required, specialist advice will be sought by a recognised species specialist.

12. REPORTING

Reporting will consist of both internal and external reports. Internal reports will make up the majority of the reporting requirements and include daily and monthly reporting.

External reports are required as a condition of approval, at the specific request of a key stakeholder or after a notifiable environmental incident.

All reporting requirements and their timings are presented in Table Four - Reporting Schedule.

12.1. Annual or Exception Reporting

12.1.1. Annual Compliance Report

The annual report for the SSMP will be prepared to satisfy the requirements of the EPBC 2014/7305 approval, condition 20 and EPBC 2015/7538 condition 15 for the BHM.

The annual report will provide a summary of environmental performance including but not be limited to:

- Summary of weather, seasonal and climatic conditions
- A summary of construction activities undertaken through the period
- A summary of project progress for the period
- Environmental incidents
- Number of non-conformances (if any)
- Corrective actions implemented
- Area (ha) of clearance over the months and year to date

- Area (ha) of rehabilitation for the year and for the project overall, including project performance against performance targets/measures of success
- Environmental awareness training completed
- A summary of community complaints and how they were managed, and
- Any environmental initiatives with regards to the SSMP

12.1.2.Incident reports

Environmental incidents will be documented in accordance with the BHM Environmental Incident Reporting Procedure and reported as per condition 22 of the approval.

12.1.3.Non-conformance reports

Non-conformance reports will be documented in accordance with the BHM Incident reporting procedure.

Table Four - REPORTING SCHEDULE

Report Name	Approval type and condition	Timing	Reporting authority	Trigger (if any)
Annual compliance report	EPBC 2015/7538 condition 15, EPBC 2014/7305 condition 20	Annual EPBC 2015/7538 within three months of the anniversary of commencement of action EPBC 2014/7305 within three months of the anniversary of commencement of action	Department of Environment and Energy	
Independent audit of compliance	EPBC 2015/7538 condition 17, EPBC 2014/7305 condition 21	Upon the direction of the minister	Department of Environment and Energy	Suspected non-compliance
Pre-clearing inspection report	Internal report to site general manager and metro mining	Upon completion of all pre- clearing inspection	Metro Mining	Significant species located within clearing area
Initial establishment rehabilitation report	Internal report to site general manager and metro mining	Within 18 months of establishment of rehabilitation	Metro Mining	
Long term rehabilitation monitoring report	Internal report to site general manager and metro mining	Upon completion of annual monitoring and in line with rehab monitoring sequences set out in the rehabilitation management plan (3, 5, 10, 15, 20+ year intervals)	Metro Mining	Significant species located within clearing area
Annual Return	Annual return for EA EPML00967013 and EPML03398515	Annually at time of licence renewal	QLD Department of Environment and Heritage Protection	EA non compliances identified

Table Four - REPORTING SCHEDULE

Report Name	Approval type and condition	Timing	Reporting authority	Trigger (if any)
Third party reporting	EA EPML00967013 and EPML03398515, condition A16 and A15 respectively, conduct an independent third party audit of compliance with the EA	Within one year of commencement and then at regular intervals not exceeding three years	QLD Department of Environment and Heritage Protection	EA non compliances identified

13.AUDIT AND REVIEW

13.1.Environmental Auditing

The implementation and effectiveness of this SSMP will be internally audited on an annual basis. Additionally, approvals EPBC 2014/7305 and EPBC 2015/7538 give provision for the minister to request an independent audit in accordance with conditions 21 and 14 respectively.

The Corporate Environment Manager will be responsible for coordinating any auditing.

13.2.SSMP Review

This version of the management plan, will remain in place for the period of approval, unless:

- Significant species are recorded within the BHM mining lease,
- A significant species is delisted, and / or
- Annual audits or the ongoing environmental monitoring program predict or reveal a failure to meet one or more of the performance targets.

If a review is required, it will take into account environmental monitoring records, corrective actions and results of audits. The Site Environmental Officer will be responsible for coordinating reviews, which should be undertaken by suitably qualified individuals, in consultation with the Queensland DEHP.

In the event that the management plan is altered, the revised plan will be submitted to DoTE as required by both approvals (conditions 23 and 18).

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1. APPENDIX ONE - APPROVAL EPBC 2014/7305



Approval

Skardon River Bauxite Mining Project, 100 km north of Weipa, Queensland (EPBC 2014/7305)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted Gulf Alumina Limited

proponent's ABN 47 108 086 371

proposed action To construct and operate a bauxite mine in ML 40069, ML 40082 and ML 6025, and associated bed levelling, barge loading facility and floating harbour, approximately 100km north of Weipa, Queensland [See EPBC Act referral 2014/7305, Notifications of Variation to Proposal on 18 February 2015 and 22 April 2015, and the Skardon River Bauxite Project Environmental Impact Statement published October 2015 and amended March 2016].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved
Listed migratory species (sections 20 & 20A)	Approved
Commonwealth marine areas (sections 23 & 24A)	Approved

conditions of approval

This approval is subject to the conditions specified below

expiry date of approval

This approval has effect until 1 September 2041

Decision-maker

name and position Chris Murphy
A/g Assistant Secretary
Assessments (Qld, Tas, Vic) and Sea Dumping Branch

signature

date of decision

21 September 2016

Conditions attached to the approval

1. The **approval holder** must only undertake the **action** in the **project area** shown at Attachment A.
2. The **approval holder** must undertake **pre-disturbance surveys** in all areas proposed to be cleared to identify areas containing hollows and other potential breeding, roosting and nesting habitat for the vulnerable Red goshawk (*Erythrotriorchis radiatus*), endangered Masked owl (northern) (*Tyto novaehollandiae kimberli*) and critically endangered Bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudiclunatus*) and their prey.
3. **Pre-disturbance surveys** must be supervised by a **suitably qualified person** and undertaken in accordance with the **Department's survey guidelines** in effect at the time of the survey or other equivalent survey methodology approved by the **Department**.
4. The **approval holder** may carry out the **action** in **project stages**. The **approval holder** must not **commence** the **action** until **pre-disturbance surveys** for the first **project stage** have been completed.
5. In the event that areas containing hollows and other potential breeding, roosting and nesting habitat for the Red goshawk, Masked owl and Bare-rumped sheath-tail bat and their prey are found in the areas proposed be cleared, the **approval holder** must submit an Offset Management Plan for the written approval of the **Minister**. The Offset Management Plan may be prepared and submitted to the **Minister** for written approval in stages. If the **approval holder** submits the Offset Management Plan in stages, each stage of the Offset Management Plan must correspond with a **project stage**. The Offset Management Plan must be in accordance with the principles of the **EPBC Act Environmental Offsets Policy** and include:
 - a. results from pre-disturbance surveys for the **project stage** as required, including a map of areas containing hollows and other potential breeding, roosting and nesting habitat for Red goshawk, Masked owl and Bare-rumped sheath-tail bat and their prey;
 - b. details of the offset areas required to compensate for the loss of areas containing hollows and other potential breeding, roosting and nesting habitat for Red goshawk, Masked owl and Bare-rumped sheath-tail bat and their prey;
 - c. a survey and description of the current condition (prior to any management activities) of the offset area proposed, including existing vegetation (the baseline condition);
 - d. a map to clearly define the location and boundaries of the offset area, including the **offset attributes** and a **shapefile**;
 - e. details of how the offset areas provide connectivity with other relevant habitats and biodiversity corridors;
 - f. a description of the management measures that will be implemented, including a discussion of how measures outlined take into account relevant **conservation advice** and are consistent with the measures in relevant **recovery plans** and **threat abatement plans**;
 - g. performance and completion criteria for evaluating the management of the offset area, and criteria for triggering remedial action (if necessary);

- h. a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria; and
 - i. a timeline for when management measures will be implemented and the proposed mechanism for securing the offset. The **approval holder** must not **commence** the **action** until the Offset Management Plan has been approved by the **Minister** in writing. The approved Offset Management Plan must be implemented by the **approval holder**.
- 6. The **approval holder** must, if required, secure offsets for the first **project stage** within three years of **commencement** of the **action**.
- 7. The **approval holder** must, if required, secure offsets for a **project stage** which are sufficient to compensate for the loss of areas containing hollows and other potential breeding, roosting, and nesting habitat for the Red goshawk, Masked owl and Bare-rumped sheath-tail bat and their prey for that **project stage**.
- 8. If the **approval holder** submits the Offset Management Plan in stages, the **approval holder** must prepare and submit an updated Offset Management Plan for each subsequent **project stage**, for written approval by the **Minister**. The updated Offset Management Plan must:
 - a. include the information required for the Offset Management Plan at condition 5 for the relevant **project stage**;
 - b. include a reconciliation of actual loss of areas containing hollows and other potential breeding, roosting, and nesting habitat for the Red goshawk, Masked owl and Bare-rumped sheath-tail bat and their prey for that **project stage**; and
 - c. demonstrate how the offset builds on offsets already secured for previous **project stages**.
- 9. The **approval holder** must not commence the subsequent **project stage** until the Offset Management Plan, updated for that **project stage**, has been approved by the **Minister** in writing.
- 10. Information obtained during **pre-disturbance surveys** required at condition 2 must be used to inform the Species Management Plan at condition 12.
- 11. The **approval holder** must submit a Species Management Plan for the **Minister's** approval in writing. The Species Management Plan must include:
 - a. measures that will be taken to avoid, mitigate and manage impacts to **EPBC threatened species** and their habitat during vegetation clearance, construction, operation and decommissioning of the **action**;
 - b. a monitoring program to determine the success of mitigation and management measures to ensure adaptive management for the duration of this approval; and
 - c. a discussion of relevant **conservation advice, recovery plans and threat abatement plans** and how management measures proposed take into account relevant **conservation advice** and are consistent with the measures contained in relevant **recovery plans and threat abatement plans**.
- 12. The **approval holder** must not **commence** the **action** until the Species Management Plan has been approved by the **Minister** in writing. The approved Species Management Plan must be implemented by the **approval holder**.

13. The **approval holder** must submit a Marine Management Plan for the written approval of the **Minister** for all **marine related activities** associated with the **action**. The Marine Management Plan must include measures to avoid, mitigate and manage **impacts** to dugong (*Dugong dugong*), **listed sawfish and river shark species, listed turtle species and listed dolphin species** and the **environment of the Commonwealth marine area**, including:
- a. artificial light related **impacts** including lighting from port construction and operation, shipping and barge movements, barge terminals, and anchored/moored vessels;
 - b. barge and ship loading and unloading as well as all other aspects of shipping activities, including the management of bauxite dust and contamination spills;
 - c. vessel strike including restricting vessel speed limits to 6 knots and implementation of a transit lane in the Skardon River that follows the greatest water depth;
 - d. underwater noise including pile driving activities, barging and shipping movements;
 - e. the risk of introduced marine pest species over the life of the project, including ballast water management;
 - f. a monitoring program to determine the success of mitigation and management measures to ensure adaptive management for the duration of this approval;
 - g. a discussion of relevant **conservation advice, recovery plans and threat abatement plans** and how mitigation and management measures proposed take into account relevant **conservation advice** and are consistent with the measures contained in relevant **recovery plans and threat abatement plans**; and
 - h. details of the timeframe for reviews of the approved Marine Management Plan; including to ensure that the Marine Management Plan is informed by the findings of the Sawfish and River Sharks Research Proposal at condition 16.
14. The **approval holder** must not commence **marine-related activities** until the Marine Management Plan has been approved by the **Minister** in writing. The approved Marine Management Plan must be implemented by the **approval holder**.
- Note 1:** The **approval holder** may prepare and align a management plan required under these conditions with the requirements of the Queensland Government, provided the relevant matters under the conditions of this approval are clearly and adequately addressed.*
15. The **approval holder** must submit a Sawfish and River Sharks Research Proposal for the written approval of the **Minister**. The Sawfish and River Sharks Research Proposal must:
- a. be prepared in consultation with the **Department**;
 - b. provide funding in accordance with the **Schedule** with payments made to a fund agreed to in writing by the **Department**;
 - c. include baseline surveys for **listed sawfish and river shark species** to be completed prior to the commencement of **marine-related activities**;
 - d. determine the movement patterns and habitat use of **listed sawfish and river shark species** in the Skardon River and Namaleta Creek;

- e. monitor changes to key environmental water quality parameters (flow, salinity, turbidity, dissolved oxygen, Chlorophyll A) that may influence movement and habitat use of the Skardon River and Namaleta Creek;
 - f. contribute to ongoing research and inform knowledge about the distribution and abundance of local populations of **listed sawfish and river shark species** and identification of habitat utilised by **listed sawfish and river shark species**; and
 - g. inform avoidance, mitigation and management measures required in the Marine Management Plan at condition 14.
16. The **approval holder** must not commence **marine-related activities** until the Sawfish and River Sharks Research Proposal has been approved by the **Minister** in writing and the first annual **Schedule** payment has been made to the fund agreed to by the **Department** in writing.
 17. The findings of the approved Sawfish and River Sharks Research Proposal must be provided to the **Department** within six months of completion of the research and made available to **Queensland Government Authorities** on written request.

General

18. Within 20 days after the **commencement** of the **action**, the **approval holder** must advise the **Department** in writing of the actual date of **commencement**.
19. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of **approval**, including measures taken to implement the management plans required by this **approval**, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of **approval**. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.
20. Unless otherwise agreed to in writing by the **Minister**, within three months of every 12 month anniversary of the **commencement** of the **action**, the **approval holder** must publish a report on its website addressing compliance with each of the conditions of this **approval**, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and details of non-compliance with any of the conditions of this **approval** must be provided to the **Department** at the same time as the compliance report is published. Reports must remain published for life of the approval. The approval holder may cease preparing and publishing compliance reports required by this condition with written agreement of the **Minister** to do so.
21. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of **approval** is conducted and a report submitted to the **Minister**. The independent auditor and audit criteria must be approved by the **Minister** prior to the commencement of the audit. The audit report must address the approved criteria to the satisfaction of the **Minister**.
22. The **approval holder** must report any contravention of the conditions of this approval to the **Department** within 2 business days of the **approval holder** becoming aware of the contravention.
23. The **approval holder** may choose to revise a management plan approved by the **Minister** under conditions 5, 12 and 14 without submitting it for approval under section 143A of the

EPBC Act, if the taking of the **action** in accordance with the revised plan would not be likely to have a **new or increased impact**. If the **approval holder** makes this choice it must:

- a. notify the **Department** in writing that the approved plan has been revised and provide the **Department** with an electronic copy of the revised plan or strategy;
- b. implement the revised plan from the date that the plan or strategy is submitted to the **Department**; and
- c. for the life of this **approval**, maintain a record of the reasons the **approval holder** considers that taking the **action** in accordance with the revised plan would not be likely to have a **new or increased impact**.

24. The **approval holder** may revoke its choice under condition 23 at any time by notice to the **Department**. If the **approval holder** revokes the choice to implement a revised plan, without approval under section 143A of the Act, the plan most recently approved by the **Minister** must be implemented.

25. If the **Minister** gives a notice to the **approval holder** that the **Minister** is satisfied that the taking of the **action** in accordance with the revised plan would be likely to have a **new or increased impact**, then:

- a. condition 23 does not apply, or ceases to apply, in relation to the revised plan; and
- b. the **approval holder** must implement the plan most recently approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 5, 12 and 14 in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that for a specified period of time that condition 23 does not apply for one or more specified plans required under the approval.

26. Conditions 23, 24 and 25 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the **approval holder** to submit a revised plan or strategy to the **Minister** for approval.

27. If, at any time after 5 years from the date of this **approval**, the **approval holder** has not substantially **commenced** the **action**, then the **approval holder** must not substantially **commence** the **action** without the written agreement of the **Minister**.

28. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on its website. Each management plan must be published on the website within 1 month of being approved by the **Minister**. All published plans must remain on website for the life of the approval.

Definitions

Action means to construct and operate a bauxite mine in ML 40069, ML 40082 and ML 6025, and associated bed levelling, barge loading facility and floating harbour and barging and shipping activities, approximately 100km north of Weipa, Queensland [See EPBC Act referral 2014/7305, Notifications of Variation to Proposal on 18 February 2015 and 22 April 2015].

Approval holder means the person to whom the approval is granted or any person acting on their behalf, or to whom the approval is transferred under section 145B of the EPBC Act.

Commenced/commencement: means any physical disturbance, including clearance of vegetation, new road work and construction of the port and barge loading facility.

Commencement does not include:

- a) minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or geotechnical investigations; or
- b) activities that will have no adverse impact on **matters of national environmental significance**.

Commonwealth marine area means any part of the sea, including the waters, seabed and airspace within Australia's exclusive economic zone, 3 to 200 nautical miles from the coast, that is not State or Northern Territory waters.

Conservation advice means a conservation advice approved by the Minister under the EPBC Act.

Department means the Australian Government Department administering the **EPBC Act**.

Department's survey guidelines means: Survey Guidelines for Australia's Threatened Frogs, Threatened Birds, Threatened Fish, Threatened Mammals, Threatened Reptiles and Threatened Bats: <http://www.environment.gov.au/epbc/guidelines-policies.html>

EPBC/ EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Act Environmental Offsets Policy means the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (October 2012) including the Offsets Assessment Guide.

EPBC threatened species means the.

- Red goshawk (*Erythrotriorchis radiatus*);
- Masked owl (*Tyto novaehollandiae kimberli*);
- Bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudiclunatus*);
- Northern quoll (*Dasyurus hallucatus*); and
- Golden shouldered parrot (*Psephotus chrysopterygius*).

Impact is as defined in section 527E of the EPBC Act. **Listed dolphin species** means the migratory Indo-Pacific humpback dolphin (*Sousa sahulensis*) and Australian snubfin dolphin (*Orcaella heinsohni*)

Listed sawfish and river shark species means the vulnerable Dwarf Sawfish (*Pristis clavata*), vulnerable Green Sawfish (*Pristis zijsron*), Large Sawfish (*Pristis pristis*) and the critically endangered Speartooth Shark (*Glyphis glyphis*).

Listed turtle species means the vulnerable Flatback Turtle (*Natator depressus*), endangered Olive Ridley Turtle (*Lepidochelys olivacea*) and vulnerable Hawksbill Turtle (*Eretmochelys imbricata*)

Marine related activities means bed leveling at the mouth of the Skardon River; construction and operation of the barge loading facility port related activities below the high water mark; upgrade and construction of new creek crossings at Namaleta Creek; barge and ship movements and offshore anchoring and cyclone mooring construction.

Minister means the Minister administering the **EPBC Act** and includes a delegate of the Minister.

New or increased impact means a new or increased impact on any matter protected by the controlling provisions for the **action**, when compared to the plan, program or strategy that has been approved by the Minister.

Offset attributes means an '.xls' file capturing relevant attributes of the offset area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares.

Project area means the granted mining leases (MLs) 6025, 40069 and 40082, including the Skardon River partly covered by MLs 40069 and 40082, Namaleta Creek partly covered by ML 6025, bed levelling area at the mouth of the Skardon River, barge loading facility and floating harbour and associated barging and shipping activities, as shown at Attachment A.

Pre-disturbance surveys means surveys that are undertaken to determine if areas containing hollows and other potential breeding, roosting, and nesting habitat for the vulnerable Red goshawk (*Erythrotriorchis radiatus*), endangered Masked owl (northern) (*Tyto novaehollandiae kimberli*) and critically endangered Bare-rumped sheathtail bat (*Saccolaimus saccolaimus nudicluniatatus*) and their prey are present prior to the commencement of vegetation clearance.

Project stage means the development phases of the project which are to be for a duration of no more than 2 years.

Queensland Government authorities means authorities who have a role in regulating activities relating to water resources or biodiversity.

Recovery plan means a recovery plan made or adopted by the Minister under the EPBC Act.

Schedule means annual payments in accordance with the following:

	Year 1	Year 2	Year 3	Year 4	Total
Amount (excluding GST)	\$130,063	\$123,876	\$108,066	\$110,982	\$472,987

Suitably qualified person means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.

Threat abatement plan means a threat abatement plan made or adopted by the **Minister** under the EPBC Act.

Attachment A



This is a preliminary map and should not be used for any purpose other than for general information. It is not a legal document and should not be relied upon for any legal purpose. The map is not a guarantee of accuracy and should not be used for any purpose other than for general information. The map is not a guarantee of accuracy and should not be used for any purpose other than for general information. The map is not a guarantee of accuracy and should not be used for any purpose other than for general information.

2. APPENDIX TWO - APPROVAL EPBC 2015/7538

**Approval****Bauxite Hills Mining and Barging Project, Weipa, Queensland (EPBC 2015/7538)**

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

person to whom the approval is granted	Metro Mining Limited
proponent's ACN	117 763 443
proposed action	To construct and operate a 24 hour bauxite mine and barge loading facility with an annual production tonnage of 5 Mtpa over a 12 year operational period, 100 km north of Weipa, Queensland [as described in EPBC Act referral 2015/7538 received on 7 August 2015 and the variation to proposal to take an action received on 4 November 2015].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved
Listed migratory species (sections 20 & 20A)	Approved
Commonwealth marine areas (sections 23 & 24A)	Approved


conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 1 September 2041.

Decision-maker

name and position	James Barker Assistant Secretary Assessments and Governance Branch
signature	
date of decision	23/6/2017

Conditions attached to the approval

1. The approval holder must not take the action outside of the **project area**.
2. Prior to the **commencement** of the action, the approval holder must undertake **pre-disturbance surveys** in all areas proposed to be cleared to identify areas of **habitat** for the **EPBC Act** listed Red Goshawk (*Erythrotriorchis radiatus*), Masked Owl (Northern) (*Tyto novaehollandiae kimberli*), Bare-rumped Sheath-tail Bat (*Saccolaimus saccolaimus nudiclunatus*) and Black-footed Tree-rat (North Queensland) (*Mesembriomys gouldii rattoides*).
3. The approval holder must update the **Proposed Methodology for Habitat Assessment for EPBC Listed Threatened Fauna (Survey Methodology)** as required under **EPBC Act** approval 2014/7305 to include the **project area** and a survey methodology to identify **habitat** for the Black-footed Tree-rat (North Queensland). The approval holder must not commence **pre-disturbance surveys** until the updated **Survey Methodology** has been approved by the **Minister** in writing.
4. **Pre-disturbance surveys** must be undertaken by a **suitably qualified person** and in accordance with the approved **Survey Methodology** required at condition 3.
5. If **habitat** for the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheath-tail Bat and Black-footed Tree-rat (North Queensland) are found in the areas to be cleared, the approval holder must submit an Offset Management Plan for the written approval of the **Minister**. The Offset Management Plan must be prepared in accordance with the **Department's Environmental Management Plan Guidelines** and include:
 - a. results from **pre-disturbance surveys** required at condition 2, including a calculation of the amount of **habitat** (in hectares) and a map of the areas containing **habitat** for the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheath-tail Bat and Black-footed Tree-rat (North Queensland);
 - b. details of indirect offset/s for **impacts** on the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheath-tail Bat and Black-footed Tree-rat (North Queensland), including:
 - i. justification of how the proposed indirect offset/s provide an environmental outcome for the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheath-tail Bat and Black-footed Tree-rat (North Queensland);
 - ii. a description of the proposed indirect offset/s that will be implemented, including a discussion of how the proposed indirect offset/s take into account relevant **approved conservation advices** and are consistent with the measures contained in relevant **recovery plans** and **threat abatement plans**;
 - iii. details of outcomes and performance criteria for evaluating the effectiveness of the proposed indirect offset/s;
 - iv. a program to monitor and report on the effectiveness of the outcomes and performance criteria; and
 - v. a timeline for when the proposed indirect offset/s will be implemented.
 - c. details of how the indirect offset/s comply with the principles of the **EPBC Act Environmental Offsets Policy** and, if relevant, details of how the indirect offset/s meet the criteria for research and educational programs identified in Appendix A of the **EPBC Act Environmental Offsets Policy**.

6. The approval holder must not **commence** the action until the Offset Management Plan has been approved by the **Minister** in writing. The approved Offset Management Plan must be implemented.
7. The approval holder must submit a Species Management Plan for the written approval of the **Minister**. The Species Management Plan must be prepared in accordance with the **Department's Environmental Management Plan Guidelines** and include:
 - a. details of measures that will be taken to avoid, mitigate and manage **impacts** to **EPBC Act listed threatened species** and their habitat during vegetation clearance, construction, operation and decommissioning of the action;
 - b. measures to manage areas in the **project area**, that are not within the disturbance footprint, as habitat for **EPBC Act listed threatened species**;
 - c. details of how rehabilitation and revegetation measures required under the Environmental Authority issued under the *Environmental Protection Act 1994* (Qld) provides environmental outcomes for **EPBC Act listed threatened species** and their habitat;
 - d. a monitoring program to determine the success of mitigation and management measures to ensure adaptive management for the duration of this approval; and
 - e. details of how proposed management measures take into account relevant **approved conservation advices** and are consistent with the measures contained in relevant **recovery plans** and **threat abatement plans**.
8. The approval holder must not **commence** the action until the Species Management Plan has been approved by the **Minister** in writing. The approved Species Management Plan must be implemented.
9. The approval holder must submit a Marine Management Plan for the written approval of the **Minister** for **marine-related activities**. The Marine Management Plan must be prepared in accordance with the **Department's Environmental Management Plan Guidelines** and include:
 - a. details of measures to avoid, mitigate and manage **impacts** to **EPBC Act listed dolphin species, EPBC Act listed sawfish and river shark species, EPBC Act listed turtle species, the EPBC Act listed Dugong (*Dugong dugon*) and the environment of the Commonwealth marine area**, including:
 - i. artificial light related **impacts** from shipping and barging activities, and anchored/moored vessels;
 - ii. shipping and barging activities, including management of bauxite dust and contamination spills;
 - iii. vessel strike, including restricting vessel speed limits to six (6) knots and the implementation of a transit lane in the Skardon River that follows the greatest water depth;
 - iv. underwater noise, including from pile driving activities, and shipping and barging activities; and
 - v. the risk of introduced marine pest species over the duration of this approval, including ballast water management.

- b. a monitoring program to determine the success of mitigation and management measures to ensure adaptive management for the duration of this approval;
 - c. details of how proposed management measures take into account relevant **approved conservation advices** and are consistent with the measures contained in relevant **recovery plans** and **threat abatement plans**; and
 - d. details of the timeframe for reviews of the approved Marine Management Plan, including to ensure that the Marine Management Plan is informed by the findings of the Sawfish and River Sharks Research Proposal required under **EPBC Act** approval 2014/7305.
10. The approval holder must not commence **marine-related activities** until the Marine Management Plan has been approved in writing by the **Minister** and baseline surveys for **EPBC Act listed sawfish and river shark species** required under **EPBC Act** approval 2014/7305 have been completed as determined in writing by the **Department**. The approved Marine Management Plan must be implemented.
11. Within 12 months of the approval of the Marine Management Plan required under **EPBC Act** approval 2014/7305, the approval holder must submit a Marine Debris Management Plan for the written approval of the **Minister**. The Marine Debris Management Plan must be prepared in accordance with the **Department's Environmental Management Plan Guidelines** and in consultation with **key organisations**. The Marine Debris Management Plan must include:
- a. a description of the measures that will be taken to reduce **marine debris** in the Skardon River and the Skardon River mouth;
 - b. details on the location and scope of the proposed measures;
 - c. details of how the proposed measures are consistent with Objective 6b in the **Sawfish and River Sharks Multispecies Recovery Plan**;
 - d. details of how the proposed measures are consistent with the objectives and actions contained in the **Threat abatement plan for the impacts of marine debris on vertebrate marine life**;
 - e. a timeline for implementation of the proposed measures; and
 - f. a program to report on the effectiveness of the proposed measures.
12. The approved Marine Debris Management Plan must be implemented for the duration of this approval.

Administrative Conditions

13. Within 20 days after the **commencement** of the action, the approval holder must advise the **Department** in writing of the actual date of **commencement**.
14. The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement management plans required by this approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

15. Within three (3) months of every 12 month anniversary of the **commencement** of the action, the approval holder must publish a report (the Annual Compliance Report) on its website addressing compliance with each of the conditions of this approval, during the previous 12 months. Documentary evidence providing proof of the date of publication must be provided to the **Department** at the same time as the Annual Compliance Report is published. Reports must remain published for the life of the approval. The approval holder must continue to publish the Annual Compliance Report each year until such time as agreed to in writing by the **Minister**.
16. The approval holder must report any potential or actual contravention of the conditions of this approval to the **Department** in writing within two (2) business days of the approval holder becoming aware of a contravention.
17. Upon the direction of the **Minister**, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The approval holder must not commence the audit until the **Minister** approves the independent auditor and audit criteria in writing. The audit report must address the criteria to the satisfaction of the **Minister**.
18. The approval holder may choose to revise a management plan approved by the **Minister** under conditions 7, 9 and 11 without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the revised plan would not be likely to have a **new or increased impact**. If the approval holder makes this choice it must:
 - a. notify the **Department** in writing that the approved plan has been revised and provide the **Department**, at least four (4) weeks before implementing the revised plan, with:
 - i. an electronic copy of the revised plan;
 - ii. an explanation of the differences between the revised plan and the approved plan; and
 - iii. reasons the approval holder considers that the taking of the action in accordance with the revised plan would not be likely to have a **new or increased impact**.
- 18A. The approval holder may revoke their choice under condition 18 at any time by notice to the **Department**. If the approval holder revokes the choice to implement a revised plan, without approval under section 143A of the **EPBC Act**, the plan approved by the **Minister** must be implemented.
- 18B. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised plan would be likely to have a **new or increased impact**, then:
 - a. condition 18 does not apply, or ceases to apply, in relation to the revised plan; and
 - b. the approval holder must implement the plan approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 18 and 18A in the period before the day the notice is given.

At the time of giving the notice, the **Minister** may also notify that for a specified period of time that condition 18 does not apply for one or more specified plans required under the approval.

- 18C. Conditions 18, 18A and 18B are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised plan to the **Minister** for approval.
19. If, at any time after five (5) years from the date of this approval, the approval holder has not **commenced** the action, then the approval holder must not **commence** the action without the written agreement of the **Minister**.
20. Unless otherwise agreed to in writing by the **Minister**, the approval holder must publish all management plans referred to in these conditions of approval on its website. Each management plan must be published on the website within one (1) month of being approved by the **Minister** or being submitted under condition 18. All management plans must remain on the website for the lifetime of the approval unless otherwise agreed to in writing by the **Minister**.

Definitions

Approved conservation advice/s: A conservation advice approved by the **Minister** under section 266B(2) of the **EPBC Act**.

Commence/commenced/commencement: The first instance of any specified activity associated with the proposed action, including clearance of vegetation and construction of any infrastructure. Commencement does not include:

- a. minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or geotechnical investigations or to protect environmental and property assets from fire, weeds and pests; or
- b. activities that will have no adverse **impact** on matters of national environmental significance.

Department: The Australian Government Department or agency responsible for administering the **EPBC Act** from time to time.

Environment of the Commonwealth marine area: Any part of the sea, including the waters, seabed and airspace within Australia's exclusive economic zone, three (3) to 200 nautical miles from the coast that is not State or Northern Territory waters.

Environmental Management Plan Guidelines: The Environmental Management Plan Guidelines (2014), or subsequent revision. Available at:
www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines.

EPBC Act: The *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Act Environmental Offsets Policy: The **EPBC Act** Environmental Offsets Policy (October 2012), or subsequent revision, including the Offsets Assessment Guide. Available at:
www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.

EPBC Act listed dolphin species: A threatened dolphin species listed under the **EPBC Act** for which this approval has effect, including:

- Indo-Pacific Humpback Dolphin (*Sousa chinensis*)
- Australian Snubfin Dolphin (*Orcaella heinsohni*)

EPBC Act listed sawfish and river shark species: A threatened sawfish and river shark species listed under the **EPBC Act** for which this approval has effect, including:

- Speartooth Shark (*Glyphis glyphis*)
- Dwarf Sawfish (*Pristis clavata*)
- Freshwater Sawfish (*Pristis pristis*)
- Green Sawfish (*Pristis zijsron*)

EPBC Act listed threatened species: A threatened flora or fauna species listed under the **EPBC Act** for which this approval has effect, including:

- Chocolate Tea Tree Orchid (*Dendrobium johannis*)
- Red Goshawk (*Erythrotriorchis radiatus*)
- Masked Owl (Northern) (*Tyto novaehollandiae kimberli*)
- Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus nudicluniatus*)
- Northern Quoll (*Dasyurus hallucatus*)
- Black-footed Tree-rat (North Queensland) (*Mesembriomys gouldii rattoides*)

EPBC Act listed turtle species: A threatened turtle species listed under the **EPBC Act** for which this approval has effect, including:

- Flatback Turtle (*Natador depressus*)
- Hawksbill Turtle (*Eretmochelys imbricata*)
- Olive Ridley Turtle (*Lepidochelys olivacea*)

Habitat: Areas containing breeding hollows for the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheathtail Bat and Black-footed Tree-rat (North Queensland) and their prey.

Impact/s: As defined in section 527E of the **EPBC Act**.

Key organisations: An organisation identified in the **Sawfish and River Sharks Multispecies Recovery Plan**, including the Australian Government, state and territory governments, Indigenous communities and Indigenous land and sea management organisations, relevant non-government organisations and researchers.

Marine debris: As defined in the **Threat Abatement Plan for the impacts of marine debris on vertebrate marine life**, and includes land sourced plastic garbage, fishing gear from recreational and commercial fishing abandoned into the sea, and ship sourced, solid non-biodegradable floating materials disposed of at sea. Plastic material includes bags, bottles, strapping bands, sheeting synthetic ropes, synthetic fishing nets, floats, fibreglass, piping, insulation, paints and adhesives.

Marine-related activities: Offshore anchoring and mooring construction, and barge and ship movements.

Minister: The Minister administering the **EPBC Act** and includes a delegate of the Minister.

New or increased impact: A new or increased impact on any matter protected by the controlling provisions for the action, when compared to the environmental impact or risk resulting from implementing the plan that has been approved by the **Minister**.

Pre-disturbance surveys: The surveys undertaken to determine if **habitat** for the Red Goshawk, Masked Owl (Northern), Bare-rumped Sheathtail Bat and Black-footed Tree-rat (North Queensland) are present in the **project area** prior to the commencement of vegetation clearance.

Project area: Granted mining lease applications (MLAs) 20676, 20689, 20688 and transportation access to MLA100130, cyclone moorings as shown at Attachment A, and associated barging and shipping activities down the Skardon River into the Gulf of Carpentaria.

Proposed Methodology for Habitat Assessment for EPBC Listed Threatened Fauna (Survey Methodology): The survey methodology for terrestrial **EPBC Act** listed threatened fauna, or subsequent revision, as required under **EPBC Act** approval 2014/7305 and approved by the **Department** on 21 November 2016.

Recovery plan/s: A recovery plan made or adopted by the **Minister** under the **EPBC Act**.

Sawfish and River Sharks Multispecies Recovery Plan: The Sawfish and River Sharks Multispecies Recovery Plan: (*Pristis pristis*, *Pristis zijsron*, *Pristis clavata*, *Glyphis glyphis* and *Glyphis garracki*) (2015), or subsequent revision. Available at: www.environment.gov.au/biodiversity/threatened/publications/recovery/sawfish-river-sharks-multispecies-recovery-plan.

Suitably qualified person: A person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant standards, methods or literature.

Threat Abatement Plan for the impacts of marine debris on vertebrate marine life: The Threat abatement plan for the impacts of marine debris on vertebrate marine life (2009), or subsequent revision. Available at: www.environment.gov.au/marine/publications/threat-abatement-plan-impacts-marine-debris-vertebrate-marine-life.

Threat abatement plans: A threat abatement plan made or adopted by the **Minister** under the **EPBC Act**.



Attachment A:



3. APPENDIX THREE RISK ASSESSMENT AND CONTROLS

The following tables describe the events or circumstances that may influence Metro Minings' ability to achieve this plan's performance objectives for each of the species of concern within this SSMP.

The risk assessment uses the risk management framework and Likelihood and Consequence tables as supplied by the department with approval EPBC 2014/7305 and builds upon the material previously supplied as part of the EIS process and original approval application.

All risk assessments presented here are post application of the controls outlined in the Management Actions section of this SSMP

Risk framework

Likelihood		Consequence				
		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Likelihood and consequence

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate	Moderate risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High	High risk of failure to achieve the plan's objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major	The plan's objectives are unable to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.
Critical	The plan's objectives are unable to be achieved, may include widespread and severe environmental harm, with no evidenced mitigation strategies.

INDIVIDUAL SPECIES RISK ASSESSMENTS

Bare-rumped Sheathtail Bat

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Unlikely - species is insect dependant and is known to frequent cleared areas and forage actively across habitats including during fires	Moderate - suitable habitat remains adjacent to the mining areas	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance of Bats	pre-clearing surveys
No appreciable loss of roosts	Clearing resulting in a loss of hollow trees would reduce breeding locations	Unlikely - loss den trees would reduce breeding opportunity however species breeds during wet season which is outside of seasonal clearing schedules	Moderate - if roosts were present would be in low numbers and able to be relocated	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance of Bats	pre-clearing surveys
No mortality of individual bats	mortality due to species being impacted by clearing activity or site activities	Unlikely - pre-clearance surveys would detect the species in areas to be cleared, species is arboreal	Minor - individual bats could be relocated	Low	Bats found during clearing	review of clearing activities to minimise disturbance of Bats	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Bare-rumped Sheathtail Bat

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	operation of the mine	Unlikely - limited opportunity for European bees to colonise area	Minor	Low	Pre-clearing surveys would identify any pests or increases in other species	removal of pests, monitoring other species numbers	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	mine activities alter fire regime	Unlikely - fire regime managed in conjunction with Traditional Owners	Minor - unlikely loss of hollows on adjacent remnants	Low	Increase in fire frequency	change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	rehabilitation is not suitable habitat in the long term for bats	possible - rehabilitation program will replace trees suitable for bats once hollows are formed	Moderate - in the short term, no hollows will form (but rehabilitation will become foraging habitat)	Medium	Rehabilitation monitoring program will include fauna surveys	potential to create artificial hollows if no bats are present in surveys	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Red Goshawk

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Unlikely - species forages over a wide area, highly mobile and not found in EIS	Moderate - suitable habitat remains adjacent to the mining areas	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of roost	pre-clearing surveys
No appreciable loss of nesting roosts	Clearing resulting in a loss of large roost trees	Unlikely - no suitable roost trees identified during EIS	Minor - suitable roost trees elsewhere	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of roost	pre-clearing surveys
No mortality of individuals	mortality due to species being impacted by clearing activity or site activities	Unlikely - species arboreal and highly mobile	Minor	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of roost	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Red Goshawk

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	operation of the mine	Unlikely - no known competitors	Minor	Low	Pre-clearing surveys would identify any pests or increases in other species	removal of pests, monitoring other species numbers	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	mine activities alter fire regime, losing habitat trees	Unlikely - fire regime managed in conjunction with Traditional Owners	Minor - unlikely loss of large trees on adjacent remnants	Low	Increase in fire frequency	change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	rehabilitation is not suitable habitat in the long term for Red Goshawks	possible - rehabilitation program will replace tree species suitable for Red Goshawks	Moderate - in the short term, no large trees present (but rehabilitation will become foraging habitat)	Medium	Rehabilitation monitoring program will include fauna surveys	raptor roosts could be installed to encourage foraging in rehab	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Masked Owl

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Unlikely - species forages over a wide area, are highly mobile and not found in EIS	Moderate - suitable habitat remains adjacent to the mining areas	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of potential roosts	pre-clearing surveys
No appreciable loss of roosts	Clearing resulting in a loss of hollow trees would reduce breeding locations	Unlikely - few large trees exist in clearing areas suitable for breeding hollows	Minor - suitable trees found elsewhere	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of potential roosts	pre-clearing surveys
No mortality of individuals	mortality due to species being impacted by clearing activity or site activities	Unlikely - species is arboreal	Minor	Low	Species found during pre-clearance surveys	review of clearing activities, investigation of sighting and location of potential roosts	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Masked Owl

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	operation of the mine	Unlikely - no known competitive species	Minor	Low	Pre-clearing surveys would identify any pests or increases in other species	removal of pests, monitoring other species numbers	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	mine activities alter fire regime	Unlikely - fire regime managed in conjunction with Traditional Owners	Minor - unlikely loss of hollows on adjacent remnants	Low	Increase in fire frequency	change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	rehabilitation is not suitable habitat in the long term for Masked Owls	possible - rehabilitation program will replace trees suitable for owls once hollows are formed	Moderate - in the short term, no hollows will form (but rehabilitation will become foraging habitat)	Medium	Rehabilitation monitoring program will include fauna surveys	potential to create artificial hollows if no owls are present in surveys	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Northern Spotted Quoll

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Unlikely - species is highly mobile and forages across a range of habitats	Moderate - suitable habitat remains adjacent to the mining areas	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to quolls	pre-clearing surveys
No appreciable loss of roosts	Clearing resulting in a loss of denning areas would reduce breeding locations	Unlikely - No suitable denning sites found onsite	Moderate - very unlikely dens present on site due to lack of rock formations and log piles	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to quolls	pre-clearing surveys
No mortality of individuals	mortality due to species being impacted by clearing activity or site activities	Unlikely - pre-clearance surveys would detect the species, species highly mobile	Minor - species would self relocate rapidly due to shy nature	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to quolls	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Northern Spotted Quoll

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	operation of the mine	Likely - species heavily impacted by Cane Toads over its entire range, Cats and Dogs also a threat	Moderate - species was not located during EIS and may be locally extinct	Medium	Pre-clearing survey detects species	increased efforts to control cane toads, ongoing cat and dog management	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	mine activities alter fire regime, degrading potential Quoll habitat	Unlikely - fire regime managed in conjunction with Traditional Owners	Minor - unlikely loss of hollows on adjacent remnants	Low	Increase in fire frequency	change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	rehabilitation is not suitable habitat in the long term for quolls	possible rehabilitation program will replace log piles which may serve as dens	Moderate - in the short term but rehabilitation will become foraging habitat	Medium	Rehabilitation monitoring program will include fauna surveys	potential to create log piles suitable for dens	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Golden Shouldered Parrot

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Rare - species is geographically restricted and habitat is not similar to SRBP area	High - no suitable habitat exists but if present would be a significant find	Low	Species found during pre-clearance surveys	Notify authorities and cease clearing in location	pre-clearing surveys
No appreciable loss of roosts	Clearing resulting in a loss of termite mounds	Rare - particular termite mounds not located in SRBP area	High - no suitable habitat exists but if present would be a significant find	Low	Species found during pre-clearance surveys	Notify authorities and cease clearing in location	pre-clearing surveys
No mortality of individuals	mortality due to species being impacted by clearing activity or site activities	Rare - species is geographically restricted and habitat is not similar to SRBP area	High - no suitable habitat exists but if present would be a significant find	Low	Species found during pre-clearance surveys	Notify authorities and cease clearing in location	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Golden Shouldered Parrot

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	operation of the mine	Rare - species is geographically restricted and habitat is not similar to SRBP area	High - no suitable habitat exists but if present would be a significant find	Low	Pre-clearing surveys would identify any pests or increases in other species	removal of pests, monitoring other species numbers	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	mine activities alter fire regime	Rare - species is geographically restricted and habitat is not similar to SRBP area	High - no suitable habitat exists but if present would be a significant find	Low	Increase in fire frequency	change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	rehabilitation is not suitable habitat in the long term for bats	Rare - species is geographically restricted and habitat is not similar to SRBP area	Minor- not possible with soil type and vegetation type to create suitable habitat	Low	Rehabilitation monitoring program will include fauna surveys	Unlikely to create rehabilitation suitable for this species	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Black Footed Tree Rat

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No appreciable loss of foraging habitat	Clearing activities for construction or mining	Unlikely - species is highly mobile and forages across a range of habitats, large tracts of habitat remain outside project area	Moderate - suitable habitat remains adjacent to the mining areas	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to rats, relocation to suitable habitat	pre-clearing surveys
No appreciable loss of nesting habitat	Clearing resulting in a loss of nesting habitat would reduce breeding locations	Likely - suitable nesting sites found on and offsite	Moderate - unlikely nesting present on site due to noise from site activities	Medium	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to rats, relocation to suitable habitat	pre-clearing surveys
No mortality of individual rats	mortality due to species being impacted by clearing activity or site activities	Unlikely - pre-clearance surveys would detect the species, species highly mobile	Minor - species would self relocate rapidly due to shy nature	Low	Species found during pre-clearance surveys	review of clearing activities to minimise disturbance to rats, relocation to suitable habitat	pre-clearing surveys

INDIVIDUAL SPECIES RISK ASSESSMENTS

Black Footed Tree Rat

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No impact on species from Pests or competitive species	Operation of the mine	Possible - species may compete with more common species tolerant of site activities	Moderate - species may relocate away from disturbance area and may be outcompeted by similar species or pest species	Medium	Pre-clearing survey detects species	Increased efforts to control competitive pests in buildings	Pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	Mine activities alter fire regime, degrading potential habitat	Possible - fire regime managed in conjunction with Traditional Owners however is listed as key threatening process	Moderate - Fire regime must be suitable for rats	Medium	Increase in fire frequency	Change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
rehabilitation is suitable habitat for species	Species is arboreal and may utilise rehabilitation of a certain age and tree density / hollows	Possible - rehabilitation program will create future habitat	Moderate - in the short term but rehabilitation will become foraging habitat	Medium	Rehabilitation monitoring program will include fauna surveys	Potential to increase species density and increase planting of suitable nesting species and or install suitable hollows	Rehabilitation monitoring program

INDIVIDUAL SPECIES RISK ASSESSMENTS

Chocolate Tea Tree Orchid

Objective	Activity	Likelihood	Consequence	Risk	Trigger	Contingency	Related Monitoring Activity
No loss of suitable vegetation type	Operation of the mine	Unlikely - species is confined to different vegetation type than proposed mining areas. Some minor habitat will be cleared as part of port activities	Moderate - species was not located during EIS but may be present in buffers and adjacent port area	Low	Pre-clearing survey detects species	Species will be relocated to suitable habitat or suitable rehabilitation area	pre-clearing surveys, rehabilitation monitoring
No changes to fire regime	Mine activities alter fire regime, degrading potential habitat	Unlikely - fire regime managed in conjunction with Traditional Owners	Minor - unlikely loss of tree habitat on adjacent remnants	Low	Increase in fire frequency	Change during practices and work with Traditional Owners to maintain fire regime	Fire Management plan audit regime
Rehabilitation is suitable habitat for species	Species is epiphytic and may recolonise wetter parts of the rehabilitation	Possible - rehabilitation program will create future habitat	Moderate - in the short term rehabilitation will not be suitable but as trees develop, Orchid habitat is possible	Medium	Rehabilitation monitoring program will include Orchid surveys and potential relocation of individuals to rehabilitation areas	N / A	Rehabilitation monitoring program

