KARARA MINING LTD

Karara Corporate Standard

Environmental Procedure - Malleefowl Management and Monitoring

CORP-EN-PRO-1035

12-Apr-22

SYNOPSIS

This 'Environmental Procedure - Malleefowl Management and Monitoring' forms part of Karara Mining Limited Corporate Standards and describes the procedures specification that shall be used for all works within Karara Mining Limited.

Disclaimer
"This document has been prepared by Karara Mining Limited for their exclusive use ("the Purpose"). Use of this document other than for the Purpose is not permitted."

CORP-EN-PRO-1035 - KARARA CORPORATE STANDARD

REV	DESCRIPTION	ORIG	REVIEW	APPROVER	DATE
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CONTENTS

LIST OF APPENDICIES

LIST OF FIGURES

LIST OF TABLE

1 PURPOSE & SCOPE

The purpose of this procedure is to minimise, to as low as reasonably practicable, the impact of the Greater Karara Project (the Project) activities on Malleefowl (*Leipoa ocellata*) by identifying and implementing a range of management and monitoring measures. These measures have taken into account the objectives of the National Recovery Plan for Malleefowl (Benshemesh, 2007) and the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team, 2019).

The Project consists of the Karara Iron Ore Project (KIOP), Mungada Iron Ore Project (MIOP), Hinge Iron Ore Project (HIOP), and includes all exploration, mining and processing activities undertaken by KML, along with associated linear infrastructure including haul roads, railway, the 330kV transmission line, and raw water pipeline.. This procedure applies to all elements and stages of the Project that may impact on Malleefowl. Information on Malleefowl biology as relevant to the Project is included in Appendix A. This procedure is an approved document prepared to satisfy the requirements of:

- Condition 2 of EPBC 2006/3017, approved under the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).*

In addition, this document provides direction with respect to the following ministerial statements under the *Environmental Protection Act 1986* (EP Act):

- Condition 10 (Fauna Mortality Register) of Ministerial Statement 805 (Karara Iron Ore Project); and
- Conditions 9 (Fauna Mortality Register) of Ministerial Statement 806 (Mungada Iron Ore Project).

Karara Mining Limited (KML) is committed to continual improvement and has implemented an adaptive approach to managing its potential impact on Malleefowl. This procedure will be reviewed and amended based on the outcomes of monitoring and the findings of any incident investigations; or otherwise every 2 years. Any substantial changes to the intent of the procedure or management controls, resulting in any new or increased impacts on Malleefowl, are required to be reviewed and approved by the Department of Biodiversity, Conservation and Attractions (DBCA) and the Department of the Agriculture, Water and the Environment (DAWE) to satisfy conditions of federal approval EPBC 2006/3017.

1.1 Objectives

The objectives of this procedure are to:

- Identify relevant legal obligations in relation to Malleefowl management and how these are achieved;
- Define and implement a methodology to manage and monitor any potential impact on the Malleefowl; and
- Detail a methodology by which Malleefowl surveys and monitoring are to be undertaken.

This procedure supports the KML Environmental Management Plan CORP-EN-PLN-1020 (EMP) and KML Environmental Plan – Fauna Management CORP-ENV-PLN-1008 and the Environmental Procedure – Terrestrial Fauna Management (CORP-EN-PRO-1010). Compliance with this procedure and the requirements of the EMP is mandatory.

2 DEFINITIONS

Table 1: Definitions

Term	Definition
Active Malleefowl Mound	A mound that almost certainly contains eggs
BC Act	*Biodiversity and Conservation Act 2016*
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DMIRS	Department of Mines, Industry Regulation and Safety
EMP	Environmental Management Plan
EMS	Environmental Management System
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GD	Ground Disturbance
GIS	Geographic Information System
KML	Karara Mining Limited
MS805	Ministerial Statement 805
MS806	Ministerial Statement 806
PER	Public Environmental Review
POW	Program of Works
SWP	Safe Work Procedure
the Project	Being the Greater Karara Project, all mining and processing activities undertaken by KML, along with associated linear infrastructure including haul roads, railway, the 330kV transmission line and raw water pipeline.
WA	Western Australia
WAM	Western Australian Museum

3 PLANNING

3.1 Legal and Other Requirements

This procedure is designed to meet all commitments, legal requirements and the expectations of external stakeholders made for the Project. The relevant Commonwealth and State legislation to this Malleefowl Management and Monitoring Procedure are summarised below:

- *Animal Welfare Act 2002 (WA)*
- *Biodiversity Conservation Act 2016 (WA)*
- *Biodiversity and Conservation Regulations 2018*
- *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
- *Environmental Protection Act 1986 (WA)*
- *Mining Act 1978 (WA)*

In addition to these Acts, commitments made in the KML Public Environmental Review (PER) have been considered during the development of this procedure.

The Malleefowl is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is listed as 'Vulnerable' under the Western Australian *Biodiversity and Conservation Act 2016* (BC Act).

In 2009, KML obtained federal approval under the EPBC Act (EPBC Approval number 2006 / 3017) to undertake activities associated with the Project. Condition 2 of 2006/3017 provides specific management measures associated with Malleefowl.

3.1.1 Licences and Permits

KML shall obtain an Authorisation to take or disturb threatened fauna under Section 40 of the BC Act through the Department of Biodiversity Conservation and Attractions (DBCA, formerly Department of Parks and Wildlife) in order to carry out disturbance activities that may impact Malleefowl.

The KML Environmental Department will maintain the details for any KML authorised persons approved in the handling of Malleefowl and Malleefowl eggs in the KML Environmental Management System (EMS).

3.1.2 Exploration Activities

For proposed exploration programs, the tenement condition to provide information on proposals which may disturb any declared rare or geographically restricted fauna applies.

KML has developed and implemented an overarching Exploration Environmental Management Plan CORP-EN-PLN-1002 which has been endorsed by DBCA and states that prior to the lodgement of an Exploration Program of Work (POW), KML will address the conservation impacts of the proposed activities on Malleefowl through the Environmental Procedure – Information to Support Environmental Assessment of Exploration POW CORP-EN-PRO-1041. This information will be submitted to DBCA for review and assessment via the Environmental Form - Information to Support Environmental Assessment of Exploration POWs CORP-EN-FRM-1059.

DBCA's acceptance of the POW will be provided to the Department of Mines, Industry Regulations and Safety (DMIRS) for consequent approval of the POW with any additional conditions attached.

3.2 Roles and Responsibilities

Table 2 provides a summary of the roles and responsibilities to ensure compliance in the implementation of this procedure. The main body of the procedure should be referred to where clarification is required.

Table 2: KML Roles and Responsibilities

Relevant Role	Responsibility
KML *Manager Environment*	• Overall responsibility for development, implementation, maintenance and compliance with this procedure, • Report to Senior Management on matters of environmental compliance and legal requirements, • Facilitate environmental auditing and compliance monitoring as required.
KML *Environment Department / in conjunction with fauna specialist*	• Provide environmental advice and assistance to all personnel as required; • Coordinate the delivery of environmental training to key personnel;

Relevant Role	Responsibility
	• Implement monitoring programs and maintain records and registers related to such programs; • Conduct surveys in proposed disturbance areas, prior to the activity, to identify Malleefowl mounds; • Determine if GD will impact on Malleefowl and in the event that GD will impact an active Mound, liaise with DBCA for course of action; • Obtain relevant licences related to Malleefowl management and report any non-compliance of licence conditions; • Compile and report on licences compliance, management and interactions related to Malleefowl; • Liaise with DBCA and stakeholders for egg removal. DBCA will be responsible for the welfare of the eggs and chicks once handed over by KML; • Where there are repeat Malleefowl mortalities, investigate and implement mitigation measures in consultation with DBCA; • Report all Malleefowl mortalities, injuries or unauthorised disturbance to Malleefowl mounds to the DBCA Geraldton District office within 72 hours of the incident being reported internally and to the DAWE within seven days; • Submit any substantial changes to the intent of the procedure or management controls, resulting in any new or increased impacts on Malleefowl to the Minister for the Environment for Approval; and • Submit any variation to this procedure to DAWE and DBCA for their records.

Relevant Role	Responsibility
All KML Employees and Contractors	• All personnel shall take all necessary measures outlined in this procedure to ensure compliance with this procedure; • Employees and Personnel shall not interfere with native animals, feed feral animals, or bring domestic pets, off-road recreational vehicles or firearms to any Project area; • Report all sightings of Malleefowl and/or Malleefowl mounds to the KML Environment Department using the Environmental Form - Fauna Sighting, Relocation and Mortality CORP-EN-FRM-1045; and • Report Malleefowl injuries, mortalities, and unauthorised disturbance to Malleefowl mounds to the KML Environment Department in accordance to the Safety Procedure – Incident Management CORP-HS-PRO-1046.

3.3 Competence, Training and Awareness

In accordance with the Safety Procedure – HSE Training and Induction CORP-HS-PRO-1001, all KML Personnel, Contractors and Sub-Contractors must undertake the mandatory inductions prior to commencing work on site. The induction provides a brief overview of Malleefowl management on site and includes, but not limited to, the following information:

- Photographs and description of the Malleefowl, including appearance and conservation status;
- All native animals are not to be interfered with and Malleefowl mound is not to be disturbed unless authorised under a Ground Disturbance (GD) permit;
- All Malleefowl injuries, mortalities and unauthorised disturbance to mound must be reported as an incident to the KML Environmental Department;
- Speed limits and road signage must be complied with, traffic is restricted to designated roads, off-road driving is prohibited and entry is restricted to areas of significant habitat;

- Feral animals are managed under the Environmental Plan – Feral Animal Management CORP-EN-PLN-1009 and must not be encouraged through feeding, incorrect waste disposal, access to artificial water bodies, or be brought to site;
- Housekeeping must be maintained at a high standard;
- All feral animal sightings (cats, goats, foxes) are to be reported to the KML Environmental Department; and
- Information on Malleefowl mounds and locations will be included in toolbox meetings and educational posters will be displayed around site.
- Any personnel handling Malleefowl or their eggs shall have the appropriate licence and be suitably trained to handle fauna.

An environmental training matrix is maintained and KML's online training management system (InTuition) ensures KML employee and contractor induction and training requirements are maintained and follow up inductions conducted every second year to ensure ongoing compliance with the EMP.

4 IMPLEMENTATION AND OPERATION

The following management measures have been implemented by KML to avoid and/or minimise impacts to Malleefowl.

4.1 Approvals Request and Ground Disturbance Permits

Impacts to Malleefowl habitats is managed and minimised through the implementation of the KML Environmental Procedure - Approvals Request and Ground Disturbance CORP-EN-PRO-1004 and the associated GD permitting requirements.

Prior to ground disturbance, and as required by the KML Environmental Procedure - Approvals Request and Ground Disturbance CORP-EN-PRO-1004, a desktop review will be conducted to ensure all proposed disturbance areas are assessed for prospective Malleefowl habitat. Any gaps in the assessment information will be addressed prior to ground disturbance commencing.

4.1.1 Ground Disturbance Inspections and Permits

Once the GD permit is issued but prior to ground disturbance commencing a field inspection will be conducted to ensure the conditions of the GD are being followed. Information collected during this inspection will be recorded on the KML Environmental Form – Pre-Ground Disturbance Inspection CORP-EN-FRM-1027.

The Environmental Form - Ground Disturbance Release CORP-EN-FRM-1014 must be completed, understood and signed off by personnel listed on the form prior to disturbance commencing under the GD Permit.

The Environmental Form - Post Ground Disturbance Inspection CORP-EN-FRM-1015 is also completed by the KML Environmental Department following disturbance to determine if disturbance has been carried out in accordance with the GD permitting requirements and to ensure there has been no unauthorised disturbance to Malleefowl habitat. Any non-compliance will be reported as an environmental incident and managed through the Safety Procedure - Incident Reporting and Analysis CORP-HS-PRO-1018.

Progressive rehabilitation has also been implemented in accordance with KML's Environmental Procedure – Land Rehabilitation CORP-EN-PRO-1002 to minimise potential impact on Malleefowl and their habitat due to clearing.

4.2 Feral Animal Management

KML's Environmental Procedure - Feral Animal Management and Monitoring CORP-EN-PRO-1050 and associated monitoring and abatement procedures have been implemented to reduce feral animal impact on the Malleefowl. All site personnel (including contractors) are inducted not to feed feral animals or bring domestic pets to site and ensure waste is disposed of correctly to discourage feral animal at site.

4.3 Traffic and Lighting Management

KML's Safety Plan - Traffic Management CORP-HS-PLN-1008 and associated control measures (i.e. reduced speed limit signage or "no-go" zones where Malleefowl are known to exist) are in place to prevent Malleefowl strikes.

Temporary and permanent lighting installed on infrastructure is placed to minimise light overspill, particularly into surrounding vegetated areas, to ensure Malleefowl are not deterred from roosting near lit areas, and to minimise the risk of predation.

4.4 Reporting of Sighting, Injuries and Deaths of Malleefowl

Malleefowl training and awareness programs have been implemented for staff and contractors, through site inductions, awareness presentations and educational posters. All KML staff and contractors are aware of their responsibility for reporting sightings of Malleefowl and/or Malleefowl mounds to the KML Environment Department using the Environmental Form - Fauna Sighting Relocation and Mortality CORP-EN-FRM-1045.

All KML staff and contractors are aware of their responsibility to report Malleefowl injuries or mortalities to the Environmental Department in accordance with the Safety Procedure – Incident Management CORP-HS-PRO-1046. KML Environmental Department records all Malleefowl injuries or mortalities on a Fauna Mortality Register in accordance with Condition 10 of MS805 and Condition 9 of MS806.

4.5 Avoidance Controls

Where work is to take place near an active mound KML will ensure that:

- Active Malleefowl mounds located inside or within **10m** of a GD boundary, shall be flagged (red and white) in the field as avoidance sites.

- Where practicable, plant and equipment shall maintain a **50m** buffer from active mounds through demarcation of the mound in the field as per the GD permit. If this buffer cannot be achieved a spotter shall be allocated. This is the responsibility of the GD permit holder.
- If plant and equipment need to tram past an active mound, the KML Environment Department shall be notified and a spotter must be used during the activity to ensure no disturbance to the mound.
- Unauthorised personnel shall not enter the 50m buffer around active Malleefowl mounds and limit the period of time spent near the mound by undertaking work as quickly as practicable.
- If Malleefowl mounds are identified during the desktop review, additional inspections are undertaken to determine the status of the mound(s) and whether or not they contain eggs as part of the Pre-Ground Disturbance Inspection before a GD release is issued.
- Where active Malleefowl mounds exist in areas of proposed disturbance, clearing will be taken outside of breeding season (1st September – 30th April) where practicable.
- If the mound does contain eggs then the work **must be postponed** until the mound is no longer incubating eggs or the eggs have been removed.

There are no buffer requirements around inactive Malleefowl mounds; however they must remain undisturbed unless prior approval has been sought from the KML Environment Department.

4.6 Avoidance Constraints

The Project has been designed to minimise disturbance as much as practicable, and to minimise impacts to the surrounding environment. Where active mounds inside the disturbance footprint cannot be avoided and will be either directly or indirectly impacted, KML will contact DBCA to coordinate mound excavation and appropriate collection, incubation and transport of chicks and eggs.

5 SALVAGING

5.1 Egg Removal

KML shall maintain a BC Act Authorisation for works associated with the Project for the purposes of mound removal.

When a mound has been approved for removal, prior to disturbance it must be checked for the presence of eggs. If eggs are present and the mound cannot be avoided until hatching occurs they will be salvaged. Egg removal can only be undertaken under BC Act Authorisation in accordance with the following process outlined in this section.

5.1.1 Prior to disturbing the Malleefowl mound

- Contact DBCA to notify them that egg removal will be undertaken.
- Ensure the incubators are clean and at temperature, refer Section 5.1.5.
- Transport routes are clearly identified and communicated, all equipment is on hand and all personnel are clear on roles and responsibilities.

5.1.2 Opening the Malleefowl Mound

- Open the mound early in the day following the natural work regime of the birds (Van der Waag, 2009).
- Two people shall be located on opposite sides of the mound, minimising pressure on the centre of the mound.
- Gently scoop the sand outwards with hands only until the eggs are exposed.
- Lightweight gloves will reduce the risk of minor scratches. Heavy duty gloves should not be used because they will reduce the sensitivity of the searching process.

***N.B.** It is important that the eggs remain upright, at all times, from the moment they are removed from the mound until hatching.*

5.1.3 Label Egg and Record Information

- Using a soft pencil only, place an arrow pointing to the top of the egg. The egg must remain with the arrow facing upward at all times during the salvage process
- Ensure movement of the eggs is minimised as much as possible.

- Clearly label any eggs collected from the mound with the mound identification number, sourced from KML GIS data, the egg number (e.g. 1, 2 or 3 etc. depending on the sequence the eggs are removed from the mound), and current date e.g. MFM110_1_25/11/2019).
- Record on the KML Environmental Form – Malleefowl Egg Data Record Sheet CORP-EN-FRM-1025 the following for each egg removed; weight (grams) and the length and width of each egg using callipers to the nearest 0.1mm.

5.1.4 Egg Transfer and Storage

- For each egg, once all data has been collected, place the eggs into stubby holders and put into an esky lined with a blanket, or other insulation material.
- The egg must remain with the arrow facing upward at all times during the salvage process.
- Ensure material is packed between the eggs, with a blanket placed over the top of all of the eggs.
- Once the eggs are carefully packed and secured in the vehicle, they should be immediately transported to the incubator. For longer distances monitor the temperature of the box to ensure a constant 32-34°C is maintained.
- Transfer the eggs to the incubating facility as soon as possible following removal from the mound. Never leave eggs on vehicle seats or in direct sunlight or anywhere they are at risk of damage. Ensure eggs are secured appropriately within the vehicle in which they will be travelling.
- Vehicles containing eggs must be driven extremely carefully to the KML incubation facility. All efforts must be made to prevent damage to the eggs during transfer to the incubator.
- DBCA must be informed that eggs/ chicks are ready for collection from site. Liaison with DBCA is required to organise collection logistics.
- Malleefowl egg data sheets must be duplicated and a copy supplied to DBCA on collection of eggs/chicks.

5.1.5 Malleefowl Egg Incubation

KML have been advised by DBCA that they are able to collect eggs and or chicks from site between 1-2 weeks of being informed that eggs have been salvaged. KML must therefore incubate and manage the eggs and any hatched chicks until collected by DBCA. Equipment required to transport incubated eggs and chicks from site will be provided by DBCA.

It is important the incubator remains as clean and hygienic as possible during egg incubation and hatching. Prior to initial use of the incubator, ensure the equipment is cleaned thoroughly with a suitable antibacterial wash, or vinegar as an alternative. Once rinsed and dried the incubator can be set up for use.

- Refer to the incubator user guide for initial set up and temperature setting. It may take several hours for the incubator to reach optimum temperature for egg incubation, so ensure the unit is turned on well before use.
- Carefully place the salvaged eggs into the incubator, ensuring they remain secure in each stubby holder. The stubby holders containing eggs should be placed on petri dishes within the incubator, to collect any fluid during hatching. Any soiling of the incubator should be cleaned up with a clean cloth soaked in antibacterial solution, and then washed with distilled water.
- The incubator should be maintained at 32.5-34.5°C and checked at least twice (2) a day to ensure temperature maintenance, and three (3) times a day when chicks are expected. Incubation period for a newly laid egg is approximately 60 days.
- Ensure the humidity is maintained as high as possible within the incubator by keeping the water reservoir full of distilled water. The water should be replaced every time the incubator is opened.
- The incubation period of each egg will depend on the age of the egg when removed from the mound. Malleefowl eggs are thin-shelled and pale pink in colour, and will change to dark beige during the incubation period.
- Disturbance to eggs should be kept to a minimum at all times.

5.1.6 Malleefowl Chick Care

- When an egg starts the hatching process, cover the incubator with a towel to create a dark environment internally.

- Once hatched, the chick should be left in its stubby holder in the incubator until the head is dry and fluffy (approximately 5 hours from first emergence). See below Figure 1 Chick Hatching and Drying.

Figure 1: Chick Hatching and Drying (Van der Waag, 2009)

- The chick can then be removed from the stubby holder. Wipe an area down with antibacterial solution and place a paper towel down for the chick to stand on when removed from the stubby holder. Most chicks will make their own way out of the stubby holder when held horizontal; however, if the chick does not emerge on its own, the stubby holder can be gently cut to remove the chick. **The chick's body will still be wet, so work quickly so it doesn't chill**.
- It may be necessary to cut the umbilical cord. If this is required, use medical scissors cleaned with an antibacterial wipe and cut the cord a few centimetres from the chick's body. Once cut, squirt the navel with a small amount of Betadine to minimise the risk of infection.
- Place the chick into a warm insulated box to continue to dry off. The box should be maintained at about 30°C, internal temperature. See Figure 2 below.

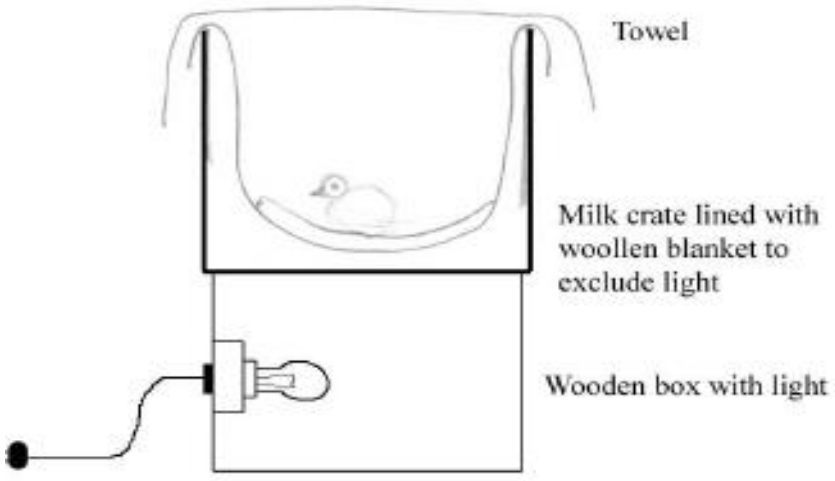


Figure 2: Insulated Box Layout (Van der Waag, 2009)

- Once the chick is dry, turn off the heat source and allow to remain in the box for another one hour prior to removal.
- The chick can be held in a temporary pen in a quiet, indoor location until collection by DBCA. The pen can be set up as shown in Figure 3 below. A 1x1x1m cardboard box lined with newspaper is ideal. Ensure a shallow dish of water and some turkey crumbles (chick food) are provided. Provide a branch for shelter. **No heat source is required from this stage**.

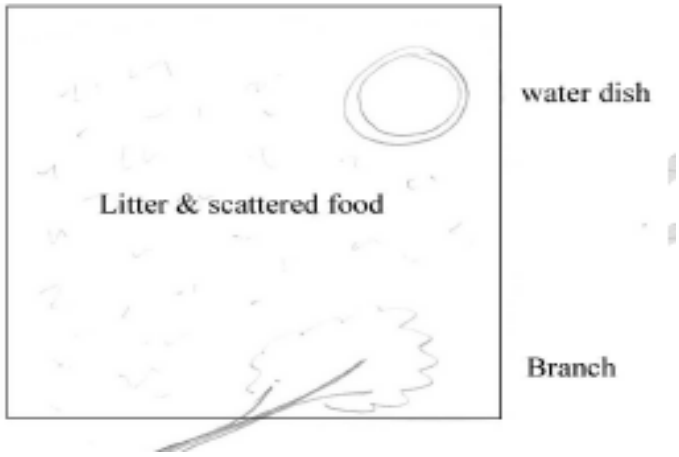


Figure 3: Litter and Scattered Food (Van der Waag, 2009)

N.B. **In the wild, Malleefowl chicks must fend for themselves as soon as they hatch and emerge from the mound. The adult Malleefowl do not care for the chicks once hatched.**

Once the eggs or chicks have been collected by DBCA or delegate, they will be responsible for the transport, release (including determining the release area) and post monitoring of the Malleefowl.

6 SURVEYS AND ANNUAL MONITORING

6.1 Malleefowl Baseline Surveys

Baseline Malleefowl mound surveys shall be undertaken for all areas of proposed disturbance to identify prospective habitat and determine the presence and status of any mounds within the area. Mounds are categorised in accordance with the Mound Profile details outlined in Section 6.2.1 of this procedure.

Surveys are conducted using a human chain method, as outlined in the *National Malleefowl Monitoring Manual* (National Malleefowl Recovery Team 2019).

6.2 Annual Monitoring

Malleefowl monitoring shall be undertaken annually throughout the breeding season (being 1st September until 30th April) and all field information is to be recorded within KML's GIS system by using the Environmental Form – Malleefowl Mound Monitoring – Field Sheet CORP-EN-FRM-1031.

Monitoring shall be undertaken in accordance with KML's Safe Work Procedure Malleefowl Mound Monitoring EN-SWP-043

KML uses the *National Malleefowl Monitoring Manual* (National Malleefowl Recovery Team 2019) as a guide to define the monitoring programme. The Project has defined the monitoring programme as follows:

- All known active or recently active mounds should be visited every year.
- Mounds that have not been active for at least 5 years will only be monitored every 5 years.
- Old or Very Old mounds as defined in Table 3 shall be assessed opportunistically and not required to be monitored regularly.

Monitoring priority will be placed on mounds located in close proximity to activity or infrastructure.

Additionally, opportunistic observational records of Malleefowl and mounds are recorded by KML employees and contractors on the Environmental Form – Fauna Sighting, Relocation and Mortality CORP-EN-FRM-1045.

6.2.1 Mound Profile

The mound profile describes the appearance of the mound, which changes with breeding activity (erosion and vegetation growth) and age. Mound profiles can be described as follows (Figure 4);

Profile 1: Typical crater with raised rims. This is the typical shape of an inactive mound. However the mound can also be active and open.

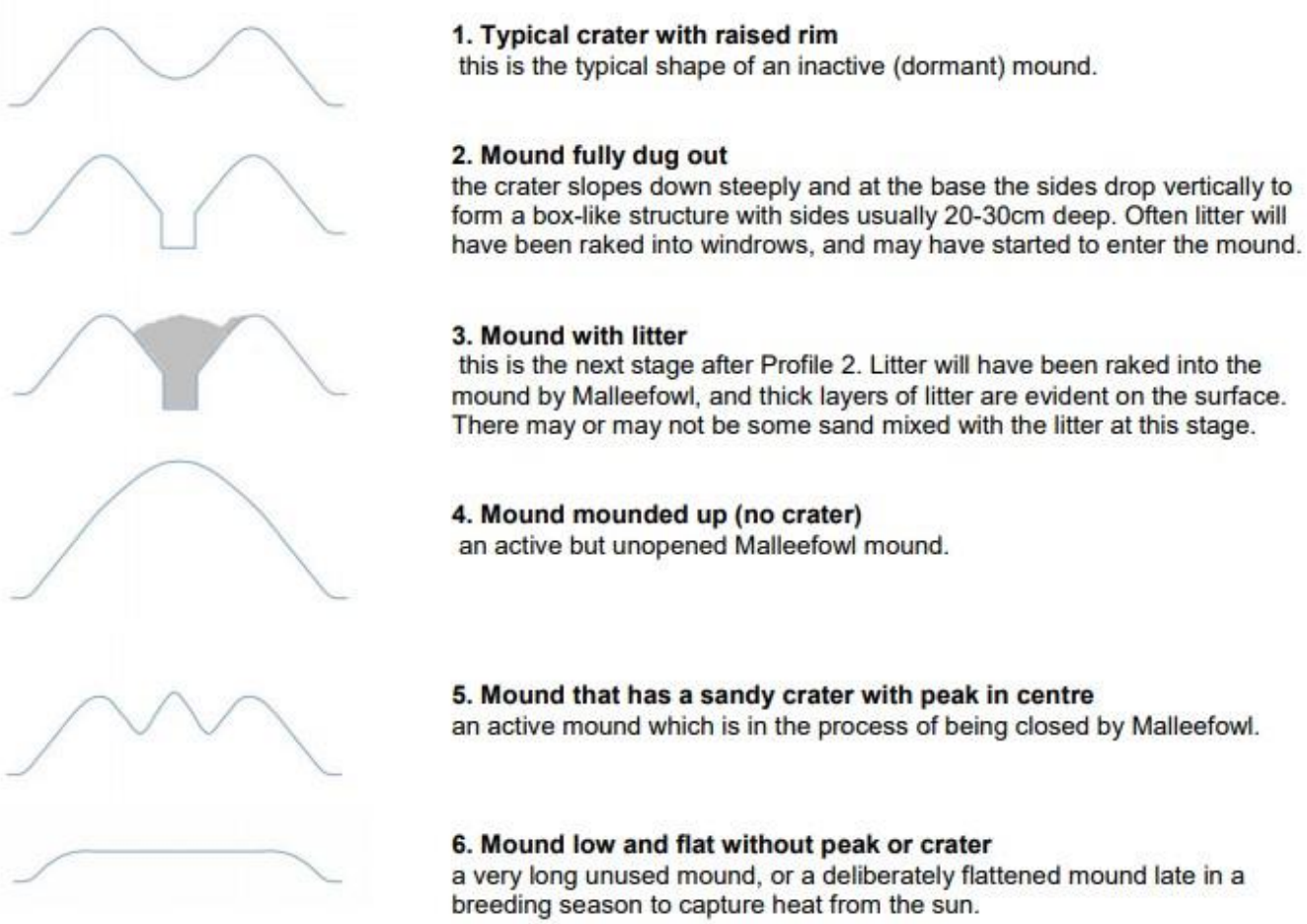
Profile 2: Mound fully dug out. The characteristic of this profile is that the crater slopes down steeply, and at the base the sides drop vertically to form a box- like structure with side usually 20 to 30 cm deep. Often, litter will have been raked into windrows, and may have started to enter the mound.

Profile 3: Mound with litter. This is the next stage after profile 2. Litter will have been raked into the mound by Malleefowl, and thick layers of litter are evident on the surface. There may or may not be sand mixed with the litter at this stage.

Profile 4: Mound mounded up (no crater). This is the typical profile of an active but unopened Malleefowl mound. The active mound is closed and dome shaped.

Profile 5: Mound has a sandy crater with a peak in centre. This is a typical profile of an active mound which is in the process of being closed by Malleefowl.

Profile 6: Mound low and flat without peak or crater. This mound has not been used for some time and weathering and erosion have ‘flattened” the original mound. Pictures of each mound profile are below. Note that these are taken in sandy environments and mounds in the Karara area can look different.



1. Typical crater with raised rim
this is the typical shape of an inactive (dormant) mound.

2. Mound fully dug out
the crater slopes down steeply and at the base the sides drop vertically to form a box-like structure with sides usually 20-30cm deep. Often litter will have been raked into windrows, and may have started to enter the mound.

3. Mound with litter
this is the next stage after Profile 2. Litter will have been raked into the mound by Malleefowl, and thick layers of litter are evident on the surface. There may or may not be some sand mixed with the litter at this stage.

4. Mound mounded up (no crater)
an active but unopened Malleefowl mound.

5. Mound that has a sandy crater with peak in centre
an active mound which is in the process of being closed by Malleefowl.

6. Mound low and flat without peak or crater
a very long unused mound, or a deliberately flattened mound late in a breeding season to capture heat from the sun.

Figure 4: Diagrammatic view of Mound Profiles and descriptions **(National Malleefowl Recovery Team 2019).**

Profile 1 Mound

Profile 2 Mound

Profile 3 Mound

Profile 4 Mound

Profile 5 Mound

Profile 6 Mound

(Pictures from the National Manual for the Malleefowl Monitoring System and J. Turpin)

Figure 5: Photographic examples of Mound Profiles **(National Malleefowl Recovery Team 2019).**

6.2.2 Mound Status

Mounds are recorded as either Active or Inactive based on Table 3. Active mounds are those that are currently being used by Malleefowl as an incubator for their eggs, or are likely to contain eggs. Mounds that have obvious signs of Malleefowl, such as scats, litter trails, tracks or scratchings are not recorded as active. .

Table 3: Description of Malleefowl mound status to determine Active or Inactive

Mound Status	Status Description
Active	(Profile 4): Mound almost certainly contains eggs. Mound is covered over, dome-shaped and surface is freshly disturbed (that day), often with small excavations around the lower perimeter where the male has scratched material onto the centre of the mound. There will be no ant-line tracks and very few tracks of small animals present, as the surface of the mound is being worked constantly.
Inactive	(Profile 4): Mound is covered over and dome-shaped, but surface is not disturbed, having assorted animal tracks and ant-lion traps on it. This is a mound that has been fully-prepared for incubation in that year, but has been abandoned. Note that it may also have been prepared in an earlier year but this will have been recorded previously.
Inactive	(Profile 3 or 5): Mound has been excavated and filled with leaf-litter, but has been abandoned.
Inactive	(Profile 1 or 2): Mound has been excavated but no further progress has been made.
Inactive	(Profile 1 or 6): No recent activity. Profile 1 and 6 grade into each other, but mounds can be roughly aged (i.e. time since last used) by their appearance. For example • **Recently Used:** Eggshell and plant material in centre still present. It is not known how long it takes for such material to degenerate in the Karara region, but such a mound could be >5 years old. If very young, the plant material in the centre is like compost, may contain beetle larvae and termites, and may be excavated by foraging goannas and echidnas.

Mound Status	Status Description
	• **Not Recently Used:** No eggshell or plant material in centre, but central depression still well-formed, crater still distinct, with central depression often lower than the surrounding soil surface. Such mounds may be decades old. One that has been observed annually for five years has not changed in appearance at all. Weathering of such mounds and colonisation by plants may be very slow except after rare heavy rainfall events • **Old:** Clearly weathered by still distinctly Profile 1. Often with small plants in the centre, and probably several decades old or older. • **Very Old:** Profile 6 or still with a hint of Profile 1. The age of such mounds may be in the order of 50 to 500 years. Shrubs and even trees may be present

6.2.3 Additional information

Additional information shall be recorded on Environmental Form – Malleefowl Mound Monitoring – Field Sheet CORP-EN-FRM-1031 during the field monitoring, and includes;

- Whether or not the mound has been recently scratched;
- Whether or not egg shell is visible on the mound;
- Signs of animal activity such as tracks or scats;,
- The amount and type of vegetation growing around or on the mound; and
- The status of the crossed sticks placed during the previous monitoring visit. These sticks are placed in a cross on an inactive mound and help to indicate whether or not the mound has been worked on by a Malleefowl between monitoring events.

7 CHECKING

7.1 Incident Reporting

All Malleefowl injuries, mortalities and unauthorised disturbance to mounds will be reported to the KML Environment Department as an incident report and shall include the following information:

- Injury / mortality / disturbance date and time;
- Reported by;
- Area of injury / mortality / disturbance;
- Location of injury / mortality / disturbance (easting and northing);
- Number of birds, and whether they are injured or dead;
- Cause/ Nature of injury / mortality / disturbance;
- Any predators sighted in the area; and
- Any additional comments.

Incidents are documented and investigated in accordance to the Safety Procedure – Incident Management CORP-HS-PRO-1046. All injuries to Malleefowl or unauthorised disturbance to Malleefowl mounds will be reported to the DBCA Geraldton District office within 72 hours or as soon as practicable and to DAWE within seven days. Deceased Malleefowl will be recovered, frozen and given to the Malleefowl Preservation Group, DBCA or the WA Museum (WAM) to contribute towards ongoing research, on request.

Should repeated mortalities of Malleefowl occur, mitigation measures will be investigated and implemented in consultation with the DBCA Mid-West Regional personnel.

Disciplinary action will be taken if employees and contractors are found to be deliberately interfering with Malleefowl.

Any incidents that occur during the egg salvage and management program, including egg breakage, injury or death of Malleefowl, must also be reported via this process.

7.2 Control of Records

All data collected during baseline surveys is recorded and maintained as per the Environmental Procedure – Environmental and Heritage Data Management CORP-EN-PRO-1045.

Annual monitoring data is recorded and maintained in the KML Malleefowl Register (Master Tab) found in the KML EMS and is managed by the site Environment Department. Data is reviewed and analysed during the monthly desktop review and uploaded to GIS as per the following:

- GIS Coordinator checks the Masters Tab monthly for new Malleefowl mounds and adds new mounds to the database;
- Selected mounds are monitored annually;
- Any status changes found during the monitoring process are recorded in the register;
- Site Environment team notify GIS Specialist of any changes to status, including if a mound is removed, via email as changes are detected; and
- If a mound inspected during GD pre-release is found to be active, notify GIS via email.

7.3 Reporting

Fauna Returns are to be submitted annually to DBCA as per specific conditions as dictated by the relevant licences. Annual reporting will be carried out as follows:

- Malleefowl injuries, deaths and relocations will be reported to the DBCA within 72 hours and DAWE within seven days of the incident being reported internally, and to the DAWE in the EPBC Annual Environmental Report;
- The number of Malleefowl eggs and chicks that have been handed to DBCA and any incidents that occur through the egg salvage and management process will be reported to DBCA and DAWE in the EPBC Annual Environmental Report;
- Unauthorised disturbance to Malleefowl mounds will be reported to the DBCA and DAWE in the EPBC Annual Environmental Report.
- All sightings of Malleefowl and/or Malleefowl mounds will be reported to DAWE and DBCA Regional Department on an annual basis, via the EPBC Annual Environmental Report.

7.4 Review

Karara Mining Limited (KML) is committed to continual improvement and has implemented an adaptive approach to managing its potential impact on Malleefowl. This procedure will be reviewed and amended based on the outcomes of monitoring and the findings of any incident

investigations; or otherwise every two years. Any substantial changes to the intent of the procedure or management controls, resulting in any new or increased impacts on Malleefowl, are required to be reviewed and approved by the DBCA and the DAWE to satisfy conditions of federal approval EPBC 2006/3017 for the Project.

8 DOCUMENT LIST

The documents referred to in this procedure are listed in the table below.

Table 4: Document List

Document Title	KML Document Number
Environmental Form - Malleefowl Egg Data Record Sheet	CORP-EN-FRM-1025
Environmental Form – Malleefowl Mound Monitoring – Field Sheet	CORP-EN-FRM-1031
Environmental Form – Fauna Sighting Relocation and Mortality	CORP-EN-FRM-1045
Safety Procedure - HSE Training and Induction	CORP-HS-PRO-1001
Safety Plan – Traffic Management	CORP-HS-PLN-1008
Safety Procedure – Incident Reporting and Analysis	CORP-HS-PRO-1046
Environmental Procedure – Approvals Request and Ground Disturbance	CORP-EN-PRO-1004
Environmental Procedure – Environmental and Heritage Data Management	CORP-EN-PRO-1045
Environmental Procedure – Land Rehabilitation	CORP-EN-PRO-1002
Environmental Procedure– Feral Animal Management and Monitoring	CORP-EN-PRO-1050
Environmental Plan – Fauna Management	CORP-EN-PLN-1008
Environmental Plan – Environmental Management Plan	CORP-EN-PLN-1020
Environmental Plan – Exploration Environmental Management Plan	CORP-EN-PLN-1002

9 REFERENCES

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National Malleefowl Recovery Team (2019), National Malleefowl Monitoring Manual Edition: 2019-1

Turpin, J. & Bamford, M.J. (2008). Shine Fauna Assessment. Prepared for Gindalbie Metals Limited.

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APPENDIX A: MALLEEFOWL BIOLOGY

In Western Australia Malleefowl occur mainly in scrubs and thickets of Mallee (*Eucalyptus spp.*), Acacia (particularly *Acacia ramulosa var. linophylla*), Boree (*Melaleuca lanceolata*) and other dense litter-forming shrublands including Mulga (*Acacia aneura*) shrublands (Johnstone & Storr in Turpin & Bamford). They also occur in mixed shrublands and Tammar *Allocasuarina acuminata* shrublands (M. Bamford pers. obs). In the Karara area, they appear to concentrate on the lower slopes of the hills (within dense Acacia shrublands), particularly for mound construction. The species' distribution was once larger and less fragmented, but the widespread clearing of suitable habitat, coupled with the degradation of habitat by fire and livestock and predation by foxes have reduced Malleefowl numbers considerably.

The EPBC Act lists Malleefowl as a migratory species, although they are usually sedentary with an average home range area of 1.7 to 4.6 km². Dispersal of many kilometres has been recorded, but true migration has not been observed (Marchant and Higgins 1993).

Malleefowl have developed a highly sophisticated method of temperature control for egg incubation. This species constructs distinctive nests that comprise a large mound covering a central core of leaf litter. The mound is constructed out of sand, pebbles or small rocks, depending on the habitat available. Mounds have a large central depression which is filled with leaf litter and covered with soil. Eggs are laid within the mound, buried and left to incubate by the heat generated from decomposing leaf litter (Malleefowl Preservation Group, 2008). An adult pair maintains the mound temperature of 32 – 34 degrees Celsius by adjusting soil cover to either retain or expel heat from the egg chamber (Malleefowl Preservation Group, 2008).

Malleefowl are generally monogamous with pair bonds maintained for life (Priddel & Wheeler, in Turpin & Bamford, 2008). The lifespan of the Malleefowl is unknown but studies have not recorded an individual breeding beyond 12 years (DPaW, 2009). Established pairs generally breed annually with mounds constructed as early as May and maintained until as late as March the following year. The male starts to open up the mound and collect leaf litter in May, but this may not start until June or July if the first rains are late. Eggs are laid around September, when the mound is fully prepared and producing warmth from decomposing litter. The mound is maintained to incubate the eggs until February, but activity sometimes continues until March.

The number of eggs laid by the female is low in some years, dependent upon conditions. The average clutch size is 16 (but may range from 5 to 30) and the incubation period lasts for between 62 and 64 days (DPaW, 2009). Malleefowl chicks receive no parental care and as a result chick mortality is high due to predation and exposure (DPaW, 2009).

Malleefowl mounds vary in size and diameter, depending on age and activity, however mounds commonly span more than five metres and are up to one metre high (DPaW, 2009). A pair of Malleefowl will often use the same mound over successive seasons; however nest fidelity is highly variable. Some Malleefowl pairs have been recorded using the same mound for up to nine years while others relocate seasonally between a cluster of two, three or four mounds (Priddel & Wheeler in Turpin & Bamford, 2008). The density of mounds is generally low. There may be as many as 11.1 active mounds / km², but in semi-arid areas such as the Karara project area, there is often 1 mound / km² or less (Marchant & Higgins in M. Bamford pers. comms).

Mound construction and breeding rely heavily on rainfall. Malleefowl have been recorded abandoning mound construction or failing to use a mound during seasons of low rainfall, including in the Karara area (Priddel & Wheeler in Turpin & Bamford, 2008). Breeding Malleefowl tend to be sedentary, as they nest and roost in the same area year after year. Breeding males do not stray far from the nest however birds may range over several kilometres outside the breeding season (DPaW, 2009). Malleefowl also require large amounts of leaf litter for egg incubation so are generally restricted to areas of dense vegetation that have not been burnt for many years.

The Malleefowl is currently the subject of a number of conservation initiatives both within Western Australia and Australia-wide. There is a high degree of coordination between the National Recovery Plan for Malleefowl and local activities by volunteer groups. Key stakeholders are:

- WA DBCA carries out re-introductions using eggs that are removed from areas where the species are abundant.
- Malleefowl Preservation Group is based in Ongerup, approximately 400km south east of Perth, where there is a Malleefowl centre. This group oversees a large amount of monitoring and survey work throughout southern WA using volunteers.
- North Central Malleefowl Preservation Group based in Wubin/ Dalwallinu. This group carries out some monitoring and survey work in its region.

WA Malleefowl Network is operated through the WWF and coordinates local activities by volunteers, including the implementation of national standards for survey work.