SOUTHERN IRON PTY LTD

Peculiar Knob Annual Compliance Report
EPBC 2014/7154 1 21
December 2020 to 30 Nov 2021

PeaK IRON MINES

Peculiar Knob Iron Ore Project

Peak Iron Mines – Perth Head Office ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 11, 28 The Esplanade Perth, WA 6000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748	**Peak Iron Mines – Adelaide Project Office** ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 12, 33 King William Street Adelaide, SA 5000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748

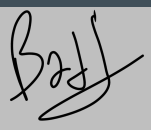
Date: 28 February 2022

Doc.Ref: S-2-REP-3-1006_A EPBC 2014/7154

Executive Declaration

Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Name	Position or Agent	Signature	Date
Marnus Bothma	CEO		28/02/2022

Document Status

Rev No.	Author(s)	Responsible Manager(s)
Rev A	Tegan Stehbens	Diona Antonas Environment and Approvals Manager

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Glossary

As per the definitions provided in EPBC Act Approval EPBC 2014/7154 and the Annual Compliance Report Guidelines (DotE 2014)

Term	Definition
Baltana sub-region	means STP07 as shown on the *Interim Biogeographic Regionalisation for Australia, Version 7* map published on the Department's website.
Business day	means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.
Commencement/Commencement of the action	means commencement of any works in the Peculiar Knob Iron Ore Project "expansion area".
Compliance report	means a written report: i. providing accurate and complete details of compliance, incidents, and non-compliance with the conditions and the plans; ii. consistent with the Department's Annual Compliance Report Guidelines (2014); iii. include a shapefile of any clearance of any listed threatened species and communities, or their habitat, undertaken within the relevant 12 month period; and iv. annexing a schedule of all plans prepared and in existence in relation to the conditions during the relevant 12-month period.
Compliant	'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.
Department	means the Australian Government agency responsible for administering the EPBC Act.
EPBC Act	means the *Environment Protection and Biodiversity Conservation Act 1999*.
Incident	means any event which has the potential to, or does, impact on one or more listed threatened species and communities.
Listed threatened species and communities	means a matter protected under sections 18 and 18A of the EPBC Act.
Minister	means the Australian Government Minister administering the EPBC Act including any delegate thereof.
Non-compliant	A designation of 'non-compliance' should be given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.
Not applicable	A designation of 'not applicable 'should be given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.
Plan	means any of the documents required to be prepared, approved by the Minister, implemented by the person taking the action and/or published on the website in accordance with these conditions.
Peculiar Knob Iron Ore Project "expansion area"	means the area identified as the "proposed vegetation clearance area" in Figure 1.
Sensitive ecological data	means data as defined in the Australian Government Department of the Environment (2016) Sensitive Ecological Data – Access and Management Policy V1.0
Shapefile	means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx' , '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes.

Term	Definition
Suitably qualified Thick-billed Grasswren expert	means a person who has professional qualifications, training, skills and/or experience relevant to Thick-billed Grasswren and can give authoritative advice related to rehabilitation of Thick-billed Grasswren habitat.
Thick-billed Grasswren	means the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*) listed as threatened under the EPBC Act.
Threat Abatement Plans	means a Threat Abatement Plan made under the EPBC Act.
Website	means a set of related web pages located under a single domain name attributed to the person taking the action and available to the public.

1 INTRODUCTION

1.1 Project Background

The Peculiar Knob Iron Ore Project (the Project) was approved by the South Australian Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE) on 7th of July 2011, and active mining commenced on 1st of December 2011. The Project consists of mining of an estimated 16.7 million tonnes (Mt) of hematite (iron ore) reserves to a vertical depth of 175 metres in the south-eastern portion of ML6314 area using open pit mining techniques. The Project involves extracting ore at a rate of approximately 3.0 million tonnes per annum (Mt/a). Extracted iron ore is hauled 96 km west to the rail siding at Wirrida and is crushed onsite ready for export via the Port of Whyalla.

In 2013, Southern Iron Pty Ltd (Southern Iron), a wholly owned subsidiary of Peak Iron Mines Pty Ltd, varied the open pit design to decrease the batter angle and widen the overall open pit footprint as a safety measure to prevent wall collapse. A consequential effect of this design change is that a larger volume of waste rock material must be mined to enable the hematite resource to be mined safely. As a result, Southern Iron sought and obtained a new tenement (miscellaneous purposes licence, MPL 147) to facilitate a new waste rock dump (WRD) just east of the existing mine.

1.2 Project Location

The Peculiar Knob Iron Ore Project (the Project) is located 30 km east of the Stuart Highway, approximately 700 km northwest of Adelaide, and approximately 90 km southeast of Coober Pedy (refer Appendix A, Figure 1). The mine pit, pit access road, haul road, rail siding and crusher plant are all located within the Woomera Prohibited Area (WPA), which has been gazetted by the Commonwealth Department of Defence (DoD). Southern Iron has an access agreement with the DoD regarding secure access to the WPA for mining purposes at Peculiar Knob. The agreement also includes the right to construct, operate, maintain, repair and replace any road or water transmission system or anything else which is an ancillary activity within the access/infrastructure areas.

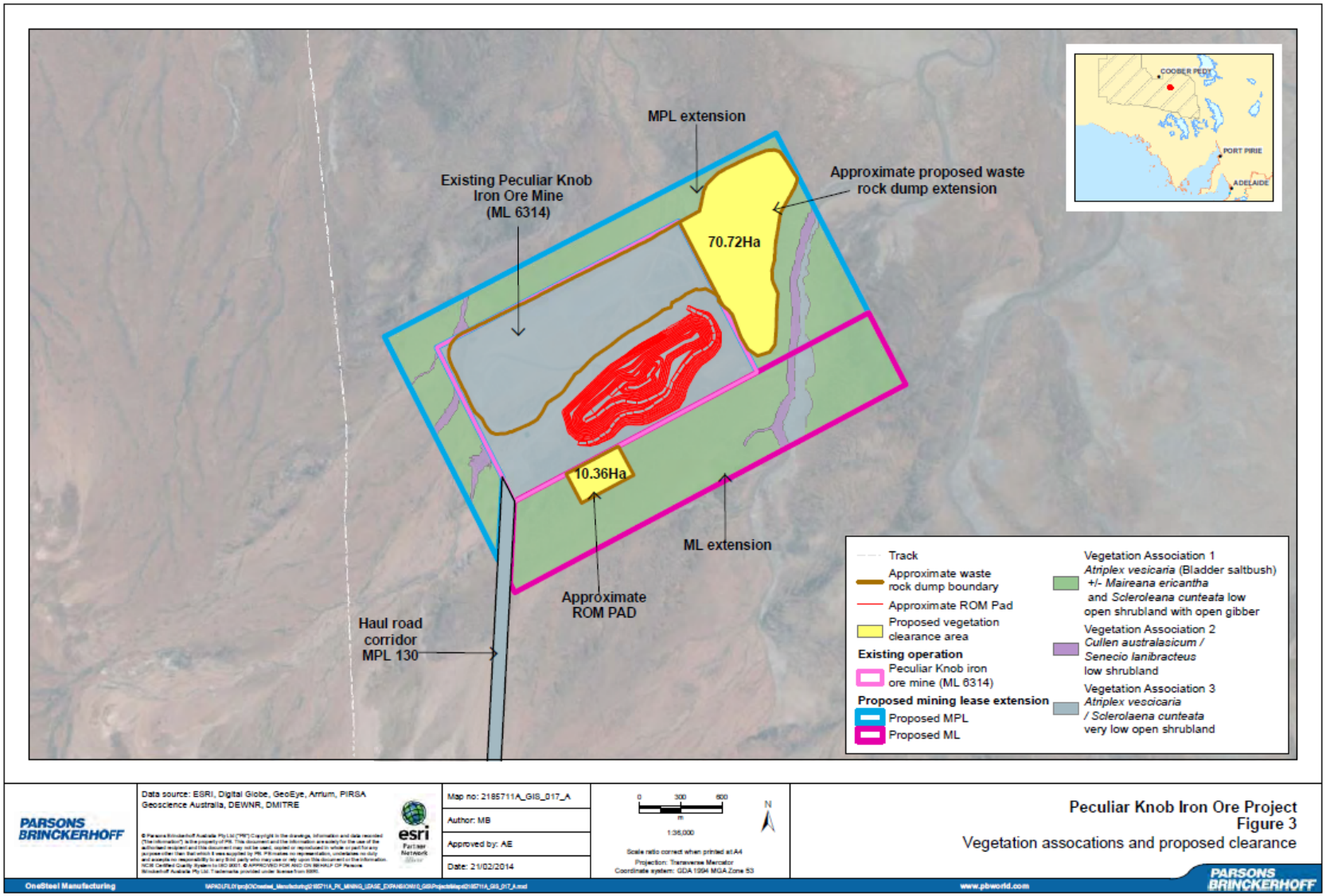


Figure 1.1 Approved clearance for Peculiar Knob Iron Ore expansion (reproduction of Figure 3 from EPBC Referral 2014/7145)

1.3 EPBC Act Approval History

Mining and ancillary operations in the Peculiar Knob Mining Area were originally referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 5 September 2010. The Project was deemed a 'controlled action' due to potential impacts on the nationally vulnerable *Amytornis textilis modestus* (Thick-billed Grasswren, eastern subspecies). The original application included construction and operation of a mine pit, haul road, rail siding, crusher, accommodation village and groundwater bores, with clearing of up to 400 ha of potential Thick-billed Grasswren habitat. The project was ultimately approved on 8 June 2011 (EPBC 2010/5634).

On 30 October 2012, a variation to conditions of the EPBC approval (Decision Notice EPBC 2010/5634) was obtained, reflecting an increase of 123 ha to the area of potential Thick-billed Grasswren habitat approved for clearance in the PKMA. This variation increased the total approved clearance area in the PKMA to 523 ha.

On 11 March 2014, an additional referral was made to the Commonwealth Department of the Environment (DotE) (previously DSEWPaC), which related to the proposed new tenement area required to accommodate extra waste material generated as a result of the pit redesign (Southern Iron 2014). On 11 April 2014, the DoE determined that the proposed action is a 'controlled action', with the expansion obtaining approval on 28 July 2014 (EPBC 2014/7154).

As per the Approval Decision Notice- Peculiar Knob Iron Ore Project (EPBC 2014/7154) dated 29 July 2014, a Feral Animal Control Programme (Revision 4) for the expanded area was submitted to Department of Agriculture, Water and the Environment (DAWE) (previously DoE) on the 6 March 2020 and was approved on 10 March 2020. An approval to extend the period of effect by 10 years and subsequent Variations to Conditions Attached to Approval was documented in April 2020 (see Appendix A).

2 DESCRIPTION OF ACTIVITIES

2.1 Approved Action

The Approved Action under EPBC 2014/7154 (amended 28 April 2020) is:

> To expand the Peculiar Knob Iron Ore Project as a result of a revised pit design leading to additional waste rock. Located approximately 90 km southeast of Coober Pedy, South Australia.

As detailed in EPBC Act referral 2014/7154, Southern Iron sought to expand the Peculiar Knob iron ore mineral lease area to accommodate extra waste material as a result of a pit re-design to ensure safe mining practices can be employed. The additional area would require clearing of an additional 81.08 ha of native vegetation, which was assessed as potential habitat for Thick-billed Grasswren.

The action (clearance of vegetation) commenced on 1 December 2020, as communicated in writing to the Department on 9 December 2021.

2.2 Current Activities

2.2.1 Fauna Surveys

Thick-billed Grasswren Habitat Assessment

In 2014, Southern Iron contracted Ecological Horizons Pty Ltd to conduct a Thick-billed Grasswren habitat survey of the proposed WRD expansion area to fulfill Condition 4 of the EPBC conditions (EPBC 2014/7154, see Appendix A). A full copy of the survey report is presented in Appendix B.

The habitat survey was led by Dr John Read, a published fauna specialist with over thirty years' experience conducting fauna surveys and habitat assessments in the South Australian arid zone.

No Thick-billed Grasswrens were detected during the survey, although previous sightings in the region and suitable habitat suggest the northern third of this area does provide suitable habitat for the species. Ecological Horizons (2014) note that due to their secretive nature, failure to detect Grasswrens during short surveys cannot be considered to indicate the absence of this species, nor the unsuitability of the habitat. Thick-billed Grasswrens have been recorded from the nearby permanent fauna monitoring sites and at other nearby sites (Ecological Horizons 2014).

Ecological Horizons (2014) assessed the impact footprint of the WRD extension to determine whether the vegetation could be considered suitable habitat for Thick-billed Grasswrens. Two habitat types were mapped across the impact footprint:

1. The southern portion is characterised by hard-packed clay soils that shed water and are typically vegetated by low sparse chenopods. This habitat is highly unlikely to support grasswrens because it lacks the extensive patches of emergent chenopods that characterize their habitat.
2. the northern third features more gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. These water-holding or water-transporting habitats support larger emergent chenopods, especially Atriplex omissa and Rhagodia spp that provide suitable habitat for Thick-billed Grasswrens.

The results of the fauna habitat mapping are presented in Figure 2.1.

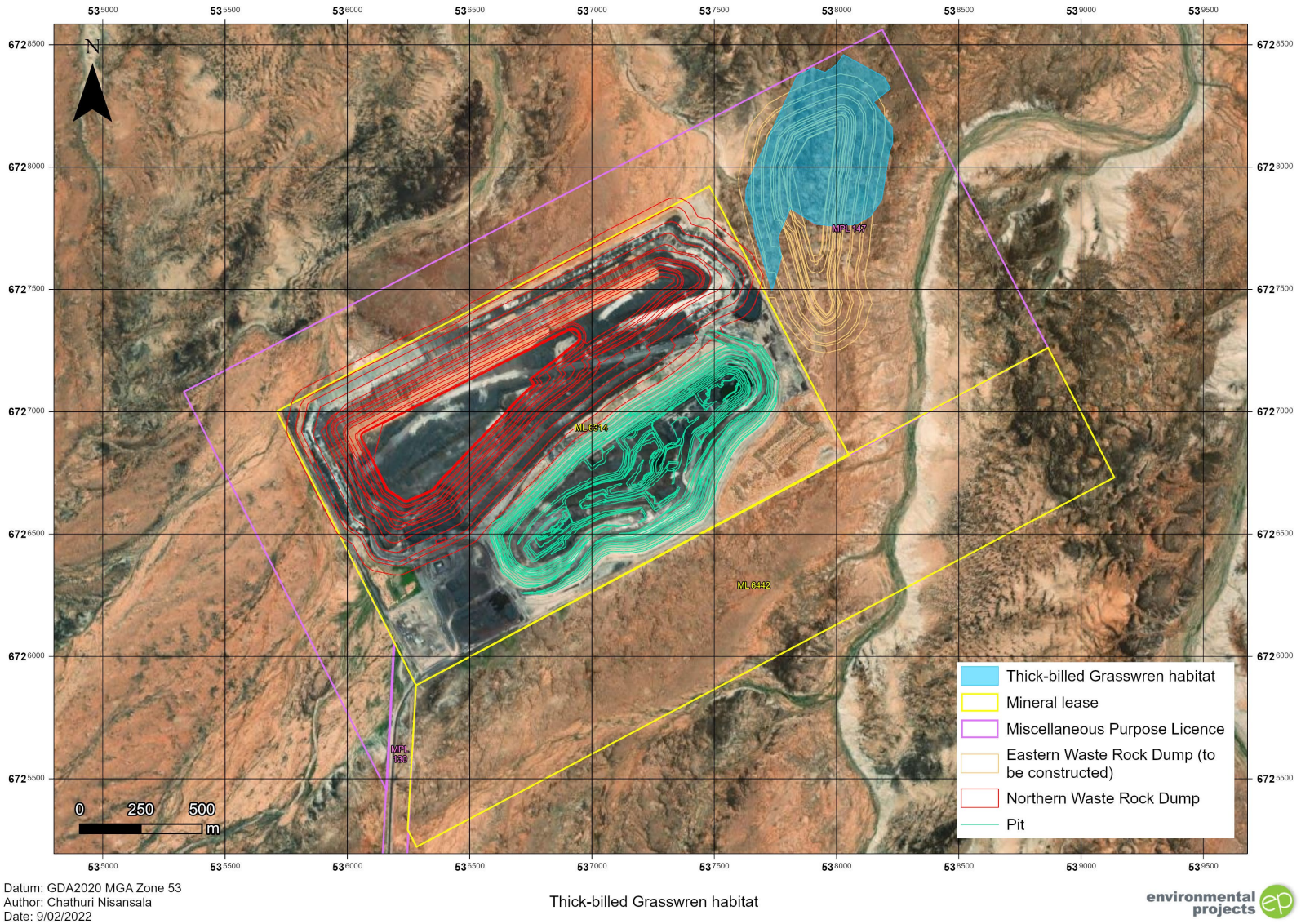


Figure 2.1 Thick-billed Grasswren habitat

Annual Fauna Survey

EBS Ecology was engaged by Peak Iron Mines Pty Ltd (PIM) to conduct the annual ecological compliance monitoring for Peculiar Knob Iron Ore Project (the PK project) in Spring 2021, as required under the Program for Environment Protection and Rehabilitation (PEPR). The full report from this survey is presented in Appendix C.

The objectives of the September 2021 survey were to:

- Measure and compare abundance and diversity of fauna at established impact and control sites.
- Compare capture trends at impact sites and control sites when compared to baseline data (EBS 2007).
- Determine if any significant decrease in abundance or diversity of native fauna can be attributed to mining operations (including fire), when compared to control sites.
- Determine if any new pest species (feral animals) have been introduced, or if existing pest species have increased in abundance.

Results from the 2021 PK fauna survey found no observable impact to native fauna abundance or diversity caused by mining operations. Specifically:

- There was no reduction in occupancy or abundance of fauna species of conservation significance such as Thick-billed Grasswren or Chestnut-breasted Whiteface.
- Results of monitoring program demonstrate no net adverse impacts on native fauna abundance or diversity when compared with control sites.
- There was no demonstrated increase in pests or incursion of new pest species.
- There were no net adverse impacts on fauna abundance or diversity at ephemeral ecosystems when compared with control site results.

In addition to monitoring the general health of populations of native fauna within the Project Area, a program was implemented to monitor the populations of Nationally listed Thick-billed Grasswrens which occur within the Project Area. Thick-billed Grasswrens (TBGWs) were observed to occupy four sites during the 2021 bird survey.

2.2.2 Vegetation Clearing

Vegetation clearing commenced on 1 December 2020. During the reporting period (1 December 2020 to 30 November 2021), a total of 51.28 ha of native vegetation within the approved eastern waste rock dump footprint were cleared (see blue (Dec 2020 to Feb 2021) and yellow (Mar 2021 to Feb 2022) Figure 2.2). This is less than the maximum clearing allowance for the eastern waste rock dump of 81.08 ha.

Of the total amount cleared, 28.13 ha is considered Thick-billed Grasswren habitat, as per the pre-clearing habitat assessment completed by Ecological Horizons in 2014 (see Section 2.2.1 and Appendix B).

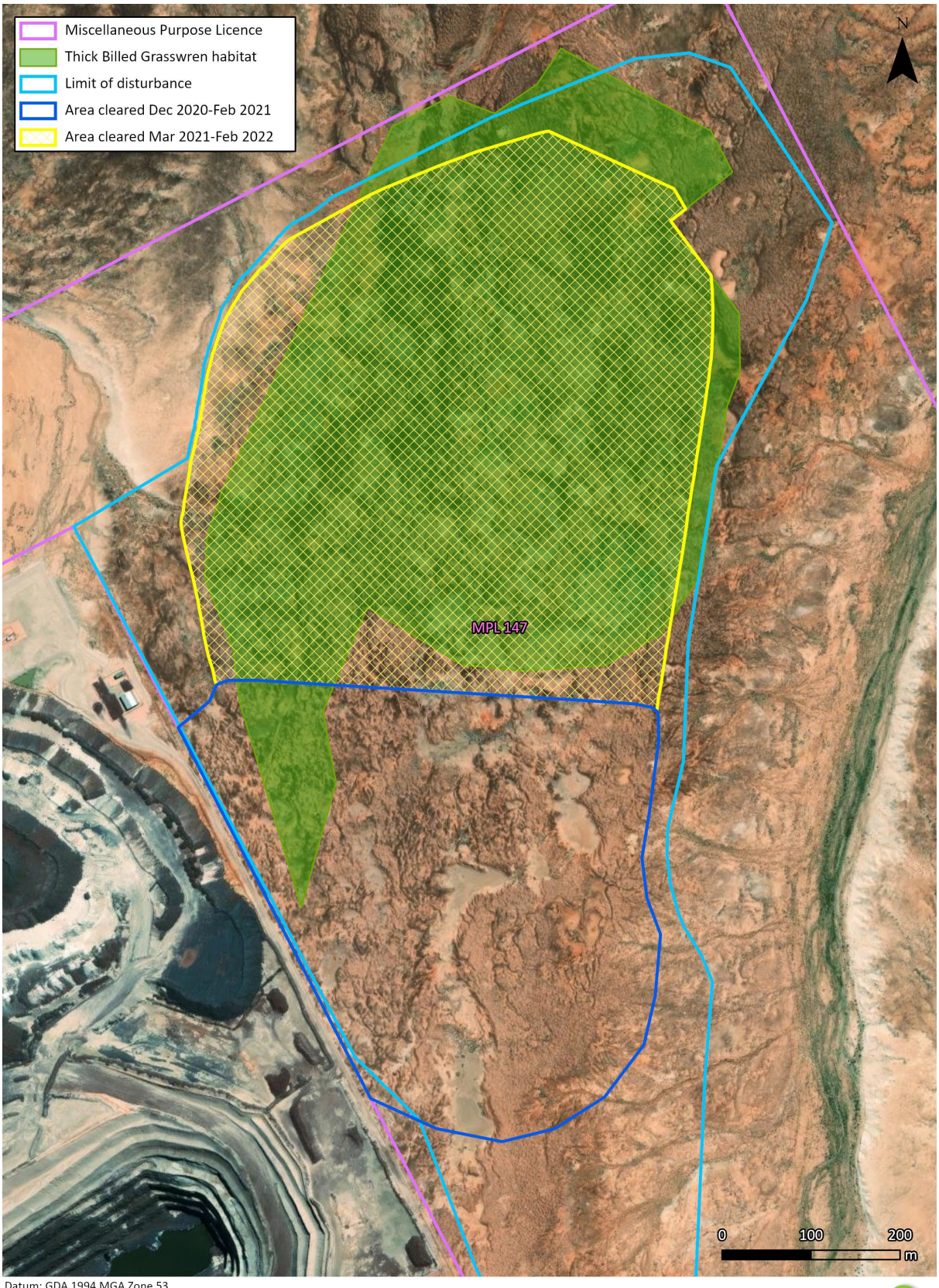


Figure 2.2 Native vegetation clearance – MPL 147

2.2.3 Feral Animal Control Programme

Although vegetation clearance for the Project expansion (and thus the commencement of the activity) only began on 1 December 2020, the approved Feral Animal Control Programme was first implemented in May 2020. The Programme was implemented twice a year, in Autumn and Spring, in both 2020 and 2021.

Curiosity Cat baits were not commercially available in 2020 due to changes needed to legislation. Although the legislation has since been amended, the baits were not available in time to support the most recent implementation of the programme. It is intended that future implementation of the programme will include the Curiosity Cat baits (provided via SAAL Landscapes SA).

Autumn 2020

The first implementation of the approved Feral Animal Control Programme was carried out in Autumn 2020 (21 May – 1 June, see Appendix F). Fox off baits were laid as per the programme plan and checked on seven days over the fortnight. Five baits were taken, one of which was confirmed to be taken by a fox. All baits were collected on 1 June.

Cat traps were laid and spotlight shooting occurred on the seven nights. Nightly spotlighting failed to locate any rabbits, and an intensive search for rabbit warrens found no evidence of rabbits in the area.

Landholders were consulted on 21 May with no complaints and noted they were satisfied with the aspects of the programme.

Spring 2021

The second implementation of the programme was carried out in Spring 2020 (22 September – 10 October, see Appendix F). Again, fox off baits were laid and checked over seven nights as per the programme plan. Spotlight shooting also occurred over the seven nights, during which one cat was shot. No rabbits or rabbit warrens were observed during the programme.

Autumn 2021

The Autumn 2021 programme was conducted from 7 May to 18 May 21 (see Appendix G). Fox off baits were laid and checked over this period, and there was also nightly spotlight shooting. Two cats and one kitten were shot. No rabbits or rabbit warrens were observed during the programme.

Spring 2021

The Spring 2021 programme was conducted from 23 September to 5 October (see Appendix G), with fox off baits laid and nightly spotlight shooting. One cat was shot, and although no rabbits or rabbit warrens were observed, the remnants of a single rabbit was detected in the gut contents of the cat. It seems likely that the rabbit population is very low.

2.3 Incidents

As per Decision Notice EPBC 2014/7154 (see Appendix A), an ‘incident’ is defined as any event which has the potential to, or does, impact on one or more listed threatened species and communities.

No events of this nature occurred at the Peculiar Knob Iron Ore Project during the reporting period.

3 COMPLIANCE

3.1 Compliance Reporting

This report is the first Annual Compliance Report against the EPBC Approval Conditions (EPBC 2014/7154, see Appendix A) for Peculiar Knob and covers the 12-month period from commencement on 1 December 2020 to 30 November 2021. However, although the project commenced on 1 December 2020, the approved Feral Animal Control Programme was first implemented in May 2020; consequently, the outcomes of the feral animal control implementation for 2020 are also reported here.

This report will be published on the Peak Iron website by 28 February 2022.

3.2 Assessment Against the EPBC Approval Conditions

The review of the Project against the EPBC Approval Conditions is detailed in Table 3.1. The assessment found that the Project was 'compliant' for 12 of the 15 conditions, with the remaining three considered 'not applicable'.

As per the Annual Compliance Report Guidelines (DotE 2014), the following designations are used to record findings in compliance reports:

Compliant: 'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.

Non-compliant: A designation of 'non-compliance' is given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.

Not applicable: A designation of 'not applicable' is given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.

Table 3.1 Review against the EPBC Approval Conditions

Ref	Condition	Compliance	Evidence/Comments
1	At the expiry date of this approval, there must be no permanent adverse impact as a result of the action on the abundance of the **Thick-billed Grasswren** within the **Peculiar Knob Iron Ore Project "expansion area"**.	Compliant	The fauna survey has not found any impacts to fauna abundance attributable to mining (see EBS 2021, Appendix C).
2	**Habitat Clearing** The person taking the action must not clear more than 81.08 hectares of potential **Thick-billed Grasswren** habitat from the **Peculiar Knob Iron Ore Project "expansion area"**.	Compliant	Vegetation clearance commenced 1 December 2020. A total 51.28 ha of Thick-Billed Grasswren habitat was cleared in the reporting period (see Figure 2.2).
3	**Habitat Rehabilitation** The person taking the action must rehabilitate **Thick-billed Grasswren** habitat removed within the **Peculiar Knob Iron Ore Project "expansion area"** as a result of the action to a quality of habitat equivalent to the habitat removed.	Not applicable	Habitat rehabilitation has not yet commenced, as operations are ongoing at this stage.
4	Prior to the clearance of vegetation within the **Peculiar Knob Iron Ore Project "expansion area"** the person taking the action must conduct a habitat survey to establish the quality and extent of **Thick-billed Grasswren** habitat within the **Peculiar Knob Iron Ore Project "expansion area"**. The habitat survey must be undertaken by a **suitably qualified Thick-billed Grasswren expert**. The results of the habitat survey are to be used by the person taking the action as the baseline for rehabilitation activities required by Condition 3 and be reported in the annual **compliance report** required by Condition 10.	Compliant	A Thick-billed Grasswren habitat survey was undertaken and completed by a suitably qualified Thick-billed Grasswren expert (Ecological Horizons 2014, see Appendix B).

Ref	Condition	Compliance	Evidence/Comments
5	The person taking the action must conduct ongoing monitoring of progress towards meeting the outcome in Condition 3, including, but not limited to, the following: a) Following cessation of construction and operation activities associated with the **Peculiar Knob Iron Ore Project "expansion area"**, the person taking the action must undertake an audit of the final **Peculiar Knob Iron Ore Project "expansion area"** landform and determine the actions required to achieve Condition 3. The audit must be done in consultation with a **suitably qualified Thick-billed Grasswren expert** and the results and actions identified reported in the annual **compliance report** required by Condition 10. b) Following the audit required by Condition 5 (a), the person taking the action must conduct annual habitat surveys to monitor rehabilitation of the **Peculiar Knob Iron Ore Project "expansion area"**. The annual habitat surveys must be undertaken **by a suitably qualified Thick-billed Grasswren** expert. The results of the annual habitat surveys must report on the progress of rehabilitation activities, identify whether or not **Thick-billed Grasswren** habitat recovery is evident and progressing satisfactorily and, if required, identify and recommend actions for promoting and accelerating the rate of **Thick-billed Grasswren** habitat recovery. The results and recommendations of the annual habitat surveys must be included in the annual **compliance report** required by Condition 10. c) Condition 5 (b) ceases to apply once the person taking the action has demonstrated to the satisfaction of the **Minister** that Condition 3 has been achieved.	Not applicable	Habitat rehabilitation has not yet commenced, as operations are ongoing at this stage.
6	Any incidental observations during the monitoring activities required by Condition 5 of a **Thick-billed Grasswren** or a **Thick-billed Grasswren** nest must be reported in the annual **compliance report** required by Condition 10.	Not applicable	A Thick-billed Grasswren was sighted on 21 May 2020, near the centre of the programme area. No other sightings have occurred during the reporting period.

Ref	Condition	Compliance	Evidence/Comments
7	**Offsets** 7. To offset residual significant impacts to the **Thick-billed Grasswren**, the person taking the action must prepare and submit a Feral Animal Control Programme for approval by the **Minister**. The Feral Animal Control Programme must (but is not limited to): a) apply to a minimum 400 ha area of **Thick-billed Grasswren** habitat within the ***Baltana* sub-region**; b) include measures, consistent with relevant **Threat Abatement Plans**, to control feral cats (*Felis catus*), European wild rabbits (*Oryctolagus cuniculus*) and European red fox (*Vulpes vulpes*); c) be implemented prior to clearing of the **Peculiar Knob Iron Ore Project "expansion area"** and remain in place until the **Peculiar Knob Iron Ore Project "expansion area"** has been rehabilitated in accordance with Condition 3. The Feral Animal Control Programme must be submitted to the **Minister** for approval at least three (3) months prior to implementation. The approved Feral Animal Control Programme must be implemented.	Compliant	See Appendix D – Peculiar Knob Iron Ore Mine Feral Animal Control Programme. The Feral Animal Control Programme was approved by the Department on 10 March 2020 (see Appendix E). First implementation of the programme occurred in Autumn 2020 (May/June, see Appendix F). Second implementation of the programme occurred in Spring 2020 (September/October, see Appendix F). Third implementation of the programme occurred in Autumn 2021 (May, see Appendix G). Fourth implementation of the programme occurred in Spring 2021 (September/October, see Appendix G).
8	Within 10 days after the **commencement** of the action, the person taking the action must advise the **Department** in writing of the actual date of **commencement**.	Compliant	The action (clearance of vegetation) commenced on 1 December 2020, as communicated in writing to the Department on 9 December 2021.
9	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the programme and rehabilitation activities required by this approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act** or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.	Compliant	Records of the actions taken regarding vegetation clearing and implementation of the EPBC Feral Animal Control Programme are being recorded in the Peculiar Knob Environmental Management System and are available for audit on request.

Ref	Condition	Compliance	Evidence/Comments
10	**Annual compliance reporting** The person taking the action must prepare a **compliance report** for each 12-month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The person taking the action must: a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12-month period; b. notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within five business days of the date of publication; c. keep all **compliance reports** publicly available on the **website** until this approval expires; d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication. Note: **Compliance reports** may be published on the **Department's** website.	Compliant	This report is the first Annual Compliance Report against the EPBC Approval Conditions for Peculiar Knob. This report will be published on the Peak Iron website by 28 February 2022.
10A	**Reporting non-compliance** The person taking the action must notify the **Department** in writing of any: **incident**; non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify: a. any condition which is or may be in breach; b. a short description of the **incident** and/or non-compliance; and c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.	Compliant	No incidents or non-compliances with the conditions have occurred.

Ref	Condition	Compliance	Evidence/Comments
10B	The person taking the action must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying: a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b. the potential impacts of the **incident** or non-compliance; and c. the method and timing of any remedial action that will be undertaken by the person taking the action.	Compliant	No incidents or non-compliances with the conditions have occurred.
11	If the person taking the action wishes to carry out any activity otherwise than in accordance with the programme as specified in the conditions, the person taking the action must submit to the **Department** for the **Minister's** written approval a revised version of that programme. The varied activity shall not commence until the **Minister** has approved the varied programme in writing. The **Minister** will not approve a varied programme unless the revised programme would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised programme, that programme must be implemented in place of the programme originally approved.	Compliant	No other actions required.
12	If the **Minister** believes that it is necessary or convenient for the better protection of **listed threatened species and communities** to do so, the **Minister** may request that the person taking the action make specified revisions to the programme specified in the conditions and submit the revised programme for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved programme must be implemented. Unless the **Minister** has approved the revised programme, then the person taking the action must continue to implement the programme originally approved, as specified in the conditions.	Compliant	A revision has not been requested.

Ref	Condition	Compliance	Evidence/Comments
13	Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish the programme referred to in these conditions of approval on their **website**. The programme must be published on the **website** within one (1) month of being approved. The person taking the action must notify the **Department** within five (5) **business days** of publishing the programme on the **website**. The programme must remain on their **website** for the period this approval has effect.	Compliant	The Feral Animal Control Programme has been published on Peak Iron Mines website and the Department notified.

*Refer to glossary for full definition of items in **bold**.

3.3 New Environmental Risks

No new environmental risks to listed threatened flora and fauna, or other matters of national environmental significance, were identified during the reporting period.

REFERENCES

Department of the Environment (DotE) 2014. *Annual Compliance Report Guidelines*, Department of the Environment, Australian Government, Canberra.

Ecological Horizons Pty Ltd 2014. *Proposed Peculiar Knob Waster-rock Dump Extension Thick-billed Grasswren Appraisal*, November 2014, unpublished report prepared for Southern Iron Pty Ltd.

EBS 2021. *Peculiar Knob Iron Ore Project Annual Fauna Survey, 2021*. unpublished report prepared for Southern Iron Pty Ltd.

Environmental Projects 2020. *Peculiar Knob Iron Ore Mine Feral Animal Control Programme, Rev 4,* 4 March 2020, unpublished report prepared for Southern Iron Pty Ltd.

Southern Iron Pty Ltd (Southern Iron) 2014. *EPBC Referral, Peculiar Knob ML & MPL Tenement Extension.* Referred under the EPBC Act to the Commonwealth, see EPBC 2014/7145.

Appendix A

Decision Notice EPBC 2014/7145 (as amended 28 April 2020)

Australian Government
Department of Agriculture, Water and the Environment

VARIATION OF CONDITIONS ATTACHED TO APPROVAL

Expansion of the Peculiar Knob Iron Ore Project, SA (EPBC 2014/7154)

This decision to vary conditions of approval is made under section 143 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Approved Action

Person to whom the approval is granted	Southern Iron Pty Ltd ACN: 119 611 068
approved action	To expand the Peculiar Knob Iron Ore Project as a result of a revised pit design leading to additional waste rock. Located approximately 90 km southeast of Coober Pedy, South Australia [See EPBC Act referral 2014/7154]

Variation

Variation of conditions attached to approval	The variation is: Delete condition 10 attached to the approval and substitute with the conditions 10, 10A and 10B specified in table below Add new definitions of Business day, Compliance report, Incident, Plan, Sensitive ecological data, Shapefile and Website specified in the table below
Date of effect	This variation has effect on the date the instrument is signed

Person authorised to make decision

Name and position	Greg Manning Assistant Secretary Assessments (WA, SA, NT), Post Approvals and Policy Branch
Signature	
Date of decision	28 April 2020

Date of decision	Conditions attached to approval
Original dated 29/07/2014	1. At the expiry date of this approval, there must be no permanent adverse impact as a result of the action on the abundance of the **Thick-billed Grasswren** within the **Peculiar Knob Iron Ore Project "expansion area"**.
Original dated 29/07/2014	**Habitat Clearing** 2. The person taking the action must not clear more than 81.08 hectares of potential **Thick-billed Grasswren** habitat from the **Peculiar Knob Iron Ore Project "expansion area"**.
Original dated 29/07/2014	**Habitat Rehabilitation** 3. The person taking the action must rehabilitate **Thick-billed Grasswren** habitat removed within the **Peculiar Knob Iron Ore Project "expansion area"** as a result of the action to a quality of habitat equivalent to the habitat removed.
Original dated 29/07/2014	4. Prior to the clearance of vegetation within the **Peculiar Knob Iron Ore Project "expansion area"** the person taking the action must conduct a habitat survey to establish the quality and extent of **Thick-billed Grasswren** habitat within the **Peculiar Knob Iron Ore Project "expansion area"**. The habitat survey must be undertaken by a **suitably qualified Thick-billed Grasswren expert**. The results of the habitat survey are to be used by the person taking the action as the baseline for rehabilitation activities required by Condition 3 and be reported in the annual **compliance report** required by Condition 10.
Original dated 29/07/2014	5. The person taking the action must conduct ongoing monitoring of progress towards meeting the outcome in Condition 3, including, but not limited to, the following: a) Following cessation of construction and operation activities associated with the **Peculiar Knob Iron Ore Project "expansion area"**, the person taking the action must undertake an audit of the final **Peculiar Knob Iron Ore Project "expansion area"** landform and determine the actions required to achieve Condition 3. The audit must be done in consultation with a **suitably qualified Thick-billed Grasswren expert** and the results and actions identified reported in the annual **compliance report** required by Condition 10. b) Following the audit required by Condition 5 (a), the person taking the action must conduct annual habitat surveys to monitor rehabilitation of the **Peculiar Knob Iron Ore Project "expansion area"**. The annual habitat surveys must be undertaken by a **suitably qualified Thick-billed Grasswren expert**. The results of the annual habitat surveys must report on the progress of rehabilitation activities, identify whether or not **Thick-billed Grasswren** habitat recovery is evident and progressing satisfactorily and, if required, identify and recommend actions for promoting and accelerating the rate of **Thick-billed Grasswren** habitat recovery. The results and recommendations of the annual habitat surveys must be included in the annual **compliance report** required by Condition 10. c) Condition 5 (b) ceases to apply once the person taking the action has demonstrated to the satisfaction of the **Minister** that Condition 3 has been achieved.

Date of decision	Conditions attached to approval
Original dated 29/07/2014	6. Any incidental observations during the monitoring activities required by Condition 5 of a **Thick-billed Grasswren** or a **Thick-billed Grasswren** nest must be reported in the annual **compliance report** required by Condition 10.
Original dated 29/07/2014	**Offsets** 7. To offset residual significant impacts to the **Thick-billed Grasswren**, the person taking the action must prepare and submit a Feral Animal Control Programme for approval by the **Minister**. The Feral Animal Control Programme must (but is not limited to): a) apply to a minimum 400 ha area of **Thick-billed Grasswren** habitat within the ***Baltana* sub-region;** b) include measures, consistent with relevant **Threat Abatement Plans**, to control feral cats (*Felis catus*), European wild rabbits (*Oryctolagus cuniculus*) and European red fox (*Vulpes vulpes*); c) be implemented prior to clearing of the **Peculiar Knob Iron Ore Project "expansion area"** and remain in place until the **Peculiar Knob Iron Ore Project "expansion area"** has been rehabilitated in accordance with Condition 3. The Feral Animal Control Programme must be submitted to the **Minister** for approval at least three (3) months prior to implementation. The approved Feral Animal Control Programme must be implemented.
Original dated 29/07/2014	**Standard Conditions** 8. Within 10 days after the **commencement** of the action, the person taking the action must advise the **Department** in writing of the actual date of **commencement**.
Original dated 29/07/2014	9. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the programme and rehabilitation activities required by this approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act** or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.
As varied on the date this instrument was signed	**Annual compliance reporting** 10. The person taking the action must prepare a **compliance report** for each 12-month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The person taking the action must: a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12-month period; b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within five **business day**s of the date of publication;

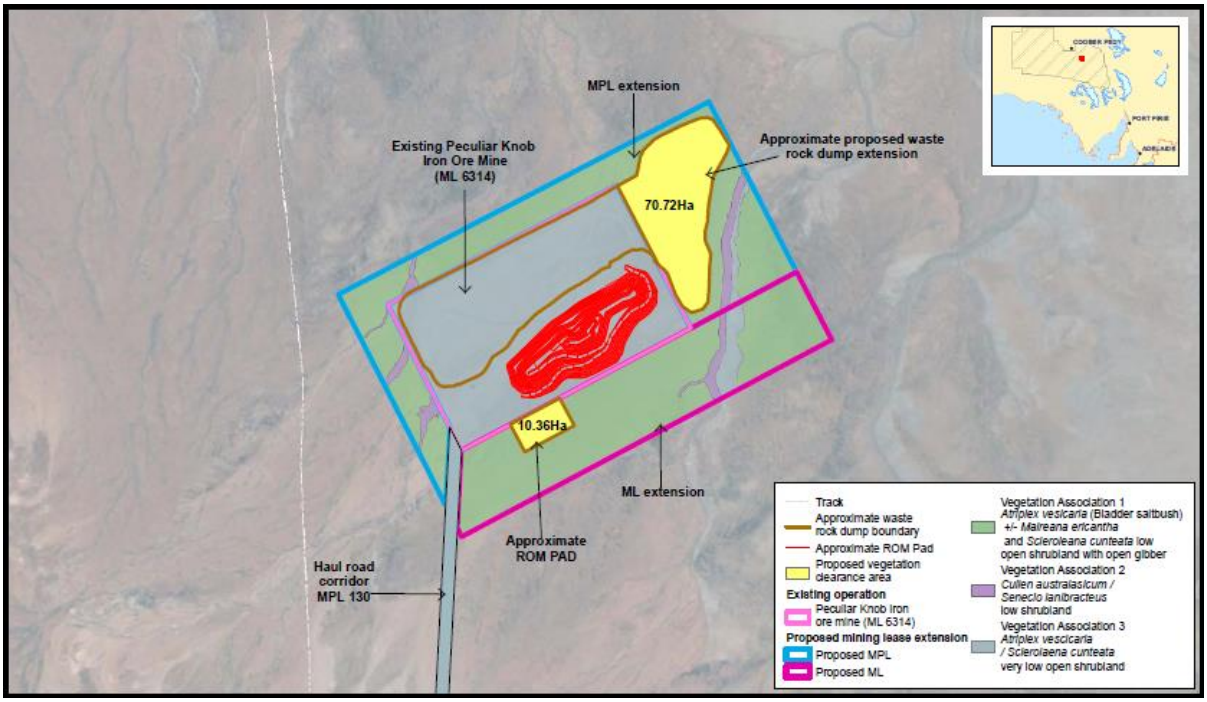
Date of decision	Conditions attached to approval
	c. keep all **compliance reports** publicly available on the **website** until this approval expires; d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication. Note: **Compliance reports** may be published on the **Department**'s website.
As varied on the date this instrument was signed	**Reporting non-compliance** 10A. The person taking the action must notify the **Department** in writing of any: **incident;** non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify: a. any condition which is or may be in breach; b. a short description of the **incident** and/or non-compliance; and c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.
As varied on the date this instrument was signed	10B. The person taking the action must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying: a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b. the potential impacts of the **incident** or non-compliance; and c. the method and timing of any remedial action that will be undertaken by the person taking the action.
Original dated 29/07/2014	11. If the person taking the action wishes to carry out any activity otherwise than in accordance with the programme as specified in the conditions, the person taking the action must submit to the **Department** for the **Minister's** written approval a revised version of that programme. The varied activity shall not commence until the **Minister** has approved the varied programme in writing. The **Minister** will not approve a varied programme unless the revised programme would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised programme, that programme must be implemented in place of the programme originally approved.
Original dated 29/07/2014	12. If the **Minister** believes that it is necessary or convenient for the better protection of **listed threatened species and communities** to do so, the **Minister** may request that the person taking the action make specified revisions to the programme specified in the conditions and submit the revised programme for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved programme must be implemented. Unless the **Minister** has approved the revised programme, then the person taking the action must continue to implement the programme originally approved, as specified in the conditions.

Date of decision	Conditions attached to approval
Original dated 29/07/2014	13. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish the programme referred to in these conditions of approval on their **website**. The programme must be published on the **website** within one (1) month of being approved. The person taking the action must notify the **Department** within five (5) **business days** of publishing the programme on the **website**. The programme must remain on their **website** for the period this approval has effect.

Date of decision	Definitions attached to approval
Original dated 29/07/2014	***Baltana* sub-region** means STP07 as shown on the *Interim Biogeographic Regionalisation for Australia, Version 7* map published on the **Department's** website.
As varied on the date this instrument was signed	**Business day** means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.
Original dated 29/07/2014	**Commencement/Commencement of the action** means commencement of any works in the **Peculiar Knob Iron Ore Project "expansion area**".
As varied on the date this instrument was signed	**Compliance report** means a written report: i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**; ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014); iii. include a **shapefile** of any clearance of any **listed threatened species and communities**, or their habitat, undertaken within the relevant 12 month period; and iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12-month period.
As varied on the date this instrument was signed	**Department** means the Australian Government agency responsible for administering the **EPBC Act**.
Original dated 3/3/2011	**EPBC Act** means the *Environment Protection and Biodiversity Conservation Act 1999.*
As varied on the date this instrument was signed	**Incident** means any event which has the potential to, or does, impact on one or more **listed threatened species and communities**.
Original dated 29/07/2014	**Listed threatened species and communities** means a matter protected under sections 18 and 18A of the **EPBC Act**.
Original dated 29/07/2014	**Minister** means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.
As varied on the date this instrument was signed	**Plan** means any of the documents required to be prepared, approved by the **Minister**, implemented by the person taking the action and/or published on the **website** in accordance with these conditions.

Date of decision	Definitions attached to approval
Original dated 29/07/2014	**Peculiar Knob Iron Ore Project "expansion area"** means the area identified as the "proposed vegetation clearance area" in Figure 1.
As varied on the date this instrument was signed	**Sensitive ecological data** means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy V1.0*
As varied on the date this instrument was signed	**Shapefile** means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx' , '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes**.**
Original dated 29/07/2014	**Suitably qualified Thick-billed Grasswren expert** means a person who has professional qualifications, training, skills and/or experience relevant to **Thick-billed Grasswren** and can give authoritative advice related to rehabilitation of **Thick-billed Grasswren** habitat.
Original dated 29/07/2014	**Thick-billed Grasswren** means the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*) listed as threatened under the **EPBC Act**.
Original dated 29/07/2014	**Threat Abatement Plans** means a Threat Abatement Plan made under the **EPBC Act**.
As varied on the date this instrument was signed	**Website** means a set of related web pages located under a single domain name attributed to the person taking the action and available to the public.

Date of decision	**Annexures**
Original dated 29/07/2014	**Figure 1:** Map of the Peculiar Knob Iron Ore Project "expansion area"



Appendix B

Thick-billed Grasswren Appraisal, Ecological Horizons 2014

Proposed Peculiar Knob Waster-rock Dump Extension Thick-billed Grasswren Appraisal

November 2014

DRAFT

Ecological Horizons Pty Ltd

Potential Thick-billed Grasswren habitat within the proposed Peculiar Knob Waste Rock Dump extension

Limitations Statement

In preparing this document Ecological Horizons Pty Ltd makes no warranty or guarantee, whether expressed or implied, with respect to the information reported or to the findings, observations or conclusions expressed in this document. Further, such information, findings, observations and conclusions are based solely on observations made and information available to Ecological Horizons Pty Ltd at the time of this study.

Scope

Ecological Horizons was contracted by Arrium (Southern Iron) to conduct a an assessment of Proposed Peculiar Knob Waster-rock Dump Extension in northern South Australia to satisfy conditions of the EPBC Referral 2014/7154 .

The key deliverables was:

1) A habitat survey of the proposed expansion area by a suitably qualified Thick-billed Grasswren expert.

2) Provide baseline information on feral animal distribution to assist in the development of a feral animal control program to be implemented to protect a minimum of 400ha within the Baltana subregion

Credentials of the Thick-billed Grasswren assessor

Dr. John Read from Ecological Horizons Pty Ltd has thirty years' experience of conducting fauna surveys and habitat assessments in the South Australian arid zone. He has coordinated, conducted and written up several surveys for rare birds (including Thick-billed Grasswrens) in northern South Australia and has recorded Thick-billed Grasswrens on each of four annual surveys at the Peculiar Knob mine, including some records adjacent to the survey area (see Table 1). Dr. Read was appointed as the Birds Australia Atlas Coordinator for northern South Australia in the early 2000s, which provides further indication of his credentials.

Assessment Approach

Dr. Read walked the perimeter of the proposed Peculiar Knob Waste Rock Dump extension, guided by Arrium Environmental Scientist Christine Jones on November 6, 2014. The following morning, when detectability of grasswrens was considered to be optimal, the survey area was traversed on foot, with particular attention paid to visiting sites with emergent chenopod shrubs, which are the favoured habitat for the grasswrens. A playback recording of Thick-billed Grasswren calls was broadcast from a portable recorder at a minimum of ten localities for one minute each within the proposed Waste Rock Dump extension, concentrating on areas of potential habitat. Binoculars were also used both to survey clumps of tall chenopods and to scan for moving birds in front of the observer.

Results

No Thick-billed Grasswrens were detected during the survey of the Peculiar Knob Waste Rock Dump extension, although previous sightings in the region and suitable habitat suggest the northern third of this area does provide suitable habitat for the species (Figure 1). Due to their often secretive nature, failure to detect grasswrens during short surveys cannot be considered to indicate the absence of this species, nor the unsuitability of the habitat. Thick-billed Grasswrens have, however, been recorded from the nearby permanent fauna monitoring sites 7I and 7C (Table 1) and also at two other sites within or immediately adjacent to the study area in 2012 (Figure 1). Birds recorded during the survey were Nankeen

Kestrel (1), Rufous Fieldwren (4), Richard's Pipit (2), White-winged Fairywren (5) and Orange Chat (2).

The Peculiar Knob Waste Rock Dump extension overlies two distinctly different habitat types. The southern two thirds is characterized by hard-packed clay soils that shed water and are typically vegetated by low sparse chenopods (Plate 1). The birds occupying this habitat have been surveyed for four years at the nearby PK6I fauna monitoring site without any records of Thick-billed Grasswrens. This habitat is highly unlikely to support grasswrens because it lacks the extensive patches of emergent chenopods that characterize their habitat.

By contrast the northern third features more gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. These water-holding or water-transporting habitats support larger emergent chenopods, especially *Atriplex omissa* and *Rhagodia* spp that provide suitable habitat for Thick-billed Grasswrens (Plates 2-5). Subsequent mapping of the precise boundary of the Peculiar Knob Waste Rock Dump extension indicated that the surveyed area omitted the northern quarter, including the site of a previous Thick-billed Grasswren record. However, the southern extent of the suitable habitat was mapped in detail (Figure 1) and surveyed on both days and the assumption is made that most of the area to the north of this line is suitable habitat for grasswrens.

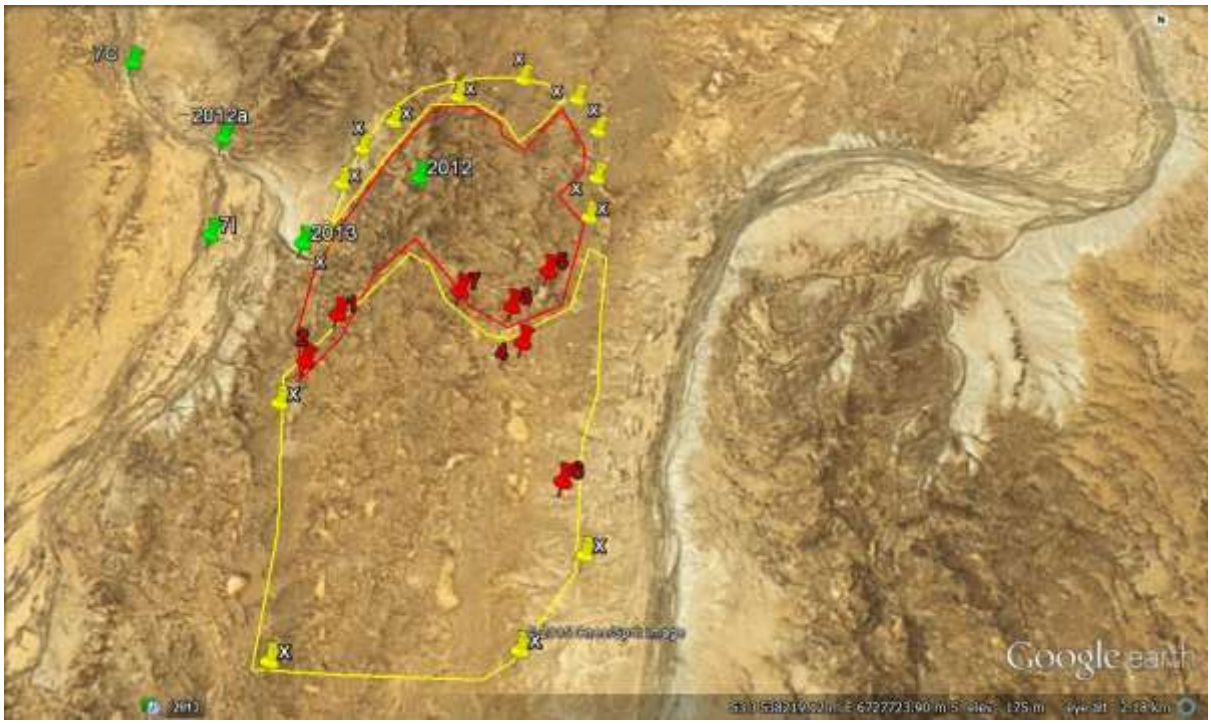


Figure 1. Outline of the proposed Peculiar Knob Waste Rock Dump Extension (yellow symbols), potential habitat sites for Thick-billed Grasswren (red symbols) and previous Thick-billed Grasswren records (green symbols). The extent of suitable grasswren habitat within the proposed Peculiar Knob Waste Rock Dump Extension is demarcated by the red polygon and unsuitable habitats are delineated by the yellow polygon.

Table 1. Presence of Thick-billed Grasswrens (TBGW) at Peculiar Knob bird monitoring sites in 2011- 2014 (Data from Ecological Horizons 2014).

Site	Zone	Eastings	Northings	2011	2012	2013	2014
Bird 1	53J	533409	6717125	TBGW	TBGW	-	-
Bird 2	53J	530401	6716960	TBGW	TBGW	TBGW	TBGW
Bird 3	53J	499300	6737400	-	-	-	-
Bird 4	53J	522850	6721800	-	-	-	TBGW
Bird 5	53J	492200	6734200	-	-	-	-
Bird 6	53J	499300	6735700	-	-	-	-
2I				-	-	-	-
2C				-	-	-	-
3I				-	-	-	TBGW
3C				-	TBGW	TBGW	TBGW
5I				TBGW	-	TBGW	-
5C				-	TBGW	-	-
7I				-	TBGW	-	-
7C				TBGW	-	-	-

Plate 1. Fauna monitoring site PK06 showing the sparse, low vegetation and hard, water-shedding soils characteristic of the southern two thirds of the proposed Peculiar Knob Waste Rock Dump Extension that are considered unsuitable for Thick-billed Grasswrens.

Plate 2. Headwaters of drainage line on north-western corner of proposed waste Rock Dump extension (Site 2 in Figure 1).

Plate 3 Oodnadatta saltbush (*Atriplex omissa*) growing in drainage line near northern margin of proposed waste rock dump extension (Site 1 in Figure 1) and in similar habitat to previous record 2012 (Figure 1).

Plate 3 Gilgai on eastern margin of proposed waste rock dump

Plate 4. Cracking clay gilgai in proposed waste rock dump extension (Site 5 in Figure 1). Thick-billed Grasswrens would be expected to use the fringing emergent chenopods for shelter and nesting.

Discussion

One third of the proposed Peculiar Knob Waste Rock Dump Extension will be overlain upon habitat suitable for Thick-billed Grasswrens. This nationally listed species has been recorded at the site and at several other localities adjacent to the Peculiar Knob mine.

Waste rock dumps do not provide suitable habitat for Thick-billed Grasswren. Even if they are successfully rehabilitated by native vegetation, rock dumps are unlikely to provide suitable habitats due to their water-shedding nature that is not conducive to colonization by emergent chenopod shrubs. Hence this development should be regarded as permanent removal of the habitat from potential grasswren occupancy.

Construction of the proposed Peculiar Knob Waste Rock Dump Extension could affect the ability of the habitat to support Thick-billed Grasswrens beyond the physical footprint of the dump. Along with the pervasive impacts of dust and noise from construction of the rock dump, changes in the hydrogeological regimes could affect the important emergent chenopod populations, especially since the proposed rock dump lies at the headwaters of grasswren supporting drainage lines. If the dump diverts the natural flow of water from the water-shedding soils to the south to these northward-flowing drainages, it is likely that the emergent chenopods that depend upon enhanced water availability will be negatively impacted. If however, water shed from the rock dumps is clean and mimics natural water flows from the hardpan soils, there may be little change in grasswren habitat downstream of the development.

Appendix C

Peculiar Knob Iron Ore Project
Annual Fauna Survey, 2021

ebs ecology

Peculiar Knob Iron Ore Project

Annual Fauna Survey 2021

Peculiar Knob Iron Ore Project Annual Fauna Survey 2021

23 February 2022

Version 2

Prepared by EBS Ecology for Peak Iron Mines

Document Control					
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Cover photograph: Gibber Earless Dragon (*Tympanocryptis intima*) captured during 2021 Fauna Survey.

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GLOSSARY AND ABBREVIATION OF TERMS

ANOVA	Analysis of Variance (two factor without replication)
EBS	Environment and Biodiversity Services (Trading as EBS Ecology)
EML	Extractive Mineral Lease
EPBC Act	*Environment Protection and Biodiversity Act 1999*
Ha	Hectares
km	Kilometres
km^2	Square kilometres
LGA	Local Government Area
MARP	Mining and Rehabilitation Program (now PEPR)
m	Metres
Mm	Millimetres
ML	Mineral Lease
Mothball	to take out of service but maintain in reserve
MPL	Miscellaneous Purposes Licence
NPW Act	*National Parks and Wildlife Act 1972*
PEPR	Program for Environment Protection and Rehabilitation
PI	Peak Iron
PIM	Peak Iron Mines Pty Ltd (PIM).
PK	Peculiar Knob
PUA	Pastoral Unincorporated Area
ROM	run-of-mine
WPA	Woomera Prohibited Area

EXECUTIVE SUMMARY

EBS Ecology was engaged by Peak Iron Mines Pty Ltd (PIM) to conduct the annual ecological compliance monitoring for Peculiar Knob Iron Ore Project (the PK project) in Spring 2021, as required under the Program for Environment Protection and Rehabilitation (PEPR).

Objectives and Methods

The objectives of the September 2021 survey are to continue to monitor the permanent fauna survey sites across the Project Area by following repeatable survey methods at dedicated monitoring sites including:

- Pitfall trapping small-mammals, reptiles and amphibians at five paired impact and control sites.
- Conducting bird surveys at 23 survey sites (20 minute 2-ha search and call playback)
- Actively searching for tracks, scats, traces (i.e., nests)
- Recording opportunistic observations of fauna species to create an ongoing inventory.
- Spotlighting two 30-kilometre permanent transects to monitor activity of medium and large mammals.

Data obtained from the fauna survey is then used to:

- Review methodology and relevance of pitfall sites in regard to any changes in the mine layout or activities.
- Produce a document detailing the findings of the annual fauna survey
- Provide recommendations in relation to fauna management in the area.
- Provide recommendations in relation to survey design going forwards.

Results

A total of 174 captures (excluding recaptures) were made at five paired impact and control sites during the spring 2021 pitfall survey. This included 116 mammals (eight native, one introduced) and 58 reptiles (comprising 23 species). There was no significant difference in the abundance or diversity of species between control or impact sites, however Site PK-1 had significantly higher abundance and diversity of reptiles than all other sites.

Bird surveys resulted in 317 observations of 30 species across 23 bird monitoring sites. Nationally threatened species, Thick-billed Grasswrens (TBGWs) were observed to occupy four sites during the 2021 bird survey, while state listed Chestnut-breasted Whiteface (Figure 12) were recorded at one monitoring site (PK-5C) during the field survey.

Results from the 2021 PK fauna survey suggest that there has been no observable impact to native fauna abundance or diversity caused by mining operations. Specifically:

- There was no reduction in occupancy or abundance of fauna species of conservation significance such as Thick-billed Grasswren or Chestnut-breasted Whiteface.
- Results of monitoring program demonstrate no net adverse impacts on native fauna abundance or diversity when compared with control sites.

- There was no demonstrated increase in pests or incursion of new pest species.
- There were no net adverse impacts on fauna abundance or diversity at ephemeral ecosystems when compared with control site results.

Discussion

Peculiar Knob mine occurs in an arid area which is known to undergo significant 'boom and bust' cycles related to seasonal climatic conditions. The significance of variation observed in populations can be difficult to quantify due to these large seasonal fluctuations, and therefore require long term datasets to detect any significant changes which may be occurring over time, such as in response to a sudden or ongoing impact. Repeated changes in ownership of the mine site, since the initial start-up in 2008, has resulted in annual monitoring reports and raw data being 'lost', and it is highly recommended that this information be recovered, if possible, to strengthen data analysis going forward.

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1 INTRODUCTION

Peculiar Knob Iron Ore Mine is required to undertake annual ecological monitoring under the Program for Environment Protection and Rehabilitation (PEPR) for Mineral Leases (ML) 6314, 6442; Extractive Mineral Leases (EML) 6363-6382 and Miscellaneous Purposes Licences (MPLs) 125-131, 133, 134, 141, 147.

EBS Ecology was engaged by Peak Iron Mines Pty Ltd (PIM) to conduct the annual ecological compliance monitoring for Peculiar Knob Iron Ore Project (the Pk project) in Spring 2021. The survey forms part of a long-term ecological monitoring program to monitor impacts of the mine infrastructure and operation on local fauna (and flora) populations including threatened species known to occur in the area, the Thick-billed Grasswren (*Amytornis modestus*) and Chestnut-breasted Whiteface (*Aphelocephala pectoralis*), This report presents the results of the 2021 PK fauna survey, undertaken between the 14th and 19th September 2021.

1.1 Project Background

The Peculiar Knob Iron Ore Mine is located approximately 90-kilometres (km) southeast of Coober Pedy and is currently operated by Peak Iron Mines Pty Ltd (PIM).

The PK project has been owned and operated by several entities, with the original tenements granted to Western Plains Group (ML 6314) in June 2008. OneSteel Limited took ownership of the project in October 2011, changing its name to Arrium Limited in July 2012, and later mothballed the project in April 2015 due to a downturn in the iron ore market. During his time, the PK project was maintained by a subsidiary of Arrium, Southern Iron Pty Ltd, under the approved Peculiar Knob Mothballing Environmental Management Plan. Peak Iron Mines (PIM) acquired the PK project in July 2019 and transitioned the mine out of care and maintenance, resuming mining operations in February 2020. Following the takeover by PIM, crushing and screening works have been relocated from the Wirrida rail loop to the run-of-mine (ROM) pad at the mine site.

The PK mine consists of an open cut iron ore mine and associated infrastructure, as well as an approximately (~) 94 km long 'haul road', used for transporting iron ore from the PK mine site in the east to the Wirrida crushing and rail siding approximately 45 km to the west of the Stuart Highway. From the Wirrida site, iron ore is then transported further afield utilising a rail linkage to the Adelaide to Darwin railway line.

Potential ecological impacts are monitored during the annual ecological survey program which has been running as an approval and compliance condition since 2011. Monitoring is carried out using paired impact and control sites situated strategically to detect various impacts at three identified 'impact zones': at PK mine and crushing site, along the Haul Road and at Wirrida Rail Siding.

Possible impacts to fauna caused by the mine activities have been identified as:

- Loss of fauna habitat (through clearance and dust impacts) resulting in impacts to species abundance / diversity through a reduction in food resources, decrease in shelter and resulting increase in predation pressure.
- Noise and vibration and lighting from construction and operation activities.

- Entrapment of fauna in trenches, dams and pits.
- Collision of vehicles with native fauna.
- Increased abundance of introduced fauna.
- Attraction of fauna to artificially wet areas thereby increasing the likelihood of vehicle collision and predation susceptibility.
- Loss or reduction in quality of downstream riparian habitats.

1.2 Fauna Monitoring Program details

Fauna monitoring, in association with a series of other mitigation measures, listed in detail in *Peculiar Knob Iron Ore Project – Mining And Rehabilitation Program (MARP) Volume 1 Main Report (Parsons Brinckerhoff Australia, 2013*), has been identified in the document to be undertaken annually and be repeatable at the same time every year.

The MARP was lodged in 2011 by WPG Resources Limited (WPG) and granted approval by Primary Industries SA (now Department of Primary Industries and Regions SA DPIR), as an equivalent to Programs for Environment Protection and Rehabilitation (PEPR) which is now the accepted document. Ecological monitoring forms part of the conditions of the PEPR for Peculiar Knob Iron Ore Mine. The PEPR is the key operational document for the mining project and details information on environmental control measures and outcome-based performance criteria as outlined in Table 4.

Table 1. Project outcomes, parameters and monitoring activities associated with the Fauna Management Plan for Peculiar Knob Iron Ore Mining Project (Parsons Brinckerhoff, 2013).

Outcome	Location	Parameters	Frequency	Compliance criteria / target values and control data
No permanent loss of native fauna abundance or diversity in ML MPLs, EMLs and adjacent areas caused by mining operations and vegetation clearing.	Clearance areas associated with infrastructure footprint on ML, MPL and EML (Table 10.2 Section 10 in MARP)	Annual monitoring to determine abundance and diversity of native fauna.	Annual spring fauna and flora surveys	Target: vegetation clearance no greater than 890.47 ha at commencement of full operations as approved in MARP.
No introduction of new pests (including feral animals) or increase in abundance of existing species.	All infrastructure areas.	Species, location and abundance of identified pest species – recorded and mapped. Success of pest eradication programs (if required).	Annual spring fauna and flora surveys. Eradication programs as required.	Control: Control sites for annual monitoring. Target: Demonstrate that pest eradication / control programs implemented

				within 72hrs of reporting infestations.
No permanent loss of native fauna abundance or diversity in ML, MPLs, EMLs and adjacent areas caused by mining operations.	Surface water diversions / crossings and ephemeral systems located on or directly adjacent to mine infrastructure areas.	Annual monitoring to determine abundance and diversity of ephemeral ecosystems within Project Area.	Annual spring fauna and flora surveys.	Control: Control sites for annual monitoring. Target: Vegetation clearance no greater than 890.47 ha at commencement of full operations as approved in MARP.

As such, objectives of the fauna monitoring program within the mining lease are to:

1. Measure and compare abundance and diversity of fauna at established Impact and Control sites.
2. Compare capture trends at Impact sites and Control sites when compared to baseline data (EBS 2007).
3. Determine if any significant decrease in abundance or diversity of native fauna can be attributed to mining operations (including fire), when compared to control sites.
4. Determine if any new pest species (feral animals) have been introduced, or if existing pest species have increased in abundance.

The Lease and licence conditions relating to fauna are outlined in Table 2.

Table 2. Summary of Fauna – Lease and licence conditions as outlined in the PK MARP (Parsons Brinckerhoff 2013)

Mining Tenement	Condition number and requirement
MPL125 – MPL131 (inclusive), MPL133, MPL134, EML6363-EML6382 (inclusive)	*Schedule C: Environmental Outcomes* *The Licensee must:* *7. Native Fauna* Ensure that there is no permanent loss of native fauna abundance or diversity in the Lease area and in adjacent areas caused by mining operations (including fire).
MPL125 – MPL131 (inclusive); MPL133 and MPL134, MPL 141, EML6363-EML6382 (inclusive)	*9. Weeds and Pests (Feral animals)* Ensure that no introduction of new species of weeds, plant pathogens or pests (including feral animals), nor increase in abundance of existing weed or pest species in the Licence area compared to adjoining land.

In addition to monitoring the general health of populations of native fauna within the Project Area, a program was implemented to monitor the populations of Nationally listed Thick-billed Grasswrens which occur within the Project Area. The Thick-billed Grasswren is an EBPC listed species and as such, an EPBC

Referral was undertaken and approved with conditions (EBPC 2014/ 7154). A variation was attached to the approval in 2020 (28th April 2020) for *Expansion of the Peculiar Knob Iron Ore Project, SA*. The conditions of the approval (in effect until 31st December 2036) relevant to the fauna survey are as follows:

Table 3. Conditions of EPBC Referral 2014/7154

Condition	Conditions attached to approval
1	At the expiry date of this approval, there must be no permanent adverse impact as a result of the action on the abundance of the Thick-billed Grasswren within the Peculiar Knob Iron Ore Project "expansion area"
6	Any incidental observations during the monitoring activities required by Condition 5 (rehabilitation) of a Thick-billed Grasswren or a Thick-billed Grasswren nest must be reported in the annual compliance report required by Condition 10.
10 – Annual Compliance Monitoring	The person taking the action must prepare a compliance report for each 12-month period following the date of commencement of the action, or

Annual monitoring is required to obtain a long-term understanding of the use of habitat by the Thick-billed Grasswren within the Project Area, and to determine what impacts, if any, have been caused by the mine at the conclusion of operational activities. The fauna management plan identifies vegetation clearing as a risk which may cause a reduction in threatened species abundance across the Project Area. Though no formal requirement exists for monitoring of Chestnut-breasted Whiteface, surveys have been designed to incorporate this information as an additional measure.

1.2.1 Survey objectives

The objectives of the September 2021 survey are to continue to monitor the permanent fauna survey sites across the Project Area including five paired (impact and control) pitfall (and bird) trapping sites and eleven dedicated bird monitoring sites by:

- Following repeatable survey methods allowing for replication and statistical analysis over time through monitoring each site via:
    - Trapping small-medium mammals, reptiles and amphibians
    - Conducting bird surveys (20 minute 2-ha search and call playback)
    - Actively searching for tracks, scats, traces (i.e., nests)
    - Recording opportunistic observations of fauna species to create an ongoing inventory
- Reviewing methodology and relevance of pitfall sites given the most recent location change of the crushing plant.
- Conducting car spotlight surveys to monitor activity of medium and large mammals and other fauna utilising the area.
- Producing a document detailing the findings of the annual fauna survey
- Providing recommendations in relation to fauna management in the area.
- Providing recommendations in relation to survey design going forwards.

1.3 Previous surveys conducted

A baseline survey was first undertaken in sections of the PK project area in 2007 by EBS Ecology. Subsequently compliance monitoring of five fauna sites have been undertaken between 2011 and 2015. No fauna surveys were undertaken during the shutdown / maintenance period between 2015 and 2020.

Monitoring timetable and sequence of relevant events:

- A baseline fauna survey was conducted in March 2007 by EBS Ecology around the PK mine site.
- In 2011 permanent pitfall survey sites were first installed by Ecological Horizons, comprising five paired impact and control sites, with one line of six small (150mm diameter x 500mm deep) pitfall traps set 8-10m apart. Bird survey sites were established at PK mine and along the haul road.
- In 2012, additional traplines were added to each trap site consisting of four large pitfall traps.
- In 2015 the haul road was bituminised, significantly reducing impacts from dust at associated monitoring sites. Mining operations were suspended in the seven months leading up to the 2015 fauna survey. Four new bird monitoring sites were surveyed / established in the vicinity of Wirrida crushing plant.
- In 2015 mining operations ceased and the PK project area went into care and maintenance operations only until February 2020.
- In 2020, crushing facilities were moved from Wirrida to the PK mine site, significantly reducing potential dust impacts on all sites associated with the Wirrida Rail Siding.
- In 2020, following reopening of the mine for operational activities, fauna sites were surveyed by COOE. Two sites (PK-3I and PK-5I) were unable to be surveyed due to flooding causing traps to be submerged. The large pitfall line at site PK-7C was unable to be located due to the provision of erroneous coordinates from the 2015 survey. A new large-pitfall line was established at an appropriate location at this site. An additional bird site (Bird 7) was established in 2020, in a culvert along the haul road.
- In 2021, PK-7C was found to have only three pitfall traps on the large line.

2 ENVIRONMENTAL SETTING

2.1 Project Area

The Project Area is located within the South Australian Arid Lands Landscape Management Region (SAAL LMR), within the Pastoral Unincorporated Area (PUA) Local Government Area (LGA). The project area falls across two bioregions (Gawler and Stony Plains) and four subregions (Commonwealth Hill, Ooodnadatta, Baltana and Breakaways). Descriptions of each of these associations can be found in Appendix 4 – Summary site locations and condition during the 2021 survey.

The Project Area occurs within the Woomera Prohibited Area (WPA), which forms a 122,000 square kilometre (km^2) tract of land within the SAAL, utilised periodically for military equipment testing. The Antakirinja Area Minerals Exploration Indigenous Land Use Agreement is in place across the project area.

2.2 Land use

Peculiar Knob project area is located across two pastoral leases, Ingomar Pastoral Lease (409,400ha) in the west (including Wirrida) and McDouall Peak to the east (Peculiar Knob Iron Ore Mine), with cattle grazing the primary land use. Evidence of over-grazing and trampling is evident across the project area. In particular, impacts are noticeable around ephemeral waterways, where cattle have trampled creek beds, causing pugging of the soil and grazing impacts to vegetation.

2.3 Climate

The climate at Peculiar Knob is typical of an arid region, typified by hot, dry summers and mild, dry winters with infrequent and unreliable rainfall. The mean maximum temperature (1994-2021) is 27.8 °C and mean annual rainfall 138.4 millimetres (mm). Average monthly climate data for the nearest weather station at Coober Pedy (Site Number: 016090) is presented in Figure 1.

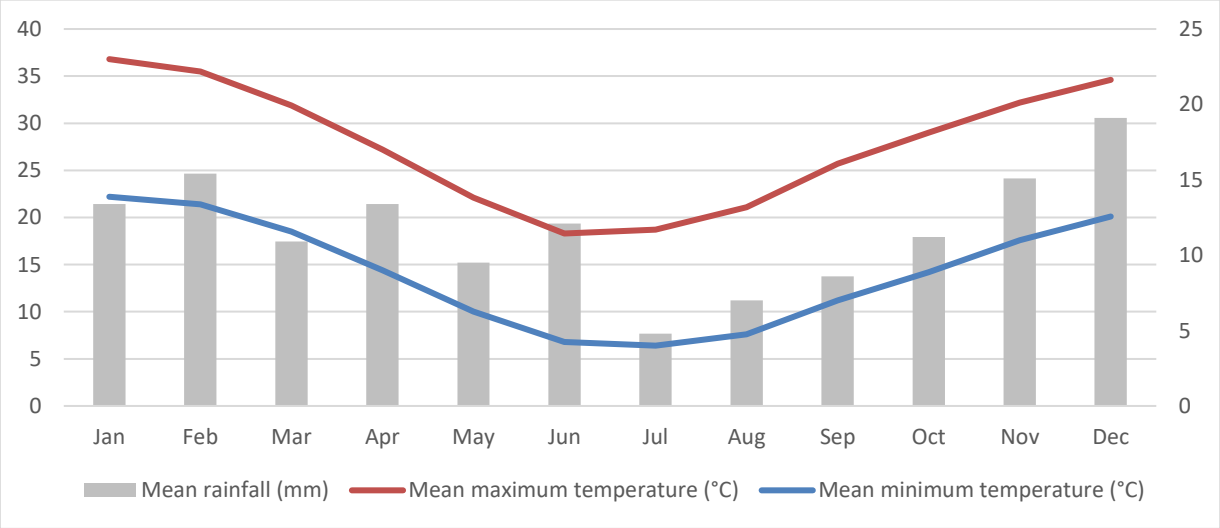


Figure 1. Mean temperature (maximum and minimum) and rainfall each month, from 1994-2021 at Coober Pedy Airport (Site Number: 016090). (Bureau of Meteorology, 2021)

2.3.1 Conditions during 2021 field survey

The 2021 fauna survey was undertaken on 13th – 18th September 2021. Maximum daily temperatures (recorded from Coober Pedy Airport, station 016090) averaged 25°C, with one day (Thursday) recording the hottest day of September at 35.9°C. Most days experienced moderately to fresh winds, with average morning (9am) wind speeds of 32 km/h and afternoon speeds (3pm) of 26.8 km/h. On the evening of Thursday 16th September, a large thunderstorm passed through the area, resulting in high humidity and a small amount of rainfall overnight.

Table 4. Weather conditions during the spring 2021 field survey

Date	Temp (°C)				Max wind gust	
	Min	Max	9 am	3 pm	Direction	Speed (km/h)
Monday 13th September	**6.9**	**19.4**	**11.1**	**18.5**	**ESE**	**44**
Tuesday 14th September	**9.9**	**21.5**	**15**	**20.1**	**NE**	**57**
Wednesday 15th September	**10.7**	**28.3**	**17**	**27.6**	**ENE**	**50**
Thursday 16th September	**13.2**	**35.9**	**19.1**	**34.7**	**N**	**67**
Friday 17th September	**17.1**	**27.4**	**17.2**	**26.3**	**S**	**52**
Saturday 18th September	**9.9**	**21.9**	**13.8**	**21.4**	**S**	**52**

2.4 Threatened species known to occur

The Peculiar Knob Iron Ore Mine project area is known to contain nationally threatened species listed under the *Environment Protection and Biodiversity Act 1991* (EPBC Act) and state listed threatened species, protected under the *National Parks and Wildlife Act 1972* (NPW Act). A full list of listed species which may occur within the Project Area, determined from a desktop assessment, are presented in Appendix 3.

Two threatened bird species (Thick-billed Grasswren and Chestnut-breasted Whiteface) are known to occur within the project area, and as they are sedentary species, targeted surveys methodologies are in place to detect their presence (see section 3.1.3 for description of targeted survey methodology). One threatened mammal, the Plains Mouse, has previously been recorded in the Project Area and pitfall trapping methodologies aim to detect this species if present.

Thick-billed Grasswren (*Amytornis modestus ssp. indulkanna*)

The Thick-billed Grasswren is listed as nationally Endangered (EPBC Act). It is a sedentary (or resident) species, known to occupy chenopod shrublands in the rangelands of South Australia, preferring lower lying areas such as watercourses and drainage lines, where it spends most of its time foraging on the ground (NPWS, 2002). Grasswrens are in decline, threatened by concurrent pressures of predation by cats and foxes, habitat clearance and modification, and stock grazing (SAAL, 2011). Thick-billed Grasswrens are cryptic species, exposing themselves only with fleeting forays between shrubs and subtle, almost inaudible calls. However, as the species is resident and known to respond to call playback, it represents a strong

indicator of response to impacts, such as grazing and mining activities and disappearance of the species from known sites may be indicative of a negative response.

Chestnut-breasted Whiteface (*Aphelocephala pectoralis*)

The Chestnut-breasted Whiteface (CBWF) is state listed under the NPW Act as Rare in SA. It is endemic to SA, where it is known to inhabit stony hills, tablelands, breakaways and rises associated with stony plains, often with low and sparse chenopod shrubland. The CBWF is threatened by habitat clearance and overgrazing of low perennial shrubs by rabbits and livestock (SAAL, Undated).

Plains Mouse (*Pseudomys australis*)

The Plains Mouse is listed as nationally Vulnerable under the EPBC Act. It is an arid zone specialist which is known to have declined 50-90% in range since European settlement, primarily driven by habitat degradation from livestock and predation by cats and foxes (Moseby, 2012). Plains Mice primarily occur on private pastoral leasehold land and are primarily associated with gypseous cracking clay associated with minor drainage lines and depressions within gibber stony plains, both of which occur within the Project Area. The Plains Mouse is known to follow a ‘boom and bust’ cycle triggered by good rainfall, when they breed prolifically and disperse, then retreat to pockets of favourable habitat becoming virtually undetectable. The capture of Plains Mouse using pitfall trapping methods would be indicative of favourable seasonal conditions and the capacity of the landscape to support this species during poor conditions.

3 METHODS

3.1 Field survey

3.1.1 Survey period

The 2021 field survey was undertaken over six days from the 13th to 18th of September by four EBS Ecologists.

3.1.2 Sites

Ten permanent pitfall trap sites are located at PK including five impact (I) monitoring sites, each with a paired control (C) site (table). The five impact sites were originally located to detect any impacts associated with PK mining operations specifically:

- The crushing and loading facilities at the Wirrida Railway siding (PK-1)
- The PK mine (PK-6 and PK-7)
- The haul road (PK-3 and PK-5)

Subsequently, in 2015 the haul road was bituminised and in 2020 the crushing facilities were moved from Wirrida siding to the PK mine site. These changes are likely to have reduced potential impact on sites PK-1, PK-3 and PK-5, with the likelihood of potential impact caused by dust significantly reduced. Small impacts associated with operational activity, noise disturbance and water runoff are still likely to impact the sites, while site PK-6I and PK-7 may be further negatively impacted by the closer proximity of the crushing plant.

The 10 fauna monitoring sites double as bird monitoring sites, however due to their proximity, impact and control sites should not be considered independent sites for the purpose of bird data analysis or occupancy or abundance. An additional 13 bird monitoring sites are in habitat identified as suitable for Thick-billed Grasswrens and / or Chestnut-breasted Whiteface. All fauna monitoring sites across the site are presented in Figure 2.

Three main habitat types have been identified across the Project Area, with monitoring sites situated in each (Table 5). A full list of sites, the survey methods employed at each and their location is presented in Appendix 1.

Table 5. Vegetation type associated with each pitfall trapping site.

Vegetation Association	Site(s)
Mulga woodlands	PK-1
Stony plains with cracking clay gilgais and drainage lines	PK-3, PK-5, PK-6
Cracking gypseous plains	PK-7

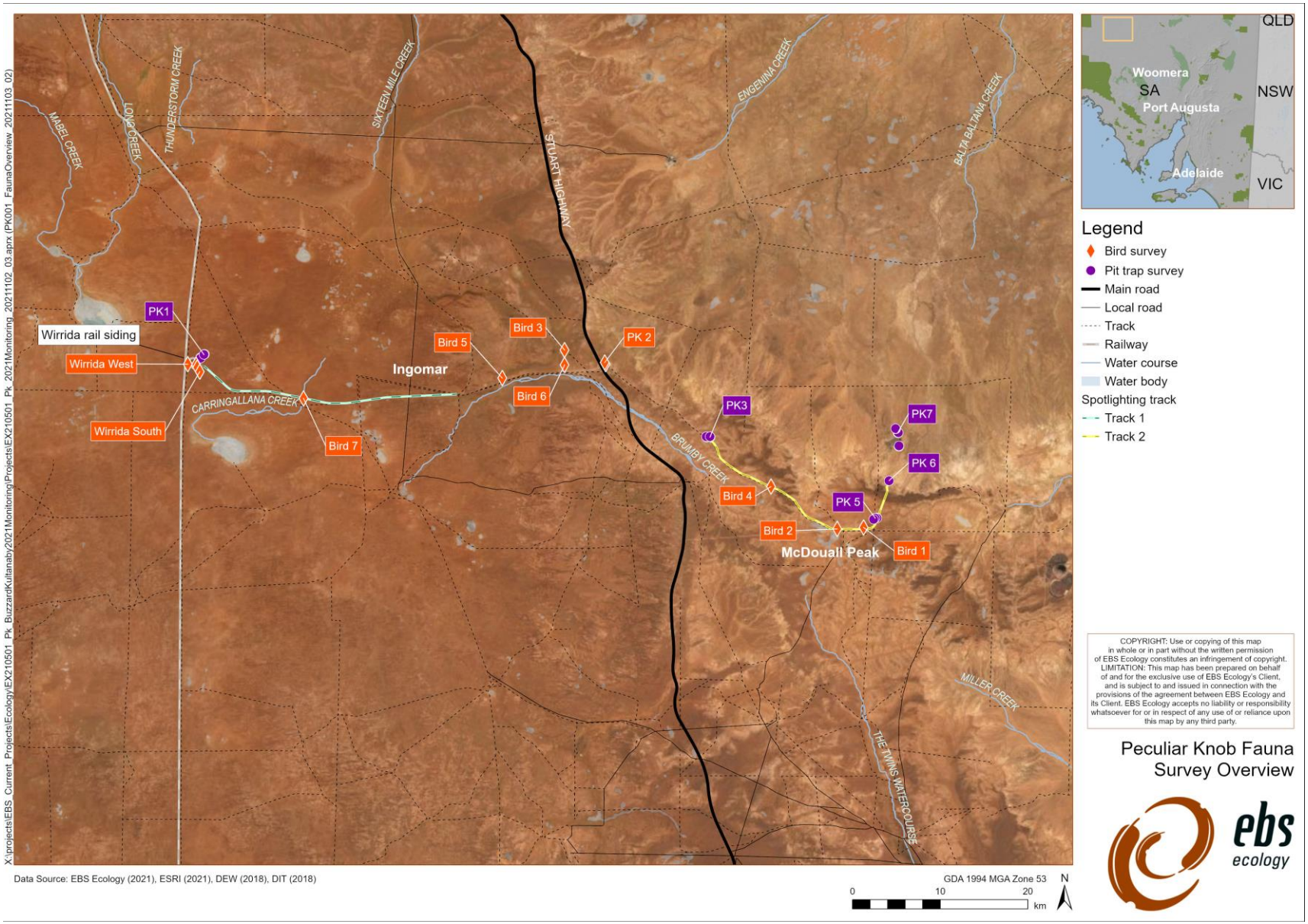


Figure 2. Overview of fauna survey sites at Peculiar Knob

3.1.3 Pitfall trapping

Semi-permanent pitfall trapping sites have been set up at each of five paired sites using the method outlined in '*Guidelines for Vertebrate Surveys in South Australia'* (Owens 2000). Though there is some variation, most sites consisted of two parallel pitfall lines, one with six 'small' (150 mm wide x 500 mm deep) pitfall traps spaced approximately 8-10 m apart, and one with four 'large' (225 mm wide x 600 mm deep) traps spaced 10-15 m apart. At the time of the survey, temporary wire mesh fencing was erected between pitfall traps using wire pins to reinforce, with an additional ~10 m of fencing trailing at each end of the pitfall line, resulting in two 60-70 m long, parallel trap lines (Appendix 5).

Each pitfall trap was 'furnished' with a thin layer of soil, a small piece of sheepskin and a toilet roll, to provide ample cover and insulation to trapped fauna. When ants were in high numbers an insecticide (such as surface spray or ant sand) was used around the entrance to the trap to discourage entry. If insecticide was observed to be ineffective at either preventing or killing ants in pitfall trap, the trap was closed to prevent possible trap deaths.

Traps were opened and set on day one of the survey and subsequently checked morning and evening for a total of four 'trap nights' at each site. Where possible, all trapped fauna was identified at the point of capture, marked using a non-toxic marker (generally in an inconspicuous location under the tail) to record incidence of recapture at subsequent trapping sessions, and then released in a covered location a short distance from the capture site.

If a species was unable to be identified in the field, or a second opinion was sought, specimens were stored in a small breathable calico bag, kept in a quiet and cool location overnight, until they could be identified and re-released at the point of capture the following day. No specimens were vouchered during the survey.

All equipment and flagging tapes were removed from each site at the end of each survey, except for the semi-permanent pits which will remain in-situ with lids re-established, and lids screwed firmly shut. At sites known to be subject to flooding (PK-3I, PK-3C, PK-5I, PK-5C) tech screws were installed into each lid to ensure they remain *in situ* in the event of inundation (Figure 3). Trench lines for drift fencing between pit traps were backfilled with the surface scarified and raked. Photos were taken of the pitfall lines and set-up after the trapping period (Figure 4).

Figure 3. Tech-screw (“) installed into pitfall lid at flood-prone sites at conclusion of trapping

Figure 4. An example of a completed pitfall site, with pitfall trap covered and backfilled trench lines.

3.1.4 Dedicated bird surveys

Avian survey effort in 2021 was consistent previous surveys years. Bird surveys were undertaken at the same 23 sites, including at each of the fauna (pitfall) trapping sites (10 sites), and an additional 13 sites, stratified across various habitats within the survey area, or where populations of targeted avian species are known to occur.

At each bird monitoring site call playback for both species of interest (Thick-billed Grasswren and Chestnut-breasted Whiteface) was used at the start of the survey for a short period of approximately 1-2 minutes. If wind was thought to be interfering with transmission of sound, call playback was undertaken in multiple locations across the site. Following commencement of playback, a 20 minute 2-hectare (ha) search of the surrounding site was undertaken. All birds observed or heard during this time were recorded. Given the transient nature of most resident bird species this method is considered sufficient in terms of indicating potential impacts of mining.

Avian datasheets are used to record the following data:

- Identification method (seen or heard);
- bird activity (e.g. flying overhead, flying over circling, resting or foraging on tree/shrub/ground);
- number of individuals observed;
- distance from observer, and;
- any other notable observations were also recorded.

All birds observed more than 100 m away from the site, or birds observed within different habitat adjoining the site were recorded as ‘off-site’.

Whenever possible, bird surveys were conducted in ideal conditions for bird survey methods, including:

- in the morning (before noon);
- during cool weather; and

- with minimal wind interference.

However, due to time limitations, this was not always possible and weather conditions throughout the survey in 2021 were not always ideal, including several days which were noted to be very windy.

3.1.5 Spotlighting

Two, one-way, 30 km spotlighting transects were driven on one night of the survey. The survey night was selected based on the optimal anticipated weather during the survey period. During the 2021 survey, spotlighting was done on the warmest evening (following a 36°C day), with rain predicted for the evening and following day.

Spotlighting commenced shortly after last light. Vehicles travelled slowly (approximately 20 to 30 km) per hour with one observer using a handheld spotlight (Lightforce 100W, 12V halogen) to scan the landscape. All fauna observed during the spotlighting transect were recorded and a GPS location was taken.

3.1.6 Opportunistic

Opportunistic observations are ‘chance’ sightings of animals in the field by surveyors while they are on site. Such observations are not intentional such as through trap captures or active searching, but provide valuable additional information on the distribution and occurrence of fauna species across the site. Opportunistic records of fauna species observed during the course of the survey whilst traversing the Project area, such as between trapping sites and while checking traps, were collected. The species, location and any additional information (such as behaviour) was recorded for each opportunistic sighting.

3.2 Limitations

The field survey was undertaken in September (Spring) 2021, which is the optimal time of the year for locating and identifying flora and fauna. However, in variable climates such as the arid zone, preceding climatic conditions have a strong influence on presence of annual flora, and the health and condition of perennial plants. Similarly, weather conditions are known to influence the daily activity, behaviour and detectability of fauna species, for example reptiles are more likely to be active during warm weather and birds are more likely to be detectable in calm weather.

While the survey was undertaken at an optimal time of year and survey effort was considered appropriate, the conditions in the lead up to, and during the short timeframe of the survey period may not have been ideal for maximum capture rate or detectability of certain species of flora and fauna.

Trapping sites were paired to create an ‘impact’ and ‘control’ site and strategically placed for each purported impact (mine, haul road, rail siding), however many of these sites were less than (<) 200 metres (m) from each other and are therefore not considered independent when considering mobile species such as birds and medium-large mammals.

Data analysis is limited due to generally small numbers of captures and large amounts of seasonal variation. For example, during the 2020 survey period two pitfall trapping sites (3 and 5) were not surveyed due to inaccessibility / inundation of the sites caused by flooding. Pitfall trapping in arid ‘boom and bust’ environments require long-term data in order to detect the significance of trends.

Peak Iron Mines have supplied EBS with access to PDF copies of the 2007 baseline and the 2015 and 2020 annual compliance fauna survey reports, however no digital data, raw data GIS files or 2011-2014 reports are available. This lack of continuous data has limited the capacity for species richness and abundance comparison between years.

4 FIELD SURVEY RESULTS

Fauna was detected using a range of methods including pitfall trapping, bird surveys, spotlighting and opportunistic observations. A complete fauna species list can be found in Appendix 6.

4.1 Pitfall trapping effort

All sites were surveyed for four days and four nights, with traps checked every morning and afternoon, in accordance with the Animal Ethics Standard Operating Procedure (DEH 2000). This resulted in a trapping effort of 396 trap nights (Table 6).

Table 6. 2021 trapping effort at the PK Mine.

Monitoring technique	# of Sites	Effort per Site	Total number of effort for all 8 sites combined	Trap nights / days	Survey effort
Pitfall trap (small)	10	6	60 (6*10)	4	240 (60*4)
Pitfall trap (large)	10	4 (excl. PK-7C with 3)	39 (4*9 + 3*1)	4	156 (40*4)
				TOTAL	**396** trap nights

4.1.1 Pitfall captures

A total of 174 captures (excluding recaptures) were made on dedicated monitoring sites during the spring 2021 pitfall survey at PK Mine. This included 116 mammals, comprising eight native and one introduced species (*Mus musculus,* House Mouse) and 58 reptiles, comprising 23 species (Table 7).

Analysis of Variance was used (ANOVA) to compare impact and control sites and found that there was no significant difference between the number of captures at control or impact sites (*P*=.62), with impact sites recording a slightly higher number of captures (54%) than control sites and slightly higher species diversity (*P*=.64), with 24 species recorded compared to 20 (Figure 5).

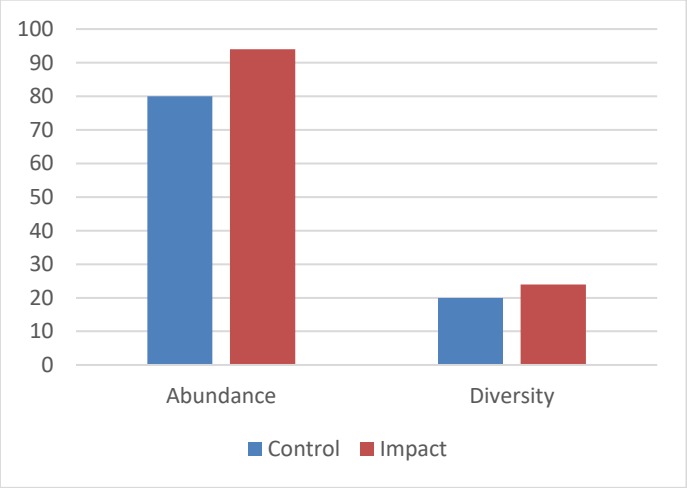


Figure 5. Abundance and diversity at control and impact sites in the 2021 survey.

Table 7. Fauna species captured at each site (minus recaptures) during the spring 2021 survey

Scientific Name	Common Name	Method	PK-1C	PK-1I	PK-3C	PK-3I	PK-5C	PK-5I	PK-6C	PK-6I	PK-7C	PK-7I	Grand Total
Reptiles													
Anilios bituberculatus	Prong-snouted Blind Snake	Pitfall		1	1				1				3
Anilios endoterus	Interior Blind Snake	Pitfall		1									1
Ctenophorus isolepis	Central Military Dragon	Pitfall	2	2									4
Ctenophorus nuchalis	Central Netted Dragon	Pitfall	1	1									2
Ctenotus regius	Royal Ctenotus	Pitfall	1	1									2
Ctenotus schomburgkii	Barred Wedge-snout Ctenotus	Pitfall	2										2
Delma butleri	Unbanded Delma	Pitfall			1								1
Diplodactylus tessellatus	Tessellated Gecko	Pitfall				1							1
Lerista timida	Timid Slider	Pitfall								1			1
Liopholis inornata	Desert Skink	Pitfall	4										4
Lucasium stenodactylum	Crowned Gecko	Pitfall	3	3									6
Menetia greyii	Common Dwarf Skink	Pitfall				1				1			2
Nephrurus levis	Smooth Knob-tailed Gecko	Pitfall		1									1
Pogona vitticeps	Central Bearded Dragon	Hand-capture	1	1			1		1				4
Pygopus schraderi	Eastern Hooded Scaly-foot	Hand-capture							1				1
Rhynchoedura eyrensis	Eyre Basin Beaked Gecko	Pitfall	2	1						3			6
Suta suta	Curl Snake	Pitfall						1					1
Tiliqua rugosa	Shingleback	Hand-capture					1						1

Tympanocryptis intima	Gibber Earless Dragon	Pitfall						1		2			3
Tympanocryptis lineata	Lined Earless Dragon	Pitfall								1			1
Tympanocryptis tetraporophora	Eyrean Earless Dragon	Pitfall			2		1	2		1	4		10
Varanus gilleni	Pygmy Mulga Monitor	Pitfall		1									1
Abundance			**16**	**13**	**4**	**2**	**3**	**4**	**3**	**9**	**4**	**0**	**58**
Species Richness			**9**	**10**	**3**	**2**	**3**	**3**	**3**	**6**	**1**	**0**	**23**
Mammals													
Leggadina forresti	Desert Short-tailed Mouse	Pitfall			2		2	4	1	1			10
*Mus musculus**	House Mouse	Pitfall							1	1			2
Notomys alexis	Spinifex Hopping Mouse	Pitfall	3										3
Planigale gilesi	Giles Planigale	Pitfall						2					2
Planigale tenuirostris	Narrow-nosed Planigale	Pitfall			6	6	3	6				1	22
Pseudomys hermannsburgensis	Sandy Inland Mouse	Pitfall	4	10			1		1	1		1	18
Sminthopsis crassicaudata	Fat-tailed Dunnart	Pitfall					2	12		2	3	2	21
Sminthopsis macroura	Stripe-faced Dunnart	Pitfall	1		8	1	2	4		2	7	7	32
Sminthopsis ooldea	Ooldea Dunnart	Pitfall	3	3									6
Abundance			**11**	**13**	**16**	**7**	**10**	**28**	**3**	**7**	**10**	**11**	**116**
Species Richness			**4**	**2**	**3**	**2**	**5**	**5**	**3**	**5**	**2**	**4**	**9**
Grand Total			**27**	**26**	**20**	**9**	**13**	**32**	**6**	**16**	**14**	**11**	**174**

4.1.2 Mammal abundance and diversity

Mammals were captured at all sites, with an average of 12 captures per site (range 3 - 28) and 3-4 species at each site (range 2 – 5). PK-5I had the highest mammal abundance, with 28 captures (24.1%) and five species. This site occurred alongside the haul road nearby a shallow drainage line and had significant cracking clay habitat, which is ideal for mammal species in this region. Additionally, the runoff from the nearby sealed road may have created ideal conditions, increasing food resource availability and health of plants.

A slightly higher abundance of mammals was captured at the impact sites, accounting for 56% of mammal captures, however, species diversity was equal between impact and control sites (Figure 6 and Figure 7), and no differences were deemed to be statistically significant (diversity: *P*=.37; abundance *P*=.50).

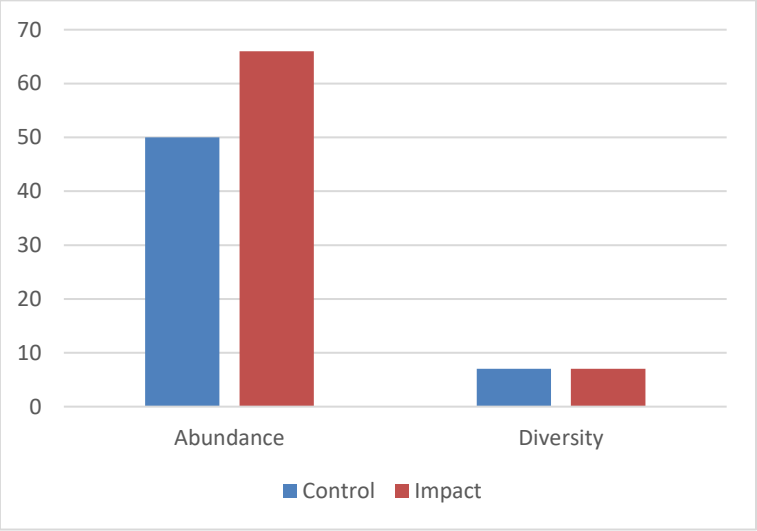


Figure 6. Total abundance and species diversity at control and impact survey sites.

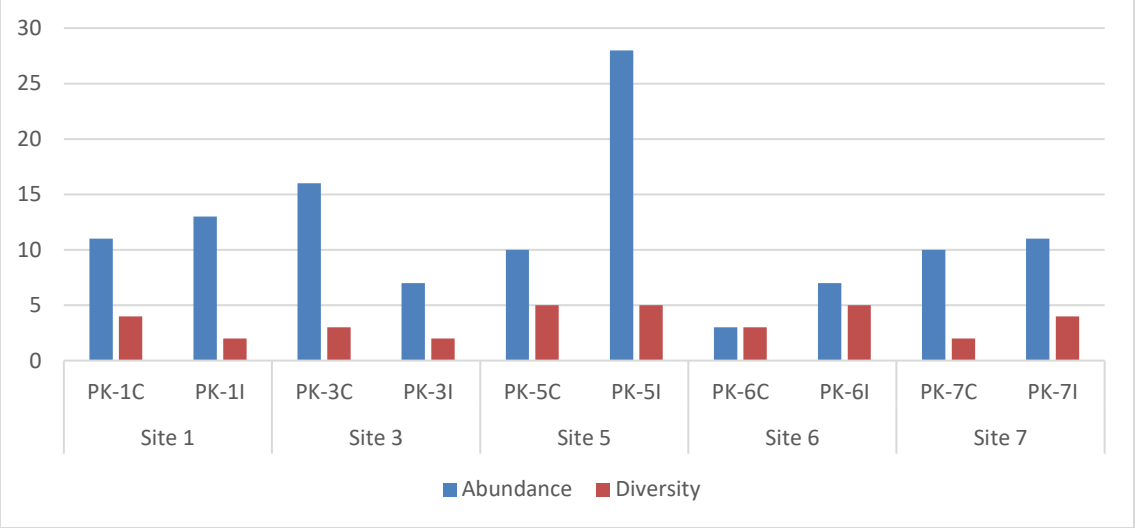


Figure 7. Mammal abundance and species diversity compared for each site.

In total five species of carnivorous marsupial mammals, three native rodents, and one introduced rodent (*Mus musculus*) were identified across the survey area. The most numerous species was the Stripe-faced

Dunnart (*Sminthopsis macroura*), which was captured at 80% of sites. The lowest number of mammal captures was at PK-6C, with only three individuals captured, however this still comprised good diversity, with three species represented.

The different habitat type at PK-1 (Mulga woodlands with sandy soil) resulted in captures of two mammal species not captured elsewhere – Ooldea Dunnart (*Sminthopsis ooldea*) and Spinifex Hopping Mouse (*Notomys alexis*).

Two planigale species were captured, the Narrow-nosed Planigale (*P. tenuirostris*) and Giles Planigale (*P. gilesi*). Planigales were only captured at sites nearby cracking clay gilgais, with the highest abundance at PK-3 and PK-5, of which both impact sites were inundated with water in the previous (2020) field survey.

Site PK-3I was found to have been damaged in the flood waters, with one pitfall trap missing its lid and up to 15 deceased mammal carcasses at various stages of decay inside, suggesting the trap had been left uncovered for some time. A lower abundance of mammal captures (less than half of what was found at the control site PK-3I) may be attributable to this finding.

Mammals were generally observed to be in fair to poor condition, with many Fat-tailed Dunnarts (*Sminthopsis crassicaudata*) exhibiting indications of post-boom conditions, with loose skin on their tail, and few showing the iconic 'fat-tail' commonly observed in good conditions. A high sex ratio disparity was observed, with 72% of all mammal captures being male.

Figure 8. Fat-tailed Dunnart (*Sminthopsis crassicaudata*) captured at site PK-5I (left); Ooldea Dunnart (*S.ooldea*) captured at PK-1C (Photos: J.Skewes).

Populations of small mammals are known to fluctuate dramatically in arid environments, in what is commonly known as a 'boom and bust' cycle. Some species can all but disappear from the landscape, becoming virtually undetectable when conditions are poor, and then becoming overabundant following well timed and significant rainfall. This is particularly true of species such as the nationally threatened Plains Mouse (*Pseudomys australis*). Numerous records from the region occur during 2011-2012, when a

significant rainfall event caused a mass explosion in their numbers. This species was not detected at Peculiar Knob during the Spring 2021 survey.

It is hypothesised that during 'bust' cycles, some small mammal species, such as Sandy Inland Mouse (*Pseudomys hermannsburgensis*) may retreat to woodland habitat, where food resources and shelter from predation are likely to be more readily available regardless of environmental conditions (Dickman et al 2011). For this reason, small remnant woodland patches, areas of higher plant diversity, and areas subject to more frequent or longer inundation are likely to be critical to the survival of some of these species. The high diversity and abundance of mammal species found at PK-5I suggest that this site may act in this capacity.

4.1.3 Reptile abundance and diversity

Abundance and species diversity of reptiles between the control and impact sites was comparable (Figure 9), with slightly higher abundance at control sites and slightly higher diversity at impact sites (diversity: *P*=.62; abundance *P*=.83). Captures were highly variable between sites, with an average of six reptiles captured at each site but ranging between 0 (PK-7I) and 16 (PK-1C). An average of four species was captured per site, however this average was inflated by PK-1 which recorded a much higher diversity of reptiles than other sites in the PK mine and haul road area.

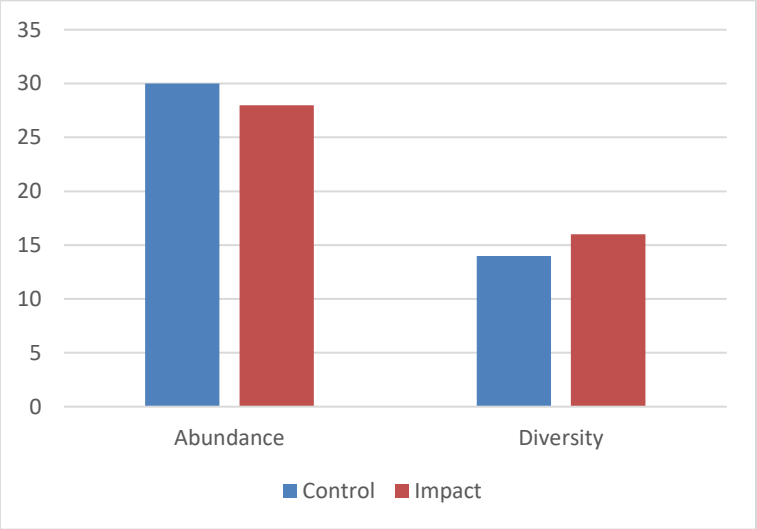


Figure 9. Total reptile abundance and diversity between control and impact sites.

Abundance of reptiles was highest at PK-1 with 50% of all captures between both the control and impact site, with 27.6% at PK-1C compared to 22.4% at PK-1I. Similarly, species diversity was considerably higher at PK-1 with 13 species captured across the two sites including nine at PK-1C and 10 at PK-1I (Figure 10). It is likely that the habitat is the main driver of this difference in reptile captures between site PK-1 and other sites, with the mulga woodland providing significantly more habitat resources for reptiles including food and shelter such as hollows and woody debris.

Abundance and species richness was comparable six of the remaining eight sites, with slightly higher abundance and richness recorded at PK-6I, and no reptiles recorded at PK-7I (Figure 10).

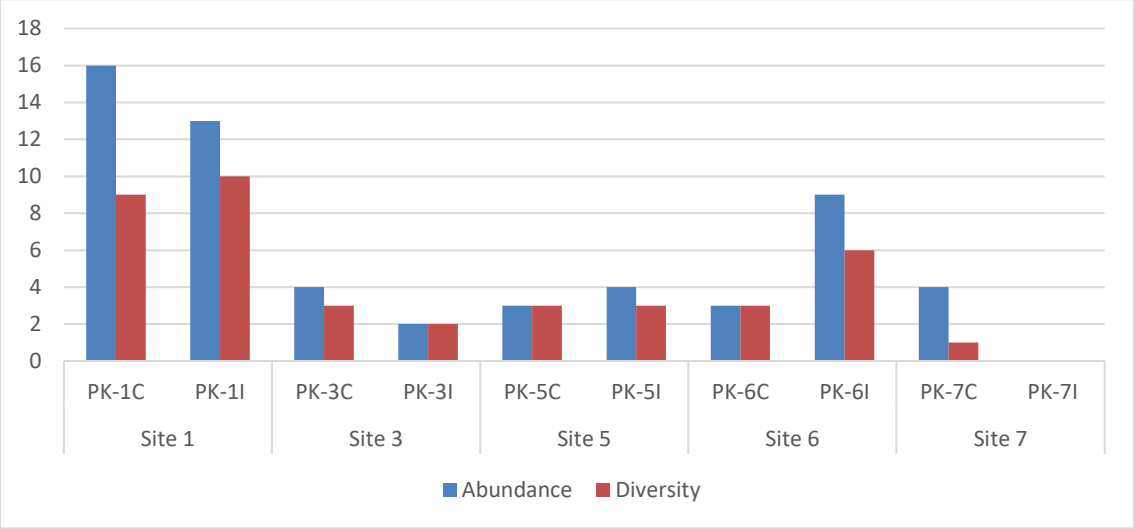


Figure 10. Reptile abundance and species diversity compared for each site.

The most frequently captured reptile species was the Eyrean Earless Dragon (*Tympanocryptis tetraporophora)*, with ten individuals captured across five sites. Eleven reptile species were only captured on one occasion during the survey.

Figure 11. Pygmy Mulga Monitor (*Varanus gilleni*) captured at PK-1I (left); and (right) Lined Earless Dragon (*Tympanocryptis lineata)* captured at site PK-6I (Photos: J. Skewes).

4.2 Dedicated bird surveys

Table 8. 2021 bird survey effort at the PK Mine.

Monitoring technique	# of Sites	Effort per Site (time)	Total effort
Bird Point Count	23	20 minutes	460 minutes or 7.66 hrs (23 x 20)

Conditions for bird surveying were not favourable during the 2021 field survey, with moderate to fresh winds reducing the activity and / or detectability of birds. Given only one survey was undertaken at each site, survey times varied from first light to early afternoon, which is likely to have influenced the bird activity observed between sites. Results reported in this section only represent birds observed at a site during the dedicated 20-minute 2ha survey. Ten of the sites were combined pitfall trapping sites and it is likely that additional birds were present and identified at the site over the course of the four-day trapping period.

A total of 30 bird species were recorded during bird surveys in the Spring 2021 survey period (Table 9). The highest abundance of birds was observed at Bird 7, which was a new site installed in a road culvert in 2020 (COOE, 2020), with a total of 43 observations of 10 species. Two sites recorded no bird activity at all during the bird survey, PK-3C and PK-5I.

Bird species recorded in highest abundance were Zebra Finch (65), Budgerigar (53), and White-winged Fairywren (48). Bird abundance in this type of habitat is generally not considered to be a good representation of quality bird habitat, as these numbers area easily influenced by flocking species such as Budgerigars or Zebra Finches which commonly occur in this region.

White-winged Fairywrens were the most widespread species, occurring at 11 of the 23 sites (47.8%). Zebra Finches were observed at 39% of sites and Black-faced Woodswallows at 30.4% of sites.

Average species diversity across sites was ~4 species (3.7) (standard deviation ± 3.81). Wirrida West Control (WWC) site had significantly higher species diversity, with 15 species recorded during the survey period, when compared with eight species for the WW Impact (WWI) site.

Table 9. Bird species recorded during Spring 2021 20-minute 2-ha bird surveys.

Species name	Common Name	Abundance	Occupancy (no. sites) n=23
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	1	1
Acanthiza uropygialis	Chestnut-rumped Thornbill	21	4
Amytornis modestus	Thick-billed Grasswrens	8	4
Aphelocephala leucopsis	Southern Whiteface	5	2
Aphelocephala pectoralis (NPW: Rare)	Chestnut-breasted Whiteface	4	1
Aquila audax	Wedge-tailed Eagle	2	2
Artamus cinereus	Black-faced Woodswallow	14	7
Artamus personatus	Masked Woodswallow	4	2
Calamanthus campestris	Rufous Fieldwren	2	1
Certhionyx variegatus	Pied Honeyeater	2	1
Cheramoeca leucosternus	White-backed Swallows	4	1
Corvus bennetti	Little Crow	18	1
Corvus coronoides	Australian Raven	8	4

Epthianura tricolor	Crimson Chat	11	3
Falco berigora	Brown Falcon	4	2
Falco cenchroides	Nankeen Kestrel	3	2
Lichenostomus virescens	Singing Honeyeater	2	2
Malurus assimilis	Purple-back Fairywren	1	1
Malurus leucopterus	White-winged Fairywren	48	11
Melopsittacus undulatus	Budgerigar	53	5
Neopsephotus bourkii	Bourke's Parrot	4	1
Oreoica gutturalis	Crested Bellbird	3	2
Petroica goodenovii	Red-capped Robin	4	3
Pomatostomus superciliosus	White-browed Babbler	12	4
Psophodes occidentalis	Chiming Wedgebill	3	2
Ptilotula penicillatus	White-plumed Honeyeater	2	1
Rhipidura leucophrys	Willie Wagtail	1	1
Taeniopygia guttata	Zebra Finch	65	9
Todiramphus pyrrhopygia	Red-backed Kingfisher	3	2
Turnix velos	Little Buttonquail	5	3
	Total observations	**317**	

Thick-billed Grasswren

Thick-billed Grasswrens (TBGWs) were observed to occupy four sites during the 2021 bird survey. All occupied sites had previously recorded TBGWs during the annual survey.

Chestnut-breasted Whiteface

Chestnut-breasted Whiteface (Figure 12) were recorded at one monitoring site (PK-5C) during the field survey. This species had not been recorded across the project area during annual monitoring surveys since 2014, when there were observed nearby at site PK-5I.

An occupancy summary of the two targeted threatened species is presented in Table 10 and presented in detail Appendix 2 – Site occupancy of threatened bird species for each survey year, however, PK Impact and Control sites should not be considered independent of one another as all sites except PK-6I and PK-6C are within 200 m of each other, and it is therefore likely that these species can readily move between these sites.

Table 10. Number of sites occupied for TBGW and CBWF each year of the survey

Site	2011	2012	2013	2014	2015	2020	2021
Occupancy: TBGW / CBWF	5/4	5/2	3/1	4/1	4/0	1/0	4/1

Figure 12. Chestnut-breasted Whiteface observed at Site PK-5C in 2021 (photo by P. Drummond).

4.3 Spotlighting

Spotlighting was undertaken on the warmest night of the survey period, with the aim to detect higher activity of reptile species if present. The survey coincided with the onset of a large thunderstorm which brought a small amount of rain. Spotlighting effort is presented in Table 11.

Table 11. 2021 spotlighting effort at the PK Mine.

Monitoring technique	# of Sites	Effort per Site (trap / time/ distance)	Total effort	Survey effort
Spotlighting	2	30 km length	60 km (30 x 2)	60 km (60 x 1)

A total of nine species were observed during the spotlighting survey, including two native mammals, four reptiles and three introduced mammals (Table 12). The Red Kangaroo (*Macropus rufus*) was the most frequently sighted animal, with 16 observations.

Introduced mammals made up almost half of all sightings (47.7%) and included 15 cows, three rabbits and three cats. Two cats were observed close to the 'breakaways' area, likely to provide a significant shelter and resource site. One cat was seen crossing the haul road carrying a rabbit which had been predated upon. The rabbit warren was also observed close to the haul road in this location.

Table 12. Fauna observations during spotlighting survey

Category	Scientific Name	Common Name	Sum of No Ind.
Native mammal	*Macropus rufus*	Red Kangaroo	16
	Sminthopsis sp.	Dunnart sp.	1
Reptile	*Diplodactylus conspicillatus*	Burrow-plug Gecko	1
	Gehyra sp.	Dtella	2
	Lucasium stenodactylum	Crowned Gecko	1

	Rhynchoedura eyrensis	Eyre Basin Beaked Gecko	2
Introduced mammal	*Bos sp.*	Cows	15
	Felis catus	Cat	3
	Oryctolagus cuniculus	Rabbit	3
		Total	**44**

4.4 Opportunistic observations

Opportunistic observations accounted for 22 positively identified species which were not recorded during the survey effort, presented in Table 13. This included four reptiles and 18 birds which were predominantly sighted whilst traversing the haul road between trapping sites.

Thick-billed Grasswrens were opportunistically recorded at two locations outside of the dedicated survey sites, and additionally at both PK-3I and PK-3C, where an observation led to the discovery of an old nesting site.

Table 13. Opportunistic observations of species within the Project Area, but not recorded at permanent monitoring sites or using dedicated survey methodology.

Scientific Name	Common Name	Survey Type	Dedicated survey site / Other
Bird			
Anthus australis	Australasian Pipit	Opportunistic	Other, PK-5C
Ardea pacifica	White-necked Heron	Opportunistic	Other
Barnardius zonarius	Australian Ringneck	Opportunistic	Other (haul road)
Cacatua sanguinea	Corella	Opportunistic	Other (haul road)
Cheramoeca leucosternus	White-backed Swallow	Opportunistic	Other, PK-6I
Chrysococyx lucidus	Shining Bronze Cuckoo	Opportunistic	Other
Cincloramphus mathewsi	Rufous Songlark	Opportunistic	PK-3C
Cinclosoma clarum	Copper-backed Quail-thrush		Other, PK-3C
Coracina novaehollandiae	Black-faced Cuckoo Shrike	Opportunistic	Other
Dromaius novaehollandiae	Emu	Opportunistic	Other
Eolophus roseicapilla	Galah	Opportunistic	Other
Falco peregrinus (NPW: Rare)	Peregrine Falcon	Opportunistic	PK-6I
Hirundo neoxena	Welcome Swallow	Opportunistic	Other
Honeyeater sp.	Honeyeater sp.	Opportunistic	Other
Lalage sueurii	White-winged Triller	Opportunistic	PK-1I
Milvus migrans	Black Kite	Opportunistic	Other
Northiella haematogaster	Blue Bonnet	Opportunistic	Other
Ocyphaps lophotes	Crested Pigeon	Opportunistic	Other
Phaps chalcoptera	Common Bronzewing	Opportunistic	Other
Todiramphus sp.	Kingfisher sp. (unconfirmed sighting)	Opportunistic	Other (haul road)
Wader sp.	Wader	Opportunistic	Other (dam)
Reptile			
Pseudechis australis	Mulga Snake (road kill)	Opportunistic	Other (haul road)
Pseudonaja modesta	Ringed Brown Snake	Opportunistic	Other (haul road)
Varanus gouldii	Sand Goanna	Opportunistic	Other (haul road)

Tiliqua rugosa	Shingleback	Opportunistic	Other (haul road)

5 COMPLIANCE AND COMPARISON WITH PREVIOUS SURVEYS

Comparisons are limited to the data which has been made available, which includes only the 2020 survey report. Data and reports from the baseline survey (at the permanent sites) have not been made available. As has been previously mentioned, difference in numbers from one year to the next cannot be considered significant when considering the arid boom and bust cycle operating in these areas. Reduction in occupancy of resident species such as the Thick-billed Grasswren may be representative of an impact. A summary of compliance with outcomes listed in the PEPR for 2021 is presented in Table 14 and discussed in more detail in the following sections.

Table 14. Compliance outcomes 2021.

Outcome	Compliant 2021	Comments
No permanent loss of native fauna abundance or diversity in ML MPLs, EMLs and adjacent areas caused by mining operations and vegetation clearing.	Yes	There was no observable difference in abundance or diversity of native fauna recorded between control and impact sites in the 2021 survey. There was no reduction in occupancy or abundance of EPBC listed species, Thick-billed Grasswren and NPW Act listed Chestnut-breasted Whiteface.
No introduction of new pests (including feral animals) or increase in abundance of existing species.	Yes	No new pest species were detected during the 2021 fauna survey. Abundance of pest species such as House mouse (*Mus musculus*) was lower than the previous survey year.
No permanent loss of native fauna abundance or diversity in ML, MPLs, EMLs and adjacent areas caused by mining operations.	Yes	There was no established trend indicating reduction in abundance or diversity of fauna related to mine impacts. PK-3I had slightly lower than average mammal and reptile abundance and diversity. PK-5I had comparable, or higher diversity and abundance to all other sites. Variation is likely attributable to seasonal conditions rather than mining impacts.

5.1 Abundance of fauna species with conservation significance

Two species of conservation significance were recorded during the 2021 survey period including Thick-billed Grasswren and Chestnut-breasted Whiteface.

The Chestnut-breasted Whiteface was recorded at one site in 2021, the first record of this species at PK during spring surveys since 2014, when it was also observed at PK-5.

The Thick-billed Grasswren was observed at four sites in 2021, representing an improvement from 2020 when it was only seen at one site. The 2020 survey results may have been negatively influenced by the conditions experienced during the survey, which included flooding and strong winds. All occupied sites had previously recorded the presence of Grasswrens. Site PK-7 recorded TBGWs in the 2011 and 2012 fauna surveys but has not been detected there since. This may represent a change in their distribution, possibly because of mining activities, but does not appear to have impacted their abundance overall.

No Plains Mice (*Pseudomys australis*) were detected in the 2021 survey.

5.2 Abundance and diversity of native fauna at Impact vs Control sites

There was no observable difference in abundance or diversity of native fauna recorded between control and impact sites in the 2021 survey.

5.2.1 Abundance

Abundance of native fauna was higher in the 2021 survey than in 2020, with 174 captures comprising 116 mammals and 58 reptiles compared to 2020 with captures comprising 18 mammals and 68 reptiles. This fluctuation in the number of reptiles compared to mammals is likely to be representative of the conditions at the time of survey. Additionally, site PK-5I which recorded the highest number of mammals in 2021 (28 individuals) was not surveyed in 2020 due to flooding.

5.2.2 Diversity

Diversity of reptiles was comparable in the 2021 survey with 23 reptile species recorded during pitfall surveys, compared to 21 reptile species recorded in 2020. Mammal diversity was higher in 2021 with eight compared to five species recorded. No planigales were recorded in 2020 which may be attributable to seasonal conditions, and the lack of surveys done at sites PK-3I and PK-5I in the planigales preferred habitat of cracking clay gilgais, where most captures were made in 2021. Additional species were recorded opportunistically during both survey sessions for a total of 28 reptile species compared to 27 in 2021.

Two new species was recorded on survey during the 2021 survey, the Lined Earless Dragon (*Tympanocryptis lineata*) and Pygmy Mulga Monitor (*Varanus gilleni*).

5.3 Abundance or incursion of pest animal species

No new pest species were detected during the 2021 fauna survey. Only two House Mice (*Mus musculus*) were detected during the pitfall survey compared to five in 2020, with one capture at both the control and impact sites at PK-6, the same site they were captured previously.

Other pest species were primarily detected during the spotlighting survey which is not explicitly reported on in the 2020 report, however one cat and four rabbits were observed ‘incidentally’ in 2020, compared to three cats and three rabbits detected during spotlighting in 2021. Rabbits were also detected opportunistically around the PIM Office site.

Pest activity observed at the PK project area during the 2021 survey was low. Comparison with previous years suggest results are representative of no significant change in the abundance of pest species within the PK project area.

5.4 Abundance or diversity of native fauna at ephemeral ecosystems

Three monitoring sites are situated in proximity to ephemeral ecosystems – PK-7I, PK-3I and PK-5I. Two of these sites were unable to be surveyed in 2020 due to flooding and so results are not comparable. PK-7I recorded 2 mammal species in 2020 and four in 2021. Three reptile species were recorded in 2020 and none in 2021, however it is difficult to say if this is due to impacts to the ephemeral ecosystem or simply seasonal variation.

PK-5I had comparable, or higher diversity and abundance to all other sites, and therefore it is considered unlikely that there have been any impacts to this site from mining activities. This site was initially installed to detect impacts of dust from the haul road, however since it was bituminised in 2015, this potential impact has been minimised. Since sealing the road, it is possible that increased water runoff from the road may have improved conditions at this site, by creating a more heavily vegetated roadside drainage line.

PK-3I had slightly lower than average mammal and reptile abundance and diversity. It was noted that significant evidence of pugging from cattle had occurred in the ephemeral waterway nearby this site. Additionally, a pitfall trap had been flooded and the lid removed, creating a trap for mammals and reptiles unlucky enough to fall in.

6 DISCUSSION

Impacts were determined by comparisons between control and impact sites from 2021 and information reported in the 2020 COEE fauna report. Obtaining data from previous surveys would likely enable stronger statistical analysis to be undertaken, which may indicate more significant differences in these results. Results from the 2021 PK fauna survey suggest that there has been no observable impact to native fauna abundance or diversity caused by mining operations. Specifically:

- There was no reduction in occupancy or abundance of fauna species of conservation significance such as Thick-billed Grasswren or Chestnut-breasted Whiteface.
- Results of monitoring program demonstrate no net adverse impacts on native fauna abundance or diversity when compared with control sites.
- There was no demonstrated increase in pests or incursion of new pest species.
- There were no net adverse impacts on fauna abundance or diversity at ephemeral ecosystems when compared with control site results.

Analysis of fauna capture and observational data is difficult in an area where the 'boom and bust' nature of the ecosystem plays such a significant role in the numbers of fauna present at any given time. The highly variable nature of these arid ecosystems means that changes caused by other impacts, for example from the mine and associated activities, may be difficult to detect without a very long-term data set. Many fluctuations from year to year are likely to be caused by natural seasonal variation. As a result of the mine going through multiple ownership changes, data from previous surveys (pre-2015) has not been transferred, which further reduces the strength of the data set by minimising the amount of baseline data for comparison.

Site PK-3I and PK-5I were unable to be surveyed in the 2020 survey period due to inundation by floodwaters. These sites were accessible in 2021 and were found to be accurately located by GPS coordinates (a problem encountered in the previous survey). One of the pitfall traps at site PK-3I had been impacted by flooding, with the lid unable to be found. The pitfall unfortunately contained several deceased mammals. It is recommended that additional care and maintenance measures be undertaken in subsequent years to reduce likelihood of this happening again.

Considerable variation in the instalment of pitfall trap arrays was found across sites, with some pitfall traps unable to be found (or not installed) and some in poor condition including being raised above ground level and having sealed bases which may be an ethical consideration in areas where flood inundation is known to occur. This, combined with a change in perceivable impacts due to bituminisation of the road and moving of the crushing plant from Wirrida to PK mine, means that sites may not act in the same capacity to detect mine impacts as initially planned. Maintenance of trap sites, including consideration of the layout and placement of sites should be considered in 2022 to rectify these issues.

Both sites which had been inundated had clear impacts caused by grazing cattle, most notably, significant pugging in the creek beds and gilgais where water had been retained for some time. It is unknown what the impact of this could be on reptile and mammal abundance, however, it could be hypothesised that compaction of the soil by hooves could reduce the amount of available cracking clay habitat crucial to the

persistence of some of these species. This could act as an additional variable when considering impacts which may become evident at these sites over time.

7 REFERENCES

Approved Conservation Advice (2008a) Approved Conservation Advice for *Frankenia plicata*. Approved by the Minister / Delegate to the Minister on 01/10/2008.

Approved Conservation Advice (2008b) Approved Conservation Advice for *Notomys fuscus* (Dusky Hopping-mouse). Approved by the Minister / Delegate to the Minister on 26/03/2008.

Approved Conservation Advice (2008c) Approved Conservation Advice for *Ophidiocephalus taeniatus* (Bronzeback Snake-Lizard). Approved by the Minister / Delegate to the Minister on 26/03/2008.

Bureau of Meteorology (BOM) (2021), Climate statistics for Australian locations: Coober Pedy Airport 016090. Commonwealth of Australia.

Dickman C.R., Greenville A.C., Tamayo B., and Wardle G.M. (2011) Spatial dynamics of small mammals in central Australian desert habitats: the role of drought refugia. Journal of Mmmalogy, 92 (6): 1193-1209.

Owens H. (2000) Guidelines for Vertebrate Surveys in South Australia Using the Biological Survey of South Australia. First Edition December 2000. National Parks and Wildlife South Australia, Department for Environment and Heritage.

Parsons Brinckerhoff (2013) Peculiar Knob Iron Ore Mining Project – Mining and Rehabilitation Program (MARP) Volume 1, Main Report. Produced for Southern Iron Pty Ltd.

South Australian Arid Lands (SAAL) Natural Resource Management Board (2011) Fact Sheet: Thick-billed Grasswrens. Government of South Australia.

South Australian Arid Lands (SAAL) Natural Resource Management Board (Undated) Student Fact Sheet: Chestnut-breasted Whiteface. Government of South Australia. Available at: http://www.naturalresources.sa.gov.au/files/ed32444a-09e2-4737-8ba2-a2cb00ad10f1/chestnut-breasted-whiteface-grey-falcon-student-fact.pdf [Accessed 27/09/2021]

Moseby K. (2012) National Recovery Plan for the Plains Mouse *Pseudomys australis.* Department of Environment, Water and Natural Resources, South Australia.

NPWS (2002) Thick-billed Grasswren (eastern subspecies) *Amytornis textilis modestus* (North, 1902) Recovery Plan. NSW National Parks and Wildlife Service, Hurtsville NSW.

8 APPENDICES

Appendix 1 – Survey site locations and methodology summary

Table 15. Summary of dedicated fauna survey sites and survey methodology employed.

Site	Survey Method	Method
PK1 Impact	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK1 Control	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK2 Impact	Bird survey	2-ha point count
	Call playback	~2 min / species
PK2 Control	Bird survey	2-ha point count
	Call playback	~2 min / species
PK3 Impact	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK3 Control	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK5 Impact	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK5 Control	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK6 Impact	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK6 Control	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK7 Impact	Pitfall traps	Small trap line (6)
		Large trap line (4)
	Bird survey	2-ha point count
	Call playback	~2 min / species
PK7 Control	Pitfall traps	Small trap line (6)
		Large trap line (3)

	Bird survey	2-ha point count
	Call playback	~2 min / species
Wirrida West Impact	Bird survey	2-ha point count
	Call playback	~2 min / species
Wirrida West Control	Bird survey	2-ha point count
	Call playback	~2 min / species
Wirrida South Impact	Bird survey	2-ha point count
	Call playback	~2 min / species
Wirrida South Control	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 1	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 2	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 3	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 4	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 5	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 6	Bird survey	2-ha point count
	Call playback	~2 min / species
Bird 7	Bird survey	2-ha point count
	Call playback	~2 min / species

Appendix 2 – Site occupancy of threatened bird species for each survey year

Table 16. Occupancy of targeted threatened bird species (Chestnut-breasted Whiteface [CBWF] and Thick-billed Grasswren [TBGW]) at bird survey sites since 2011.

Site	2011	2012	2013	2014	2015	2020	2021
PK-1C	-	-	-	-	-	-	-
PK-1I	-	-	-	-	-	-	-
PK-2C	TBGW, CBWF	-	-	-	-	-	-
PK-2I	CBWF	-	-	-	-	-	-
PK-3C	-	TBGW	TBGW	TBGW	TBGW	-	-
PK-3I	-	-	-	TBGW	-	-	TBGW
PK-4C	-	-	-	-	-	-	-
PK-4I	-	-	-	-	-	-	-
PK-5C	-	TBGW	-	-	-	-	TBGW, CBWF
PK-5I	TBGW	-	TBGW	CBWF	TBGW	TBGW	-
PK-6C	-	-	-	-	-	-	-
PK-6I	-	-	-	-	-	-	-
PK-7C	TBGW	-	-	-	-	-	-
PK-7I	-	TBGW	-	-	-	-	-
Bird 1	TBGW	TBGW	-	-	-	-	TBGW
Bird 2	TBGW	TBGW	TBGW	TBGW	TBGW	-	-
Bird 3	-	-	-	-	-	-	-
Bird 4	-	CBWF		TBGW	TBGW		TBGW
Bird 5	CBWF	CBWF	CBWF	-	-	-	-
Bird 6	CBWF	-	-	-	-	-	-
Bird 7	-	-	-	-	-	-	-
WWC	-	-	-	-	-	-	-
WWI	-	-	-	-	-	-	-
WSC	-	-	-	-	-	-	-
WS1	-	-	-	-	-	-	-

Appendix 3 – Summary of bioregional landforms within Project Area

Gawler IBRA Bioregion

IBRA bioregion, subregion, and environmental association environmental landscape summary.

Gawler IBRA bioregion	
Semi-arid to arid, flat topped to broadly rounded hills of the Gawler Range Volcanics and Proterozoic sediments, low plateaux on sandstone and quartzite with an undulating surface of aeolian sand or gibbers and rocky quartzite hills with colluvial footslopes, erosional and depositional plains and salt encrusted lake beds, with black oak (belah) and Myall low open woodlands, open mallee scrub, bluebush/saltbush open chenopod shrublands and tall mulga shrublands on shallow loams, calcareous earths and hard red duplex soils.	
Commonwealth Hill IBRA subregion	
Remnant vegetation	Approximately 98% (1418168 ha) of the subregion is mapped as remnant native vegetation, of which 1% (12115ha) is formally conserved
Landform	Plains broken by hills and ridges; some dune tracts; saline flats; clay pans; seasonal swamps and lakes. Lakes fringed on the eastern margins by lunettes.
Geology	Sand mantle with minimal soil development, dune sands, outcrops of bare rock; clay silt & sand in alluvial & seasonal swampy lowlands. gypsum & halite deposits; some kopi dunes. Silcrete & ferricrete development. Deeply weathered Palaeozoic basement
Soil	Brown calcareous earths, Siliceous sand, Loamy soils with weak pedologic development.
Vegetation	Arid and semi-arid acacia low open woodlands and shrublands with tussock grass.
Conservation significance	13 species of threatened fauna, 5 species of threatened flora. 0 wetlands of national significance.

Stony Plains IBRA Bioregion

IBRA bioregion, subregion, and environmental association environmental landscape summary.

Stony Plains IBRA bioregion	
Arid stony silcrete tablelands and gibber and gypsum plains with sparse low chenopod shrublands on duplex soils and calcareous earths, dissected by large arid drainage systems with coolibah and redgum on cracking clays along riverbanks of numerous creeks and rivers.	
Oodnadatta IBRA subregion	
Undulating plains with some gypsum crusting, low hills with silcrete gibbers and low gypcrete escarpments. On escarpments and the reddish powdery calcareous loams of the tableland, Maireana astrotricha chenopod shrubland occurs along with a tall open shrubland of *Acacia aneura, A. cibaria and Hakea leucoptera.* The plains support the same vegetation communities, while on the floodplains a low woodland of *Eucalyptus coolabah ssp. arida, Acacia salicina, A. cambagei and A. aneura,* and Eucalyptus camaldulensis woodland occur.	
Remnant vegetation	Approximately 99% (2575667 ha) of the subregion is mapped as remnant native vegetation, of which 3% (72943ha) is formally conserved
Landform	Silcrete capped low tablelands and plains.
Geology	Nodular, prismatic silcretes; ferricretes, calcretes, commercial quality opal; gilgai; desert armour; hardpans; deep weathering profiles; ferruginized & calcreted scarp exposures with pallid zones & duricrusts; porcellanitic cemented sediments. Evaporites
Soil	Loamy soils with weak pedologic development, Crusty loamy soils with red clayey subsoils, Cracking clays, Brown calcareous earths.

Vegetation	Chenopod shrublands.
Conservation significance	28 species of threatened fauna, 43 species of threatened flora. 2 wetlands of national significance.
Baltana IBRA subregion	
Remnant vegetation	Approximately 99% (2646867 ha) of the subregion is mapped as remnant native vegetation, of which 2% (44931ha) is formally conserved
Landform	Silcrete capped low tablelands and plains.
Geology	Nodular,prismatic silcretes; ferricretes,calcretes,commercial quality opal; gilgai; desert armour; hardpans;deep weathering profiles;ferruginized & calcreted scarp exposures with pallid zones & duricrusts; porcellanitic cemented sediments. Evaporites
Soil	Loamy soils with weak pedologic development, Crusty loamy soils with red clayey subsoils, Cracking clays, Brown calcareous earths.
Vegetation	Chenopod shrublands.
Conservation significance	31 species of threatened fauna, 35 species of threatened flora. 2 wetlands of national significance.
Breakaways IBRA subregion	
A dissected silcrete tableland and mesas, and extensive gibber-covered footslopes on deeply weathered shales. There is a cover of chenopod shrubs and forbs (Atriplex vesicaria, Sclerolaena spp. Halosarcia spp.) on crusty red duplex soils and reddish firm siliceous loams with small areas of low woodland (Acacia cambagei, Eucalyptus camaldulensis, E. coolabah ssp. arida) on brown self-mulching cracking clays.	
Remnant vegetation	Approximately 100% (2418715 ha) of the subregion is mapped as remnant native vegetation, of which 6% (133227ha) is formally conserved
Landform	Silcrete capped low tablelands and plains.
Geology	Nodular, prismatic silcretes; ferricretes, calcretes, commercial quality opal; gilgai; desert armour; hardpans; deep weathering profiles; ferruginized & calcreted scarp exposures with pallid zones & duricrusts; porcellanitic cemented sediments. Evaporites
Soil	Loamy soils with weak pedologic development, Crusty loamy soils with red clayey subsoils, Cracking clays, Brown calcareous earths.
Vegetation	Assumed native vegetation cover.
Conservation significance	20 species of threatened fauna, 27 species of threatened flora. 1 wetlands of national significance.

Appendix 4 – Summary site locations and condition during the 2021 survey

PK-1 Impact

PK-1I: Large pits

PK-1I: Small pits

Map of PK 1I: Site layout

PK-1 Control

PK-1C: Large pits

PK-1C: Small pits

Map of PK 1C: Site layout

PK-3 Impact

No image available	*No image available*
PK-3I: Large pits	**PK-3I: Small pits**

Map of PK 3I: Site layout

PK-3 Control

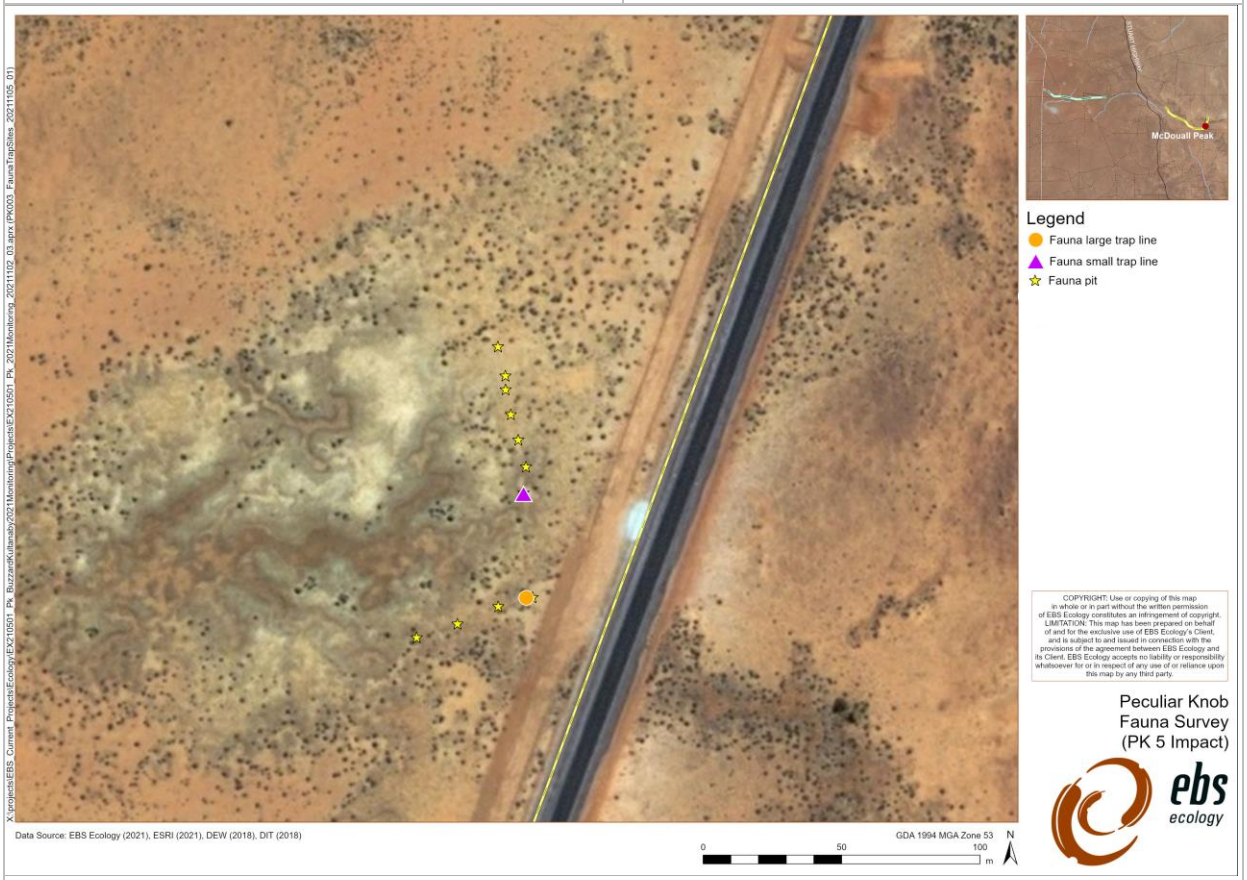
No image available	*No image available*
PK-3C: Large pits	**PK-3C: Small pits**

Map of PK 3I: Site layout

PK-5 Impact

PK-5I: Large pits (east)

PK-5I: Small pits (north)

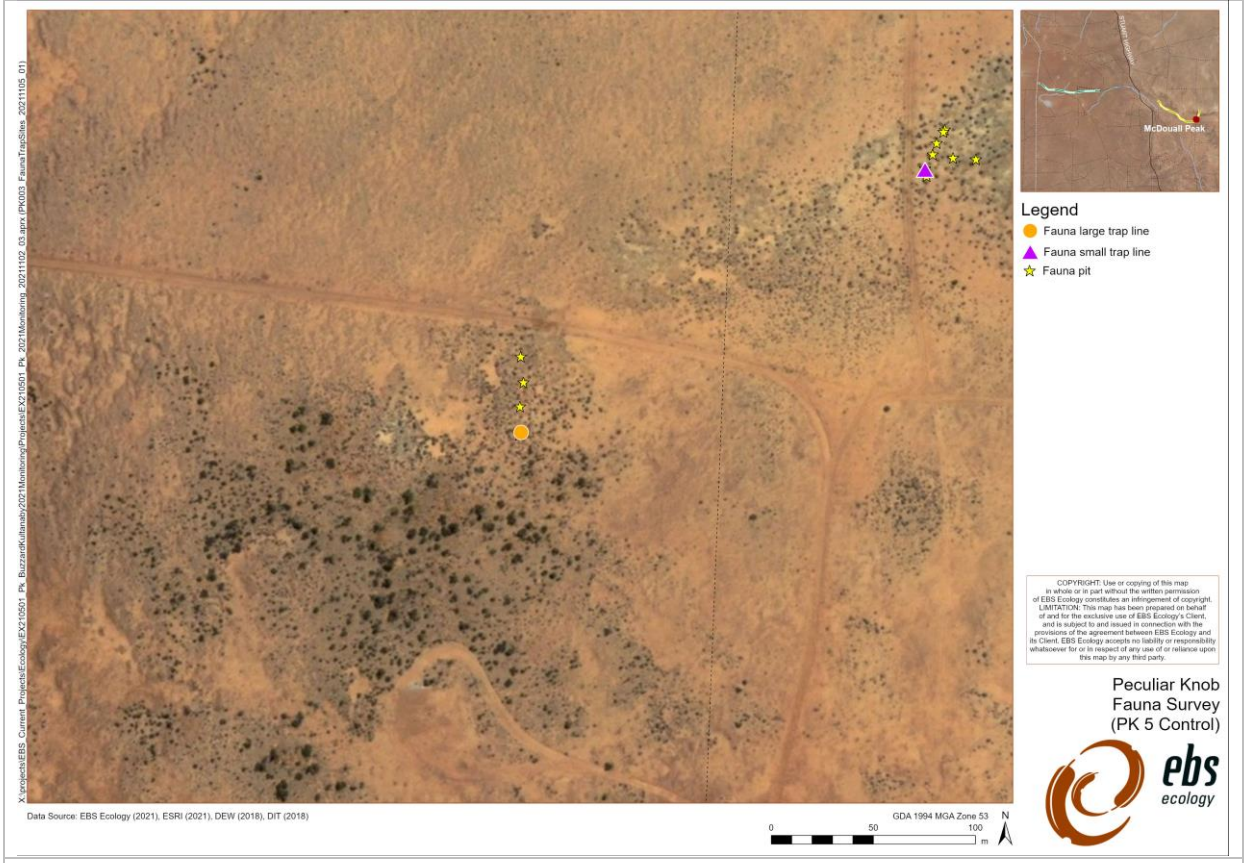


Map of PK 5I: Site layout

PK-5 - Control

PK-5C: Large pits (north)

PK-5C: Small pits (T-shaped line, photo from bottom / west)

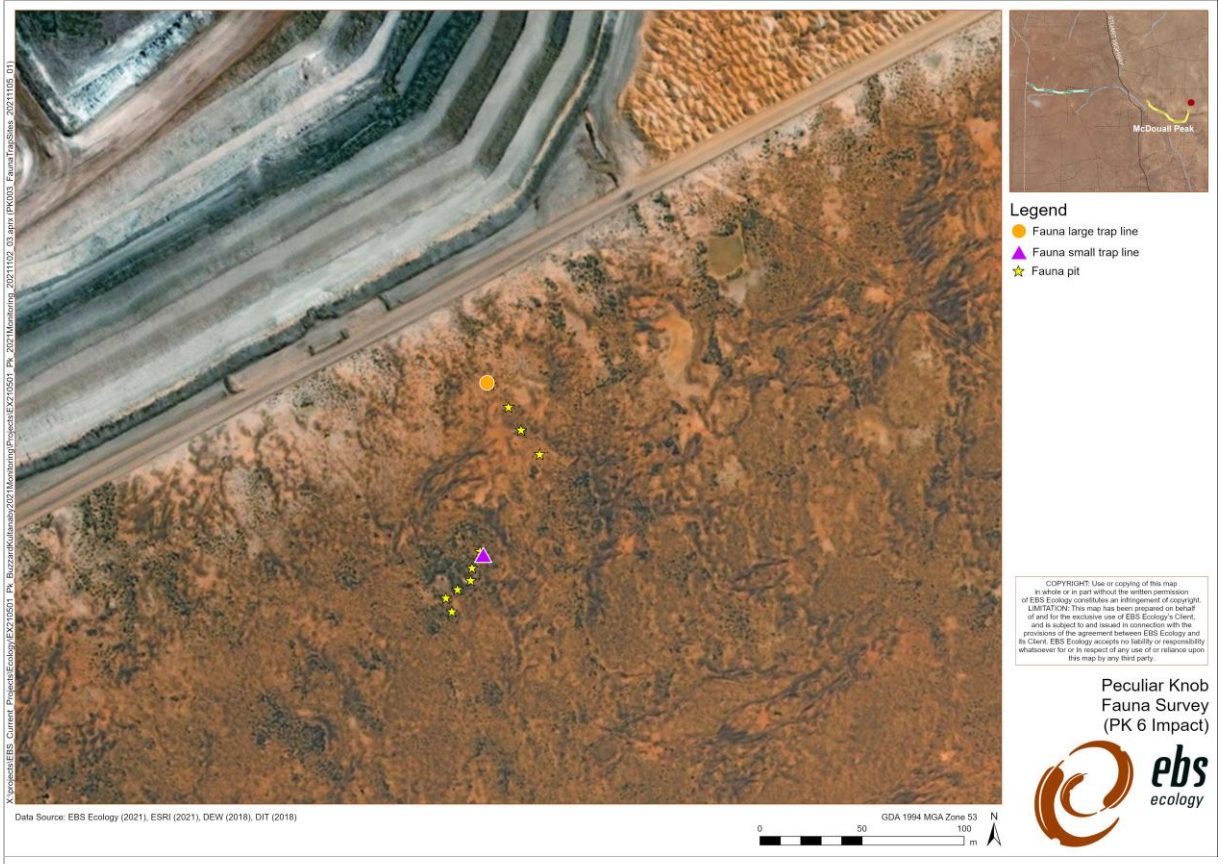


Map of PK 5C: Site layout

PK-6 Impact

PK-6I: Large pits (north)

PK-6I: Small pits (northeast)

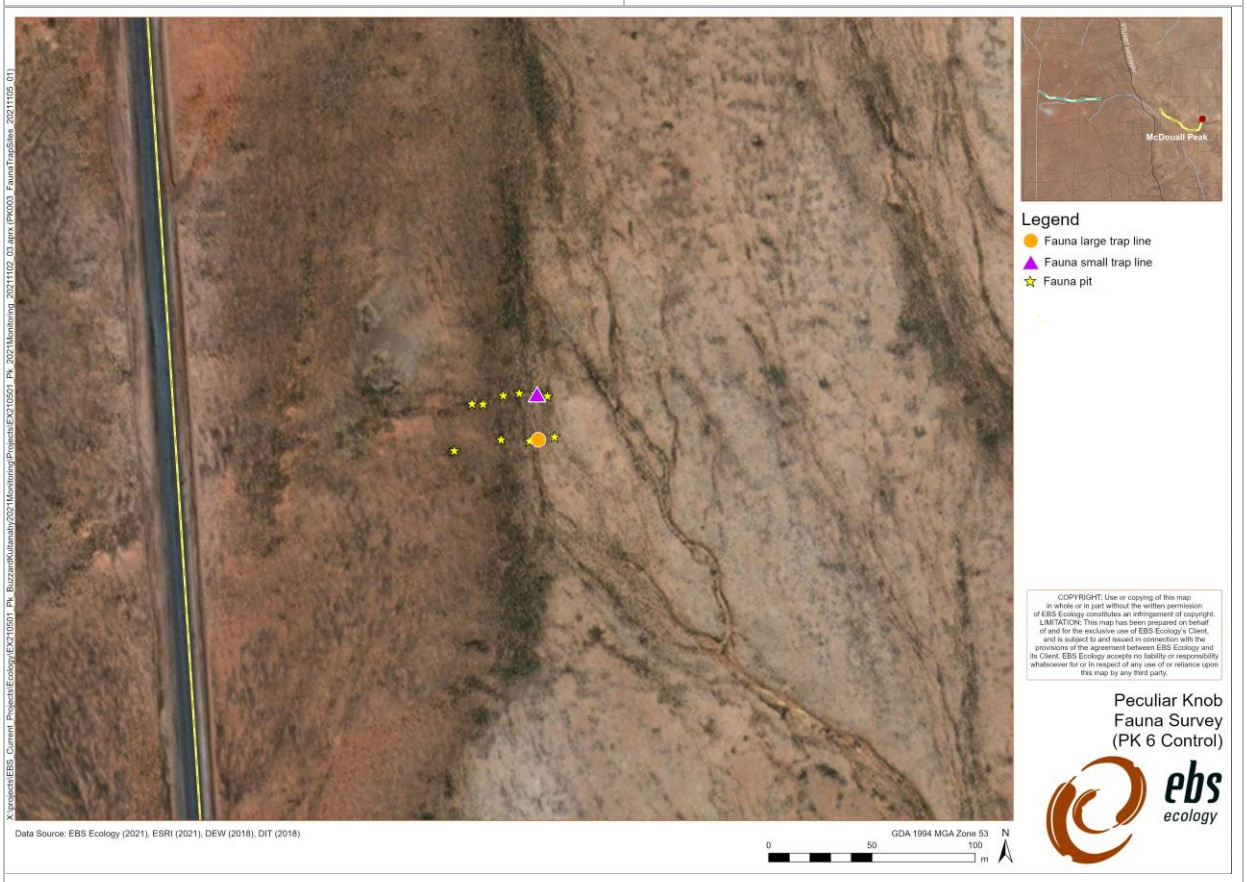


Map of PK 6I: Site layout

PK-6 Control

PK-6C: Large pits (east)

PK-6C: Small pits (east)

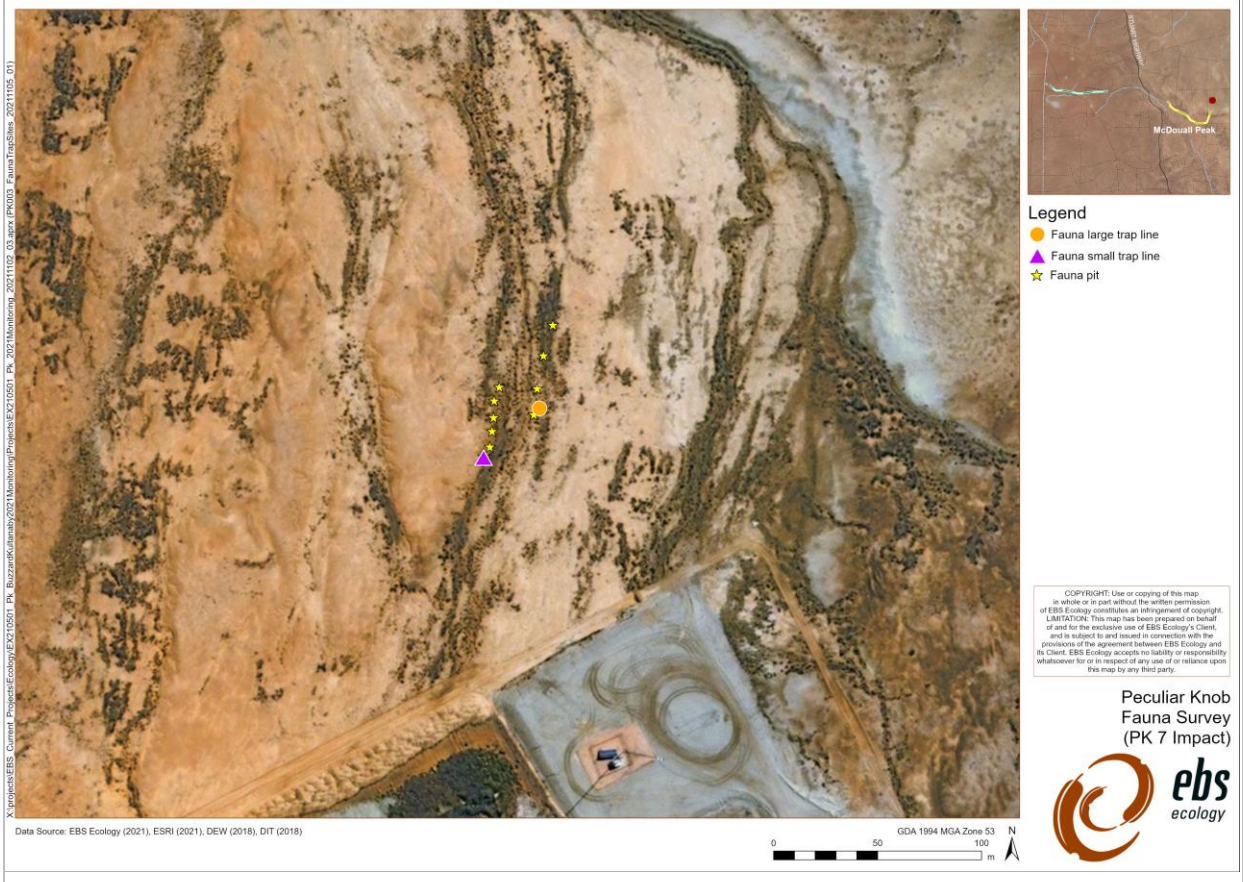


Map of PK 6C: Site layout

PK-7

PK-7I: Large pits

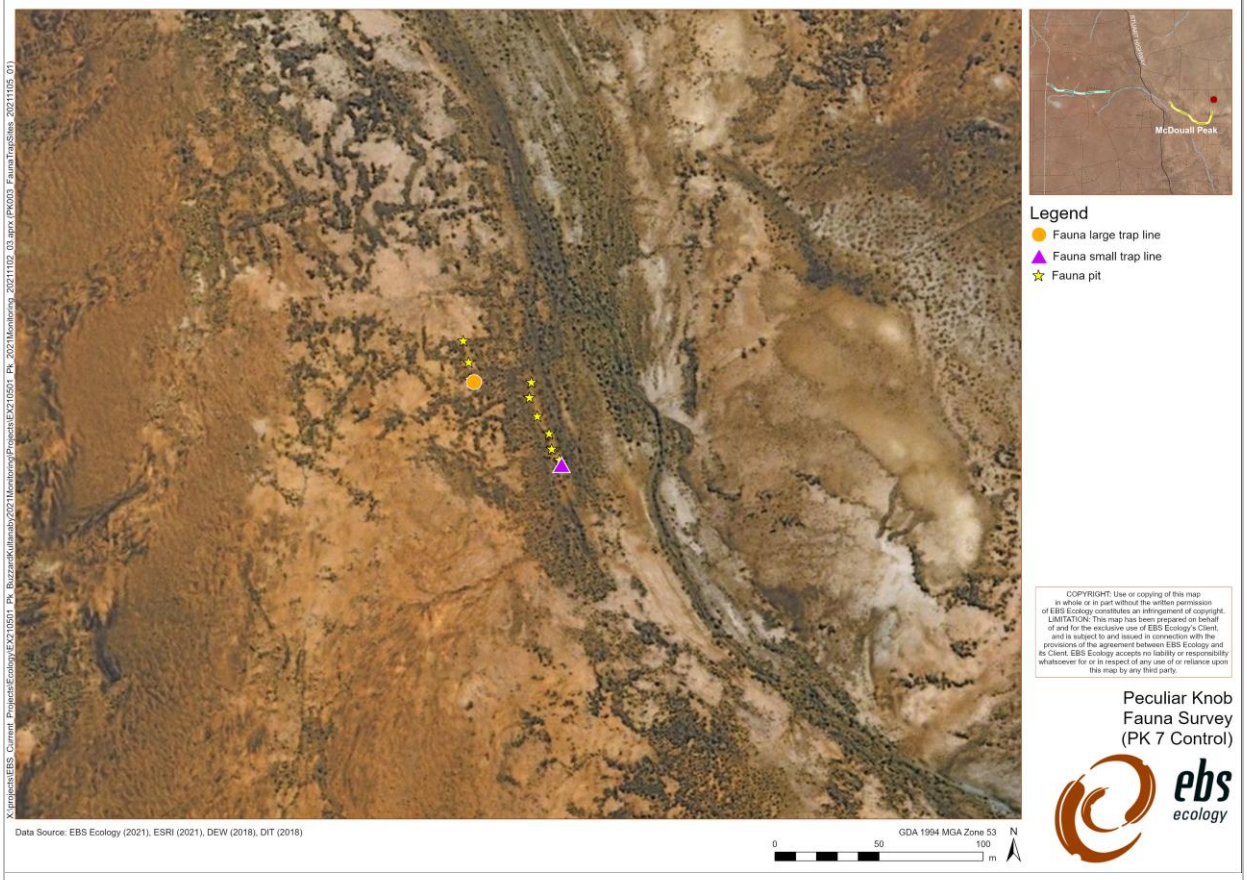
PK-7I: Small pits



Map of PK 7I: Site layout

PK-7C: Large pits

PK-7C: Small pits



Map of PK 7C: Site layout

Appendix 5 – 2021 fauna list

Scientific Name	Common Name	Survey Type			
		Bird Survey	Opportune	Pitfall	Spotlight
Birds					
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	✓	✓		
Acanthiza uropygialis	Chestnut-rumped Thornbill	✓			
Amytornis modestus	Thick-billed Grasswren	✓			
Amytornis modestus	Thick-billed Grasswren		✓		
Anthus australis	Australasian Pipit		✓		
Aphelocephala leucopsis	Southern Whiteface	✓	✓		
Aphelocephala pectoralis	Chestnut-breasted Whiteface	✓	✓		
Aquila audax	Wedge-tailed Eagle	✓	✓		
Ardea pacifica	White-necked Heron		✓		
Artamus cinereus	Black-faced Woodswallow	✓	✓		
Artamus personatus	Masked Woodswallow	✓	✓		
Barnardius zonarius	Australian Ringneck		✓		
Cacatua sanguinea	Corella		✓		
Calamanthus campestris	Rufous Fieldwren	✓			
Certhionyx variegatus	Pied Honeyeater	✓			
Cheramoeca leucosternus	White-backed Swallows	✓	✓		
Chrysococcyx lucidus	Shining Bronze Cuckoo		✓		
Cincloramphus mathewsi	Rufous Songlark		✓		
Cinclosoma clarum	Copper-backed Quail-thrush		✓		
Coracina novaehollandiae	Black-faced Cuckoo Shrike		✓		
Corvus bennetti	Little Crow	✓	✓		
Corvus coronoides	Australian Raven	✓			
Dromaius novaehollandiae	Emu		✓		
Eolophus roseicapilla	Galah		✓		
Epthianura tricolor	Crimson Chat	✓	✓		
Falco berigora	Brown Falcon	✓			
Falco cenchroides	Nankeen Kestrel	✓	✓		
Falco peregrinus	Peregrine Falcon		✓		
Falco subniger	Black Kite		✓		
Hirundo neoxena	Welcome Swallow		✓		
Honeyeater sp.	Honeyeater sp.		✓		
Lalage sueurii	White-winged Triller		✓		
Lichenostomus virescens	Singing Honeyeater	✓	✓		
Malurus assimilis	Purple-back Fairywren	✓			
Malurus leucopterus	White-winged Fairywren	✓	✓		
Melopsittacus undulatus	Budgerigar	✓	✓		
Neopsephotus bourkii	Bourke's Parrot	✓	✓		
Northiella haematogaster	Blue Bonnet		✓		
Ocyphaps lophotes	Crested Pigeon		✓		
Oreoica gutturalis	Crested Bellbird	✓	✓		
Petroica goodenovii	Red-capped Robin	✓			
Phaps chalcoptera	Common Bronzewing		✓		
Pomatostomus superciliosus	White-browed Babbler	✓	✓		

Scientific Name	Common Name	Survey Type			
		Bird Survey	Opportune	Pitfall	Spotlight
Psophodes occidentalis	Chiming Wedgebill	✓			
Ptilotula penicillatus	White-plumed Honeyeater	✓			
Rhipidura leucophrys	Willie Wagtail	✓			
Taeniopygia guttata	Zebra Finch	✓	✓		
Todiramphus pyrrhopygia	Red-backed Kingfisher	✓	✓		
Todiramphus sp.	Kingfisher sp.		✓		
Turnix velos	Little Buttonquail	✓	✓		
Wader sp.	Wader		✓		
Native Mammals					
Leggadina forresti	Desert Short-tailed Mouse			✓	
Macropus rufus	Red Kangaroo		✓		✓
Notomys alexis	Spinifex Hopping Mouse			✓	
Planigale gilesi	Giles Planigale			✓	
Planigale tenuirostris	Narrow-nosed Planigale			✓	
Pseudomys hermannsburgensis	Sandy Inland Mouse			✓	
Sminthopsis crassicaudata	Fat-tailed Dunnart			✓	
Sminthopsis macroura	Stripe-faced Dunnart			✓	
Sminthopsis ooldea	Ooldea Dunnart			✓	
Sminthopsis sp.	Dunnart sp.				✓
Reptiles					
Anilios bituberculatus	Prong-snouted Blind Snake			✓	
Anilios endoterus	Interior Blind Snake			✓	
Ctenophorus isolepis	Central Military Dragon		✓	✓	
Ctenophorus nuchalis	Central Netted Dragon			✓	
Ctenotus regius	Royal Ctenotus		✓	✓	
Ctenotus schomburgkii	Barred Wedge-snout Ctenotus			✓	
Delma butleri	Unbanded Delma			✓	
Diplodactylus conspicillatus	Burrow-plug Gecko				✓
Diplodactylus tessellatus	Tessellated Gecko			✓	
Gehyra sp.	Dtella				✓
Lerista timida	Timid Slider			✓	
Liopholis inornata	Desert Skink			✓	
Lucasium stenodactylum	Crowned Gecko			✓	✓
Menetia greyii	Common Dwarf Skink			✓	
Nephrurus levis	Smooth Knob-tailed Gecko			✓	
Pogona vitticeps	Central Bearded Dragon		✓	✓	
Pseudechis australis	Mulga		✓		
Pseudonaja modesta	Ringed Brown Snake		✓		
Pygopus schraderi	Eastern Hooded Scaly-foot			✓	
Rhynchoedura eyrensis	Eyre Basin Beaked Gecko			✓	✓
Rhynchoedura ornata	Western Beaked Gecko			✓	
Suta suta	Curl Snake			✓	
Tiliqua rugosa	Shingleback		✓	✓	
Tympanocryptis intima	Gibber Earless Dragon			✓	
Tympanocryptis lineata	Lined Earless Dragon			✓	
Tympanocryptis tetraporophora	Eyrean Earless Dragon			✓	

Scientific Name	Common Name	Survey Type			
		Bird Survey	Opportune	Pitfall	Spotlight
Varanus gilleni	Pygmy Mulga Monitor			✓	
Varanus gouldii	Sand Goanna		✓		
Introduced species					
Bos sp.	Cows				✓
Felis catus	Cat		✓		✓
Mus musculus	House Mouse			✓	
Oryctolagus cuniculus	Rabbit		✓		✓

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Appendix D

Peculiar Knob Iron Ore Mine Feral Animal Control Programme, Environmental Projects 2020

PECULIAR KNOB IRON ORE MINE

FERAL ANIMAL CONTROL PROGRAMME

Peculiar Knob Iron Ore Mine

Southern Iron Pty Ltd

Rev 4 – 4 March 2020

REVISION RECORD

Date	Version No	Description	Author	Checked by	Approved by
12/12/2019	1	Draft	Geoff Mills	Lisa Bailie	Client
18/12/2019	2	For submission	Geoff Mills	Lisa Bailie	Client
20/02/2020	3	Response document	Geoff Mills	Lisa Bailie	Client
04/03/2020	4	FINAL	Geoff Mills	Lisa Bailie	Client

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Attachments

Attachment 1 Ecological Horizons Report – Waster-rock Dump Extension Thick-billed Grasswren Appraisal

Attachment 2 COOE Report – Vegetation Assessment of ML6314 and the Surrounding Area

1. PURPOSE

1.1 Background

The Feral Animal Control Programme is a requirement of Condition 7 (Offsets) of the Decision Notice 2014-7154 made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The condition is to offset residual significant impacts to the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*).

The programme must be applied to a minimum area of 400 ha within the Interim Biogeographic Regionalisation for Australia (IBRA) Baltana sub-region (Stony Plains STP-07). Implementation of the programme must commence prior to any vegetation clearance of the Peculiar Knob Iron Ore Project expansion area and remain in place until the expansion area has been rehabilitated in accordance with Condition 3 (Habitat Rehabilitation) of Decision Notice 2014-7154. Condition 3 requires that the project expansion area be rehabilitated to 'a quality of habitat equivalent to the habitat removed'.

1.2 Definition of terms

DAWE or The Department means The Department Agriculture, Water and the Environment (previously the Department of the Environment and Energy).

EPBC Act means *Environment Protection and Biodiversity Conservation Act 1999.*

Commencement means Commencement of any works within the Peculiar Knob Iron Ore Project "expansion area".

Implementation means A contract with a service provider(s) to deliver all aspects of the approved programme has been executed and control activities have commenced (PAPP and 1080 baiting stations are installed, and rabbit warrens surveyed and ripped).

TBGW means Thick-billed Grasswren.

TBGW habitat within the expansion area means Gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. Water-holding or water-transporting habitats that support larger emergent chenopods, especially *Atriplex nummularia ssp omissa* and *Rhagodia spinescens* (see Figure 1-1).

Rehabilitation performance indicators means performance indicators that demonstrate the project expansion area be rehabilitated to a quality of habitat equivalent to the habitat removed. Rehabilitation performance indicators will be developed for approval in a revised plan.

Commitment means the programme will be implemented once approved by the Minister.

The programme will be implemented prior to commencement of any works within the Peculiar Knob Iron Ore Project 'expansion area'.

The programme will remain in place until the rehabilitation performance indicators have been achieved.

1.3 Objective

The programme objective is to abate threats to the Thick-billed Grasswren by controlling the impact of fox (*Vulpes vulpes*) and cat (*Felis catus*) predation, and habitat protection through rabbit (*Oryctolagus cuniculus*) control.

Secondary objectives as a result of the programme may include:

- a fauna threat abatement engagement opportunity with land managers
- an opportunity to facilitate the adoption of best practice baiting methods
- an opportunity to build on broader fauna threat abatement programmes
- an opportunity to establish tall shrubland plants suited to Thick-billed Grasswren habitat on ripped rabbit warrens.

1.4 Issues to be addressed

Foxes, feral cats and rabbits present major threats to biological diversity including to the Thick-billed Grasswren. The fox and the rabbit are both declared pests under the *Natural Resources Management Act 2004* (NRM Act), however the feral cat is not listed as a declared species under the NRM Act, possibly due to a lack of demonstrated effective cat control techniques. In response, the Commonwealth has published under the EPBC Act, threat abatement plans to provide guidance on pest control measures including:

- *Threat abatement plan for predation by the European red fox* (DEWHA 2008)
- *Threat abatement plan for predation by feral cats* (Department of the Environment, 2015)
- *Threat abatement plan for competition and land degradation by rabbits* (Department of the Environment and Energy 2016).

Fox baiting is encouraged and facilitated within the South Australian Arid Lands Natural Resources Management (SAAL NRM) region through Natural Resources SA Arid Lands (NR SAAL). The SAAL NRM Board have identified that this is an activity that offers potential for engagement of pastoralists in an NRM activity that has benefits for biodiversity. Additionally, facilitation of coordinated local district baiting provides an opportunity for communication of best practice baiting methods and related NRM information. NR SAAL have been contacted and have provided advice on inputs to this programme.

The Baltana sub-region is predominantly comprised of hard compacted clay soils or cracking clay soils. These soil types are typically unsuitable for rabbit infestation, however the programme area will be surveyed to identify the opportunities for rabbit control through warren destruction. As rabbits are known to forage up to 250 metres from warrens, a buffer of 250 metres adjacent to the offset area will be inspected for rabbit warrens for destruction.

1.5 Description of area to be cleared

In 2014 Southern Iron Pty Ltd engaged Ecological Horizons to conduct a habitat survey to establish the quality and extent of the Thick-billed Grasswren habitat within the Peculiar Knob Iron Ore Project expansion area (Condition 4 of Decision Notice 2014-7154). The survey was conducted by Thick-billed Grasswren expert Dr John Read.

The Peculiar Knob Waste Rock Dump (WRD) extension overlies two distinct habitat types. The southern two-thirds are characterized by hard-packed clay soils that shed water and are typically vegetated by low sparse chenopods. The birds occupying this habitat have been surveyed for four years at the nearby PK6I fauna monitoring site without any records of Thick-billed Grasswren. This habitat is highly unlikely to support grasswrens because it lacks the extensive patches of emergent chenopods that characterize their habitat.

By contrast the northern third features more gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. These water-holding or water-transporting habitats support larger emergent chenopods, especially *Atriplex omissa* and *Rhagodia* spp, that provide suitable habitat for Thick-billed Grasswrens. Subsequent mapping of the precise boundary of the WRD extension indicated that the surveyed area omitted the northern quarter, including the site of a previous Thick-billed Grasswren record. However, the southern extent of the suitable habitat was mapped in detail and surveyed on both days and the assumption is made that most of the area to the north of this line is suitable habitat for grasswrens (Ecological Horizons 2014 – provided in Attachment 1)(see Figure 1-1). The vegetation recorded by Dr Read as *Atriplex omissa* and *Rhagodia* spp were recorded during baseline flora surveys as *Atriplex nummularia ssp omissa* and *Rhagodia spinescens* (EBS, March 2007).

A full description of the vegetation community quality, species composition and structure is provided in Attachment 2 (EPBC Referral, Appendix D, Flora and Fauna Survey Report, COOE 2013). The area of disturbance described by Ecological Horizons 2014 as suitable Thick-billed Grasswren habitat is described by COOE 2013 as Vegetation Association 1 (see Attachment 2; COOE 2013, Section 4.1, Figure 1).

The portion of the area to be cleared that is described as suitable Thick-billed Grasswren habitat by Ecological Horizons 2014 and by COOE 2013 is considered to be the benchmark for rehabilitation outcomes for the affected area at the cessation of mining. Information regarding rehabilitation completion criteria is discussed in Section 1.5.

Clearance will not commence until this feral animal control programme has been approved and pest control actions in the approved plan have commenced (see Section 2.4).

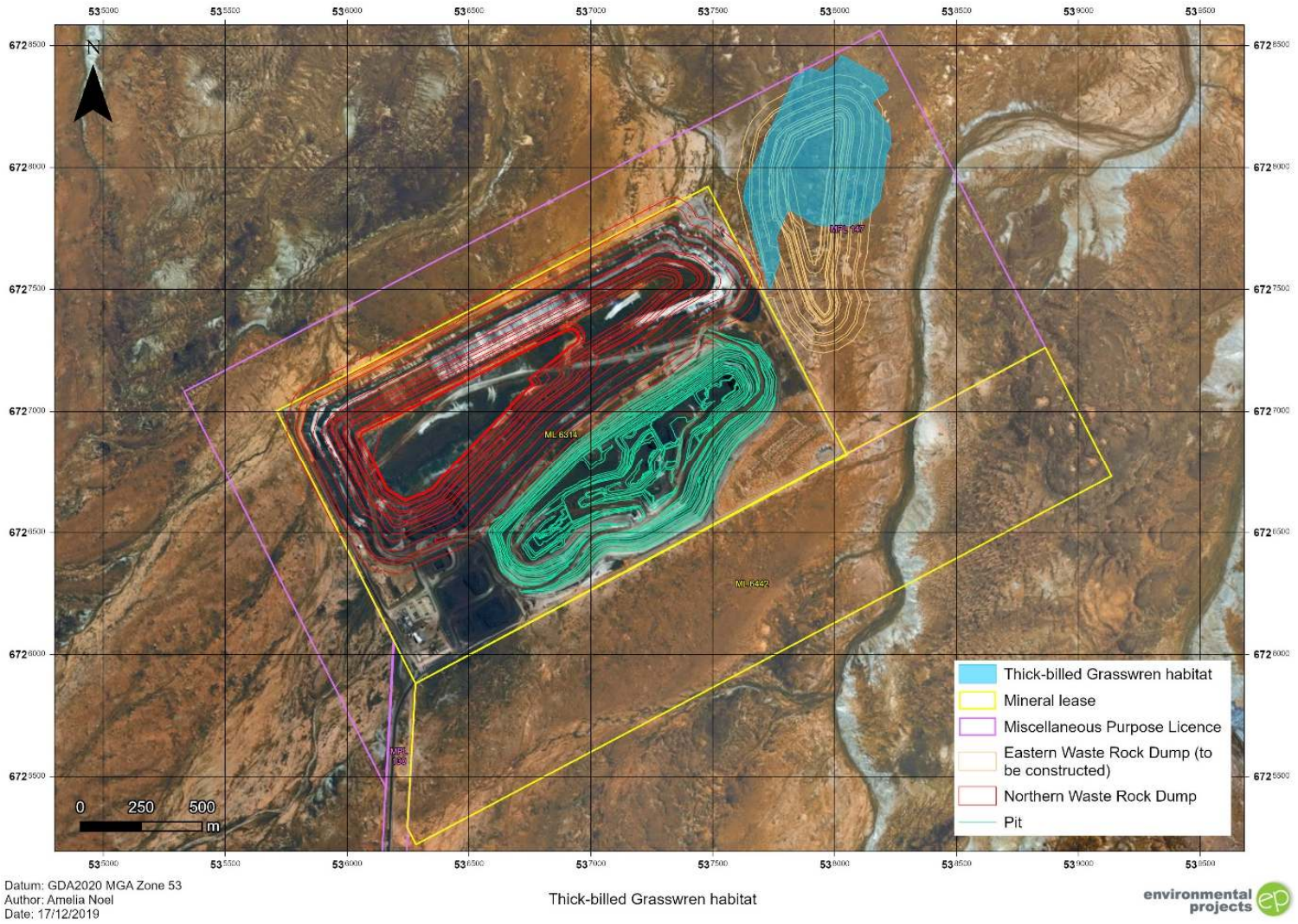

Figure 1-1: Area described by Dr Read as suitable Thick-billed Grasswren habitat (Ecological Horizons 2014)

1.6 Rehabilitation strategy

The rehabilitated waste rock dump (WRD) final cover design utilises a moisture and store-and-release cover system. Rainfall will be stored in the interstices of the topsoil and released through evaporation rather than be shed as runoff. The topsoil cap will be comprised of a minimum PSD 22% silt and clay (Peculiar Knob PEPR, November 2019). Although primarily designed to minimise runoff and soil erosion, the final cover design mimics the pre-existing landform of cracking clays and gilgais. In addition to the cover design, sediment traps and drainage channels will be installed between the rehabilitated WRD and the northern boundary of the mining lease. The sediment traps and drainage channels will mimic the purpose of drainage head waters and gilgais as described in the existing environment.

Once the WRD has been shaped to the approved final landform profile and the final cover design installed, the WRD plateau and toe where evaporation ponds and drainage channels are installed, will be seeded with the pre-existing and preferred habitat vegetation species (including *Atriplex nummularia ssp omissa* and *Rhagodia spinescens*) of the Thick-billed Grasswren. Seeds will be locally collected and dispersed across the top, face and toe of the rehabilitated WRD.

The feral animal control programme will remain in place until the rehabilitation has been completed in accordance with Condition 3 of the EPBC 2014-7154 approval.

Based on pre-clearance vegetation community quality, species composition and structure benchmarks, rehabilitation performance indicators and completion criteria will be developed during the operation phase of mining and provided to the DAWE in a revised plan for approval prior to the commencement of rehabilitation.

2. SCOPE OF PROGRAMME

2.1 Scale

Two suitable location options to apply the 400 ha feral animal control programme were considered.

Option 1 is located immediately to the north of the Peculiar Knob expansion area, within the area described by Dr Read as gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. Although favourable due to its close proximity to the disturbance area, access to Option 1 would be extremely difficult due to lack of tracks and associated mine safety management.

Option 2 is very similar terrain and is located approximately 20 km west of Option 1. Option 2 has the advantage of good access tracks away from the mine site however it has the added advantage that a small stone quarry extractive mineral lease (EML) is situated within the option area. The EML will likely increase population densities of cat and fox making the control programme more effective. Option 2 has therefore been chosen as the preferred option. The EML has a pre-disturbed area of approximately 20 ha, therefore an additional 20 ha has been added to the 400 ha programme area. Figure 2-1, Figure 2-2 and Figure 2-3 show the two option areas for implementation of the programme. Figure 2-4 shows the Option 2 area in detail.

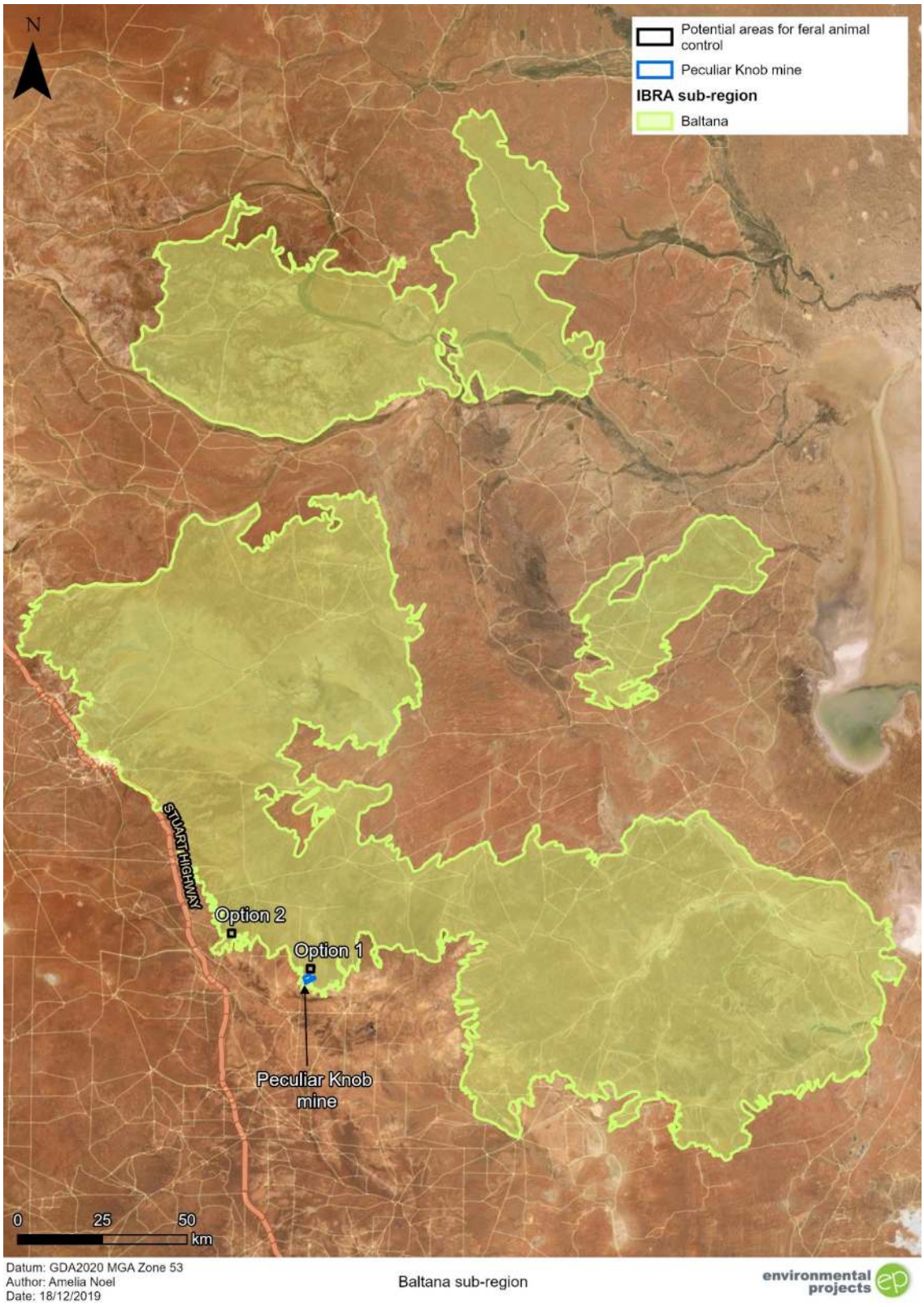

Figure 2-1: Implementation area options within the Baltana sub-region

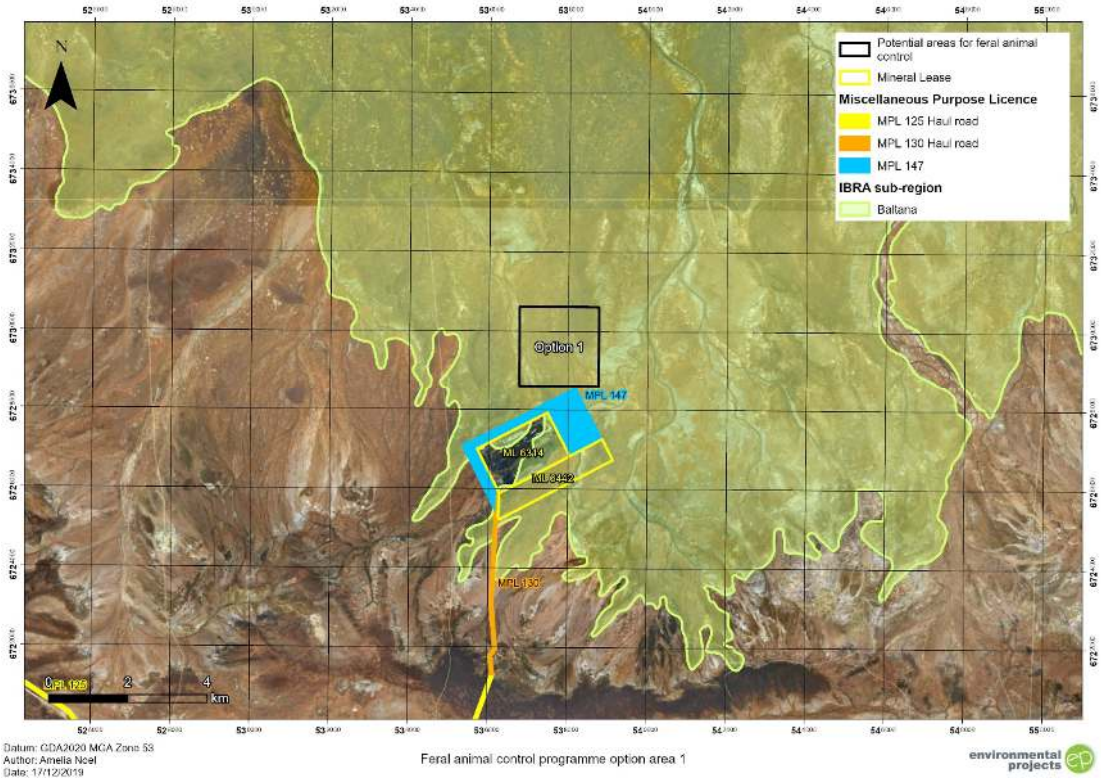

Figure 2-2: Feral animal control programme Option 1 area

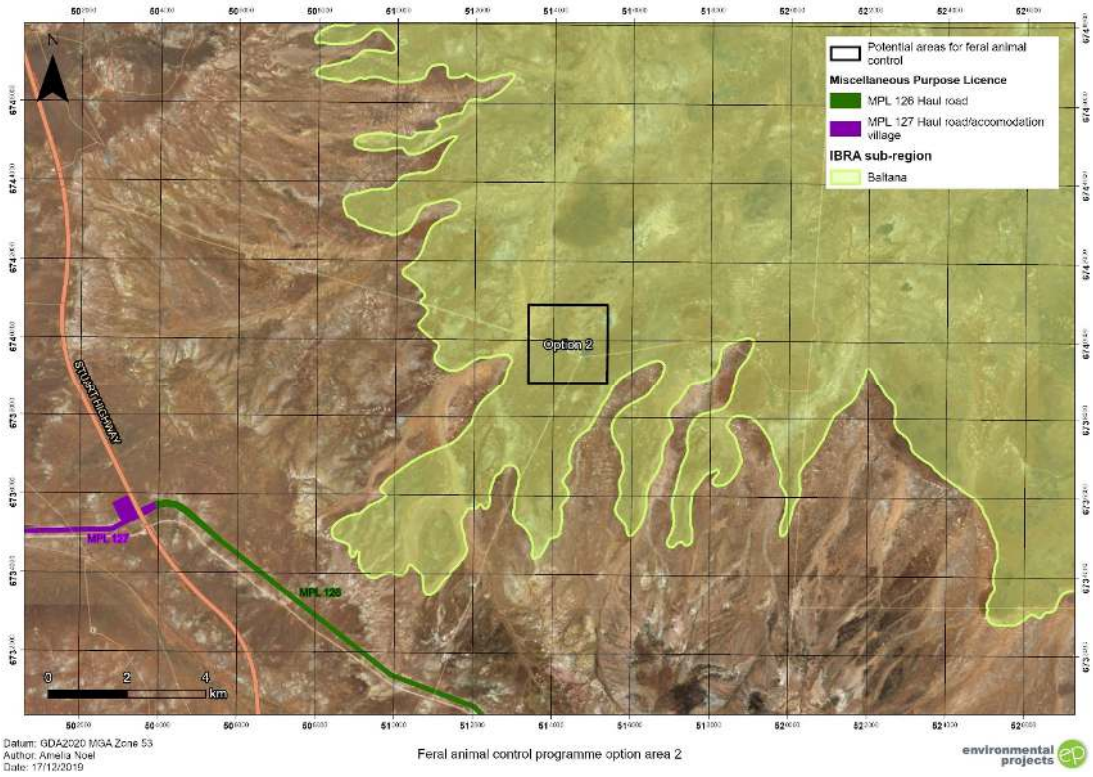

Figure 2-3: Feral animal control programme Option 2 area

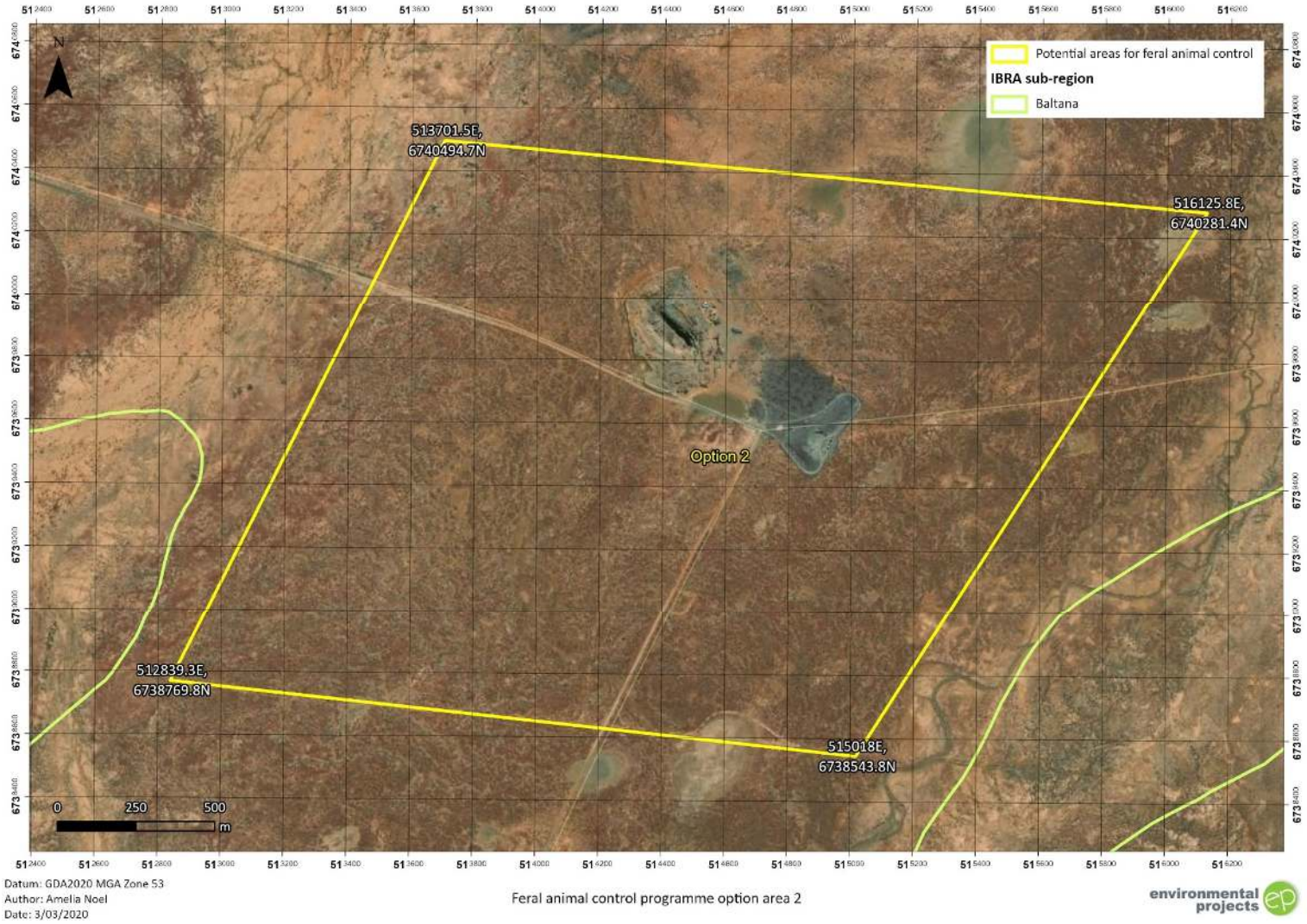

Figure 2-4: Feral animal control programme Option 2 area (detail)

2.2 Programme details

2.2.1 Fox

The programme has been designed with strong reference to the following documents:

- *Threat abatement plan for predation by the European red fox* (DEWHA, 2008)
- PestSmart: *A field guide to poison baiting: wild dogs and foxes* (Mifsud G. 2016)
- Fact Sheet: *Baiting for Fox Control* (Centre for Invasive Species Solutions 2013)
- *Directions for use of 1080 fox baits in South Australia* (PIRSA 2014).

The programme will utilise 1080 FoxOff baits within the area identified. To maximise baiting effectiveness, baiting will take place during Autumn (migration period) with follow-up baiting in Spring (breeding season) so that recovery of the fox population is addressed. Each campaign period will last two weeks and be inspected twice a week as per PestSmart and PIRSA recommendations.

At least five baiting stations will be established, one each located at the four corners and one near the middle of the programme area. Additional baits will be laid along tracks at 200 to 500 metre intervals. Baits will be buried to 5 to 10 cm.

Uptake of baits will be monitored at sample stations using three automatic in-situ cameras placed at two of the corner stations and the centre station, and also by visual inspections at all stations. Taken baits will be replaced during inspections. Baiting lines and bait station location waypoints will be recorded, mapped and included along with bait uptake data in annual reports, or another period as required.

General awareness and participation in fox control by neighbours and the local community will be encouraged through sharing of information about the programme through printed material and verbal discussions.

2.2.2 Cat

To-date there has been few methods identified to effectively control feral cats as they rarely take baits.

The *Threat abatement plan for predation by feral cats* (Department of the Environment 2015), Section 1.2.3 states that control of cats is difficult as they are found in very low densities and have large home ranges, making them difficult to locate. Cats are also extremely cautious in nature, making them hard to cost-effectively control with traditional measures such as shooting and trapping.

The site for the programme was in part chosen due its proximity to an EML that operates on a campaign basis and therefore a place that is likely to attract cats for shelter and has the potential for fluctuating food resources.

The methods of cat impact abatement considered for this programme include shooting, baiting, cage traps and the recently developed grooming traps.

Shooting could be effective because of the relatively small scale of the control area, if timed strategically.

To successfully trap feral cats, the lure or attractant chosen is important, with individual feral cats preferring different styles of lure, while some feral cats may not be attracted by any lures (Department of the Environment 2015). However trapping could be effective if timed in periods of scarce resources.

Cats prefer live prey and will only take baits when other resources are scarce, however baiting could be effective if timed strategically using surface baits such as Curiosity® in both autumn and spring.

In recent years a cat grooming trap, the 'Felixer', has been developed that takes advantage of the cats fastidious grooming habit. The Felixer targets cats and foxes and can be programmed to play a variety of audio lures to attract feral cats and foxes. Rangefinder sensors are used to distinguish the target species from nontarget species and then sprays target species with a measured dose of toxic gel. The solar-powered Felixer can hold 20 sealed cartridges of toxic gel, which automatically reset after firing. The Felixer automatically photographs all animals detected (including nontargets that are not fired upon). All data is downloaded and recorded for reporting purposes. Although the Felixer has the potential to be an effective cat control tool, little data is currently available to measure its success rate in all situations. Grooming traps are currently cost inhibitive, especially for a control area of this small scale.

After consideration of all the control options, it is proposed that an integrated programme of baiting, cage traps and spotlight shooting is adopted. Baiting utilising approved baits for the control of feral cats, such as Curiosity® baits, will be laid in both autumn and spring, at the same time and duration of the fox baiting programme, at baiting stations near the four corners and near the centre of the programme area. Monitoring the uptake of baits will utilise the three in-situ automatic cameras and via inspection observations during the baiting periods. Timing of the baiting periods will be planned to occur within periods of nil activity at the EML to coincide with periods of low food resources for cats. Likewise, cage trapping and spotlight shooting will occur at the same time as the baiting in autumn and spring and whilst there is no activity at the EML.

General awareness and participation in cat control by neighbours and the local community will be encouraged through sharing of information about the programme through printed material and verbal discussions.

Effectiveness of existing and new control technologies will be reviewed annually to assess the potential for improvements to control methods. Changes to the programme will be submitted to the Department for consideration for approval in revised plans if and when appropriate to do so.

2.2.3 Rabbit

This section was developed with reference to the *Threat abatement plan for competition and land degradation by rabbits* (Department of the Environment and Energy 2016).

At least 400 ha including the programme area will be surveyed for rabbit warrens. If present, warrens will be mapped and destroyed by ripping. Rabbit warrens within 250 metres of the area boundary will also be surveyed and destroyed to minimise rabbit grazing impacts.

General awareness and participation in rabbit control by neighbours and the local community will be encouraged through sharing of information about the programme through printed material and verbal discussions.

2.2.4 Control measures to be adopted

Table 2-1 provides a summary of the recommended control measures and the proposed controls to be adopted for this programme.

Table 2-1: Feral animal control measures to be adopted

Source document	Recommended control	Adopted controls/justification
FOX *Threat abatement plan for predation by the European red fox* (DEWHA 2008) A field guide to poison baiting: wild dogs and foxes (Mifsud 2016) PestSmart FactSheet: Baiting for Fox Control (2013) *Directions for use of 1080 fox baits in South Australia* (PIRSA 2014)	• poison baiting • shooting • trapping • den fumigation or destruction • exclusion fencing	**Poison baiting (1080 FoxOff) has been adopted for this programme.** Apart from broadscale baiting, the other recommended methods are expensive, labour intensive, long term and of limited effectiveness.
CAT *Threat abatement plan for predation by feral cats* (Department of the Environment 2015)	• shooting • leg hold traps • cage traps • 1080 Eradicat baits (WA only) • PAPP Curiosity baits • grooming trap • exclusion fencing.	**Integrated control utilising PAPP baits, cage traps and spotlight shooting have been adopted for this programme with an annual review.** All controls with the exception of exclusion fencing are considered to be of limited effectiveness. Shooting depends on the off chance of cat sightings, leg hold and cage traps are considered to be too stressful for the captured animals, grooming traps and exclusions fencing are considered to be too expensive.
RABBIT *Threat abatement plan for competition and land degradation by rabbits* (Department of the Environment and Energy 2016)	• poison baiting • biological control agents • warren ripping and fumigation • fencing • harbour removal • shooting.	**Warren ripping has been adopted for this programme.** Destruction of warrens in this harsh environment should negate the need to bait, shoot or fumigate. Exclusion fencing is too expensive, harbour removal is not applicable to this area and biological control is the responsibility of other agencies.

2.3 Implementation

The programme will be implemented as follows:

- the programme will be implemented once approved by the Minister
- the programme will be implemented prior to commencement of any works within the Peculiar Knob Iron Ore Project 'expansion area'
- the programme will remain in place until the rehabilitation performance indicators have been achieved
- a local service provider will deliver the fox baiting and rabbit control programmes
- 1080 bait will be used for fox baiting, only FoxOff manufactured 1080 bait will be utilised

- the service provider will be responsible for adherence to 1080 handling procedures including provision of safety equipment for handling and transport
- the service provider will be responsible for 'poison laid' signage, laying the bait, monitoring bait lines, bait stations and bait replacement
- the service provider will be responsible for rabbit warren mapping and destruction
- cat control will utilise integrated control of Curiosity® baits containing the toxin PAPP, cage traps and spot shooting
- adjacent landholders and NR SAAL will be consulted and given opportunities to be engaged in the programme or add value through broader supplementary control programmes
- monitoring and evaluation of outcomes and reporting will be coordinated by Southern Iron Pty Ltd (the tenement holder).

2.4 Description of Implementation

Implementation means rabbit, fox and cat control activities have each commenced (PAPP and 1080 baiting stations have been installed and rabbit warrens surveyed and ripped).

2.5 Community Engagement

General awareness will be raised through community engagement including one-on-one conversations and through printed information/fact sheets.

2.6 Risk Management

The following measures will be implemented to address potential risks:

- neighbour and broader community concerns will be addressed by highly focused promotion into the target area by multiple methods i.e. phone contact, in person, written including fact sheets
- off-target damage to domestic dogs will be addressed by early consultation and extensive signage provided for all properties adjacent to the baiting area
- 1080 accredited storage facility–options for using storage facilities of adjacent NRM Boards or PIRSA will be investigated.

2.7 Monitoring and evaluation

Monitoring will be underpinned by delineation of the baiting area, bait lines and bait station waypoints through mapping and wooden stakes.

Analysis of timing and frequency of camera image data.

Bait uptake will be monitored and used as an indicator of fox abundance and threat reduction success.

Cat bait uptake camera data will be used as an indicator of cat abundance and threat reduction success.

The number of warrens ripped and re-ripped due to annual inspections of ripped warrens to ensure they are not reopened and occupied.

The feasibility of utilising data from annual PEPR required fauna surveys will be investigated.

2.8 Information management

All data will be recorded and maintained by Southern Iron Pty Ltd and reported upon request to the Department of Agriculture, Water and the Environment as per Condition 9 of Decision Notice 2014-7154. Furthermore, Southern Iron Pty Ltd will by 30 June each year after commencement of the action, publish a report on their website that addresses compliance to all conditions of Decision Notice 2014-7154 for the previous 12 months, or part thereof, including compliance to this programme.

2.9 Summary of programme

A summary of the Feral Animal Control Programme is provided in Table 2-2.

Table 2-2: Summary of Peculiar Knob Feral Animal Control Programme

Aspect	Control/description	Timing	Document reference
Fox	1080 FoxOff baiting	Prior to commencement Biannually – Autumn and Spring	Section 2.2.1 and 2.3
Cat	Integrated control of PAPP Curiosity® baiting, cage traps and shooting	Prior to commencement Biannually – Autumn and Spring	Section 2.2.3 and 2.3
Rabbit	Warren destruction	Prior to commencement	Section 2.2.3 and 2.3

3. RISK ASSESSMENT

3.1 Background

Pest animals are synonymous with the introduction of non-native species, soil and native vegetation disturbance or the provision of artificial watering points or any artificial change to ecosystem function, which can in some way alter the balance of nature.

Some native fauna species benefit from such changes–these species are identified as increasers. The range and abundance status of other species are threatened by these factors, making them decreaser species. It is possible that the Thick-billed Grasswren is a decreaser species that could be vulnerable to predation by cats and foxes and to habitat degradation.

3.2 Consultation

During the development of this programme, consultation has been undertaken with:

- Natural Resources South Australian Arid Lands (NR SAAL)
- Dr John Read (Ecological Horizons)
- Antakirinja Matu-Yankunytjatjara Aboriginal Corporation (AMYAC)

- adjacent Pastoral land lessees.

3.3 Legal and other requirements

The following legislation was considered during the development of the programme:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Natural Resources Management Act 2004*
- *National Parks and Wildlife Act 1972*
- *Mining Act 1971*.

3.4 Risk assessment

A risk assessment was undertaken to determine the likely success of the programme.

The risk assessment was conducted to assess the expected uncontrolled and controlled impacts on the Thick-billed Grasswren from feral predators (fox and cat), and from habitat degradation from introduced herbivore (rabbit) within the required 400 ha control programme area (see Figure 2-1).The risk assessment process firstly assigned the expected uncontrolled impact consequence level score (1-5) (see Table 3-1) and then assigned the likelihood level score of the impact occurring (1-5) (see Table 3-2). The scores were added together to present the expected risk rating (negligible–very high) (see Table 3-3).

The risk rating was then considered alongside feasibility of control to inform the appropriate pest animal control strategy level (see Table 3-4). The process was then repeated to assess the expected abatement of risk to the species from carrying out the control measures (see Table 3-5, Table 3-6 and Table 3-7).

Table 3-1: Uncontrolled impact consequence

Negligible	Minor	Medium	Major	Extreme
Level 1	Level 2	Level 3	Level 4	Level 5
Environmental				
No significant regional impacts to the species No lasting effects	Low level predation of the species. Species remains abundant when climatic conditions are favourable.	Moderate effects on population densities, populations can recover when conditions are favourable.	Serious population depletion with possible localised species extinction. Long term effect Difficult for species abundance to recover.	Species depletion with possible regional species extinction.
Legal				
No legal issues	Minor legal issue. Non-compliance or breach of regulation that can be easily rectified.	Serious breach of regulation. Prosecution possible.	Major breach of regulation, Investigation and prosecution by authority. Prosecution probable.	Very serious breach of regulation Investigation by authority with significant prosecution and fines.

Table 3-2: Likelihood of impact

Likelihood	Impact
5 Almost certain	The impact is expected to occur at some stage
4 Likely	The impact will probably occur, not surprised if it happens
3 Possible	The impact might occur at some stage
2 Rare	The impact could happen at some time but surprised if it happens
1 Unlikely	The impact is not likely to happen at any stage

Table 3-3: Expected risk rating

Consequence/Likelihood	1 Negligible	2 Minor	3 Medium	4 Major	5 Extreme
5 Almost Certain	Moderate	High	Very High	Very High	Very High
4 Likely	Moderate	High	High	Very High	Very High
3 Possible	Low	Moderate	High	Very High	Very High
2 Rare	Negligible	Low	Moderate	High	Very High
1 Unlikely	Negligible	Low	Moderate	High	High

Table 3-4: Pest animal control strategy level

Pest Risk	Feasibility of Control				
	Negligible	Low	Medium	High	Very High
Negligible 1-4	Monitor	Monitor	Monitor	Contain spread	Contain spread
Low 5	Monitor	Monitor	Contain spread	Contain spread	Destroy populations
Medium 6	Contain spread	Contain spread	Destroy populations	Destroy populations	Destroy populations
High 7	Protect sites	Protect sites	Destroy populations	Eradicate	Eradicate
Very High 8-10	Protect sites	Protect sites	Destroy populations	Eradicate	Eradicate

Table 3-5: Fox (*Vulpes vulpes*) expected abatement of risk

	Impacts	Controls	Uncontrolled risks			Controlled risks			Comments	Feasibility of control
Environmental	Predation on TBGW	Baiting	3	5	8	1	5	6		Medium
Economic										
Social										
Legal	Declared species, legal requirement to control. (NRM Act 2004)								Required by Decision Notice 2014-7154	Destroy populations

Table 3-6: Cat (*Felis catus*) expected abatement of risks

	Impacts	Controls	Uncontrolled risks			Controlled risks			Comments	Feasibility of control
Environmental	Predation on TBGW	Baiting	3	5	8	2	5	7		Medium
Economic										
Social										
Legal									Required by Decision Notice 2014-7154	Destroy populations

Table 3-7: Rabbit (*Oryctolagus cuniculus*) expected abatement of risk

	Impacts	Controls	Uncontrolled risks			Controlled risks			Comments	Feasibility of control
Environmental	Degradation of TBGW habitat	Destruction of rabbit warrens	3	3	6	1	3	4		Very High
Economic										
Social										
Legal	Declared species, legal requirement to control. (NRM Act 2004)								Required by Decision Notice 2014-7154	Destroy populations

4. REFERENCES

Centre for Invasive Species Solutions 2013, *PestSmart FactSheet: Baiting for Fox Control*. The Centre for Invasive Species Solutions, Canberra, ACT.

COOE Pty Ltd, 2013. *Vegetation Assessment of ML6314 and the Surrounding Area, Significant Environmental Benefit (SEB)*, November 2013, unpublished report prepared for Arrium Mining.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). *Threat abatement plan for predation by the European red fox*, DEWHA, Canberra.

Department of the Environment, 2015. *Threat abatement plan for predation by feral cats*, Commonwealth of Australia, 2015.

Department of the Environment and Energy 2016. *Threat abatement plan for competition and land degradation by rabbits*, Commonwealth of Australia 2016.

EBS 2007, *Flora and Fauna Assessment, Peculiar Knob, March 2007*, unpublished report to Parsons Brinckerhoff Australia, EBS Adelaide.

Ecological Horizons Pty Ltd 2014. *Proposed Peculiar Knob Waster-rock Dump Extension Thick-billed Grasswren Appraisal*, November 2014, unpublished report prepared for Southern Iron Pty Ltd.

Mifsud G (2016). A field guide to poison baiting: wild dogs and foxes. 3rd edition 2018. PestSmart Toolkit publication. The Centre for Invasive Species Solutions, Canberra, ACT.

Peak Iron Mines Pty Ltd, 2019. *Peculiar Knob Iron Ore Mine, Program for Environment Protection and Rehabilitation (PEPR) Update*, Revision 3, November 2019.

PIRSA, 2014. *Directions for use of 1080 fox baits in South Australia.*

ATTACHMENT 1

Ecological Horizons Pty Ltd 2014. *Proposed Peculiar Knob Waster-rock Dump Extension Thick-billed Grasswren Appraisal*, November 2014, unpublished report prepared for Southern Iron Pty Ltd.

Proposed Peculiar Knob Waster-rock Dump Extension Thick-billed Grasswren Appraisal

November 2014

DRAFT

Ecological Horizons Pty Ltd

Potential Thick-billed Grasswren habitat within the proposed Peculiar Knob Waste Rock Dump extension

Limitations Statement

In preparing this document Ecological Horizons Pty Ltd makes no warranty or guarantee, whether expressed or implied, with respect to the information reported or to the findings, observations or conclusions expressed in this document. Further, such information, findings, observations and conclusions are based solely on observations made and information available to Ecological Horizons Pty Ltd at the time of this study.

Scope

Ecological Horizons was contracted by Arrium (Southern Iron) to conduct a an assessment of Proposed Peculiar Knob Waster-rock Dump Extension in northern South Australia to satisfy conditions of the EPBC Referral 2014/7154 .

The key deliverables was:

1) A habitat survey of the proposed expansion area by a suitably qualified Thick-billed Grasswren expert.

2) Provide baseline information on feral animal distribution to assist in the development of a feral animal control program to be implemented to protect a minimum of 400ha within the Baltana subregion

Credentials of the Thick-billed Grasswren assessor

Dr. John Read from Ecological Horizons Pty Ltd has thirty years' experience of conducting fauna surveys and habitat assessments in the South Australian arid zone. He has coordinated, conducted and written up several surveys for rare birds (including Thick-billed Grasswrens) in northern South Australia and has recorded Thick-billed Grasswrens on each of four annual surveys at the Peculiar Knob mine, including some records adjacent to the survey area (see Table 1). Dr. Read was appointed as the Birds Australia Atlas Coordinator for northern South Australia in the early 2000s, which provides further indication of his credentials.

Assessment Approach

Dr. Read walked the perimeter of the proposed Peculiar Knob Waste Rock Dump extension, guided by Arrium Environmental Scientist Christine Jones on November 6, 2014. The following morning, when detectability of grasswrens was considered to be optimal, the survey area was traversed on foot, with particular attention paid to visiting sites with emergent chenopod shrubs, which are the favoured habitat for the grasswrens. A playback recording of Thick-billed Grasswren calls was broadcast from a portable recorder at a minimum of ten localities for one minute each within the proposed Waste Rock Dump extension, concentrating on areas of potential habitat. Binoculars were also used both to survey clumps of tall chenopods and to scan for moving birds in front of the observer.

Results

No Thick-billed Grasswrens were detected during the survey of the Peculiar Knob Waste Rock Dump extension, although previous sightings in the region and suitable habitat suggest the northern third of this area does provide suitable habitat for the species (Figure 1). Due to their often secretive nature, failure to detect grasswrens during short surveys cannot be considered to indicate the absence of this species, nor the unsuitability of the habitat. Thick-billed Grasswrens have, however, been recorded from the nearby permanent fauna monitoring sites 7I and 7C (Table 1) and also at two other sites within or immediately adjacent to the study area in 2012 (Figure 1). Birds recorded during the survey were Nankeen

Kestrel (1), Rufous Fieldwren (4), Richard's Pipit (2), White-winged Fairywren (5) and Orange Chat (2).

The Peculiar Knob Waste Rock Dump extension overlies two distinctly different habitat types. The southern two thirds is characterized by hard-packed clay soils that shed water and are typically vegetated by low sparse chenopods (Plate 1). The birds occupying this habitat have been surveyed for four years at the nearby PK6I fauna monitoring site without any records of Thick-billed Grasswrens. This habitat is highly unlikely to support grasswrens because it lacks the extensive patches of emergent chenopods that characterize their habitat.

By contrast the northern third features more gypseous cracking soils and endorheic gilgais and the headwaters of ephemeral streams. These water-holding or water-transporting habitats support larger emergent chenopods, especially *Atriplex omissa* and *Rhagodia* spp that provide suitable habitat for Thick-billed Grasswrens (Plates 2-5). Subsequent mapping of the precise boundary of the Peculiar Knob Waste Rock Dump extension indicated that the surveyed area omitted the northern quarter, including the site of a previous Thick-billed Grasswren record. However, the southern extent of the suitable habitat was mapped in detail (Figure 1) and surveyed on both days and the assumption is made that most of the area to the north of this line is suitable habitat for grasswrens.

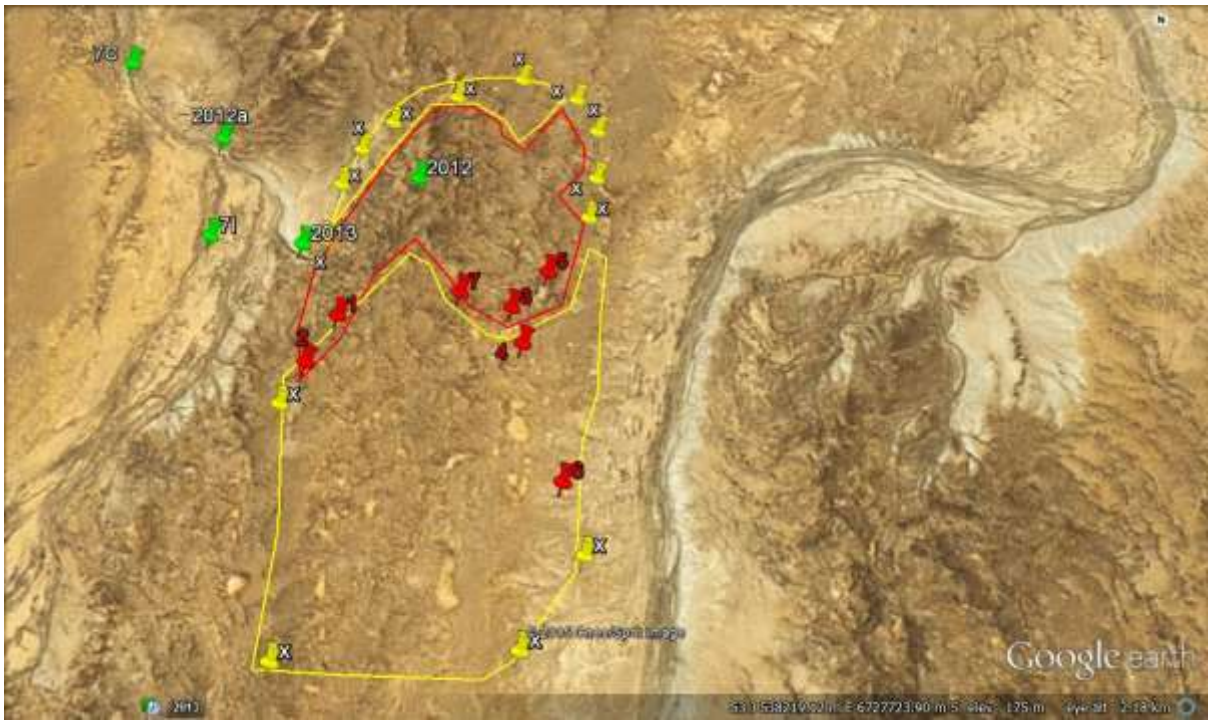

Figure 1. Outline of the proposed Peculiar Knob Waste Rock Dump Extension (yellow symbols), potential habitat sites for Thick-billed Grasswren (red symbols) and previous Thick-billed Grasswren records (green symbols). The extent of suitable grasswren habitat within the proposed Peculiar Knob Waste Rock Dump Extension is demarcated by the red polygon and unsuitable habitats are delineated by the yellow polygon.

Table 1. Presence of Thick-billed Grasswrens (TBGW) at Peculiar Knob bird monitoring sites in 2011- 2014 (Data from Ecological Horizons 2014).

Site	Zone	Eastings	Northings	2011	2012	2013	2014
Bird 1	53J	533409	6717125	TBGW	TBGW	-	-
Bird 2	53J	530401	6716960	TBGW	TBGW	TBGW	TBGW
Bird 3	53J	499300	6737400	-	-	-	-
Bird 4	53J	522850	6721800	-	-	-	TBGW
Bird 5	53J	492200	6734200	-	-	-	-
Bird 6	53J	499300	6735700	-	-	-	-
2I				-	-	-	-
2C				-	-	-	-
3I				-	-	-	TBGW
3C				-	TBGW	TBGW	TBGW
5I				TBGW	-	TBGW	-
5C				-	TBGW	-	-
7I				-	TBGW	-	-
7C				TBGW	-	-	-

Plate 1. Fauna monitoring site PK06 showing the sparse, low vegetation and hard, water-shedding soils characteristic of the southern two thirds of the proposed Peculiar Knob Waste Rock Dump Extension that are considered unsuitable for Thick-billed Grasswrens.

Plate 2. Headwaters of drainage line on north-western corner of proposed waste Rock Dump extension (Site 2 in Figure 1).

Plate 3 Oodnadatta saltbush (*Atriplex omissa*) growing in drainage line near northern margin of proposed waste rock dump extension (Site 1 in Figure 1) and in similar habitat to previous record 2012 (Figure 1).

Plate 3 Gilgai on eastern margin of proposed waste rock dump

Plate 4. Cracking clay gilgai in proposed waste rock dump extension (Site 5 in Figure 1). Thick-billed Grasswrens would be expected to use the fringing emergent chenopods for shelter and nesting.

Discussion

One third of the proposed Peculiar Knob Waste Rock Dump Extension will be overlain upon habitat suitable for Thick-billed Grasswrens. This nationally listed species has been recorded at the site and at several other localities adjacent to the Peculiar Knob mine.

Waste rock dumps do not provide suitable habitat for Thick-billed Grasswren. Even if they are successfully rehabilitated by native vegetation, rock dumps are unlikely to provide suitable habitats due to their water-shedding nature that is not conducive to colonization by emergent chenopod shrubs. Hence this development should be regarded as permanent removal of the habitat from potential grasswren occupancy.

Construction of the proposed Peculiar Knob Waste Rock Dump Extension could affect the ability of the habitat to support Thick-billed Grasswrens beyond the physical footprint of the dump. Along with the pervasive impacts of dust and noise from construction of the rock dump, changes in the hydrogeological regimes could affect the important emergent chenopod populations, especially since the proposed rock dump lies at the headwaters of grasswren supporting drainage lines. If the dump diverts the natural flow of water from the water-shedding soils to the south to these northward-flowing drainages, it is likely that the emergent chenopods that depend upon enhanced water availability will be negatively impacted. If however, water shed from the rock dumps is clean and mimics natural water flows from the hardpan soils, there may be little change in grasswren habitat downstream of the development.

ATTACHMENT 2

COOE Pty Ltd, 2013. Vegetation Assessment of ML6314 and the Surrounding Area, Significant Environmental Benefit (SEB), November 2013, unpublished report prepared for Arrium Mining.



VEGETATION ASSESSMENT OF ML6314 AND THE SURROUNDING AREA

Significant Environmental Benefit (SEB)

Arrium Mining

November 2013

Cooe
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Vegetation Assessment of ML6314 and the surrounding area

Significant Environmental Benefit (SEB)

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Date	Version	Reason for change	Author(s)	Editor(s)
11/10/2013	Draft 01	Draft	AD, VG, AC	Sean Steed
11/10/2013	Final Draft	Submission to client		Graeme Noll
13/11/2013	Final Draft 02 – map to be updated	Edits as per client's request	AC	SS
19/11/2013	Final	Updated Fig. 1 included	AC	SS

Executive Summary

Mining operations that involve the clearance of native vegetation must be undertaken in accordance with a management plan that the Native Vegetation Council (NVC) is confident will result in a significant environmental benefit (SEB) (DWLBC 2005). COOE Pty Ltd (COOE) was engaged by Arrium Mining (Arrium) to undertake a vegetation assessment within an identified area of 671.5 ha immediately surrounding the Peculiar Knob Iron Ore Mining Project (PK Project) Mineral Lease 6314 (ML6314). The 671.5 ha represents a proposed MPL and native vegetation clearance will be required as part of a proposed expansion of PK operations.

Vegetation associations were identified, the area of each association calculated and resultant condition evaluated. Land clearing designs were then compared to the vegetation associations to calculate the SEB offset amount required within the proposed MPL. Additionally, a desktop fauna assessment was undertaken to identify potential species which may be found within, or close to, the survey area. The desktop fauna assessment was based on previous surveys conducted in 2007 (PB 2012).

Three vegetation associations were identified within the survey area:

1) *Atriplex vesicaria* (Bladder Saltbush) +/- *Maireana ericantha and Sclerolaena cuneata* low open shrubland with open gibber (6:1)
2) *Cullen australasicum* / *Senecio lanibracteus* low shrubland (6:1)
3) *Atriplex vesicaria / Sclerolaena cuneata* very open shrubland (6:1).

The proposed waste rock dump is the only area that will require vegetation clearance with an area of 56.52 ha. The vegetation within this area will include only vegetation association 1. Based on the SEB ratios assigned to vegetation to be cleared, 169.56 ha of vegetation is required as an offset to achieve a SEB if restoration activities are achieved on-site.

Options to satisfy SEB offsets includes revegetation and rehabilitation of suitable areas or payment into the Native Vegetation Fund. Should payment to the Fund be an option, total payment required to satisfy SEB is = $51,998.40.

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Abbreviations

DMITRE	Department for Manufacturing, Innovation, Trade, Resources and Energy
DPTI	Department of Planning, Transport and Infrastructure
DWLBC	Department of Water, Land and Biodiversity Conservation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
MLP	Mining Lease Proposal
MPL	Miscellaneous Purposes License
NV Act	*Native Vegetation Act 1991* (SA)
NV Regulations	*Native Vegetation Regulations 2003* (SA)
PEPR	Program for Environment Protection and Rehabilitation
PK	Peculiar Knob
SEB	Significant Environmental Benefit

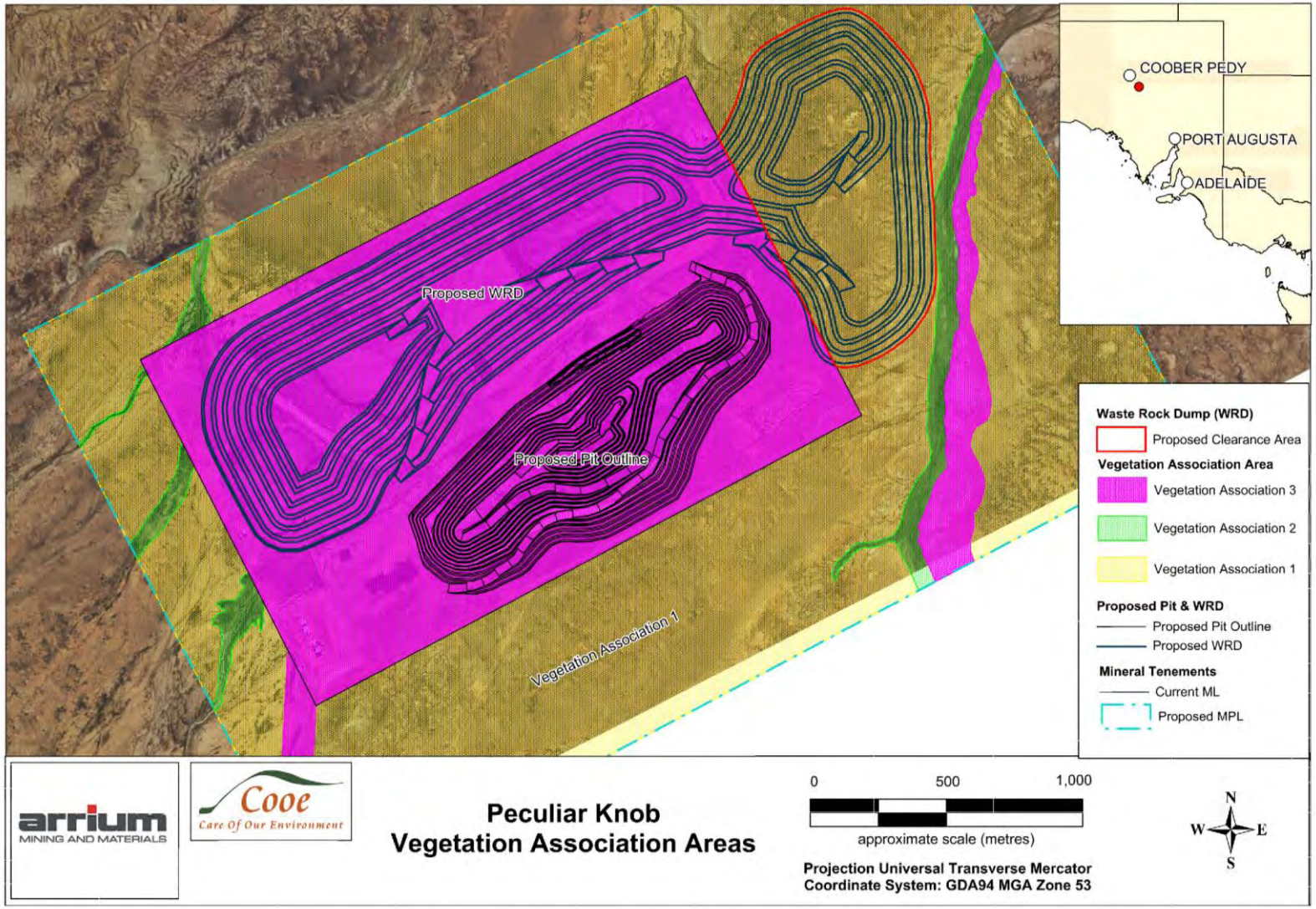
1 Introduction

Arrium Mining commissioned COOE to undertake a vegetation assessment within an identified area immediately surrounding the Peculiar Knob (PK) Iron Ore Mine ML6314 (hereafter referred to as, "study area"). Native vegetation clearance is required as part of a proposed expansion of PK mining operations surrounding ML6314. Approximately 671.5 ha of vegetation within the proposed MPL was surveyed as part of this assessment (Figure 1).

1.1 Objectives

An assessment of native vegetation within the study area was undertaken to establish vegetation communities and to calculate required SEB offsets for proposed vegetation clearance. The specific objectives were to:

- Conduct a site walkover of the approximate MPLA area of 671.5 ha that surrounds ML6314 to describe the vegetation associations (refer to Figure 1)
- Provide a general species list for each vegetation association
- Undertake a desktop fauna study report based on previous surveys and with consideration to EPBC Guidelines in line with PK Approvals
- Calculate SEB offset areas and associated payments.



*Colours for Vegetation Association 1 and 3 are in-line with that identified in Appendix D, Vegetation 2 is a new association for the area. Vegetation Association 1 where the proposed WRD, pit and acces road are located was not surveyed by COOE, information is provided by Arrium from a survey done in 2007 by EBS.

Figure 1. Vegetation associations surveyed within the proposed Peculiar Knob expansion (ML6314)

2 Regulatory Framework

All native vegetation in South Australia is protected under the provisions of the *Native Vegetation Act 1991* (SA) (NV Act) and *Native Vegetation Regulations 2003* (SA) (NV Regulations), where the South Australian NVC must approve any clearance of vegetation not exempted under the NV Regulations. Under the NV Act, clearance means:

- the killing or destruction of native vegetation
- the removal of native vegetation
- the severing of branches, limbs, stems or trunks of native vegetation
- the burning of native vegetation, and
- any other substantial damage to native vegetation, including the draining or flooding of land, or any other act or activity, that causes the killing or destruction of native vegetation, the severing of branches, limbs, stems or trunks of native vegetation or any other substantial damage to native vegetation (DWLBC 2005).

There are exemptions under the NV Act and NV Regulations for native vegetation clearance undertaken as part of operations under the *Mining Act 1971* (SA). The exemption allows native vegetation clearance for mining operations, provided it is undertaken in accordance with a management plan that details to the satisfaction of the NVC how the project will result in SEB (DWLBC 2005).

The Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the Clearance of Native Vegetation Associated with the Minerals and Petroleum Industry (DWLBC 2005) identify common objectives in the administration of the NV Regulations. Specifically, proposed mining operations should ensure:

- That there is no practicable alternative that would avoid the clearance of native vegetation, the clearance of less vegetation or the clearance of less significant vegetation.
- The retention and enhancement of biodiversity, native vegetation and landscape values.
- The restoration of native vegetation by land users to maintain and enhance biodiversity, protect water quality and conserve soil resources.
- Biological diversity of vegetation is maintained through appropriate land management practices, including a suite of measures from vegetation retention and re-establishment.
- Where native vegetation clearance is unavoidable, measures are undertaken to counterbalance the loss of that vegetation with a significant environmental benefit either on the site or within the same region, either by works undertaken by the proponent, or through payment of money into the native vegetation fund (as established under the *Native Vegetation Act 1991* (SA)).
- The clearance of higher value vegetation should be offset by a higher significant environmental benefit.
- The significant environmental benefit should support the highest possible biodiversity outcomes in terms of quality, position in the landscape, and ongoing management.

3 Methods

A field assessment was undertaken over a two day period from 17 to 18 September 2013, involving a walk through assessment of the native flora species present within the study area.

The survey recorded vegetation associations and associated vegetation condition ratings throughout the area. The vegetation condition ratings were based on the SEB ratios provided in Table 1.

The identification of flora species were verified against Kutsche & Lay (2003) and Moore (2005).

Table 1. SEB ratios used to rate condition of vegetation communities

Condition	SEB Ratio	Indicators for Condition
Very Poor Weed-dominated with only scattered areas or patches of native vegetation	2:1	– Vegetation structure no longer intact (e.g. removal of one or more vegetation strata). – Scope for regeneration, but not to a state approaching good condition without intensive management. – Dominated by very aggressive weeds. – Partial or extensive clearing (greater than 50% of area). – Poor. – Evidence of heavy grazing (tracks, browse lines, species changes, no evidence of solid surface crust).
Poor Native vegetation with considerable disturbance	4:1	– Vegetation structure substantially altered (e.g. one or more vegetation strata depleted). – Retains basic vegetation structure or the ability to regenerate it. – Very obvious signs of long-term or severe disturbance. – Weed dominated with some very aggressive weeds. – Partial clearing (10 to 50% of area). – Evidence of moderate grazing (tracks, browse lines, soil surface crust extensively broken).
Moderate Native vegetation with some disturbance	6:1	– Vegetation structure altered. – Most seed sources available to regenerate original structure. – Obvious signs of disturbance (e.g. tracks, bare ground). – Minor clearing (less than 10 % of area). – Considerable weed infestation with some aggressive weeds. – Evidence of some grazing (tracks, soil surface crust patchy).
Good Native vegetation with little disturbance	8:1	– Vegetation structure intact (e.g. all strata intact) – Disturbance minor, only affecting individual species. – Only non-aggressive weeds present. – Some litter build-up.
Intact Vegetation	10:1	– All strata intact and botanical composition close to original. – Little or no signs of disturbance. – Little or no weed infestation. – Soil surface crust intact. – Substantial litter cover.

Source: DWLBC (2005)

4 Results

4.1 Vegetation Survey Results

Three vegetation associations were identified throughout the study area (Figure 1) as listed below:

- *Atriplex vesicaria* (Bladder saltbush) +/- *Maireana ericantha and Sclerolaena cuneata* low open shrubland with open gibber (Vegetation Association 1),
- *Cullen australasicum* / *Senecio lanibracteus* low shrubland (Vegetation Association 2)
- *Atriplex vesicaria / Sclerolaena cuneata* very open shrubland (Vegetation Association 3)

Full species lists for each vegetation association have been documented in Appendix B, with a summary of dominant species and vegetation condition documented in Table 2 to Table 4. A total of 57 native species were identified in all vegetation associations within the proposed MPL area surveyed.

Vegetation association 1 – *Atriplex vesicaria +/- Maireana ericantha and Sclerolaena cuneata low open shrubland with open gibber*

Atriplex vesicaria (Bladder saltbush) +/- *Maireana ericantha* and *Sclerolaena cuneata* low open shrubland with open gibber was the dominant vegetation association within the study area, occupying an area of 639.1 ha. This association comprised of low chenopod open shrubland with patches of un-vegetated open gibber and dense vegetation along the minor ephemeral drainage lines (Plate 1). The overstorey species were sparsely distributed and only observed within the minor ephemeral drainage lines. The sparse distribution of overstorey species within the association may be attributed to the gilgais and sub-soil condition. The vegetation association supported a reasonable covering of annual species following recent rains. No species of conservation value were identified.

Cattle activity was evident (scats, soil disturbance, trampling and slight grazing) particularly throughout the minor ephemeral drainage lines (Plate 2). Cattle grazing was primarily evident on the juvenile plants of the overstorey species. A number of rabbit warrens were also observed throughout the area. Old exploration tracks and pastoral roads were also observed in areas south of the current ML and east of the eastern creek line (Plate 3).

Two weed species were identified throughout vegetation association 1*, Malvastrum americanum* and *Sonchus oleraceus.* Both species were located north of ML6314 and in very small numbers.

The overall vegetation condition was moderate for vegetation association 1, due to the evidence of grazing and slight disturbance. This association has been allocated an overall SEB risk rating of 6:1.

Table 2. Summary of vegetation association 1 - *Atriplex vesicaria +/- Maireana ericantha and Sclerolaena cuneata low open shrubland with open gibber*

Overstorey and midstorey species	*Eremophila serrulata* *Pittosporum angustifolium* *Santalum acuminatum* *Senna sp.*
Common Understorey species	*Abutilon halophilum* *Astrebla pectinata* *Atriplex spongiosa* *Atriplex vesicaria* *Digitaria brownii* *Dissocarpus paradoxus*

	Enneapogon avenaceus *Enteropogon acicularis* *Eragrostis setifolia* *Leiocarpa leptolepis* *Maireana aphylla* *Maireana ericantha* *Panicum decompositum* *Polycalymma stuartii* *Ptilotus obovatus var. obovatus* *Pycnosorus eremaeus* *Salsola kali* *Sclerolaena cuneata* *Sclerolaena diacantha* *Sclerolaena divaricata* *Setaria constricta*
Emergent species	None recorded
Conservation significant flora species	None recorded
Weed species	*Sonchus oleraceus* *Malvastrum americanum*
Condition	*Atriplex vesicaria* (Bladder saltbush) +/- *Maireana ericantha* and *Sclerolaena cunceata* low open shrubland with open gibber was considered to have a condition rating of 6:1.

Plate 1. Vegetation association 1 - *Atriplex vesicaria +/- Maireana ericantha and Sclerolaena cuneata low open shrubland with open gibber*

Plate 2. Cattle tracks within a minor ephemeral drainage line

Plate 3. Old Pastoral road located in the study area, south of ML6314

Vegetation association 2 - *Cullen australasicum/ Senecio lanibracteus* low shrubland

The *Cullen australasicum/ Senecio lanibracteus* low shrubland vegetation association was located along the major ephemeral drainage lines throughout the study area (Plate 4). These major drainage lines were densely vegetated in comparison to the other two vegetation associations.

Some cattle grazing was evident with heavy soil disturbance and tracks evident within the creeklines. One weed species was identified, *Sonchus oleraceus* (sowthistle). This species was observed at the major drainage line located east of ML6314. *S. oleraceus* formed a dense population in locations where water persisted for regionally prolonged periods.

The overall vegetation condition was moderate for vegetation association 2, due to the evidence of grazing and presence of weed species. This association has been allocated an overall SEB risk rating of 6:1.

Table 3. Summary of vegetation association 2 - *Cullen australasicum* / *Senecio lanibracteus* low shrubland

Overstorey and midstorey species	*Acacia aneura*
Common Understorey species	*Senecio lanibracteus* *Aristida holathera ssp. holathera* *Astrebla pectinata* *Atriplex holocarpa* *Atriplex vesicaria* *Cullen australasicum* *Cyperus sp.* *Enteropogon acicularis* *Lavatera plebeia* *Maireana aphylla* *Maireana sp.* *Polycalymma stuartii* *Pycnosorus eremaeus* *Setaria constricta*
Emergent species	None recorded
Conservation significant flora species	None recorded
Dominant weed species	*Sonchus oleraceus*
Condition	The *Cullen australasicum* / *Senecio lanibracteus* was considered to have a rating of 6:1.

Plate 4. Vegetation association 2 - *Cullen australasicum* / *Senecio lanibracteus* low shrubland

Vegetation association 3 – *Atriplex vesicaria / Sclerolaena cuneata very open shrubland*

The *Atriplex vesicaria / Sclerolaena cuneata* vegegation association is located on weathered bulldog shale, east of the current ML. This association was sparsely populated with the lowest species density and diversity of the three vegetation associations identified within the study area (Plate 5). No weed species were recorded.

Activity of native fauna within this vegetation association was high evidenced by the high number of burrows, in particular reptiles. Rabbit warrens were also prevalent throughout this vegetation association.

The overall vegetation condition was moderate for vegetation association 3, due to evidence of grazing. Despite the low flora species diversity and evidence of rabbits in comparison to the other associations, the high activity of native fauna in this association justified an overall SEB risk rating of 6:1.

Table 4. Summary of vegetation association 3 – *Atriplex vesicaria / Sclerolaena cuneata very open shrubland*

Overstorey and midstorey species	None recorded
Understorey species	*Arabidella glaucescens* *Atriplex quinii* *Atriplex vesicaria* *Pycnosorus eremaeus* *Salsola kali* *Sclerolaena cuneata* *Senecio lanibracteus*
Emergent species	None recorded
Conservation significant flora species	None recorded
Weed species	None recorded
Condition	*Atriplex vesicaria / Sclerolaena cuneata* vegetation association was considered to have a condition rating of 6:1

Plate 5. Vegetation association 3 – *Atriplex vesicaria / Sclerolaena cuneata very open shrubland*

4.2 Flora of Conservation Significance

No flora species with a state or national conservation rating were detected during the survey.

4.3 Fauna Desktop Study

The clearance of native vegetation may have a localised impact on the native fauna in the area. A desktop study has been conducted by COOE to compile existing information on the native fauna species recorded within (or in proximity to) the study area and is summarised below. The desktop assessment consisted of the following:

- Review of the Environmental & Biodiversity Services (EBS) Flora and Fauna Assessment, Peculiar Knob report, dated March 2007 – to identify fauna previously recorded in proximity to the study area, and
- Review of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) approvals conditions for the PK Project.

4.3.1 Mineral Lease 6314

A flora and fauna assessment comprising background research and field surveys was undertaken for the ML6314 area and access road (originating from adjacent the OzMinerals Prominent Hill Mine haul road to PK ML6314) by EBS in March 2007. The results from this study were subsequently outlined in the PK Iron Ore Project Mining and Rehabilitation Program (now referred to as, 'Program for Environment Protection and Rehabilitation' (PEPR)), dated 4 July 2011.

Fauna recorded during the March 2007 survey at sites PK 003, PK 004, PK 005 and PK 006 have been documented in Table 5 and Table 6 as they are considered to represent similar vegetation associations identified in the current study. Sites PK 003 to PK 005 are located within ML6314 and site PK 006 is located approximately 250 metres south of ML6314.

Table 5. Vertebrate captured at PK fauna sites PK 003, PK004, PK 005 and PK 006, March 2007 (EBS 2007)

Location	Species	Common Name
GROUND-DWELLING MAMMALS		
PK004	*Leggadina forresti*	Forest Mouse
PK004	*Planigale gilesii*	Giles Planigale
PK004, PK005	*Planigale tenuirostris*	Narrow-nosed Planigale
PK005, PK006	*Sminthopsis crassicaudata*	Fat-tailed Dunnart
PK006	*Sminthopsis macroura*	Stripe-tailed Dunnart
REPTILES		
PK003, PK004, PK005, PK006	*Ctenotus olympicus*	Eastern Spotted Ctenotus
PK004	*Delma butleri*	Unbanded Delma
PK005	*Diplodactylus byrnei*	Gibber Gecko
PK006	*Lerista muelleri*	Dwarf Three-toed Slider
PK003	*Lialis burtonis*	Burton's Snake-lizard
PK004	*Menetia greyii*	Common Dwarf Skink
PK003	*Suta suta*	Curl Snake
PK005	*Tiliqua rugosa*	Sleepy Lizard
BATS		
PK004, PK005	*Nyctophilus geoffroyi*	Lesser Long-eared Bat

Table 6. Birds recorded at Peculiar Knob within and surrounding ML6314 (EBS 2007)*

Location	Species	Common Name
PK003, PK004	*Amytornis textilis*	Thick-billed Grasswren
PK003, PK004, PK005, PK006	*Anthus novaeseelandiae*	Richard's Pipit
PK003, PK004	*Aquila audax*	Wedge-tailed Eagle
PK003, PK004	*Calamanthus campestris*	Rufous Fieldwren
PK003, PK004	*Charadrius australis*	Inland Dotterel
PK003, PK004, PK005, PK006	*Cincloramphus cruralis*	Brown Songlark
PK005, PK006	*Dromaius novaehollandiae*	Emu
PK003, PK004, PK005, PK006	*Epthianura aurifrons*	Orange Chat
PK003, PK004, PK005, PK006	*Epithianura tricolor*	Crimson Chat
PK003, PK004, PK005, PK006	*Malurus leucopterus*	White-winged Fairywren
PK005, PK006	*Ocyphaps lophotes*	Crested Pigeon
PK005, PK006	*Phylidonyris albifrons*	White-fronted Honeyeater
PK005, PK006	*Turnix velox*	Little Button-quail
PK003, PK004	*Vanellus tricolor*	Banded Lapwing

***NB.** The EBS report (2007) provides general locations for the bird species observed for 'Buffer Zone' and 'Mining Lease'. Sites PK 003 and PK 004 are identified as being located within the Buffer Zone (around the high impact mining zone). Sites PK 005 and PK 006 are identified as being located within the Mining Lease. Birds may not have been observed in their exact site locations identified in Table 6, but rather in the general area. COOE has provided these site locations rather than the EBS general locations for consistency.

4.3.2 *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

As part of the 2007 fauna assessment, EBS performed an EPBC Act Protected Matters database search to identify the likelihood of species of conservation significance occurring within and surrounding the PK study area. This data has been documented in Appendix C.

The *Amytornis textilis modestus* (Thick-billed Grasswren) has a national rating of vulnerable and a State rating of rare. This species and its habitat was identified in the EPBC Act Protected Matters Report as likely to occur within the nominated area and was subsequently detected on site during the 2007 EBS survey. As part of the 2007 assessment conducted by EBS, it was identified that mining activities (drilling and operational works) will impact on the population of the Thick-billed Grasswren within ML6314.

The Thick-billed Grasswren was observed during the COOE September 2013 survey and was also observed around the site during the COOE July 2013 survey, in the chenopod low shrubland with open gibber association (association 2) within an area of dense Blue Bush.

The PK Project was deemed to be a controlled action on date 9 June 2011 and subsequently approved with conditions on date 27 August 2012. On 30 October 2012 Southern Iron Pty Ltd was provided with a Variation to Conditions Attached to Approval. The variation involved the footprint of the PK Project, specifically that the person taking the action must ensure that no more than 523 ha of potential *Amytornis texilis modestus* habitat is removed from within the PK study area, as indicated in Appendix D dated 27 August 2012.

Consideration should be given to this condition in any proposed expansion of PK Project operations involving the removal of native vegetation that may be inhabited by *Amytornis texilis modestus*. The conditions for clearance of habitat for threatened fauna is further clarified in the Guidelines for a Native Vegetation SEB Policy (DWLBC 2005) where it is stated that, 'if the clearance removes any habitat for native fauna species that are listed under State (NPW Act) or Commonwealth (EPBC Act) legislation as threatened at any level, options for replacing the removed habitat should be considered'.

5 Significant Environmental Benefit

5.1 Extent of Vegetation Clearance

The total area to be cleared and vegetation associations to be disturbed is based on preliminary drawings provided by Arrium. The exact location of any of the proposed waste dump clearance areas for ML6314 has been identified (Figure 1). The total area to be cleared is provided in Table 7.

Within vegetation association 1, 56.52 ha of vegetation will require clearing as part of the proposed expansion of the PK operations. The SEB offset area has been calculated in Table 7. Calculation of the size of the PK expansion through the surveyed vegetation association was estimated from Map '19972A_Perculiar_Knob_Mine_20cm_Mosaic_August2012' provided to COOE by Arrium.

It should be noted that if ecological restoration activities will be achieved on-site, on completion of mining activities, then the initial SEB ratio will be reduced by 50% (DWLBC 2005). Should Arrium Mining undertake an on-site restoration program for the total area disturbed on completion of mining operations the total SEB offset area can be reduced by 50% to 3:1 hectares (Table 7.

Table 7. Vegetation to be cleared for the study area

Vegetation Community	Initial SEB ratio	Area surveyed (Ha)	Total Area to be Cleared (ha)	Offset Area (ha) (without restoration)	Offset Area (ha) (with restoration, 3:1)
Vegetation association 1 - *Atriplex vesicaria* (Bladder saltbush) +/- *Maireana ericantha and Sclerolaena cuneata* low open shrubland with open gibber	6:1	639.1	56.52	339.12	169.56
Vegetation association 2 - *Cullen australasicum* / *Senecio lanibracteus* low shrubland	6:1	18.49	-	-	-
Vegetation association 3- *Atriplex vesicaria* / *Sclerolaena cuneata* very open shrubland	6:1	13.91	-	-	-
Total		**671.5**	**56.52**	**339.12**	**169.56**

5.2 Potential Options for Provision of SEB

Where native vegetation is proposed to be cleared, the control and management strategy will be the SEB that is proposed to offset the native vegetation clearance (e.g. at the site of the operations or within the same region of the state) (DMITRE 2012).

Some possible ways SEB may be provided include (DMITRE 2012):

- Acquiring land, protecting and funding ongoing management of those areas (may include the donation to organisations for conservation) and/or undertaking revegetation/restoration activities on that land to re-establish habitats.
- Supporting research into rehabilitation of ecosystems/habitats.
- Supporting regionally based natural resources management projects with a biodiversity focus.
- Removal of threats/management of existing vegetation (e.g. Weed management on roadsides).
- Working with local government or other bodies to undertake environmental remediation or revegetation in areas under the control of such bodies (e.g. Re-establish roadside vegetation).
- Fund/undertake projects in crown estate parks and reserves in the region.
- Targeted feral animal reduction programs aimed at assisting the recovery of specific species.
- Any other approved activities as identified by the proponent that are likely to have a SEB.

If none of the above can be provided, payment into the Native Vegetation Fund may need to be made (see Section 6).

Arrium Mining have already implemented a range of offset strategies for past vegetation clearance. A Biodiversity Offset Strategy was achieved with Nature Foundation SA to address the conservation of the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*) (Nature Foundation SA, 2012). The agreement is to undertake a four year research project and habitat management to achieve a Significant Environmental Benefit. A combination of restoration works, reduction in predation and grazing impacts and monitoring will improve the habitat and viability of the Thick-billed Grasswren.

6 Native Vegetation Fund Payment

In the event that revegetation and rehabilitation of offset areas is unsuccessful, other offset activities should be considered and implemented if necessary, including payment into the Native Vegetation Fund (Table 8). Should a payment into the Native Vegetation Fund be the preferred option to satisfy the SEB, the following formula determines the relative amount to be contributed (DPTI, 2011):

Payment into NV Fund =

(Land value per ha x required SEB in ha) + (management fee per ha x area cleared)

Land value for the Coober Pedy region is set at $20/ha (PB 2012). The management fee of $800 is a flat rate calculated by the Native Vegetation Council.

Table 8. Calculation of SEB compensation for Vegetation Association 1

Vegetation Association	SEB Ratio	Total Estimated Clearance (ha)	Management Fee ($)	Land Value per ha ($)	Offset Area (ha)	Required Payment ($)
1	6:1	56.52	800	20	339.12	51,998.40
Total		**56.52**			**339.12**	**$51,998.40**

Total payment required to satisfy MPLA and operational expansion for SEB is = **$51,998.40**

7 Discussion

The vegetation proposed to be cleared by Arrium Mining as part of the proposed MPL to expand PK operations is of good condition with the majority of the vegetation classified as 6:1 SEB condition ratios. No flora species of state or national significance are found within the surveyed area.

Arrium Mining will be required to revegetate 169.56 ha of on-site land if the proposed MPL surrounding ML6314 is granted and clearing activities are conducted. Arrium Mining has a current program that meet and exceeds the requirements for discharge of funds in-line with the Vegetation Offset Guidelines (DPTI 2011). This is demonstrated with the Thick-billed Grasswren Research Project agreement with the Nature Foundation SA (Nature Foundation SA, 2012) and subsequent variation to the EPBC conditions that no more than 523 ha of the species' habitat is removed from the PK Iron Ore project area.

7.1 Survey Limitations

Due to the limited timeframe and size of the survey sites, the walk-through assessment did not cover the entire area. Subsequently, there may have been species present which were not recorded. Some species were not identified to species level due to a lack of distinguishing features such as seeds and flowers.

8 References

DPTI. 2011. Vegetation Offset Guidelines. Department of Planning, Transport and Infrastructure, Government of South Australia. March 2011.

DWLBC. 2005. Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the Clearance of Native Vegetation Associated with the Minerals and Petroleum Industry. Prepared for the Native Vegetation Council. Department of Water, Land and Biodiversity Conservation, Government of South Australia. September 2005.

EBS. 2007. Flora and fauna assessment, Peculiar Knob. A report by Environmental and Biodiversity Services for Parsons Brinckerhoff.

Kutsche, F and Lay, B. 2003. Field Guide to the Plants of Outback South Australia. Department of Water, Land and Biodiversity Conservation, South Australia.

Moore, P. 2005. A Guide to Plants of Inland Australia. Reed New Holland, NSW.

Nature Foundation SA. 2012. Biodiversity Offset Strategy for Impacts to the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*). Revised Strategy-2nd October 2012.

PB. 2012. Peculiar Knob Iron Ore Mining Project-Mining and Rehabilitation Program. Parsons Brinckerhoff, Adelaide.

SAAL NRM Board. 2010. Regional Natural Resources Management Plan for the SA Arid Lands Natural Resources Management Region. Volume 1-Ten-Year Strategic Plan. South Australian Arid Lands Natural Resources Management Board.

APPENDICES

Appendix A Area coordinates

Datum: GDA94

Date: 17th and 18th of September 2013

Data quality: Approx. 5 metres

Instrument: Garmin Oregon 550

Site	Coordinates							
	NE Corner		NW Corner		SE Corner		SW Corner	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
Study area	538222.23	6728728.74	535330.62	6727020	539305.21	6726684.51	536282.2	6725215.7

Appendix B Species Lists

Key
D- Dense
M-Mid-dense
S - Sparse
R -Rare (only 1 or 2 plants observed)

Vegetation Association 1

Species	Common Name	Distribution	Comments
Overstorey/ mid storey			
Eremophila serrulata	Green Emubush	R	Located in minor drainage lines
Pittosporum angustifolium	Native apricot	S	Located in minor drainage lines, heavily grazed
Santalum acuminatum	Quandong	R	Located in minor drainage lines, heavily grazed
Senna sp.		R	
Understorey			
Abutilon halophilum	Desert Lanterns	M	
Abutilon leucopetalum	Desert Chinese Lantern	R	
Aristida contorta	Curly Wire Grass	S	Senescing
Aristida holathera ssp. holathera	Tall Kerosene Grass	S	Senescing
Astrebla pectinata	Barley mitchell grass	D	
Atriplex quinii	Kidney Fruit Saltbush	R	
Atriplex holocarpa	Pop salt bush	S	Senescing
Atriplex lindleyi	Baldoo	S	
Atriplex nummularia	Old Man saltbush	S	
Atriplex spongiosa	Pop saltbush	M	
Atriplex vesicaria	Bladder saltbush	D	
Austrostipa nitida	Rough spear grass	S	Senescing
Convolvulus remotus	Common Bindweed	R	
Cullen australasicum	Tall Scurf-pea	S	Particularly common around minor drainage lines
Digitaria brownii	Cotton Panic Bush	M	
Dissocarpus paradoxus	Ball Bindi	M	Senescing
Dodonaea microzyga	Brilliant Hopbush	R	
Enneapogon avenaceus	Common Bottle Washer	M	
Enteropogon acicularis	Umbrella grass	M	
Eragrostis setifolia	Bristly Love-grass	M	
Erodium cygnorum	Blue Storksbill	S	
Frankenia serpyllifolia	Thyme Sea-Heath	S	
Gunniopsis papillata	Chinnock	S	
Lavatera plebeia	Australian Hollyhock	S	

Species	Common Name	Distribution	Comments
Leiocarpa leptolepis	Pale Plover Daisy	M	Particularly common around minor drainage lines
Lotus cruentus	Red-flowered Lotus	S	
Maireana aphylla	Cotton-bush	M	Particularly common around minor drainage lines
Maireana astrotricha	Low Bluebush	S	
Maireana eriantha	Woolly Bluebush	D	Senescing
Maireana sp.		S	Particularly common around minor drainage lines
Mairenana georgei	Slit-wing Bluebush	S	
Panicum decompositum	Native Millet	M	
Podaxis sp.		R	
Polycalymma stuartii	Poached Egg Daisy	M	
Ptilotus obovatus var. obovatus	Silver Mulla Mulla	M	
Pycnosorus eremaeus	Golden Billybuttons	D	
Rhagodia spinescens	Creeping Saltbush	S	
Rhodanthe floribunda	White sunray	S	
Salsola kali	Soft Roly Poly	M	
Sclerolaena cuneata	Tangled Bindyi	D	
Sclerolaena diacantha	Grey Bindyi	D	Senescing
Sclerolaena divaricata	Pale Poverty Bush	M	
Sclerolaena eriacantha	Silky Bindyi	S	Senescing
Sclerolaena lanicuspis	Woolly Copper Burr	S	Senescing
Senecio lanibracteus	Desert groundsel	S	Particularly common around minor drainage lines
Setaria constricta	Knotty-butt grass	M	
Tecticornia medullosa	Desert Glasswort	S	Particularly common around minor drainage lines
Zygophyllum ammophilum	Sand twinleaf	S	
Weeds			
Sonchus oleraceus	Sow thistle		
Malvastrum americanum	Wild Mulberry		

Vegetation Association 2

Species	Common Name	Distribution	Comments
Overstorey/ mid storey			
Acacia aneura	Mulga	R	Heavily grazed
Understorey			
Senecio lanibracteus	Desert groundsel	D	
Aristida holathera ssp. holathera	Tall Kerosene Grass	M	Senescing
Astrebla pectinata	Barley mitchell grass	D	
Atriplex holocarpa	Pop salt bush	M	Senescing
Atriplex vesicaria	Bladder saltbush	M	
Cullen australasicum	Tall Scurf-pea	D	
Cyperus sp.		M	
Dichanthium sericeum		S	
Enteropogon acicularis	Umbrella grass	M	
Eragrostis setifolia	Bristly Love-grass	S	
Frankenia serpyllifolia	Thyme Sea-Heath	R	
Goodenia berardiana		R	
Gunniopsis papillata	Chinnock	S	
Lavatera plebeia	Australian Hollyhock	M	
Leiocarpa leptolepis	Pale Plover Daisy	S	Senescing
Maireana aphylla	Cotton-bush	M	
Maireana astrotricha	Low Bluebush	S	
Maireana sp.		D	
Polycalymma stuartii	Poached Egg Daisy	M	
Ptilotus obovatus var. obovatus	Silver Mulla Mulla	S	
Pycnosorus eremaeus	Golden Billybuttons	D	
Rhagodia spinescens	Creeping Saltbush	S	
Setaria constricta	Knotty-butt grass	M	Senescing
Weeds			
Sonchus oleraceus	Sow thistle	M	High numbers evident along the deeper sections of the creek

Vegetation Association 3

Species	Common Name	Distribution	Comments
Arabidella glaucescens		R	
Atriplex quinii	Kidney Fruit Saltbush	R	
Atriplex vesicaria	Bladder saltbush	D	Senescing
Pycnosorus eremaeus	Golden Billybuttons	D	
Salsola kali	Buck Bush	M	
Sclerolaena cuneata	Tangled Bindyi	D	Senescing
Sclerolaena lanicuspis	Woolly Copper Burr	M	Senescing

Appendix C Fauna Database Results

Database search results compiled by EBS (2007) for fauna species previously recorded within close proximity to PK (EPBC 1999 Protected Matters Search (DEHWA, SAM 2007).

Class	Species Name	Common Name	Conservation Status	
			Aus	SA
AVES	*Acanthiza katherina*	Slender-billed Thornbill	VU	V
AVES	*Amytornis textilis modestus*	Thick Billed Grass wren	VU	R
AVES	*Aphelocephala pectoralis*	Chestnut-breasted Whiteface		R
AVES	*Apus pacificus*	Fork-tailed Swift	M	
AVES	*Ardea alba*	Great Egret	M	
AVES	*Ardea ibis*	Cattle Egret	M	
AVES	*Charadrius veredus*	Oriental Plover	Mi, M	
AVES	*Elseyornis melanops*	Black-fronted Dotteral		
AVES	*Merops ornatus*	Rainbow Bee-eater	M	
AVES	*Pedionomus torquatus*	Plains Wanderer	VU	V
AVES	*Pyrrholoaemus brunneus*	Redthroat		R
REPTILIA	*Ctenophorus tjantjalka*	Ochre Dragon		
REPTILIA	*Ctenotus olympicus*	Saltbush Ctenotus		
REPTILIA	*Ctenotus strauchii*	Short-legged Ctenotus		
REPTILIA	*Ctenotus uber*	Spotted Ctenotus		
REPTILIA	*Diplodactylus byrnei*	Pink-blotched Gecko		
REPTILIA	*Diplodactylus galeatus*	Mesa Gecko		
REPTILIA	*Egernia stokesii*	Gidgee Skink		
REPTILIA	*Gehyra variegata*	Tree dtella		
REPTILIA	*Heteronotia binoei*	Bynoe's Gecko		
REPTILIA	*Lerista muelleri*	Dwarf Three-toed Slider		
REPTILIA	*Ophidiocephalus taeniatus*	Bronzeback Snake-lizard	VU	V
REPTILIA	*Pogona vitticeps*	Central Bearded Dragon		
REPTILIA	*Tiliqua rugosa*	Sleepy lizard		
REPTILIA	*Tympanocryptis intima*	Smooth-snouted Earless Dragon		
MAMMALIA	*Pseudomys australis*	Plains Mouse	VU	V

Key

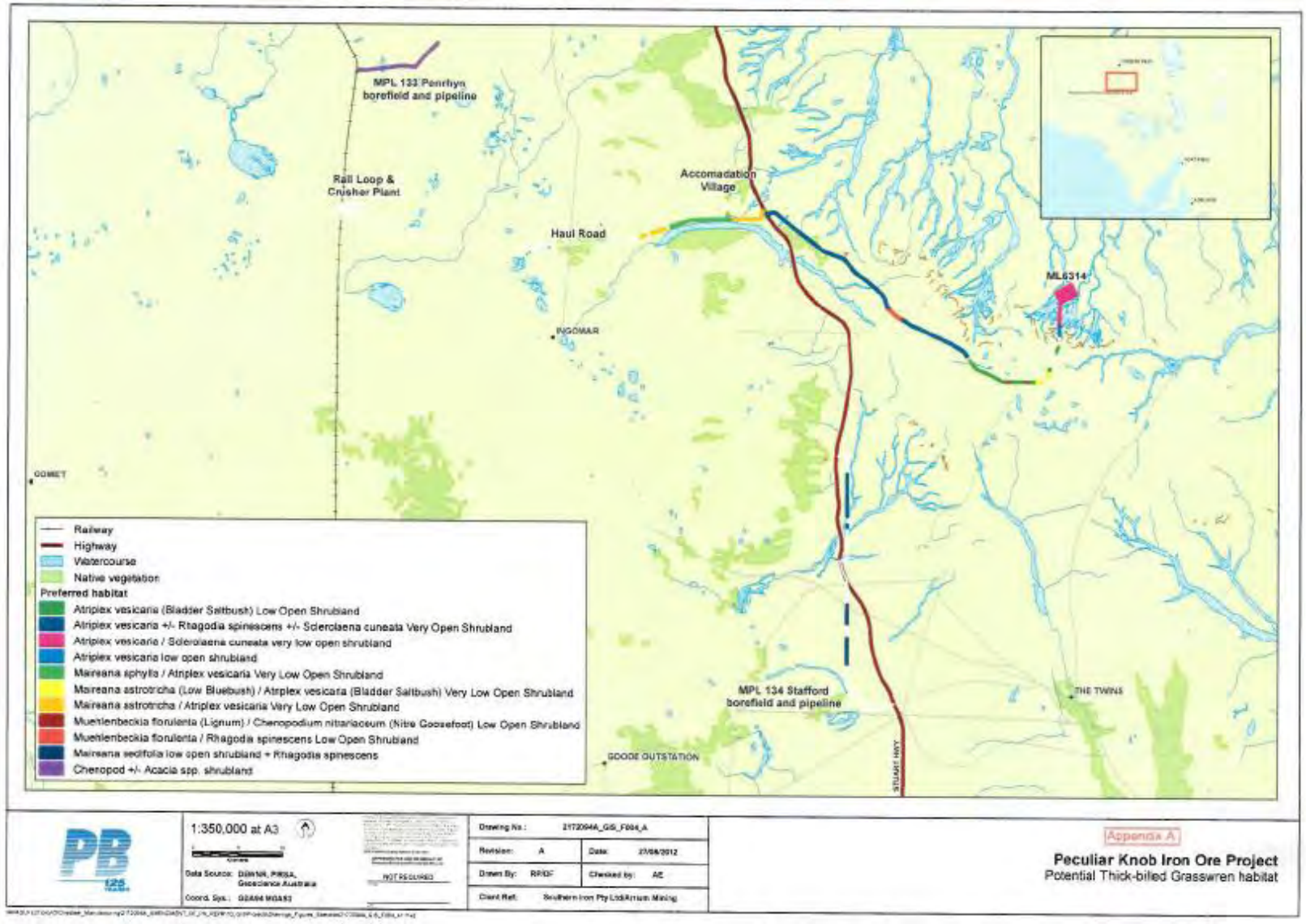
Regions:

Aus = Australia, SA = South Australia

Conservation Rating:

VU-vulnerable, Mi-migratory, M= Marine, V=Vulnerable, R=Rare

Appendix D Potential Thick-billed Grasswren habitat



Appendix E

Feral Animal Control Programme approval

Australian Government

Department of Agriculture, Water and the Environment

Mr Geoff Mills
Environmental Projects
Level 3, 117 King William Street
Adelaide SA 5000

Dear Mr Mills

Expansion of the Peculiar Knob Iron Ore Project, SA (EPBC 2014/7154): Feral Animal Control Plan.

Thank you for submitting, on behalf of Southern Iron Pty Ltd, the above management plan for approval in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Officers of the Department have advised me on the plan and on the requirements of the EPBC Act conditions of approval for the above project. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve the *Feral Animal Control Plan, Rev 4,* dated 4 March 2020. The approved plan must now be implemented.

Condition 11 of the approval means that if Southern Iron Pty Ltd wishes to implement the plan otherwise than in accordance with the approved plan, Southern Iron Pty Ltd must submit a revised *Feral Animal Control Plan* for approval by the Minister.

Should you require any further information please contact Vaughn Cox on (02) 6274 2005 or postapproval@environment.gov.au.

Yours sincerely

Greg Manning
Assistant Secretary
Assessments (WA, SA, NT), Post Approvals and Policy Branch

10 March 2020

Appendix F

Feral Animal Control Report 2020

SOUTHERN IRON PTY LTD

Peculiar Knob
Feral Animal Control Report 2020

Peculiar Knob

Peak Iron Mines – Perth Head Office ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 11, 28 The Esplanade Perth, WA 6000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748	**Peak Iron Mines – Adelaide Project Office** ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 12, 33 King William Street Adelaide, SA 5000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748

Date: 10 February 2022 **Doc.Ref:** S-2-REP-3-1004_A

Document Status

Rev No.	Author(s)	Responsible Manager(s)
Rev A	Tegan Stehbens	Diona Antonas Environment and Approvals Manager

Contents

1 BACKGROUND

The Feral Animal Control Programme is a requirement of Condition 7 (Offsets) of the Decision Notice 2014-7154 made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The condition is to offset residual significant impacts to the Thick-billed Grasswren (Eastern subspecies) (*Amytornis textilis modestus*).

The programme must be applied to a minimum area of 400 ha within the Interim Biogeographic Regionalisation for Australia (IBRA) Baltana sub-region (Stony Plains STP-07). Implementation of the programme must commence prior to any vegetation clearance of the Peculiar Knob Iron Ore Project expansion area and remain in place until the expansion area has been rehabilitated in accordance with Condition 3 (Habitat Rehabilitation) of Decision Notice 2014-7154. Condition 3 requires that the project expansion area be rehabilitated to 'a quality of habitat equivalent to the habitat removed'.

1.1 Objective

The programme objective is to abate threats to the Thick-billed Grasswren by controlling the impact of fox (*Vulpes vulpes*) and cat (*Felis catus*) predation, and habitat protection through rabbit (*Oryctolagus cuniculus*) control.

Secondary objectives as a result of the programme may include:

- a fauna threat abatement engagement opportunity with land managers
- an opportunity to facilitate the adoption of best practice baiting methods
- an opportunity to build on broader fauna threat abatement programmes
- an opportunity to establish tall shrubland plants suited to Thick-billed Grasswren habitat on ripped rabbit warrens.

1.2 Location

The Feral Animal Control Programme is applied to an area of 400 ha located approximately 20 km west of the Peculiar Knob Iron Ore Project (see Figure 1.1 and Figure 1.2)

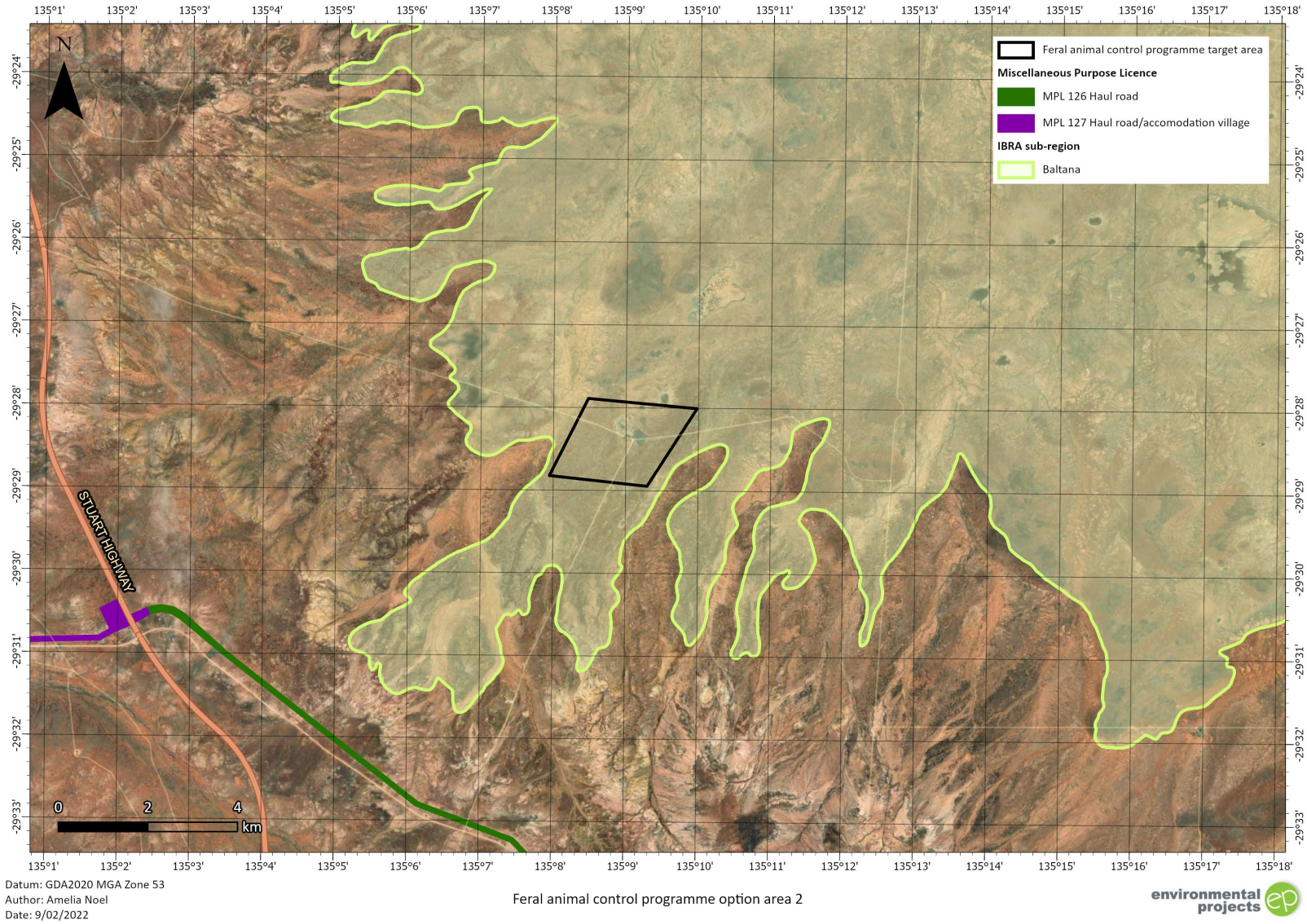


Figure 1.1 Feral Animal Control Programme location

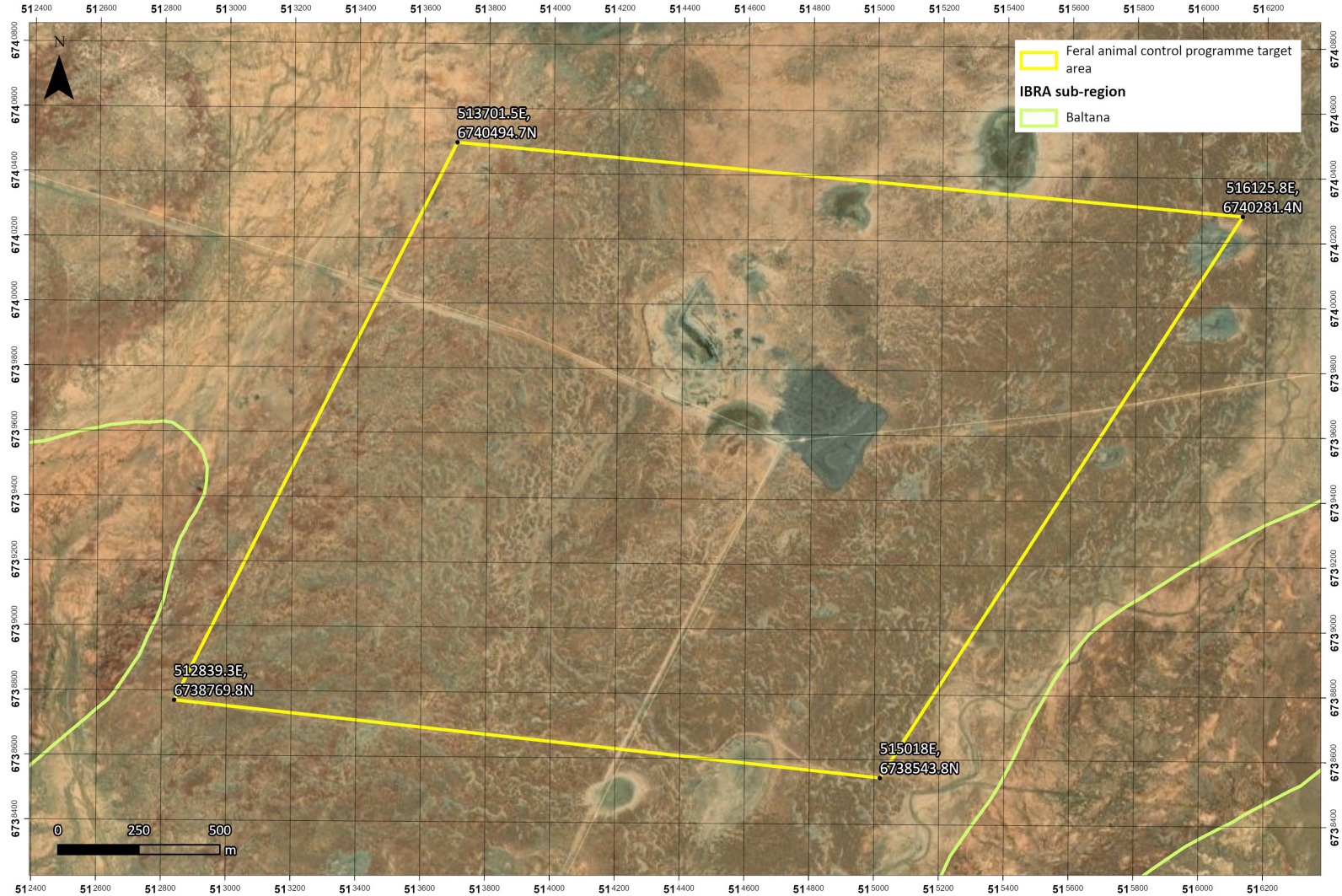


Figure 1.2 Feral Animal Control Programme area

2 FERAL ANIMAL CONTROL IMPLEMENTATION

Curiosity Cat baits were not yet commercially available in 2020 due to changes needed to legislation. As the legislation has now been amended, future events will include the Curiosity Cat baits (provided via SAAL Landscapes SA).

Land clearance commenced on 1 December 2020. 20.36 ha of the approved 81.08 ha has been cleared to-date, including 1.59 ha of Thick-billed Grasswren habitat.

2.1 Autumn 2020

The first implementation of the approved Feral Animal Control Programme was carried out by a feral animal control contractor in Autumn 2020 (21 May – 1 June). Fox off baits were laid as per the programme plan and checked on seven days over the fortnight. Five baits were taken, one of which was confirmed to be taken by a fox. All baits were collected on 1 June.

Cat traps were laid and spotlight shooting occurred on the seven nights. Nightly spotlighting failed to locate any rabbits, and an intensive search for rabbit warrens found no evidence of rabbits in the area.

Landholders were consulted on 21 May with no complaints and noted they were satisfied with the aspects of the programme.

2.2 Spring 2020

The second implementation of the programme was carried out by a feral animal control contractor in Spring 2020 (22 September – 10 October). Again, fox off baits were laid and checked over seven nights as per the programme plan. Spotlight shooting also occurred over the seven nights, during which one cat was shot. No rabbits or rabbit warrens were observed during the programme.

2.3 Thick-billed Grasswren sightings

A Thick-billed Grasswren was sighted on 21 May 2020 near the centre of the programme area (G. Mills 2020, personal communication June 2020).

Appendix G

Feral Animal Control Report 2021

SOUTHERN IRON PTY LTD

Peculiar Knob 2021
Feral Animal Control Report

Peculiar Knob

Peak Iron Mines – Perth Head Office ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 11, 28 The Esplanade Perth, WA 6000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748	**Peak Iron Mines – Adelaide Project Office** ABN: 66 619 708 468 **Central Iron Pty Ltd** ABN: 85 143 503 397 Level 12, 33 King William Street Adelaide, SA 5000 Contact: Marnus Bothma, CEO Email: marnus@peakiron.com Phone: 0408 198 748

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Secondary objectives as a result of the programme may include:

- a fauna threat abatement engagement opportunity with land managers
- an opportunity to facilitate the adoption of best practice baiting methods
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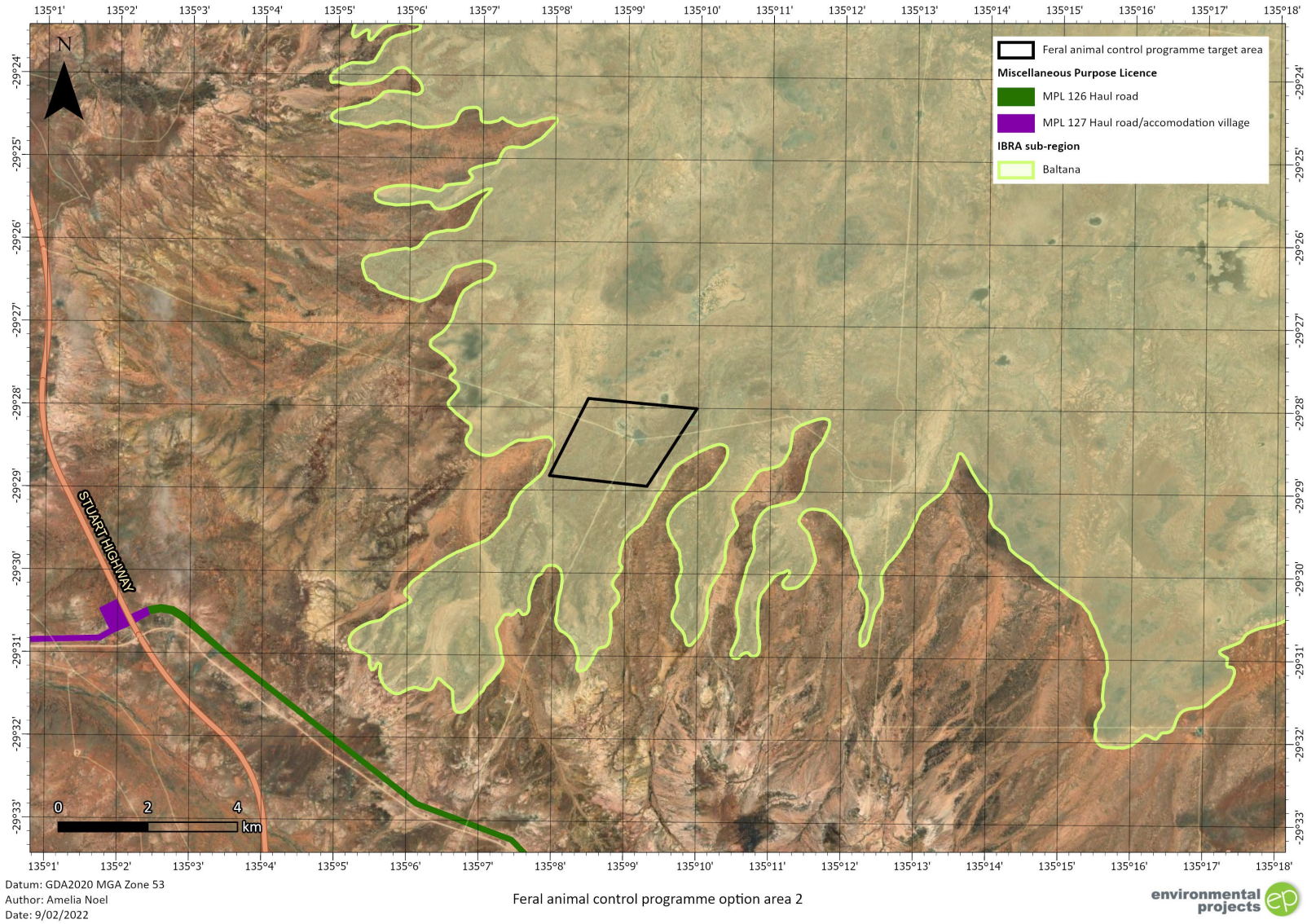

Figure 1.1 Feral Animal Control Programme location

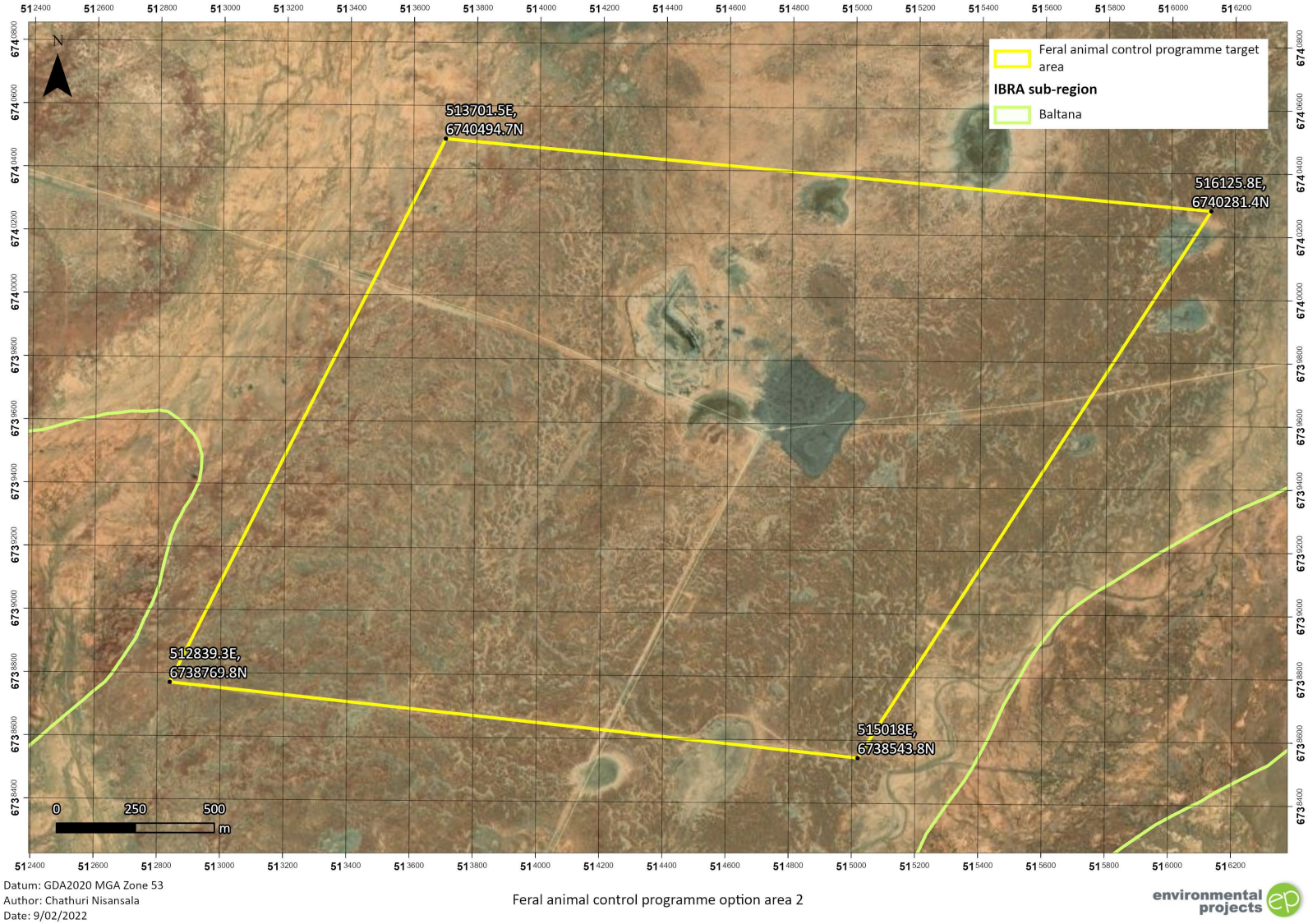

Figure 1.2 Feral Animal Control Programme area

2 FERAL ANIMAL CONTROL IMPLEMENTATION

Curiosity Cat baits were commercially available by Spring 2021 via SAAL Landscapes SA. Baits were ordered on the back of a larger order placed by SAAL Landscapes; however, SAAL Landscapes cancelled this order close to the time of the spring programme citing operational issues. The programme now has permission to order the baits direct from the manufacturer with SAAL Landscapes SA sign off.

Land clearance commenced on 1 December 2020. 51.28 ha of the approved 81.08 ha has been cleared to-date, including 28.13 ha of Thick-billed Grasswren habitat.

2.1 Autumn 2021

The Autumn 2021 programme was carried out by a feral animal control contractor from 7 May to 18 May 21. Fox off baits were laid and checked over this period, and there was also nightly spotlight shooting. Two cats and one kitten were shot. No rabbits or rabbit warrens were observed during the programme.

2.2 Spring 2021

The Spring 2021 programme was carried out by a feral animal control contractor from 23 September to 5 October, with fox off baits laid and nightly spotlight shooting. One cat was shot, and although no rabbits or rabbit warrens were observed, the remnants of a single rabbit was detected in the gut contents of the cat. It seems likely that the rabbit population is very low.

2.3 Thick-billed Grasswren sightings

No Thick-billed Grasswren were observed during implementation of the programme in 2021.