EPBC Listed Threatened Fauna Management Plan

North Star Hematite Project

21 December 2012
NS-PL-EN-0003
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<td>Author</td>
<td>Rachael Sharp</td>
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<td>Checked</td>
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<tr>
<td>Approved</td>
<td>Sean McGunnigle</td>
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Appendix 1: Species-Specific Monitoring Programme
1. INTRODUCTION

1.1 Background

FMG Iron Bridge Limited (FMG Iron Bridge) proposes to develop the North Star Hematite Project (the Project), located approximately 110 kilometres (km) south of Port Hedland in the Pilbara region of Western Australia (Figure 1). FMG Iron Bridge is a subsidiary company of Fortescue Metals Group Limited (Fortescue).

The Project was referred to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) on 27 August 2012 (referral reference EPBC 2012/6530).

Fortescue was advised on 11 October 2012 that the Project was considered a controlled action, on the basis of impacts to listed threatened species and communities (Section 18 and 18 A), to be assessed by preliminary documentation.

1.2 Purpose

The purpose of this EPBC Listed Threatened Fauna Management Plan (the Plan) is to manage the potential impacts on EPBC listed threatened fauna species resulting from the Project. In addition, the plan provides guidelines on fauna monitoring that could be utilised to determine the level of impact on fauna species within Fortescue’s operations.

The Plan addresses management issues relevant to the EPBC listed threatened fauna species which are considered likely to occur within the Project area. These species are:

- Northern Quoll (*Dasyurus hallucatus*)
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)
- Olive Python (Pilbara subspecies) (*Liasis olivaceus barroni*).

The Plan has been developed to meet the requirements of the Fauna Management Plan outlined in correspondence received from DSEWPaC on 16 October 2012. This document has been prepared in response to the request for a Fauna Management Plan.
2. PROJECT DESCRIPTION

FMG Iron Bridge is proposing to develop a new iron ore mine and dry magnetic separation facility in order to produce a saleable mag-hematite (hematite) product. Product will be trucked to Port Hedland for export. It is proposed to extract a maximum of approximately 12 million tonnes of ore at an annual rate of up to 5.0 Mtpa for approximately 2.5 years. The mine pit will extend no more than 55 m below the natural level of the surrounding ground and will not intersect groundwater.

About 20 million tonnes of waste rock and overburden will be mined during the life of the Project. Waste rock will be stored in a single temporary waste rock stockpile to the east of the pit, and will be returned to the pit once mining operations are complete.

The Project is located within mining tenement M45/1226 (mine and processing infrastructure), and pending tenements L45/293 (access road) and L45/294 (access road). Access to the Project from Port Hedland is via the Great Northern Highway and a new road to be constructed between the highway and the mine. The conceptual Project layout is shown on Figure 2.
RELEVANT LEGISLATION

FMG Iron Bridge employees and contractors are obliged to comply with all relevant environmental Commonwealth and State legislation. Legislation directly relevant to the management of fauna in Western Australia is provided in Table 1.

Table 1: Commonwealth and State Legislation Relevant to this Fauna Management Plan

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Environment Protection and Biodiversity Conservation Act 1999</em> (Cwth)</td>
<td>Assesses the conservation significance of fauna species and forms the framework for significant species protection at the Federal level.</td>
</tr>
<tr>
<td><em>Agriculture and Related Resources Protection Act 1976</em> (WA)</td>
<td>Provides for the management, control and prevention of certain plants and animals, for the prohibition and regulation of the introduction and spread of certain plants and of the introduction, spread and keeping of certain animals, for the protection of agriculture and related resources generally, and for incidental and other purposes.</td>
</tr>
<tr>
<td><em>Conservation and Land Management Act 1984</em> (WA)</td>
<td>Provides for the vesting or reservation of land for conservation purposes, and the ability to enter into agreements with private landholders and pastoral lessees. It establishes a number of statutory bodies including the Conservation Commission of Western Australia.</td>
</tr>
<tr>
<td><em>Environmental Protection Act 1986</em> (WA)</td>
<td>State environmental impact assessment and Ministerial approval process.</td>
</tr>
<tr>
<td><em>Wildlife Conservation Act 1950</em> (WA)</td>
<td>State process which assesses the conservation significance of fauna species and forms the framework for significant species protection.</td>
</tr>
</tbody>
</table>
4. ROLES AND RESPONSIBILITIES

Accountability for fulfilling the requirements of this Plan is dependent on the stage of project development (construction, operations, decommissioning).

Irrespective of whether construction activities are undertaken by an external service provider or internal personnel, the Project Manager will be accountable for ensuring the requirements of the Plan are met. Responsibility may be delegated to the Environmental Manager or other personnel.

During operational stages, the General Manager (Magnetite Projects) is accountable for ensuring the requirements of the Plan are met. Responsibility for specific tasks may be delegated.

Where responsibilities are delegated, this must be clearly recorded and communicated. Table 2 attributes specific management actions to the appropriate personnel.

Table 2: Roles and Responsibilities

<table>
<thead>
<tr>
<th>Position</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager, Environment Governance and Sustainability</td>
<td>To formulate, implement and report on fauna monitoring and assessment work. To provide guidance in the approach to fulfilling commitments of the Fauna Management Plan.</td>
</tr>
<tr>
<td>Manager, Environmental Compliance</td>
<td>To provide site staff with the tools and resources required to meet Fortescue objectives. Audits conformance of activities against the management actions of the Fauna Management Plan.</td>
</tr>
<tr>
<td>Site Environment Managers</td>
<td>To maintain site records of surveys and arrange monitoring programs as required. To document any direct observations into the fauna database. To provide site staff with the tools and resources required to meet Fortescue objectives.</td>
</tr>
<tr>
<td>Site Environmental Officers</td>
<td>To provide technical support and advice to site staff.</td>
</tr>
<tr>
<td>Construction/Operational Managers</td>
<td>To ensure Fortescue conditions, commitments and policies are followed on-site.</td>
</tr>
<tr>
<td>Employees, contractors and visitors</td>
<td>To reduce any impacts on fauna resulting from the construction and operation of the project. To report sightings, vehicle strikes or any encounters with recognisable significant fauna species.</td>
</tr>
</tbody>
</table>
5. POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT

5.1 Key Activities

Many of the activities associated with Fortescue’s exploration, construction, operation and decommissioning activities have the potential to impact on the environment.

Key activities which have the potential to impact on fauna species and/or conservation significant fauna across Fortescue’s operations include:

- vegetation clearing
- ground disturbance
- construction and establishment of infrastructure and linear infrastructure
- open pit mining
- vehicle movement
- waste disposal
- groundwater abstraction and distribution
- decommissioning/closure
- rehabilitation.

5.2 Potential Impacts

The key potential impacts to EPBC listed threatened fauna arising from Fortescue’s activities are presented in Table 3. Direct Impacts on fauna are likely to be associated with direct loss of individuals, habitat loss, alteration or fragmentation and the introduction of feral predators.

<table>
<thead>
<tr>
<th>Potential Environmental Impacts</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of individuals or populations</td>
<td>Direct mortality to Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python due to construction or operational activities associated with the Project.</td>
</tr>
<tr>
<td>Loss of suitable habitat</td>
<td>Direct loss of suitable habitat for EPBC listed threatened fauna species (including foraging and dispersal habitat for the Northern Quoll).</td>
</tr>
<tr>
<td>Habitat alteration</td>
<td>Indirect impacts to habitat, including disturbance of known dry season roost sites for the Pilbara Leaf-nosed Bat.</td>
</tr>
<tr>
<td>Habitat fragmentation or obstruction of passage or corridors</td>
<td>Fragmentation of habitat areas, normally associated with linear infrastructure.</td>
</tr>
<tr>
<td>Introduction of feral predators</td>
<td>Introduced predators (e.g. cats, foxes, wild dogs) are recognised as a threat to the survival of a number of conservation significant species including the Northern Quoll. Mining activities can contribute to an increase in these feral predator populations through an increase in available food and water.</td>
</tr>
</tbody>
</table>
5.3 Environmental Objectives and Management Approach

The overarching objective of this Plan is to maximise the ongoing protection and long term conservation of EPBC listed threatened fauna species within the Project area. Specific objectives include:

- reduce the likelihood of direct mortality to Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python due to the close proximity Project activities to known locations and suitable habitat for these species
- minimise the loss of habitat supporting EPBC listed threatened fauna species, including foraging and dispersal habitat for the Northern Quoll
- reduce the likelihood of disturbance of known dry season roost sites for the Pilbara Leaf-nosed Bat within the Project area
- minimise the likelihood of the introduction of feral predators within the Project area.

Management measures to address these objectives are presented in Section 5.3.1 to 5.3.4 below, and details of the Fauna Monitoring Program are provided in Section 6 and Appendix A.

5.3.1 Minimise Direct Mortality of EPBC Listed Threatened Fauna Species

Table 4 outlines the management actions which will be undertaken to minimise the likelihood of mortality of EPBC listed threatened species during the life of the Project.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Management Actions</th>
</tr>
</thead>
</table>
| Reduce the likelihood of direct mortality to Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python due to the close proximity Project activities to known locations and suitable habitat for these species. | Project Design:
  - The open pit has been set back from the edge of the plateau in order to avoid clearing of Northern Quoll denning and breeding habitat.
  - The mine pit has been planned to maximise the separation distance between blasting operations and potential roost caves for the Pilbara Leaf-nosed Bat.
  - Clearing for the road crossing of the Turner River will be kept to the minimum required to provide a safe working environment.
  - A minimum 100 m buffer will be established and maintained around identified potential roost caves for the Pilbara Leaf-nosed Bat.
  - Borrow pits will be designed to be self-draining wherever possible by being positioned in an elevated, sloping position in the landscape so that water is able to drain from the pit.
  - Borrow pits will cause no entrapment, injury or death of fauna. The free draining nature of the borrow pits allows fauna egress from the drainage point. Clearing and Construction
  - Internal GDPs (ground disturbance permits) will be implemented for all clearing activities prior to commencement of works.
  - Clearing of native vegetation/fauna habitat will be minimised during construction.
  - Clearing limits will be identified on design and construction documentation.
  - Clearing limits will be pegged in the field prior to commencement of clearing operations.
  - Clearing in/of sensitive flora and fauna habitats including scree slopes, ridges, outcrops, gullies and crevices will be kept to the minimum necessary for safe construction and operation of the project. |
### Operations and General Management Measures

- Information on MNES relevant to the Project and employee/contractor/visitor responsibilities will be included as part of the site induction program.
- Vehicle speed limits will be enforced for all Project roads and tracks.
- Off road driving will be prohibited unless authorised or in emergency situations.
- Driving at dawn, dusk or night will be minimised as far as practicable.
- "Confined" blasting techniques (where inert material such as crushed stone is used to seal off or 'stem' the blast holes and contain the energy released by the detonation of the explosives in the blast hole inside the rock) will be used in preference to unconfined methods.
- The water storage pond will be landscaped to allow animal egress or have specific animal egress points (for example egress matting) installed.
- Known locations of Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python have been mapped and access to these areas will be restricted as far as practicable.
- Access to water pools will be restricted.
- Unauthorised access to potential roost caves for the Pilbara Leaf-nosed Bat will be restricted.
- A fire prevention and control strategy will be developed and implemented.
- Fauna relocation will only be undertaken by suitably qualified personnel, in accordance with DEC regulations and licencing requirements.
- Fauna capture methods will depend on circumstances and species, and may be manual, calico bag and hoop net or pre-baiting and rigid cage or Elliott traps.
- All traps, bags and tools will be cleaned and sterilised prior to utilisation, between captures and prior to setting on each occasion.
- Traps will be located in a position which is sheltered from sun and rain, marked with flagging tape and their position will be recorded by GPS. Cage traps will be covered with heavy weight hessian.
- Injured fauna will be reported to the site environmental officer who will determine the appropriate course of action.
- Any deaths of fauna species protected under the EPBC Act will be reported to DEC and DSEWPaC.

### Rehabilitation

- Design and construct final landforms such that the surface is stable and not prone to erosion and the risk to people or animals entering the area is minimised.
- Borrow pit slopes will be to 1:5 or gentler on end of borrow pit use.

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>A monitoring program will be implemented for each species. Refer to Section 6 and Appendix 1 for more details.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Indicators</td>
<td>No statistically significant changes in population size and abundance near impact areas relative to environmental conditions and population trends at control site (refer to Section 6 for detail). No mortality of listed threatened species will occur as a result of construction of the Project.</td>
</tr>
</tbody>
</table>
| Reporting                   | Incident Reporting System  
Annual Environmental Report  
Internal field reporting of fauna relocations.  
Monitoring Reports (Refer to Section 6) |
| Corrective Action           | Incidents of EPBC listed threatened fauna injury or mortality will be investigated. Injury or mortality that has been attributed to the Project will be reported to DSEWPaC within 7 days of discovery. Management actions will be reviewed and amended if required to prevent re-occurrence. |
| Timing                      | Throughout the life of the Project |
| Responsibility              | Environment Manager  
Construction Manager  
Site Environmental Officers |
5.3.2 Minimise Loss of Habitat

Critical and potential habitat areas for each of the three EPBC listed threatened fauna species has been mapped as part of the targeted fauna surveys undertaken by ecologia Environmental (2011; 2012). Habitat mapping for the Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python are presented in Figures 3, 4, and 5, respectively. Table 5 provides a brief description of the broad habitat types occurring within the Project area, and their suitability as habitat for each species.

### Table 5: Habitat Suitability for EPBC Listed Threatened Fauna Species

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Description</th>
<th>Relevance for EPBC Act Threatened Fauna Species</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Northern Quoll</td>
</tr>
<tr>
<td>Acacia shrubland on hard soil</td>
<td>Moderate density, ground cover comprises low shrubs and medium sized Spinifex clumps. Hard soil does not allow the construction of burrows.</td>
<td>Not identified as critical denning or suitable foraging habitat</td>
</tr>
<tr>
<td>Creek line</td>
<td>Large eucalypt trees fringing water courses, lemon grass and sword grass.</td>
<td>Contains areas of foraging/dispersal habitat</td>
</tr>
<tr>
<td>Granite Outcrop</td>
<td>Large boulders of granite domes with low Spinifex tussock grassland and occasional low shrubs.</td>
<td>Contains areas of potential denning and foraging habitat</td>
</tr>
<tr>
<td>Rocky Plains with Spinifex</td>
<td>Moderate layer of Spinifex and denser shrub layer</td>
<td>Not identified as critical or foraging habitat</td>
</tr>
<tr>
<td>Rocky ridges, breakaways and rocky gorges</td>
<td>Usually surrounded by large areas of rocky Spinifex hills, differ in vegetation structure, substrate, and landform. Rocky gorges associated with semi-permanent waterholes.</td>
<td>Contains critical habitat for denning and breeding as well as foraging habitat.</td>
</tr>
<tr>
<td>Rocky Spinifex Hills</td>
<td>Open vegetation structure, small clumps of Spinifex and scattered low and mid-sized shrubs</td>
<td>Not identified as critical or foraging habitat</td>
</tr>
<tr>
<td>Sandy Plains with Spinifex and Scattered Granites</td>
<td>Predominated by small to medium sized Spinifex clumps and scattered small granite domes.</td>
<td>Not identified as critical or foraging habitat</td>
</tr>
</tbody>
</table>

Direct impacts to areas containing critical habitat will be avoided completely within the Rocky ridges, breakaways and rocky gorges habitat type, and minimised within Creek line and Granite outcrop habitat types.

In addition to the critical and foraging habitat identified in the targeted surveys, the *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the endangered northern quoll (DSEWPaC 2011)* specify that due to a lack of understanding about the characteristics of foraging or dispersal habitat for the Northern Quoll, any land comprising
predominantly native vegetation located within 2 km of denning habitat should be considered potential foraging and dispersal habitat for the species. The majority of direct disturbance for the mine area of the Project occurs within 2 km of denning habitat. Figure 3 shows the extent of the foraging and dispersal habitat defined by the 2 km zone, identified as ‘DSEWPaC-defined Foraging and Dispersal Habitat’.

Table 6 outlines the management actions which will be undertaken to minimise loss of habitat which supports EPBC listed threatened fauna species.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Protection of EPBC Listed Threatened Fauna Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Actions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Project Design:</strong></td>
<td></td>
</tr>
<tr>
<td>• The open pit has been set back from the edge of the plateau in order to avoid clearing of Northern Quoll denning and breeding habitat.</td>
<td></td>
</tr>
<tr>
<td>• The mine pit has been planned to maximise the separation distance between blasting operations and potential roost caves for the Pilbara Leaf-nosed Bat.</td>
<td></td>
</tr>
<tr>
<td>• Clearing for the road crossing of the Turner River will be kept to the minimum required to provide a safe working environment.</td>
<td></td>
</tr>
<tr>
<td>• Borrow material will not be sourced from within Creek Line, Granite Outcrop or Rocky ridges, breakaways and rocky gorge habitat areas.</td>
<td></td>
</tr>
<tr>
<td>• A suitable buffer will be established and maintained around identified potential roost caves for the Pilbara Leaf-nosed Bat.</td>
<td></td>
</tr>
<tr>
<td><strong>Clearing and Construction</strong></td>
<td></td>
</tr>
<tr>
<td>• Internal GDPs (ground disturbance permits) will be implemented for all clearing activities prior to commencement of works.</td>
<td></td>
</tr>
<tr>
<td>• Clearing of native vegetation/fauna habitat will be minimised during construction.</td>
<td></td>
</tr>
<tr>
<td>• Clearing limits will be identified on design and construction documentation.</td>
<td></td>
</tr>
<tr>
<td>• Clearing limits will be pegged in the field prior to commencement of clearing operations.</td>
<td></td>
</tr>
<tr>
<td>• Clearing in/of fauna habitats including creek lines, ridges, outcrops, gullies and crevices will be kept to the minimum necessary for safe construction and operation of the project.</td>
<td></td>
</tr>
<tr>
<td>• Trees of outstanding habitat value will be identified and retained where practicable.</td>
<td></td>
</tr>
<tr>
<td>• Where possible, large rocks will be left in situ within borrow pits as a habitat feature.</td>
<td></td>
</tr>
<tr>
<td><strong>Operations and General Management Measures</strong></td>
<td></td>
</tr>
<tr>
<td>• Information on MNES relevant to the Project and employee/contractor/visitor responsibilities will be included as part of the site induction program.</td>
<td></td>
</tr>
<tr>
<td>• Known locations and habitat areas of Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python have been mapped and access to these areas will be restricted as far as practicable.</td>
<td></td>
</tr>
<tr>
<td>• “Confined” blasting techniques (where inert material such as crushed stone is used to seal off or ‘stem’ the blast holes and contain the energy released by the detonation of the explosives in the blast hole inside the rock) will be used in preference to unconfined methods.</td>
<td></td>
</tr>
<tr>
<td>• Access to water pools will be restricted.</td>
<td></td>
</tr>
<tr>
<td>• A fire prevention and control strategy will be developed and implemented.</td>
<td></td>
</tr>
<tr>
<td>• Unauthorised access to potential roost caves for the Pilbara Leaf-nosed Bat will be restricted.</td>
<td></td>
</tr>
<tr>
<td>• Monitoring will be undertaken in accordance with the Mine and Rail Dust Management Plan in relation to dust impacts on vegetation of the Rocky Ridges, Breakaways and Rocky Gorges habitat.</td>
<td></td>
</tr>
<tr>
<td>• All machinery, vehicles and plant arriving on site will required to be free of vegetative matter and soil/mud.</td>
<td></td>
</tr>
<tr>
<td><strong>Rehabilitation</strong></td>
<td></td>
</tr>
<tr>
<td>• Design and construct final landforms such that the surface is stable and not prone to erosion and the risk to people or animals entering the area is minimised.</td>
<td></td>
</tr>
<tr>
<td>• Progressive rehabilitation will be undertaken when cleared areas are no longer required.</td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>Refer to Section 6.</td>
</tr>
</tbody>
</table>
5.3.3 Minimise Disturbance to Roost Sites

Table 7 outlines the management actions which will be undertaken to minimise disturbance of roost sites for the Pilbara Leaf-nosed Bat.

Table 7: Management Actions to Minimise Disturbance of Roost Sites

<table>
<thead>
<tr>
<th>Objective</th>
<th>Minimise disturbance to Pilbara Leaf-nosed Bats as a result of the Project</th>
</tr>
</thead>
</table>
| Management Actions | • A suitable buffer will be established and maintained around identified potential roost caves for the Pilbara Leaf-nosed Bat.  
  • The mine pit has been planned to maximise the separation distance between blasting operations and potential roost caves for the Pilbara Leaf-nosed Bat.  
  • “Confined” blasting techniques will be used in preference to unconfined methods.  
  • Lighting will be kept to that required for the safe construction and operation of the Project and the welfare of personnel.  
  • Directional lighting will be installed in project buildings if within 500 m of a significant bat roost and visible from the cave.  
  • Lighting required at the southern end of the open pit will be located such that it does not result in increased light levels at the nearest bat roost cave.  
  • Access to potential roost caves for the Pilbara Leaf-nosed Bat will be restricted to authorised personnel only. Entry into confirmed roost caves will be prohibited.  
  • A monitoring program for Pilbara Leaf-nosed Bats will be undertaken in order to confirm the continued presence of the species in the area during the life of the Project.  
  • Contingency measures such as regulation of blast size, frequency or timing will be considered if roost abandonment occurs and can be attributed to blasting activities.  
  • Injured Pilbara Leaf-nosed Bats will be reported to the site environmental officer who will determine the appropriate course of action.  
  • Any deaths of Pilbara Leaf-nosed Bats will be reported to DEC and DSEWPaC. |

Monitoring | A monitoring program will be implemented for the Pilbara Leaf-nosed Bat. Refer to Section 6 and Appendix 1 for more details. |

Performance Indicators | No permanent abandonment of Pilbara Leaf-nosed Bat Roost Caves as a result of the Project |

Reporting | Incident Reporting System  
Annual Environmental Report  
Monitoring Reports (Refer to Section 6) |

Corrective Action | Contingency measures such as regulation of blast size, frequency or timing will be considered if roost abandonment occurs and can be attributed to blasting activities. |

Timing | Throughout construction. |

Responsibility | Environment Manager, Construction Manager, Site Environmental Officers |
5.3.4 Minimise Feral Predators

Table 8 outlines the management actions which will be undertaken to minimise the likelihood of the introduction of feral predators within the Project area.

### Table 8: Management Actions for Feral Predators

<table>
<thead>
<tr>
<th>Objective</th>
<th>No increase in feral animals recorded within the Project area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Actions</strong></td>
<td></td>
</tr>
<tr>
<td>Education and awareness training will inform employees of their requirement to report sightings of feral animals, that no domestic pets are allowed onsite and that no feeding of native and or feral animals is permitted.</td>
<td></td>
</tr>
<tr>
<td>No pets will be allowed on site, including at the accommodation camp.</td>
<td></td>
</tr>
<tr>
<td>All opportunistic feral animal sightings will be reported through the incident reporting procedures.</td>
<td></td>
</tr>
<tr>
<td>Feral animals recorded during annual EPBC species monitoring programs will be reported within the annual monitoring report.</td>
<td></td>
</tr>
<tr>
<td>Project facilities including food and domestic water management will be managed to minimise the presence of non-indigenous fauna. This may include covering of bins, installation of fences and general housekeeping.</td>
<td></td>
</tr>
<tr>
<td>Should the results of annual EPBC monitoring or opportunistic sightings record a significant increase of feral animals in the Project area, approved control methods will be implemented in consultation with the DEC and pastoralists. This may include humane trapping or baiting.</td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>Opportunistic sightings</td>
</tr>
<tr>
<td></td>
<td>Records from annual EPBC monitoring programs</td>
</tr>
<tr>
<td><strong>Performance Indicators</strong></td>
<td>Information on feral animals is included in induction material</td>
</tr>
<tr>
<td></td>
<td>Records database maintained</td>
</tr>
<tr>
<td><strong>Reporting</strong></td>
<td>Incident Reporting System</td>
</tr>
<tr>
<td></td>
<td>Annual Environmental Report</td>
</tr>
<tr>
<td><strong>Corrective Action</strong></td>
<td>Increase or prevalence of feral animals will trigger management measures for the control of these species.</td>
</tr>
<tr>
<td><strong>Timing</strong></td>
<td>Throughout Project life</td>
</tr>
<tr>
<td><strong>Responsibility</strong></td>
<td>Environment Manager</td>
</tr>
<tr>
<td></td>
<td>Construction Manager</td>
</tr>
<tr>
<td></td>
<td>Site Environmental Officers</td>
</tr>
</tbody>
</table>
6. **MONITORING PROGRAM**

6.1 Monitoring Program

Management measures have been designed to avoid or minimise potential impacts on the EPBC listed threatened fauna species and their habitats. It is considered appropriate to monitor the implementation of these actions to ensure they are being implemented effectively. Monitoring of these and other aspects of the Project that may affect these species' values and the effectiveness of the management measures are addressed below.

6.1.1 Monitoring Objectives

The broad objective for the monitoring plan is to monitor and measure the success of management measures in protecting EPBC listed threatened fauna species. Detailed objectives include:

- Measure the impacts of the Project over time by undertaking ongoing annual monitoring of EPBC Act listed threatened fauna species: Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python.

- Measure the success of management measures to inform an adaptive management approach that may be implemented during construction of the remaining sections of the line.

6.1.2 Measuring the Impacts of the Action over Time

This objective aims to measure the impacts of construction and operation of the Project over the project lifespan on EPBC Act listed species.

There are two main potential impacts to threatened fauna species from the Project:

- direct mortality or injury to fauna through construction and operation of the Project

- loss or alteration of fauna habitat

Detailed population monitoring will be undertaken for the Northern Quoll. The methodology specifically includes the establishment of control sites in habitat not immediately adjacent to the Project Area where the species are known to currently exist or have been previously recorded. Additionally, hotspot opportunistic monitoring will be undertaken for other EPBC Act listed species present, which do not appear to occur in the in sufficient numbers for meaningful population monitoring, including the Pilbara Olive Python and Pilbara Leaf-nosed Bat.

Given the form of baseline data available to Fortescue, the following hypotheses will be tested by the data gathered through the ongoing monitoring program.
Hypothesis 1: There will be no long-term statistically significant decline in relative abundance of Northern Quoll across impact sites compared to control sites.

Targeted surveys provide baseline population data for this species, including observations such as motion cameras, scats and diggings. In addition to comparison with baseline population data, the monitoring methodologies proposed for this species can also be used to estimate relative abundance at control and impact sites. These data can then be used to compare population changes over time between control and impact sites. It is considered that this approach will be more effective at detecting any potential population changes at impact sites, rather than making a simple comparison of populations to a baseline “snapshot” in a system where population numbers can vary considerably and unpredictably in space and time.

This Plan gives commitments to using population survey methodology for determining the relative abundance of populations over the life of the project (detailed in Appendix 1), such as:

- mark-recapture and radiotracking; and/or
- non invasion techniques such as observations of burrows, diggings, scats, hair traps and motion sensors.

For species such as the Pilbara Leaf-Nosed Bat and Pilbara Olive Python, intensive trap and release programs unsuitable and are unlikely to give adequate population data results given the habits of these species. Utilising other means such as the (observation of bat calls, scats, burrows and motion cameras, may give a better indication of relative abundance).

Species such as the Pilbara Leaf-Nosed Bat and Pilbara Olive Python are unlikely to be present in adequate population numbers to allow statistical comparison over time. Evidence of their utilising available habitat may be more appropriate than recording population numbers. The methodologies described for these three species in Appendix 1 (hotspot recording) will be adequate for measuring what level of impact the project will have on these species. Northern Quoll, Pilbara Leaf-Nosed Bat, Pilbara Olive Python are addressed in Hypothesis 2.

Variation in environmental factors will influence the results of population monitoring and due to the short operating life of the Project, population monitoring may not show significant changes to local population numbers. Depending on environmental variables, the failure to recapture the same individual within 12 months may not indicate that the Project is having a detrimental impact to the local population. All variables will be considered before determining whether the Project is impacting on local fauna populations.

Table 9 outlines the monitoring actions which will be undertaken to measure the impacts to EPBC listed threatened fauna species as a result of the Project over time.
Table 9: Monitoring Actions for Measuring Impacts over Time

<table>
<thead>
<tr>
<th>Management Actions for Measuring Impacts over Time</th>
</tr>
</thead>
</table>
| **Objective** | To measure the impacts of the Project over time by undertaking ongoing annual monitoring of EPBC Act listed threatened fauna species.  
To determine whether Project has resulted in any regionally significant impacts* to populations of EPBC-listed threatened species. |
| **Monitoring Actions** | • Annual EPBC fauna monitoring will be undertaken for the life of the project.  
• Monitoring will be compared to baseline data available for this project, specifically the targeted fauna surveys undertaken by ecologia (2012).  
• Previously recorded locations of EPBC listed threatened fauna activity will be revisited.  
• Evidence of EPBC listed threatened fauna species will be recorded, including sightings, scats, tracks, diggings and burrows/nests.  
• It is noted that trapping may not be an effective technique for determining presence of some species; however, trapping will be employed if non-invasive techniques are unsuccessful.  
• Any EPBC Fauna relocations will be recorded in detail. |
| **Sampling Design** | Detailed population monitoring will be undertaken for the Northern Quoll.  
Hotspot monitoring will be undertaken for other EPBC listed threatened species which occur in the area in numbers considered to be insufficient for meaningful population monitoring, including the Pilbara Olive Python and Pilbara Leaf-nosed Bat (refer to Appendix 1). |
| **Target** | Refer to Appendix 1 for specific details of the sampling design. |
| **Reporting** | The results of monitoring will be presented in an Annual EPBC Listed Threatened Fauna Monitoring Report. |
| **Timing** | Annually |
| **Responsibility** | Environment Manager |

* Regional significance will be measured by comparison with species presence and abundance data available for the Pilbara region.

### 6.1.3 Measuring the Success of Management Measures

This objective has been developed to ensure that results from fauna monitoring contribute to the continual adaptation of the fauna management plan to ensure that the project does not significantly impact on fauna populations for the life of the project. With this in mind, the following hypothesis has been developed to measure whether adaptive management is successful.

_Hypothesis 2: EPBC-listed fauna species previously recorded within the area of impact will continue to have an ongoing presence._

If EPBC listed species known to be present continue to be recorded by the monitoring program, it could be concluded that the fauna management measures are having the desired result of ensuring that these species continue to utilise the available habitat. It is important to note that failure to locate the species in areas where they have been previously recorded should be considered in light of environmental conditions which can have a significant impact on the distribution and local abundance of any given species. The presence or otherwise of the species in control sites relative to impact sites will provide a baseline over time to assist in accounting for these factors.
Table 10 outlines the monitoring actions which will be undertaken to measure the impacts to EPBC listed threatened fauna species as a result of the project over time.

### Table 10: Monitoring Actions for Measuring Success of Management Measures

<table>
<thead>
<tr>
<th>Management Actions for Measuring Success of Management Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
</tbody>
</table>
| **Monitoring Actions** | • Progressive surveying of extent of cleared and rehabilitated areas will be undertaken.  
  • Periodic internal audits of clearing activities when clearing is underway will be undertaken.  
  • Routine visual site inspections of rehabilitated areas will be undertaken.  
  • Annual site assessments of rehabilitated areas (including photographic point monitoring) will be conducted to ascertain the survival and growth of the rehabilitated vegetation. The data collected will be analysed to provide possible recommendations for improved rehabilitation techniques.  
  • Any opportunistic sightings of EPBC listed threatened fauna will be recorded.  
  • Details of fauna relocations will be recorded.  
  • Monthly inspections of waste disposal sites (to ensure no access by feral animals) will be undertaken.  
  • Opportunistic sightings of feral animals will be recorded and ensure trapping will be undertaken if feral animal numbers increase.  
  • Internal environmental audits will be undertaken annually. |
| **Sampling Design** | Population and hotspot monitoring will be undertaken as detailed in Table 9. Refer to Appendix 1 for specific details of the sampling design. |
| **Target** | Management measures (original or adaptive) are successful in minimising impacts to EPBC listed threatened species. |
| **Reporting** | Incident reports  
  Internal audit reports  
  Annual environmental reports detailing results that record opportunistic sightings.  
  Annual environmental reports |
| **Timing** | Inspections – timing as indicated above  
  Annual rehabilitation inspections – until closure criteria is met for rehabilitated areas. |
| **Responsibility** | Environment Manager  
  Site Environmental Officers  
  All Project Employees and Contractors |

Contingency actions will be initiated during Project if monitoring indicates that implemented construction management actions are not successfully mitigating impacts to the targeted species and management objectives are not being achieved (Table 11).

### Table 11: Adaptive Management

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Action</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| Death of EPBC listed threatened fauna species | • Immediately report and record as an environmental incident.  
  • Advise Environment Superintendent as soon as practicable in order to determine possible cause and implement appropriate contingency measures. Example response measures include:  
  i. providing more detailed advice during inductions  
  ii. changing procedures and management  
  iii. reducing speed limits in certain areas.  
  • Complete an Environmental Incident Report. | All personnel  
  Environment Superintendent |
| Injury to EPBC listed threatened fauna species | • Immediately report and record as an environmental incident.  
  • Animal will be treated if possible  
  • Complete an Environmental Incident Report | All personnel  
  Environment Superintendent |
6.2 Performance Indicators

Statistically significant declines in population distribution within or close to impact areas relative to environmental conditions and population distribution trends at control sites will indicate that mining operations are impacting species. For example, permanent abandonment of any identified roost caves confirmed to be inhabited by Pilbara Leaf-nosed Bats is an indication of disturbance.

6.3 Reporting and Response

Environmental Incident Reporting

Environmental incidents are events or occurrences that result in, or have the potential to result in, impacts to the environment, for example, a death of or injury to an EPBC listed animal. All incidents will be reported on an Environmental Incident Report form and registered in an electronic database. Incidents will be tracked to ensure that the appropriate corrective actions and measures are taken to prevent the incident from reoccurring. Environmental incidents will be reviewed on a monthly and annual basis to determine incident trends. This will enable targeting of areas that require further adaptive management and will assist in preventing future incidents.

All incidents will be reviewed immediately to determine if they require reporting to the appropriate authority. If reporting is required, it will be carried out in writing to the appropriate authority within 24 hours of the incident occurring.

An Emergency Response Plan will be prepared and implemented to deal with any major environmental incidents.

Performance Reporting and Auditing

Performance reporting will be implemented to produce systematic, comprehensive and informative reports on the environmental management and monitoring activities of the Project. Monitoring data will be collected as per this monitoring plan and Fortescue will undertake annual internal audits to ensure monitoring commitments are being met. Where auditing finds environmental management actions are not being effective, the audits may recommend changes to procedures.

The DEC Audit Branch and an independent auditor approved by DSEWPaC are likely to undertake regular audits to assess compliance with all relevant conditions and commitments.

Internal auditing of activities associated with this management plan will be carried out in accordance with Fortescue’s internal audit schedule.

Audit criteria may include, but is not limited to any EPBC Act approval granted for the Project.
Where non-conformance issues or opportunities for improvement are identified these will be documented and tracked via the Business Management System (BMS).

**Review and Revision**

The methodologies in the Plan will be reviewed to determine whether they are adequate to ensure the data obtained from the monitoring program will adequately test the hypotheses developed above.

Fortescue believes that the methodology provided in Table 9, Table 10 and **Error! Reference source not found.** and Appendix 1 are specifically detailed to allow adequate data to be collected to ensure that the hypotheses above can be tested.

Continued improvement of the plan will occur in response to environmental incident resolutions, audit findings, monitoring results, continuous improvement and changes in regulatory and corporate requirements.
7. SUMMARY AND CONCLUSIONS

The Project includes development of a mine and access and haul road (Figure 2). Borrow pits will be located along the access road to provide material for road construction. This Project may potentially impact on habitat suitable for EPBC listed threatened fauna species including Northern Quoll, Pilbara Leaf-nosed Bat and Pilbara Olive Python (Table 12).

Table 12: Area of Habitat to be Impacted Compared with Available Habitat in the Project Study Area and Pilbara

<table>
<thead>
<tr>
<th>Species</th>
<th>Area of habitat to be impacted (ha) (including direct and indirect impacts)</th>
<th>Area of habitat available in study area (ha) as identified during the targeted survey (ecologia 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Quoll</td>
<td>43</td>
<td>855</td>
</tr>
<tr>
<td>Pilbara Leaf-nosed Bat</td>
<td>43</td>
<td>1,045</td>
</tr>
<tr>
<td>Pilbara Olive Python</td>
<td>43</td>
<td>713</td>
</tr>
</tbody>
</table>

Fortescue will conduct monitoring to confirm that the avoidance, mitigation and management measures are being undertaken in line with this document.

It is considered that the Project can be undertaken in a manner that has negligible to minor impacts on the EPBC listed threatened fauna species at a local level, and negligible impacts on a regional and national level.
REFERENCES

DSEWPaC. (2011). *EPBC Act 1999 referral guidelines for the endangered northern quoll*, Dasyurus hallucatus. DSEWPaC.

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Figure 1: North Star Hematite Project Location
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Figure 2: Conceptual Project Layout
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Figure 3: Northern Quoll Habitat
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Figure 4: Pilbara Leaf-nosed Bat Habitat
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Figure 5: Pilbara Olive Python Habitat
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Appendix 1: Species-Specific Monitoring Programme
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A1.1 Detailed Population Monitoring

Detailed population monitoring will be undertaken for the Northern Quoll. Monitoring methodology relevant to this species includes:

- Monitoring sites will be established in habitat outside of direct impact zones, within impact zones and in rehabilitated areas (original impact areas) within the Project area.
- Suitable control sites will be established at known population locations in similar habitat type which occurs outside of the Project area.
- Monitoring will seek to monitor all areas of critical habitat within the Project area. At minimum, where sufficient highly suitable habitat exists for the target species, 20 km of transects will be monitored by foot during each annual survey. Trapping will be undertaken at a minimum density of $y = 50x^{0.5}$ ($y =$ number trap-nights, $x =$ area of highly suitable habitat in each monitoring site). For linear habitats such as gorges and major drainage lines, a trapping rate of 1 trap per 100 linear meters will be used.
- Monitoring may involve the mark and recapture of individuals e.g. using numbered tags, tattoos, or ear notching (ethics clearance is required for this procedure). Radio-tracking or DNA sampling may be considered.
- Monitoring will take place annually for the life of the project.

Relevant environmental data, such as annual rainfall and vegetation condition will be collected so that this information can be correlated with the monitoring results and allow suitable interpretation of results which can be affected by seasonal changes to the environment and thus population densities.

Use of control sites external to the Project area will allow changes in population over time to be attributed to Project or external environmental impacts.

NORTHERN QUOLL

Objective

- To determine continued presence and population size.
- To measure potential impacts of the Project on populations data over time.

Methodology

Northern Quoll monitoring will be conducted in accordance with the draft Northern Quoll survey guidelines (DSEWPaC 2011). Monitoring sites will cover selected areas of highly suitable habitat within the project area.

Permanent traps, including wire cage traps and large Elliott traps, baited with universal bait (with sardines added) will be established at a density of $y = 50x^{0.5}$ ($y =$ number trap-nights, $x =$ area of potential Northern Quoll Habitat in each monitoring site). For linear habitats such as gorges and major drainage lines, a trapping rate of 1 trap per 100 linear meters will be used.
Trapping will be conducted for seven consecutive nights (unless two or more individuals are caught more than twice, in which case the traps will be closed after four nights). Each trap point will be permanently labelled with metal marking pegs to allow suitable replication of trapping sites. Hair funnels will also be used in highly suitable habitat areas as a non-invasive means of determining presence of this species. Broad habitat assessment, daytime surveys for scats and setting of motion-sensitive cameras will be utilised for defining broad patterns of distribution.

Relevant environmental data, such as annual rainfall and vegetation condition will be collected so that this information can be correlated with the monitoring results and allow suitable interpretation of results which can be affected by seasonal changes to the environment and thus population densities.

The monitoring program will be conducted in accordance with recommendations from the draft Northern Quoll survey guidelines (DSEWPaC 2011) as follows:

- Monitoring sites will be established in highly suitable or known denning/shelter habitat types outside of impact areas, within impact areas within the Project area where practicable.
- Suitable control sites will be established at known population locations in similar habitat type which occurs outside of the Project area.
- Monitoring may involve the mark and recapture of individuals e.g. using numbered tags, tattoos, or ear notching (ethics clearance is required for this procedure).
- Survey effort will be similar to that used during the targeted survey in both the impact and control sites.
- Monitoring will take place annually for the life of the project.
- The monitoring program will employ methodologies used in the regional monitoring program undertaken by the Department of the Environment and Conservation.

This monitoring programme will be reviewed on finalisation of the draft Northern Quoll survey guidelines (DSEWPaC 2011).

General population changes can be measured through trapping records and impacts attributed to the Project can be measured through the distribution of transects close to and distant from impact areas.

Information regarding the methodology, effort, location, timing and duration for annual population monitoring surveys is summarised in Table A3.1.
Table A3.1: Annual Population Monitoring Summary

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Northern Quoll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology</td>
<td>Wire cage traps and large Elliott traps, Non-invasive surveys including hair funnels, motion cameras, daytime searches for scats and signs.</td>
</tr>
<tr>
<td>Survey Effort</td>
<td>Trapping: 7 nights of trapping. Trapping density 1/100m. Non-invasive surveys: minimum of 40 km of survey transects where sufficient highly suitable habitat exists.</td>
</tr>
<tr>
<td>Duration</td>
<td>Trapping: 7 nights</td>
</tr>
<tr>
<td>Timing</td>
<td>May to August</td>
</tr>
<tr>
<td>Location</td>
<td>Monitoring sites will cover selected areas of highly suitable habitat and denning/shelter zones within the project area.</td>
</tr>
</tbody>
</table>

A1.2 Hotspot Fauna Monitoring

Hotspot monitoring of other EPBC listed species that are likely to occur in the Project area will also be undertaken. This monitoring is not intended to be comparable to detailed population monitoring, but will provide regular snapshots of the presence and abundance of EPBC listed species including:

- Pilbara Leaf-nosed Bat
- Pilbara Olive Python.

PILBARA LEAF-NOSED BAT

Objective

- To monitor ongoing presence within identified habitat areas.

Methodology

Permanent monitoring sites will be established in areas that provide habitat for roosting (caves), and foraging (gorges, small gullies, large water courses, pools and other water bodies). Passive acoustic bat call recorders (such as Songmaster systems) will be placed at each site for a minimum of four nights annually. Call frequency will not give an accurate population size estimate however an indication of relative abundance will be available for comparison with environmental variables.

Due to this species sensitivity to disturbance and fragile physiology (quickly declines due to water loss and stress if captured), no trapping or entering of roost caves will be conducted.

Monitoring methodology relevant to the Pilbara Leaf-nosed Bat includes:

- Monitoring sites will be established in highly suitable roosting and foraging habitat outside of direct impact zones, within impact zones and in rehabilitated areas (original impact areas) within the Project area.
- Suitable control sites will be established at known population locations in similar habitat type which occurs outside of the Project area.
- Survey effort will be similar to that used during the baseline targeted survey in both impact and control sites.

- Monitoring will take place annually for the life of the Project.

- Monitoring programs will employ specific methodologies developed in consultation with regulatory bodies and in accordance with published guidance.

Relevant environmental data, such as annual rainfall and vegetation condition will be collected so that this information can be correlated with the monitoring results and allow suitable interpretation of results which can be affected by seasonal changes to the environment and thus population densities.

**PILBARA OLIVE PYTHON**

*Objective*

- To monitor ongoing presence within identified habitat areas.

*Methodology*

Areas of potential Olive Python habitat will be surveyed to determine the location and extent of the local population. Targeted searches comprise spotlighting during dusk and dawn (especially during the wet season), road spotting at night through rocky areas near permanent water if roads are present and searches for faecal pellets or sloughed skins at rocky outcrops and breakaways (DSEWPaC 2011). During cooler winter months searches along north-facing cliffs should be conducted.

Relevant environmental data, such as annual rainfall and vegetation condition will be collected so that this information can be correlated with the monitoring results and allow suitable interpretation of results which can be affected by seasonal changes to the environment and thus population densities.

Monitoring methodology relevant to the Pilbara Olive Python includes:

- Monitoring sites will be established in highly suitable habitat outside of direct impact zones, within impact zones and in rehabilitated areas (original impact areas) within the Project area.

- Suitable control sites will be established at known population locations in similar habitat type which occurs outside of the Project area.

- Survey effort will be similar to that used during the targeted baseline survey in both the impact and control sites.

- Monitoring will take place annually for the life of the project (to be reviewed after two years of monitoring data is recorded).

Information regarding the methodology, effort, location, timing and duration for annual hotspot monitoring surveys is summarised in Table A3.2.
### A1.3 Monitoring Data Analysis

All known records of each species to be monitored, in the area prior and during the monitoring program will be collated. This database of unique records will be used to investigate historical changes in distribution, and the factors associated with any such change.

A set of environmental attributes will be assigned or every record, comprising:

- elevation
- habitat type
- vegetation type
- vegetation condition
- degree of land modification due to the propose development
- mean annual rainfall
- rainfall seasonality.

A Kruskal-Wallis-ANOVA, ANOVA, or multivariate analysis methodology (dependent on the nature of the data) will be utilised to determine whether there was statistical variation in the values of these attributes linked to EPBC listed threatened records across the monitoring period. Any significant variation observed may be due to change in the environmental range of each species across the monitoring period.

For each of the monitoring periods, the distribution of each species in relation to the environmental attributes will be modelled; using generalized linear modelling (GLM) with binomial distribution, logit link function and backward stepwise elimination of variables.

The distributional models will be mapped, and the total distributional area will be compared across the monitoring periods.
A feedback loop will be established to allow analysis of preliminary statistical outcomes to influence future survey design. This allows the long term monitoring to become an adaptive process and will optimise the outcomes of the monitoring program.