

CARRAPATEENA

EPBC Compliance Report 2023

Issue Date: March 2024



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

ACKNOWLEDGEMENTS

Acknowledgements go to all staff across the Carrapateena Operations for their contributions to the overall report and for undertaking all activities in a safe and effective manner. We also acknowledge the Kokatha People for their ongoing support and assistance provided at Carrapateena.

DOCUMENT CONTROL

CA-0000-ENV-REP-1039

Version	Description	Author	Approval	Date
1	EPBC Compliance Report 2023	Josh Allen Senior Advisor – Environment	Matthew Kidner Manager – HSHE & Social Performance	27/03/24

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EXECUTIVE SUMMARY

BHP Carrapateena submits this Compliance Report for the period January 2023 to December 2023; as required by the Conditions of Approval attached to EPBC 2017/7895 authorised under the *Environment Protection and Biodiversity Conservation Act, 1999* (Cth).

This Compliance Report has been prepared in accordance with the Annual Compliance Report Guidelines (DOE, 2014) and demonstrates compliance with the Conditions of Approval associated with EPBC 2017/7895.

1 INTRODUCTION

BHP is operating the Carrapateena mine located approximately 160 km north of Port Augusta, South Australia. On 2 May 2023 BHP Group Limited completed the acquisition of OZ Minerals Limited. The Carrapateena operation has been developed and operated by OZM Carrapateena Pty Ltd and OZ Minerals Carrapateena Pty Ltd, wholly owned by OZ Minerals Limited. The Carrapateena site has been integrated into the BHP Copper South Australia (SA) asset, also incorporating BHP's Prominent Hill mine, Olympic Dam mine and Oak Dam exploration sites. Copper SA falls under the BHP Minerals Australia business portfolio which also incorporates Western Australia Iron Ore, Nickel West, Coal, Mt Arthur Coal and Operations Services.

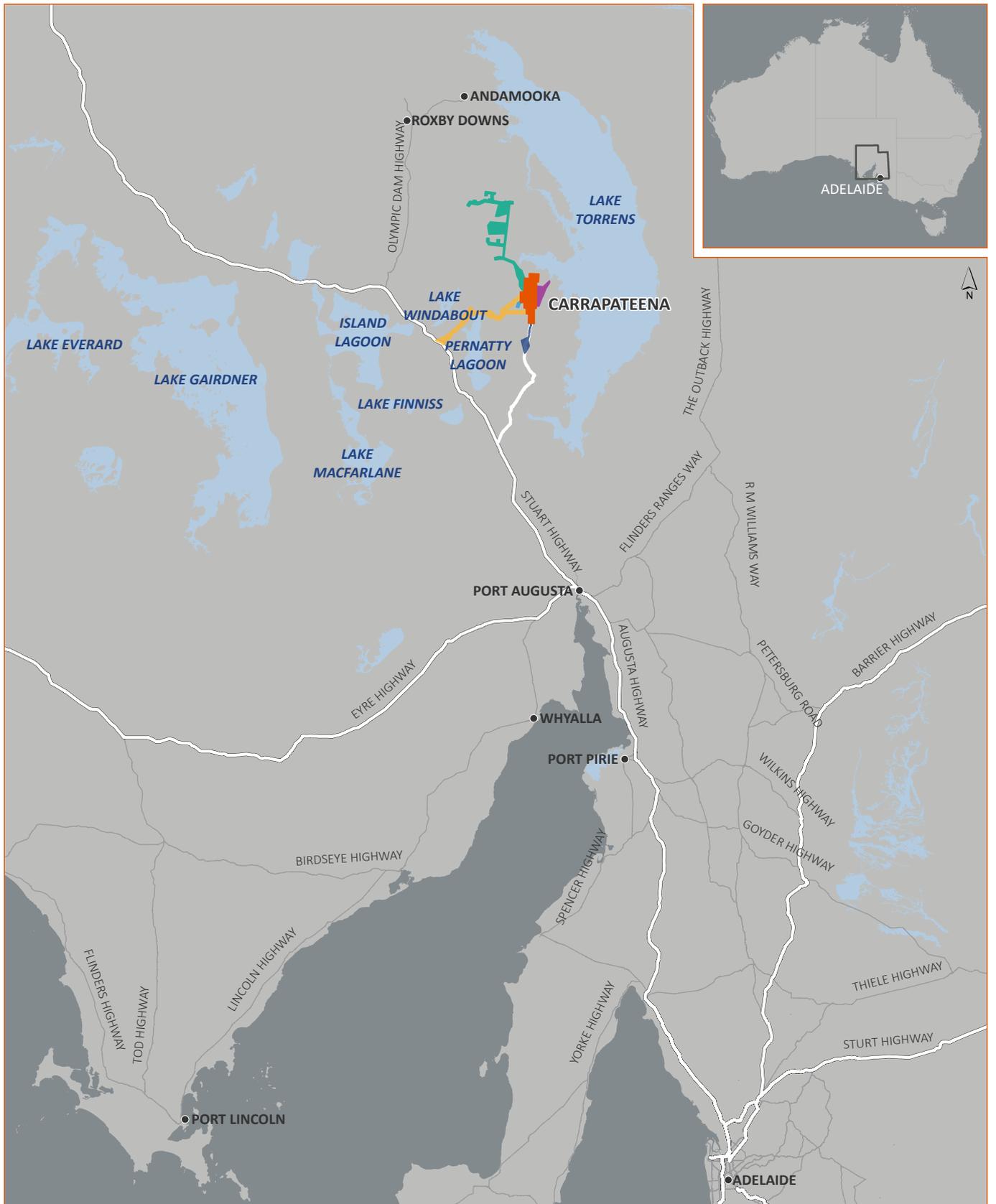
OZ Minerals previously submitted a Referral under the *Environment Protection and Biodiversity Conservation, Act 1999* (Cth) (EPBC Act) for Carrapateena in March 2017. The Carrapateena Operation (EPBC 2017/7895) was determined to be a Controlled Action in April 2017, to be approved via the *Mining Act, 1971* (SA) approvals process, in accordance with the Assessment Bilateral Agreement between the Government of South Australia and the Commonwealth of Australia. OZ Minerals submitted a Mining Lease Proposal (MLP) and Miscellaneous Purposes Licence (MPL) Management Plans (collectively referred to as the MLP) on 26 May 2017 (OZ Minerals, 2017a) to support applications for a Mining Lease and three MPLs as shown in Figure 1.1. An associated Response Document was submitted on 22 September 2017 (OZ Minerals, 2017b).

OZ Minerals received formal notification of the granting of the tenements ML 6471, MPL 152, MPL 153, MPL 154 on 3 January 2018 and MPL 156 was granted 11 December 2018. Subsequently, approval of Carrapateena under the EPBC Act was received on 29 March 2018, subject to Conditions of Approval; a variation of conditions was approved on 14 December 2018. The associated Program for Environment Protection and Rehabilitation (PEPR) for the tenements (OZ Minerals, 2018) was subsequently approved on 29 March 2018.

In November 2020, a consolidated PEPR was granted approval encompassing activities across all Carrapateena tenements (ML 6471, MPL 152, MPL 153, MPL 154 and MPL 156) (OZ Minerals, 2020).

BHP submits this Compliance Report as required by the Conditions of Approval EPBC 2017/7895.

Activities associated with Advanced Exploration, including the Airstrip, Workers' Accommodation Village, Access Road and Ancillary Infrastructure were referred as a component of EPBC 2012/6494 and determined to not be controlled actions and thus are outside the scope of this Compliance Report.



- KEY**
- Mineral Lease 6471
 - Airstrip and Tjungu Accommodation Village MPL 149
 - Western Infrastructure Corridor MPL 152
 - Eastern Radial Wellfield MPL 153
 - Southern Access Road and Radial Wellfield MPL 154
 - Northern Wellfield MPL 156



Figure 1.1: Operation location

2 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) 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	Organisation	Signature	Date
Elton Peebles	General Manager – Carrapateena	BHP		27 March 2024

3 KEY ACTIVITY INFORMATION

Key information related to the activity as approved under EPBC 2017/7895 are summarised in Table 3.1.

Table 3.1: Key Activity Information

Operation Name	Carrapateena	EPBC Number	2017/7895
Approval Holder	OZM Carrapateena Pty Ltd (58%) and OZ Minerals Carrapateena Pty Ltd (42%), wholly owned by BHP Lonsdale Investments Pty Ltd, a subsidiary of BHP Group Limited.		
Australian Company Number	149 626 255 and 007 756 443, respectively		
Approved Action	To construct and operate an underground sub-level caving mine, processing facility and associated support infrastructure, 65 km east of Woomera, SA (refer to EPBC referral 2017/7895 and variation received 14 December 2018)		
Operation Location	Located approximately 160 km north of Port Augusta. Nearby townships include Woomera (approximately 45 km west) and Roxby Downs (approximately 44 km north-west). Refer to Figure 1.1: Operation Location		
Site Contact	Elton Peebles, Carrapateena General Manager		
Address	2 Hamra Drive	City (Postcode)	Adelaide Airport (5950)
Telephone	+61 8 8422 3713	Email	elton.peebles@bhp.com
Reporting Period	01 January 2023 to 31 December 2023		

4 ACTIVITIES UNDERTAKEN DURING THE REPORTING PERIOD

BHP submits this EPBC 2017/7895 Compliance Report for the Carrapateena Mining Lease (ML 6471) and associated Miscellaneous Purposes Licences (MPL 149, MPL 152, MPL 153 and MPL 154) for the reporting period of 1 January 2023 to 31 December 2023.

Following disruption to on-ground activity in 2020 due to Covid-19, Nature Foundation, acting on behalf of OZ Minerals, initiated a program of land management on the South Gap Offset in 2021. The work program was dictated by the management goals of the offset, which include:

- Establish baseline conditions, including the distribution and condition of Plains Mouse habitat, the presence and distribution of target species, and the identification and prioritisation of local threats
- Refine the presence, distribution and abundance of Plains Mouse within the offset
- Manage total predation pressure (from Cats, Foxes and Wild Dogs)
- Maintain and/or enhance the condition of habitat for the benefit of Plain Mouse, through the management of total grazing pressure and invasive weeds
- Improve knowledge of local target species populations including how they respond to management locally.

Details of the activities undertaken during the reporting period are described in Table 4.1.

A copy of the South Gap EPBC Offset Annual Report is provided as Appendix A.

Table 4.1: Activities Undertaken During the Reporting Period

Management Goal	Activities Undertaken
Monitor the state of vegetation	Weed assessments Flora surveys using the rangeland assessment method (RAM) Jessup transects to measure habitat structure Re-sampling of shrub health to assess recovery rates from 2018 – 2020 drought. Commenced research on cracking clay function and ecology
Refine the presence, distribution and abundance of plains mouse within the offset	Baited motion camera program across twelve (12) sites Incidental surveys for other bird and reptile species
Reduce predation pressure	Four feral eradication campaigns (spotlight shooting) Predator monitoring with motion cameras
Reduce total grazing pressure	Maintain stock exclusion boundary fence Motion camera program including at a core goat habitat location Rabbit monitoring and warren fumigation Maintain a sustainable population of kangaroo within the offset to reduce impact – thermal cameras used in conjunction with a point-based survey methodology
Improve knowledge of local target species populations including how they respond to management locally	Collection of spatial data on the spread of all vegetation communities across the offset Property-wide monitoring using remote camera traps for Plains Mouse, feral animals and kangaroos to enable sufficient data for a food-web analysis Evening surveys for Night Parrot

Baited motion camera trapping efforts culminated in three confirmed Plains Mouse sightings across the twelve sites indicating population presence within the offset area. Details of the sightings were submitted to the Biological Databases of South Australia in March 2024.

Figure 4.1 shows the current disturbance footprint for activities subject to the action.

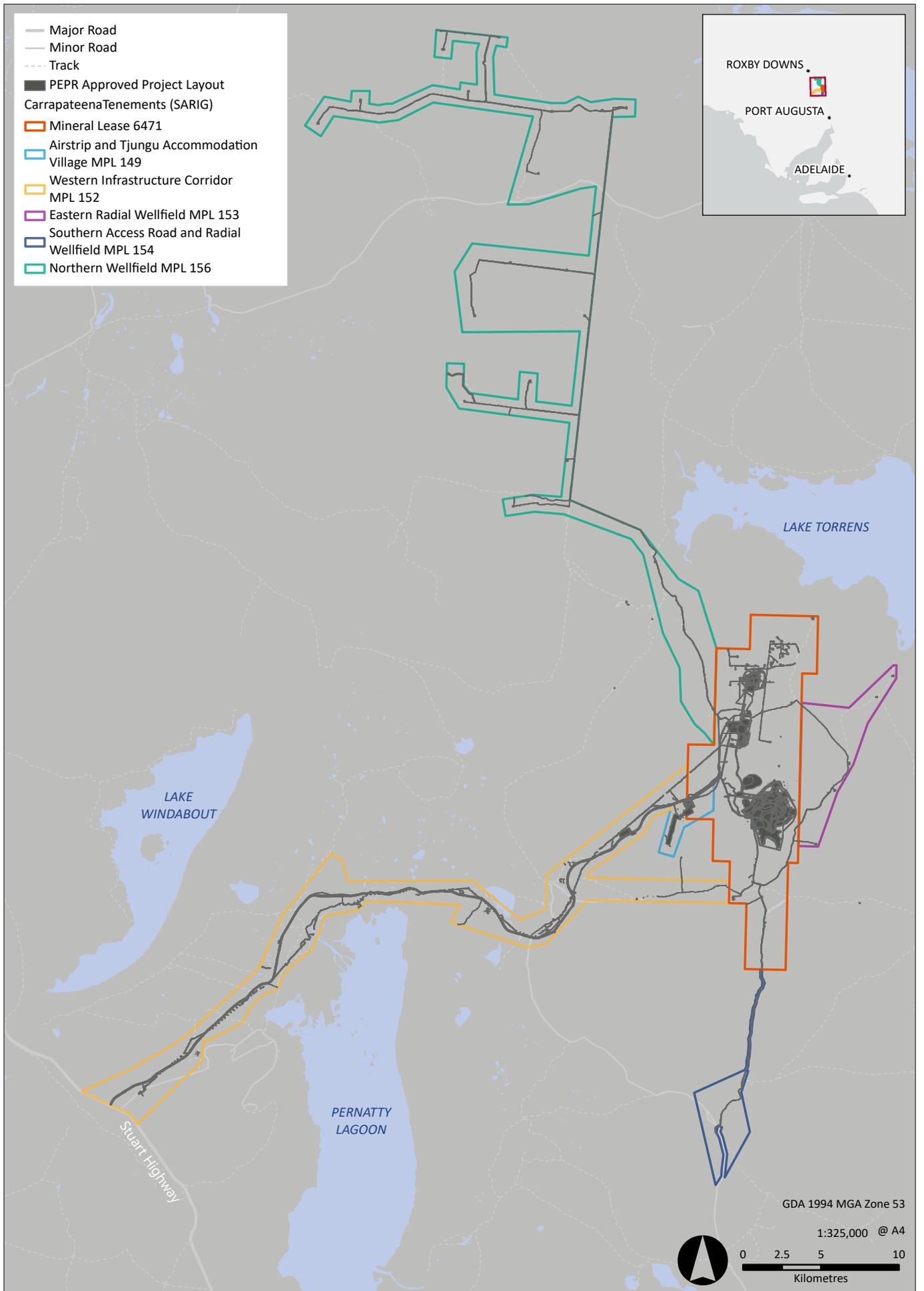


Figure 4.1 | Plan of Mining Operation Showing all Tenements Covered by Approved PEPR

5 EPBC ACT APPROVAL CONDITIONS AND COMPLIANCE STATUS

The Conditions of Approval associated with EPBC 2017/7895 are detailed in Table 5.1, together with clear statements regarding the status of compliance with the Conditions of Approval. Where necessary, statements regarding compliance are supported by a summary of evidence clearly demonstrating the conclusion that compliance with the condition was (or was not) fully met.

Table 5.1: EPBC Act Approval Conditions and Compliance Status

Condition number	Condition	Compliance Status	Evidence demonstrating compliance with condition
1	To manage the impacts of the action on the environment, the person taking the action must implement the conditions of the SA approval.	Compliant	The PEPR Compliance Report associated with the granting of the Carrapateena Tenements under the <i>Mining Act 1971 (SA)</i> will be submitted to the Department for Energy and Mining (SA) on 31 March 2023 indicating compliance with the conditions of the SA approval. This Compliance Report will be publicly available on the DEM website at: http://www.energymining.sa.gov.au/minerals/mining/mines_and_quarries/carrapateena
2	The person taking the action must not impact more than 1,740 hectares of Plains Rat habitat within the disturbance footprint.	Compliant	Total disturbance since the commencement of the referred action is 1,521.77 ha, including 269.5 ha of Plains Rat habitat, as shown in Figure 5.1.
3	Prior to commencement of the action, to compensate for residual impacts to the Plains Rat, the person taking the action must acquire an offset property which must contain: <ol style="list-style-type: none"> a population of the Plains Rat no less than 1,740 hectares of Plains Rat habitat habitat quality equal to that of the Plains Rat habitat within the disturbance footprint. 	Compliant	<p>Following on from an "Agreement to Underlease" (CA-APR-AGR-1037) with the Pastoral Lessee of South Gap Pastoral Station two offset areas, OZ Minerals has established two individual Underlease Agreements, one for each offset area, securing a total of 3,251 ha of suitable Plains Rat habitat (Northern Offset Underlease Agreement 1,882 ha and Southern Offset Underlease Agreement 1,369 ha (CA-APR-LET-1178). The Underlease Agreements have a 10-year expiry term, with successive Agreements to be established totalling the required duration as per the approval conditions.</p> <p>The offset areas consist of Arcoona Tablelands habitat that is similar in quality and structure to the land disturbed at Carrapateena and are considered to represent equally viable Plains Rat habitat. Historical observations of Plains Rats have been recorded nearby the northern offset, and within the same stretch of continuous tablelands habitat connecting disturbed Plains Rat habitat at Carrapateena, to the offset areas on South Gap Station.</p>
4	The person taking the action must maintain or improve the habitat quality of the existing Plains Rat habitat at the acquired offset property for the life of this approval.	Compliant	<p>BHP Carrapateena has developed an Environmental Offset Management Plan (CA-0000-ENV-PLN-1004) which aims to:</p> <ul style="list-style-type: none"> • Monitor the state of vegetation • Refine the presence, distribution, and abundance of plains mouse within the offset • Reduce predation pressure (fox, cat, wild dog/dingo) • Reduce total grazing pressure (sheep, goats) • Improve knowledge of local target species populations including how they respond to management locally <p>The Plan presents 14 individual objectives grouped under 11 management strategies to address EPBC Act offset liability, and associated legislative and policy obligations, for the first 10-year period of management.</p>
5	Within 2 years from commencement of the action, the person taking the action must change the tenure of the offset property for conservation purposes using an appropriate legal mechanism for long term protection.	Compliant	Underlease agreements signed, executed and back-dated to 21 April 2020 (2 years from the commencement of the action) for the Northern Offset Area and the Southern Offset Area. The areas have been officially registered with the Lands Titles Office; two registrations as associated with each offset area. The Agreements to Underlease clearly define that the areas are to be set aside for environmental purposes. The change in land use will apply for 10 years, after which the change in land use will need to be renewed (Permission granted from the Commonwealth to manage as rolling terms to achieve the total required tenure).
6	Prior to the commencement of the action, the person taking the action must engage a suitably qualified expert to undertake a Night Parrot survey within the development envelope. The Night Parrot survey must be undertaken in accordance with the EPBC Act Night Parrot survey guidelines. Within three months of the Night Parrot survey being completed, the person taking the action must provide the Department with the Night Parrot survey results.	Compliant	OZ Minerals completed a targeted Threatened Species Survey for Night Parrot in March 2018 (CA-ENV-REP-1040). There were no Night Parrots or evidence of Night Parrots detected during the survey. The results of the survey were forwarded to the Australian Government Department of the Environment and Energy (DoEE) in April 2018 (DOE: CA-APR-EML-1077). Night Parrot has not been reconfirmed as locally extinct within South Australia.
7	Should the Night Parrot or evidence of the Night Parrot be recorded during the survey, the person taking the action must submit for the Minister's approval, a Night Parrot Management Plan that must include: <ol style="list-style-type: none"> Details of the Night Parrot survey results, including the methodology, timing and area surveyed. An assessment of the impacts to the Night Parrot that will result from the action. Management actions that will avoid, minimise and/or offset both the immediate and long-term impacts of the action on the Night Parrot. Monitoring and reporting requirements that demonstrate the management actions are effectively being implemented and achieve the intended results. This should include the frequency, intensity and duration of monitoring. <p>The person taking the action must not commence the action prior to the Minister approving the Night Parrot Management Plan. The approved Night Parrot Management Plan must be implemented.</p>	Not Applicable	The targeted survey (CA-ENV-REP-1040) did not find evidence of the Night Parrot in the Project area. Night Parrot has not been reconfirmed as locally extinct within South Australia.

Condition number	Condition	Compliance Status	Evidence demonstrating compliance with condition
8	Prior to the commencement of the action, the person taking the action must engage a suitably qualified expert to undertake a <i>Frankenia plicata</i> survey within the development envelope. The <i>Frankenia plicata</i> survey must be undertaken in accordance with contemporary survey methods. Within three months of the <i>Frankenia plicata</i> survey being completed, the person taking the action must provide the Department with the <i>Frankenia plicata</i> survey results.	Compliant	OZ Minerals completed a targeted Threatened Species Survey for <i>Frankenia plicata</i> in March 2018 (CA-ENV-REP-1040). <i>Frankenia plicata</i> was not detected during the survey. The results of the survey were forwarded to DoEE in April 2018 (CA-APR-EML-1077). Follow-up work by the engaged consultant uncovered the incorrect classification of locally collected <i>Frankenia</i> samples lodged with the South Australian Herbarium. Consultation with the SA Herbarium coupled with extensive survey work within the Carrapateena tenements and more broadly within the region has failed to detect this species, which is more likely to occur much further north of operations.
9	Should the <i>Frankenia plicata</i> be recorded during the survey, the person taking the action must submit for the Minister's approval, a <i>Frankenia plicata</i> Management Plan that must include: a. Details of the <i>Frankenia plicata</i> survey results, including the methodology, timing and area surveyed. b. An assessment of the impacts to the <i>Frankenia plicata</i> that will result from the action. c. Management actions that will avoid, minimise and/or offset both the immediate and long-term impacts of the action on the <i>Frankenia plicata</i> . d. Monitoring and reporting requirements that demonstrate the management actions are effectively being implemented and achieve the intended results. This should include the frequency, intensity and duration of monitoring. The person taking the action must not commence the action prior to the Minister approving the <i>Frankenia plicata</i> Management Plan. The approved <i>Frankenia plicata</i> Management Plan must be implemented.	Not Applicable	The targeted survey (CA-ENV-REP-1040) did not find evidence of <i>Frankenia plicata</i> in the Project area. Follow-up work by the engaged consultant uncovered the incorrect classification of locally collected <i>Frankenia</i> samples lodged with the South Australian Herbarium
10	Within 3 months following the change of tenure referred to in condition 5) the person taking the action must provide the Department with written evidence that the offset property has been secured for conservation purposes using an appropriate legal mechanism.	Compliant	Written evidence provided to DoEE via letter dated 16 December 2020, signed Andrew Oswald (CA-APR-LET-1178).
11	Within 30 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	OZ Minerals advised DoEE of the commencement of the action on 21 April 2018 (CA-ENV-LET-1001).
12	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of 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	BHP maintains an Environmental Management System that includes electronic data management systems for document control (InEight), obligations management and land access (Land Folio) and consultation/correspondence (Borealis). Data collected during Carrapateena monitoring is recorded on the site environmental data management system (MonitorPro) or within ArcGIS. Data collected for the environmental offsets on South Gap station will be collected, managed and reported on by a third party engaged to manage the offset (Nature Foundation South Australia) with select information captured back into the Carrapateena systems.
13	Within 30 days after completion of the action, the person taking the action must advise the Department in writing of the actual date of completion and provide a map clearly defining the date, location and actual impact within the Disturbance footprint of the action and be accompanied with a shape file.	Not Applicable	BHP is currently undertaking the action.
14	The approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or as otherwise agreed to in writing by the Minister. The approval holder 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 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: The first compliance report may report a period less than 12 months so that it and subsequent compliance reports align with the similar requirement under state approval.	Compliant	The EPBC 2017/7895 Compliance Report is posted annually in April to the BHP website where copies of previous Compliance Reports can also be located.
15	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not Applicable	BHP has not been directed by the Minister to commission an independent audit of compliance with the conditions of approval associated with EPBC 2017/7895.

Condition number	Condition	Compliance Status	Evidence demonstrating compliance with condition
16	If, at any time after 5 years from the date of this approval, the person taking the action has not commenced the action, then the person taking the action must not commence the action without the written agreement of the Minister.	Not Applicable	OZ Minerals commenced the action in late March 2018, as communicated to DoEE in April 2018 (CA-ENV-LET-1001).
17	The approval holder 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) the condition which is or may be in breach; and b) a short description of the incident and/or non-compliance.	Compliant	There were no non-compliances with the EPBC 2017/7895 conditions of approval, nor non-compliances with commitments described in any plans required therein during the reporting period. There were no incidents associated with the action during the reporting period that caused, or had the potential to cause, significant impacts to matters of national environmental significance.
18	The approval holder must provide to the Department details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 30 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 approval holder.	Compliant	There were no non-compliances with the EPBC 2017/7895 conditions of approval, nor non-compliances with commitments described in any plans required therein during the reporting period. There were no incidents associated with the action during the reporting period that caused, or had the potential to cause, significant impacts to matters of national environmental significance.

Figure 5.1 shows the current disturbance footprint for activities subject to the action in relation to the Plains Rat habitat.

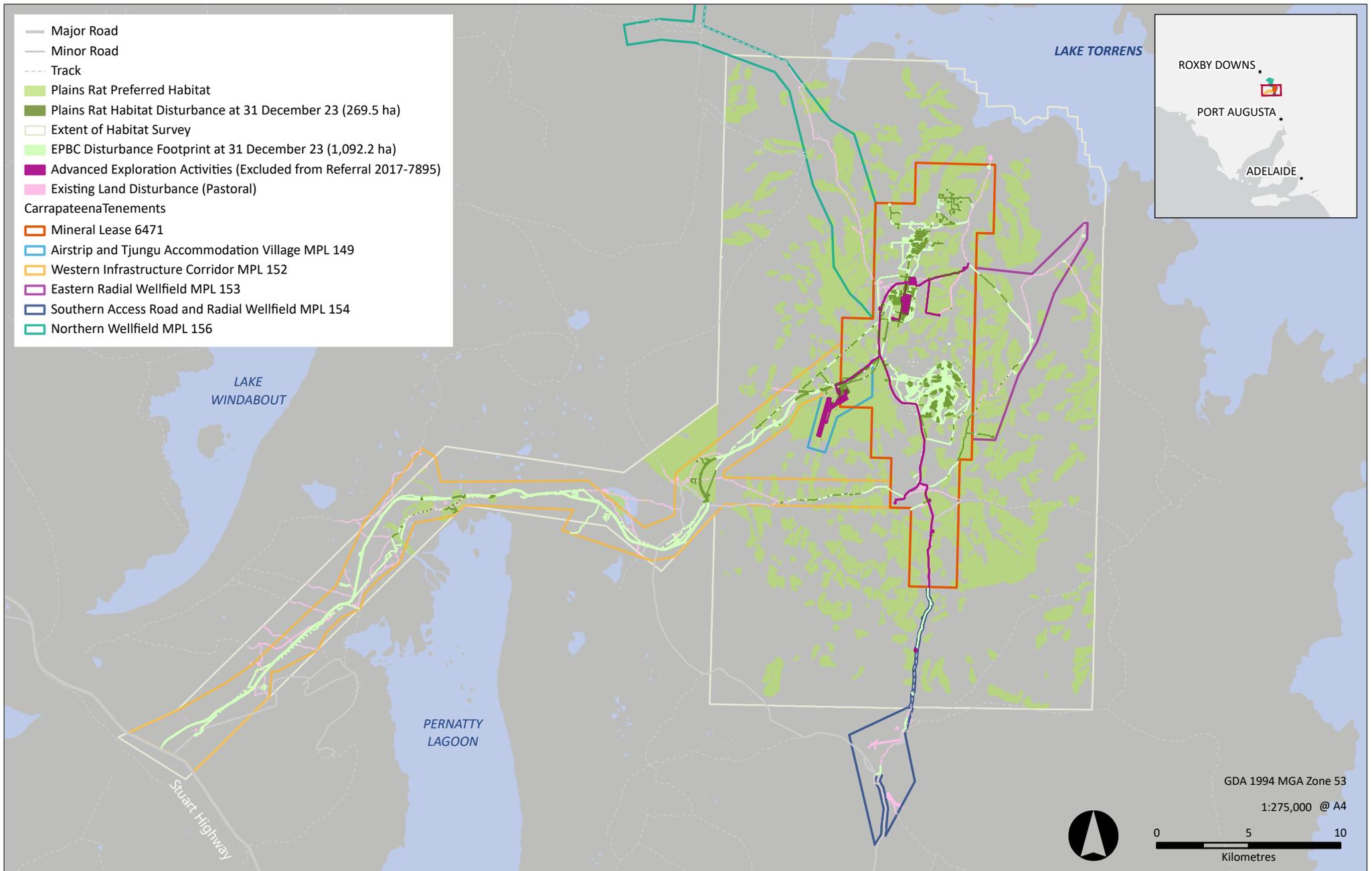


Figure 5.1 | Plains Rat (*Pseudomys australis*) Habitat Disturbance at 31 December 2023

6 CORRECTIVE ACTIONS

There were no non-compliances with the Conditions of Approval during the reporting period.

There were no corrective actions carried over from previous reporting periods, and therefore no assessment of the effectiveness of the corrective actions was required.

7 NEW ENVIRONMENTAL RISKS

There were no new environmental risks that were identified during the reporting period, and subsequently no risk analysis is presented.

8 REFERENCES

DoE. 2014. *Annual Compliance Report Guidelines. Environment Protection and Biodiversity Conservation Act 1999 – Guidelines*. Commonwealth of Australia 2014. Australian Government – Department of the Environment. Canberra.

OZ Minerals. 2017a. *Carrapateena Project Mining Lease Proposal and Miscellaneous Licence Purposes Management Plans*. 26 May 2017. Version A. CA-MIN-PPL-1001. Adelaide.

OZ Minerals. 2017b. *Carrapateena Project Mining Lease Proposal and Miscellaneous Licence Purposes Management Plans Response Document*. 22 September 2017. Version A. CA-MIN-PPL-1004. Adelaide.

OZ Minerals. 2018. *Carrapateena Project Program for Environment Protection and Rehabilitation, ML 6471 Mineral Lease, MPL 152 Western Infrastructure Corridor, MPL 153 Eastern Radial Wellfield, MPL 154 Southern Access Road and Radial Wellfield*. Version A. CA-ENV-REP-1035. March 2018. Adelaide.

OZ Minerals, 2019. *Carrapateena Project Program for Environment Protection and Rehabilitation, ML 6471 Mineral Lease, MPL 152 Western Infrastructure Corridor, MPL 153 Eastern Radial Wellfield, MPL 154 Southern Access Road and Radial Wellfield and MPL 156 Northern Wellfield*. Version A. CA-ENV-REP-1085. October 2019. Adelaide.

DEFINITIONS AND ABBREVIATIONS

Acronym	Expansion or Definition
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.
DoEE	Australian Government Department of the Environment and Energy
EPBC	Environment Protection and Biodiversity Conservation
ha	hectare
km	kilometre
ML	Mining Lease
MLP	Mining Lease Proposal
MPL	Miscellaneous Purposes Licence
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' will 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.
PEPR	Program for Environment Protection and Rehabilitation

Appendix A. 2023 South Gap EPBC Offset Annual Report



Nature
Foundation

16 JANUARY 2024

South Gap-EPBC Offset

Annual report 2023

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Abbreviations

IBRA	Interim Biogeographic Regionalisation for Australia (Region, Sub-region, Association)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
EOMP	EPBC Offset Management Plan
MNES	Matters of National Environmental Significance

1. Introduction

1.1 Background

Delivery of the EPBC Act on-ground offset program on behalf of BHP at South Gap Station (central South Australia) is part-way through delivering the third year of management. The main focus of this site is to protect the EPBC listed Plains Mouse (*Pseudomys australis*) and restore their habitat. To achieve this, we follow the EPBC Offset Management Plan (EOMP) to satisfy relevant approval conditions.

The management goals of the on-ground offset are to:

Goal 1- Establish baseline conditions, including the distribution and condition of Plains Mouse habitat, the presence and distribution of target species, and the identification and prioritisation of local threats (refer to Jacobs 2020)

Goal 2- Refine the presence, distribution, and abundance of Plains Mouse within the offset

Goal 3- Manage total predation pressure (from Cats, Foxes and possibly Wild Dogs)

Goal 4- Maintain and / or enhance the condition of the habitat for the benefit of Plains Mouse through the management of total grazing pressure and invasive weeds

Goal 5- Improve knowledge of local target species populations, including how they respond to management locally.

The EOMP presents 14 individual objectives grouped under 11 management strategies to address EPBC Act offset liability and associated legislative and policy obligations for the first 10-year period of management. This report will detail progress against these objectives for 2023.

1.2 Location and site features

The South Gap EPBC offset area is in central South Australia, approximately 100 km north of Port Augusta and 30 km south-east to the Carrapateena mine (Fig. 1). The site is adjacent to Lake Torrens. It is in the traditional country of the Kokatha people, who have strong connections to this land. The pastoral industry has utilised the landscape for the last 200 years, with sheep as the dominant stock for the area. The South Gap EPBC offset area is approximately 1882 ha in size.

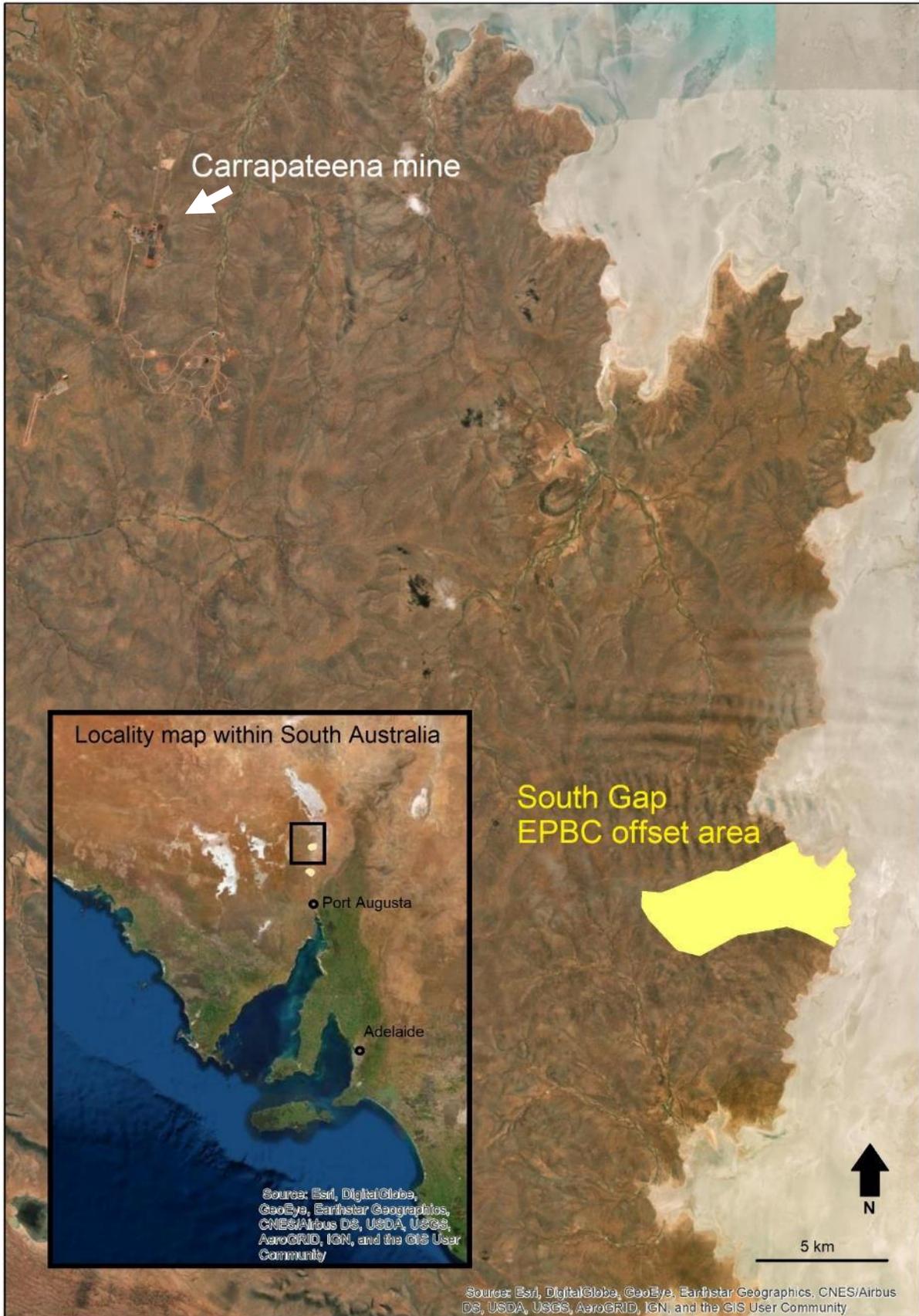


Figure 1. Location of the South Gap EPBC offset area (yellow) within South Australia

1.3 Landscape

The South Gap EPBC offset area's habitat is dominated by low plateau hills around 200m high. Vegetation is mostly low open Chenopod shrublands, interspersed with trees and shrubs along the drainage lines. The most important habitat features for the Plains Mouse (*Pseudomys australis*) are cracking clays (also known as Gilgai's).

1.4 Climate

The South Gap EPBC offset area has a semi-arid climate, with average annual rainfall of 180 mm per year (nearest BOM station, South Gap station number 016043, complete records for 1884–December 2023). So far during 2023, South Gap has recorded 206 mm of rain which would be classed as average rainfall. This follows three years of average and above average rainfall (Fig 2).

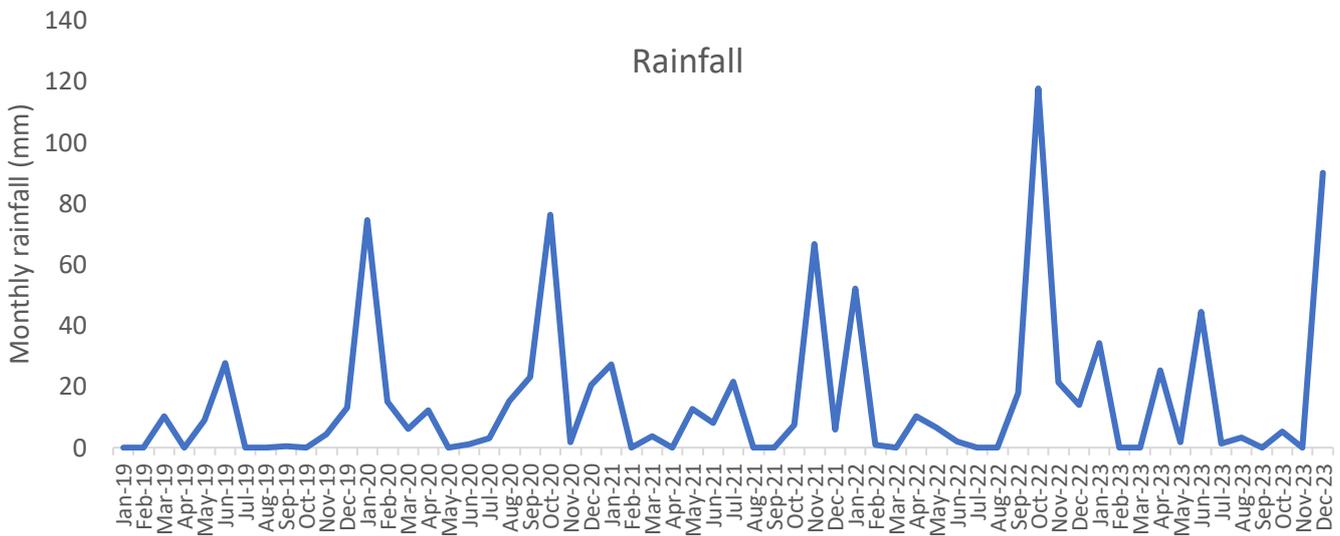


Figure 2. Rainfall from January 2019 to December 2023 from the South Gap BOM weather station (# 016043)

1.5 Conservation Values

The primary conservation value for the South Gap EPBC area is the preservation of habitat for the Plains Mouse, a threatened native rodent. This species lives in the open dry shrubland, builds small burrows, and is, on average, 55 g. This makes it within the critical weight range of mammals, where species with a body mass between 35 – 5500 g have a propensity to be threatened by feral Cats and Foxes (Johnson and Isaac 2009, Woinarski, Burbidge et al. 2015). Plains Mice are listed under Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) as a Vulnerable Matter of National Environment Significance.

Two nationally threatened species may occur on site, although there are no known recent records from the surrounding area. These are the Thick-billed grass-wren (*Amytornis modestus*) and Night Parrot (*Pezoporus occidentalis*). Other local species of note include the locally endemic Pernatty Knob-tailed Gecko (*Nephrurus deleani*), along with small native mammals like Spinifex Hopping Mouse (*Notomys alexis*) and Bolam's Mouse (*Pseudomys bolami*).

1.6 Threatening processes

Key threatening processes most likely affecting the offset areas and the Plains Mouse include:

- Predation by European Red Fox (*Vulpes vulpes*)
- Predation by Feral Cat (*Felis catus*)
- Predation by Wild Dog (*Canis spp.*)
- Competition and land degradation by European Rabbit (*Oryctolagus cuniculus*)
- Competition and land degradation by domestic stock (*Bos spp.* and *Ovis aries*)
- Competition and land degradation by feral Goats (*Capra hircus*)

2. Legislative Framework

2.1 Environment Protection and Biodiversity Conservation Act (1999)

The Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) is the primary Commonwealth legislation established to protect and manage Matters of National Environmental Significance (MNES), including nationally and internationally important flora, fauna, ecological communities, and heritage places.

The EOMP guides the delivery of an on-ground offset required to address the residual impact to Plains Mouse (Condition 3, 4 and 5) as per the EPBC Act Approval conditions (granted on 29 March 2018).

2.2 Other legislation

Other relevant legislation relating to the offset area includes the National Parks and Wildlife Act (1972), Native Title Act (1993), Aboriginal Heritage Act (1988), Landscape Act (2019) and the Pastoral Land Management and Conservation Act (1989). For more detail on these acts, refer to the EOMP.

3. Management Goals, Strategies and Objectives

Goals	Strategies	Objectives (under same acronym headings as EOMP)
Goal 1- Establish baseline conditions	Strategy 2: Improve knowledge of target species population dynamics and management	PM1: Quantify and monitor Plains Mouse habitat within the offset
Goal 2- Refine the presence, distribution, and abundance of Plains Mouse within the offset	Strategy 2: Improve knowledge of target species population dynamics and management	PM1: Quantify and monitor Plains Mouse habitat within the offset
Goal 3- Reduce predation pressure	Strategy 3: Cat control Strategy 4: Fox control Strategy 5: Wild dog control	CC1: Reduce Cat density to less than 4 Cats / 100 km within the offset area. FC1: Reduce Fox density to less than 1 Fox / 100 km within the offset area. DC1: Keep the offset area free of Wild Dogs.
Goal 4- Reduce total grazing pressure	Strategy 1: Stock management Strategy 6: Rabbit control Strategy 7: Weed control	SM1: Keep the offset area free of domestic livestock. RC1: By 2023, reduce Rabbit numbers and warrens by 80% within the offset area. RC2: Map and rip 5 km ² of chenopod shrublands in priority areas each year for 4 yrs. WC1: By 2028, the distributions of invasive weeds (i.e. Declared and Weeds of National Significance) will be reduced.
Goal 5- Improve knowledge of local target species populations	Strategy 2: Improve knowledge of target species population dynamics and management	PM1: Quantify and monitor Plains Mouse habitat within the offset

4. Results

4.1 Goal 1 - Establish baseline conditions

4.1.1 Overview

The vegetation of the South Gap EPBC offset area is important to manage and understand. We monitor vegetation condition with annual Rangeland Assessment Method (RAM) floral surveys and Jessop transects (described in more detail below). We have also begun detailed research on cracking clay function and ecology.

4.1.2. Rangeland Assessment Method floral surveys

To record a broad measure of how vegetation condition changes through time relative to the baseline, the Botanist, Andrew Sinel, (Ecosphere Ecological Solutions) conducted the annual vegetation monitoring survey in June 2023. This consisted of Rangeland Assessment Method (RAM) floral surveys, weed assessments, and measuring vegetation structure in three Jessop transects. Also, Nature Foundation has conducted more quantitative measures of cracking clay habitat condition at extra sites. The RAM floral surveys record characteristics of vegetation structures, species composition and disturbances (Ecosphere Ecological Solutions (2023)). This is conducted at eight cracking clay sites, which have been sampled since 2019 (Clive and Fels (2020)). This allows us to compare changes against a baseline before our management. The overall broad vegetation condition at all sites was classed as 'moderate' (all scores were between 42 – 57 RAM score). These scores have been stable through time (Fig 3) and have not significantly changed (mixed effects linear model, coefficient -0.17, standard error = 0.46, degrees freedom =15, $t=-0.37$, $P=0.72$). Ecosphere Ecological Solutions (2023) concludes that recent good rains had resulted in abundant growth, however, this was offset by increased presence of weeds and grazing pressures. Since the creation of this offset vconditions have remained stable.

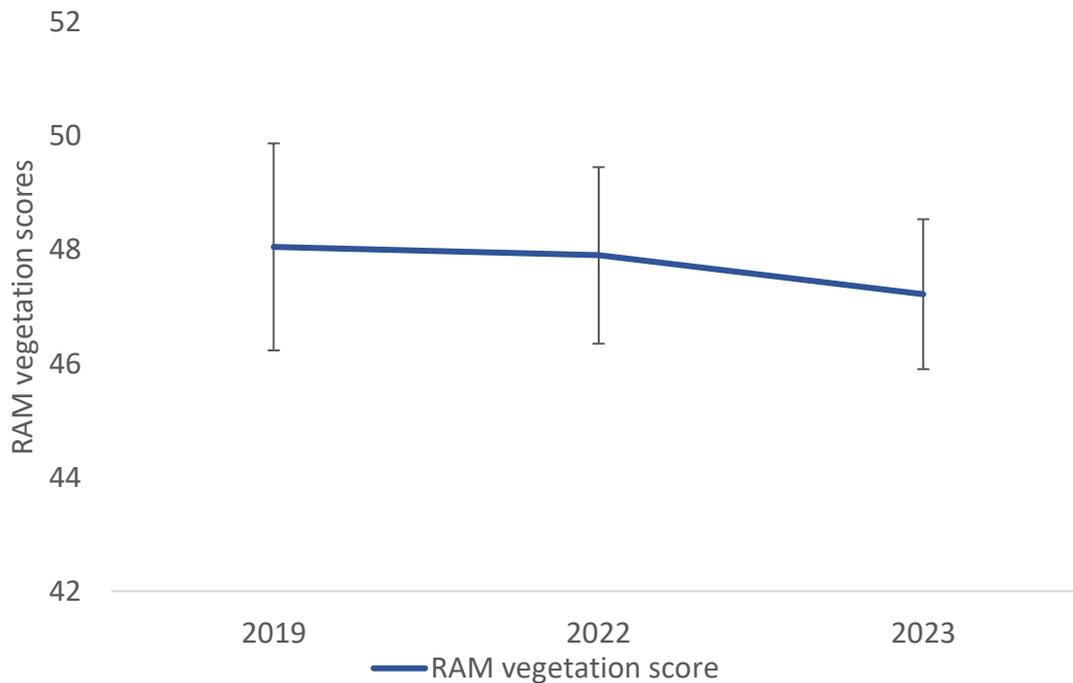


Figure 3. Trends in Rangeland Assessment Method (RAM) scores at the South Gap EPBC offset area from 2019 to 2023 at eight different sites sampled.

4.1.3 Jessup transects

Vegetation structure is measured at three permanent Jessup transects set up on the South Gap EPBC offset area. These differ from the RAM scores by having a more quantitative measure of structure. They consist of a fixed 4 m x 100 m transect, comprised of twenty smaller 10 x 2 m plots. Every shrub and grass with a stem inside the transect are identified and assigned age class (adult/juvenile). This provides density and frequency estimates of each perennial plant species for each site. Three of these sites were set during 2022, and surveyed again in 2023. This was also conducted by Dr Sinel. All three of these sites reported an increase in shrub abundance, with Bladder Saltbush (*Atriplex vesicaria*) increasing by the greatest extent at all three sites.

4.1.4 Weed assessments

Weed assessments were conducted on site. No weeds of national significance were detected. However, some annual exotic forbs were found at cracking clay sites, including Sow Thistle (*Sonchus oleraceus*), Malvastrum (*Malvastrum americanum*) and London Rocket (*Sisymbrium irio*). These species are expected and are widespread across the region after heavy rainfall (Ecosphere Ecological Solutions 2023).

To limit the spread of weeds to the South Gap EPBC offset area, vehicles are washed down before and after arrival. For the Nature Foundation field ecologist based in Roxby Downs, this occurs at the Arid Recovery wash down facility at Olympic Dam.

4.1.5 Cracking clay condition

We have begun new research into the impacts of herbivore management on cracking clay habitats in 2023. In April 2023, we conducted a preliminary survey at 16 sites inside the offset area, with eight at cracking clay and eight at nearby saltbush plain sites. Each site was centered within a 3 m radius around a fixed post for consistency. At each site we measured herbivore scat volume with scales (grams), estimated the length of the cracks (total cm), measured the depth of the deepest crack with a ruler (cm), and estimated vegetation cover by dividing the extent of each species in m² by the plot total area. Scat was removed from the site after recording. These surveys were intended to occur annually. However, due to a large incursion of sheep into the offset area (see 4.4), we repeated the survey in August 2023 to quantify the scale of the incursion relative to previous data. Each site has a small wooden post marking the survey center.

The condition of the cracking clay sites has decreased dramatically since the April 2023 survey (Table 1 and Fig 4). The volume of sheep scat at each site was markedly higher in August 2023, with a more substantial increase at the cracking clay sites than nearby saltbush habitat. This suggests incursion sheep are spending more time in areas of cracking clay. Whilst the volume of kangaroo scat decreased at all sites between April and August, this does not necessarily indicate a reduction in kangaroo presence. For the first survey in April, scat could have accumulated for a long time prior, yet for the second survey, scat could only have accumulated for a maximum of four months. The average crack length decreased substantially between April (571 cm), and August (57 cm) in addition to a reduction in the number of crack entrances (Table 1), with some sites observed to be entirely trampled with no remaining cracks (e.g. Fig 4). Vegetation cover in the cracking clay sites also decreased between April (24%) and August (14%), with a smaller magnitude reduction in cover being observed in the saltbush sites (Table 1). The increased sheep presence is the most probable cause of this decrease in habitat condition at cracking clay sites. However, as this is only the second survey, we cannot yet distinguish between seasonal impacts.

Table 1. Average values from sixteen sites sampled twice, spread equally between sites at cracking clay and nearby saltbush plains.

	Apr-23	Aug-23
Sheep scat (g)		
cracking clay	0	97
Saltbush	4	11
Kangaroo scat (g)		
cracking clay	59	20
Saltbush	18	15
Crack length (cm)		
cracking clay	571	57
Saltbush	0	0
Crack entrances (n)		
cracking clay	8	2
Saltbush	0	0
Vegetation cover (%)		
cracking clay	24	14
Saltbush	33	29



Figure 4. Example of one of the cracking clay sites where herbivore damage has been substantial.

These methods for measuring cracking clay conditions have thus far been able to provide useful and repeatable measurements of habitat condition. Therefore, we will set this up as a permanent monitoring technique. We aim to set up a basic herbivore-proof fence around four or more of the sites during 2024, to better tease apart grazing impacts from background seasonal changes.

4.2 Goal 2 - Presence, distribution, and abundance of Plains Mouse

We monitor Plains Mouse activity at 12 permanent remote camera sites. These consist of a remote camera (Reconyx Hyperfire 2 Professional HP2X) with adjusted focus to 90 cm placed on a star-picket facing down at a lure (PVC tube with peanut butter). A 50 x 50 cm corkboard with 10 mm gridlines was placed underneath to enable measurements of animal size. Using this guide, we can identify Plains Mice as they are the only local rodent with a head and body length 90 – 145 mm, and tail less than 125 mm (Van Dyck *et al.* 2013). The camera batteries were checked and replenished in December 2023. Two of the cameras were not operational, with one having too many false triggers and running out of battery, and the other being knocked down by inquisitive kangaroos.

We identified Plains Mice using the characteristics listed above. Images of rodents with a head and body length of approximately 90 mm were only classed as 'likely' Plains Mice. We could reliably identify to species level the spinifex hopping-mouse (*Notomys alexis*), Narrow-nosed planigale (*Planigale tenuirostris*), and desert short-tailed mouse (*Leggadina forresti*). Some individuals of the other small mammal species could be identified to species, though not all. For example, some dunnart images could be differentiated between *Sminthopsis crassicaudata* or *S. macroura*, though often not. Therefore, these species were often clumped together, along with small rodents (*P. bolami*, *P. hermanbergiensis* or *M. domesticus*).

Five Plains Mice were detected at the South Gap EPBC offset area early in 2023. Two of those five detections were only classed as 'likely' Plains Mice, as they measured around 80 mm long. This is lower than our threshold for identification, and they could either be small Plains Mice or large Bolams Mice. Despite these detections early in the year, there were no more detections from May onwards on remote cameras. This decline is likely due to the increased degradation of cracking clay habitat, discussed in the previous chapter. April is when there was a sharp increase in sheep activity on site, and there was no major increase in feral predator activity over that same time period.

The decline in Plains Mice detections from April onwards corresponds with a decline in the detection rate of all other small mammals, including Dunnarts, Spinifex Hopping-mice, and other small rodents (Fig. 5). Dunnarts consist of both the species Fat-tailed Dunnart (*Sminthopsis crassicaudata*), Stripe-faced Dunnart (*S. macroura*), and the smaller Narrow-nosed Planigale (*Planigale tenuirostris*). These Dunnarts had a peak in activity during April and May, but reduced to lower activity in spring

and summer. This pattern does not appear seasonal but would be more related to recent rainfall in an arid environment such as this.

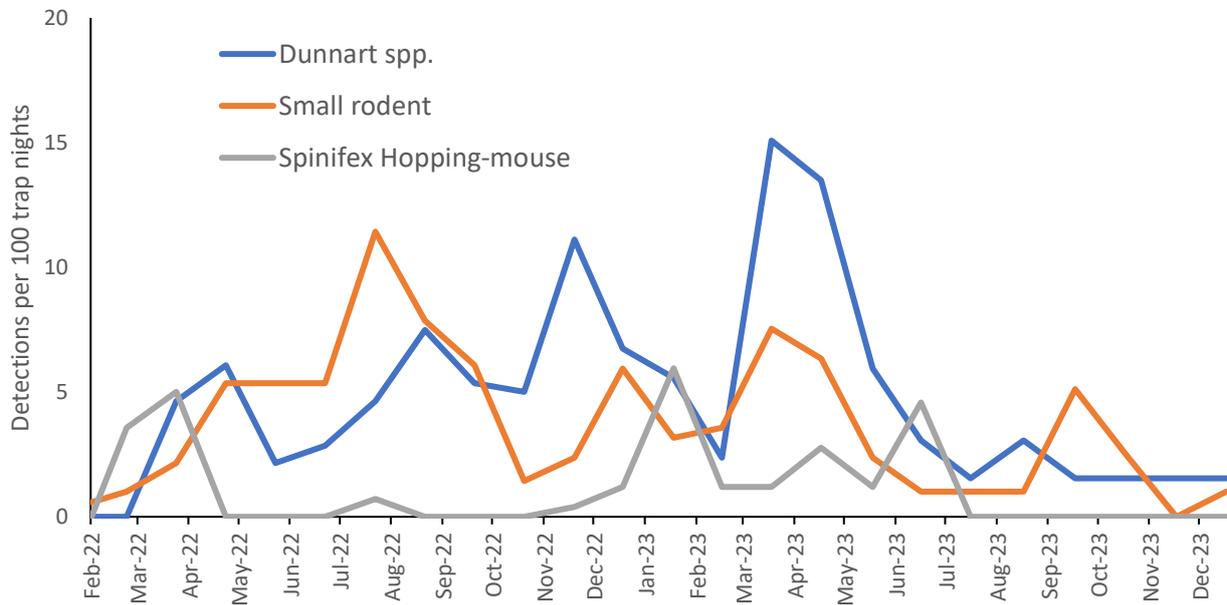


Figure 5. Detection rates of dunnarts, small rodents (<20g) and Spinifex Hopping mice at the South Gap EPBC offset area.

4.3 Goal 3 - Reduce predation pressure

We have conducted four feral predator control trips in the South Gap EPBC offset area during 2023, conducted by the professional shooters Graham Miller and Phil Johns. On these trips, six feral cat and two red fox have been shot. To monitor trends in feral animals and place this control in context, we have spread 20 Swift Enduro Pro remote cameras across the paddock (Fig. 6). These were deployed in February 2022, and have been continuously deployed since then. From these cameras, fox activity has decreased on site (Fig 7). There was a spike in cat activity during July this year, although this has abated. Feral predator control will be continued through 2024.

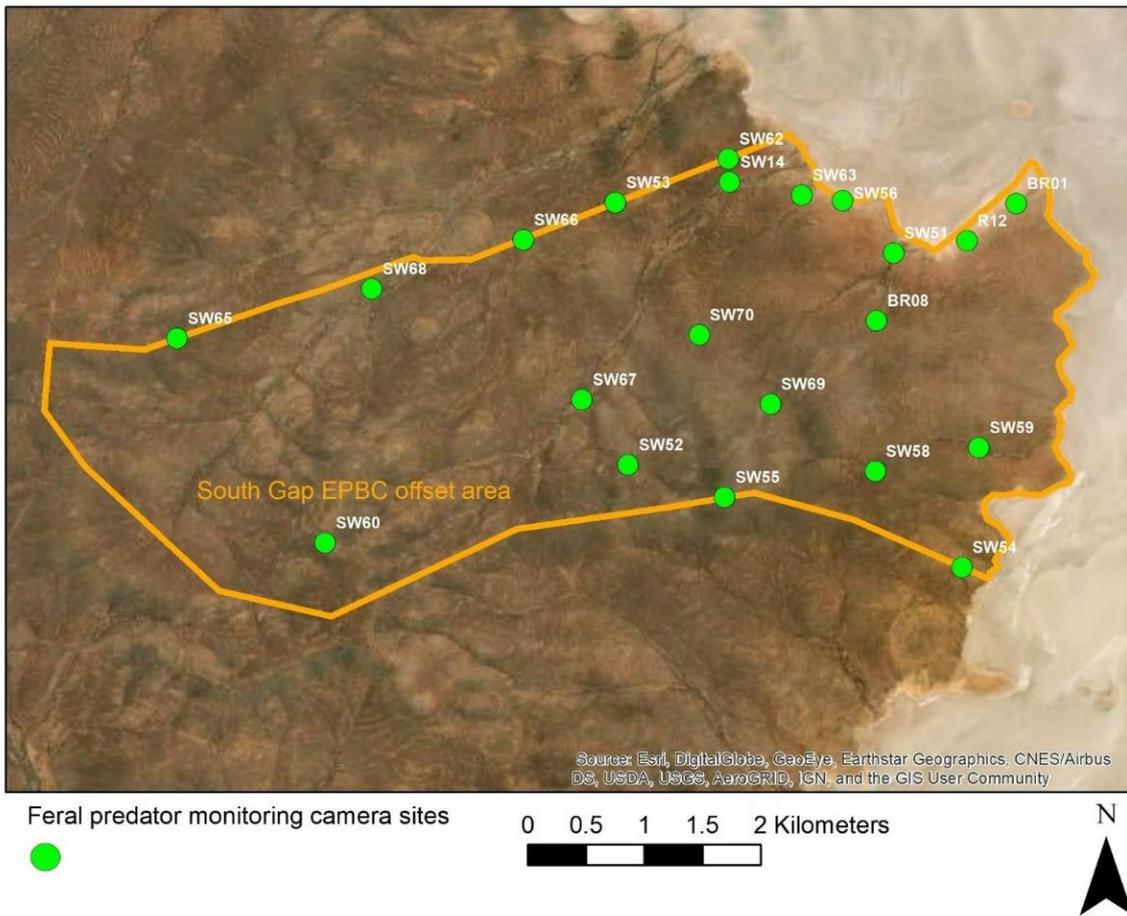


Figure 6. Location of the remote camera sites used at the South Gap EPBC offset area to monitor feral predators from 2022 and 2023.

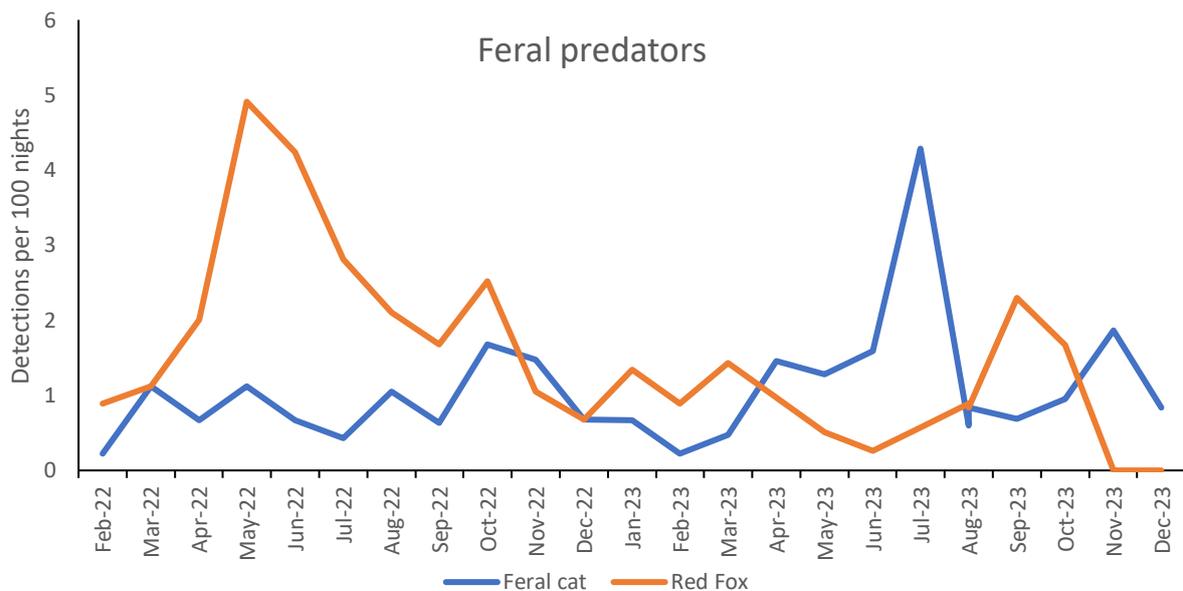


Figure 7. Detection rates of Feral cats and Red Fox at remote camera trap sites spread across South Gap EPBC offset area from initial deployment in Feb 2022 to August 2023.

4.4 Goal 4 - Maintain habitat condition through management of grazing and invasive weeds

To maintain and enhance habitat condition, we aim to reduce total grazing pressure to prevent negative impacts to vegetation. Primarily, this is achieved using stock-proof perimeter fence and removal of sheep and goats. We also control rabbits and aim to manage kangaroo numbers. In this section, we will begin discussing the current condition of the fence, then report on the activity of each of the main herbivores.

4.4.1 Fence condition

The northern fence line was in poor condition during 2023. There were five breaches anecdotally detected, and patched, in April and May 2023. A fence audit was conducted in August 2023, which involved driving the full boundary looking ingress points where sheep were able to breach the fence and taking photos and recordings of each patch. In total, nine ingress points were found (Fig. 8). Two points consisted of approximately 100 m sections where star pickets have corroded to ground level, and the whole fence has fallen. There were multiple sheep tracks crossings over these sections. The other seven ingress points consisted of gaps 30 cm or greater under the fence, usually in a hollow or creekline (Fig 9). All of these had wool attached to the lower rung of strainer wire, suggesting many sheep have been going in and out. The western and southern fence line were in good condition. Despite the fact the fence was down for most of 2023, the offsetr was in no worse condition than when management commenced.

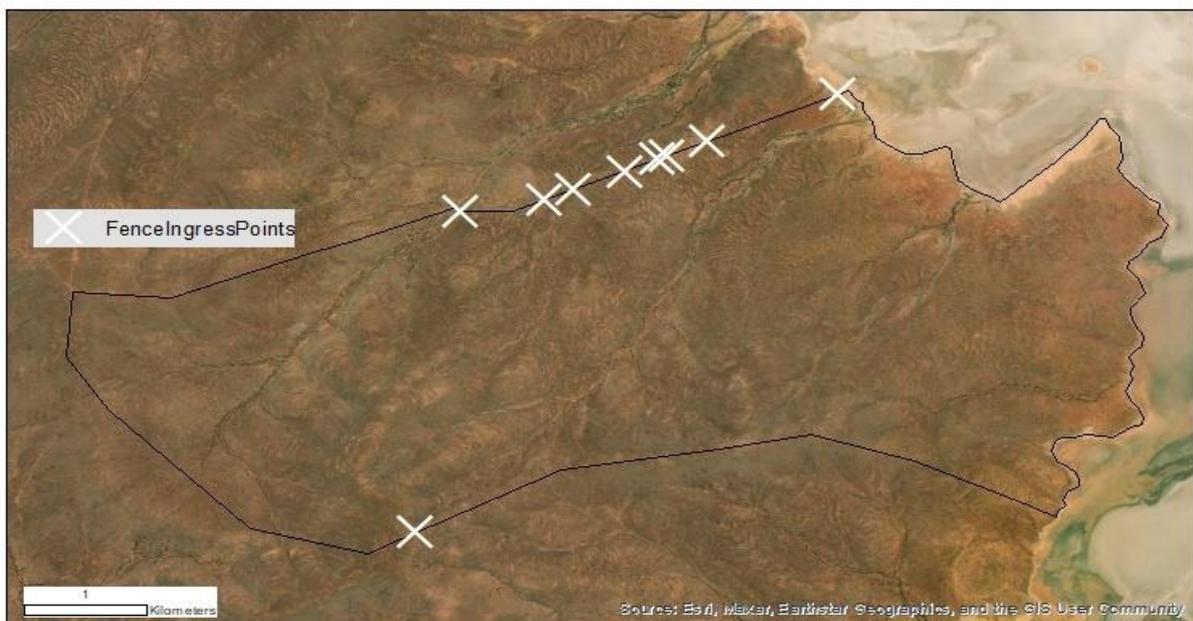


Figure 8. Location of the nine ingress points found on the boundary fence where there was evidence of domestic sheep getting in and out of the South Gap EPBC offset area.



Figure 9. Example of stock ingress points on the fence line, where there is a large gap under the fence and wool deposited on the wires after frequent use.

The northern boundary fence was not in stock-proof condition during 2023. A full replacement was constructed in 2024, and all stock were mustered out.

4.4.2 Sheep activity

Sheep were prevalent on the South Gap EPBC offset area during 2023. Based on the remote cameras set to monitor feral animals, we have recorded a substantial increase in sheep activity after April 2023 (Fig 10). They were essentially a permanent presence. Although the previous year in 2022 there was a large flock of sheep that in September 2022, these were soon removed and most of the year was sheep-free. The decline in sheep activity later in 2023 corresponds with drier conditions. Although sheep activity was higher in 2023 than 2022 or 2021, it would still have been lower than activity prior to the EPBC offset being created and southern fence set up.

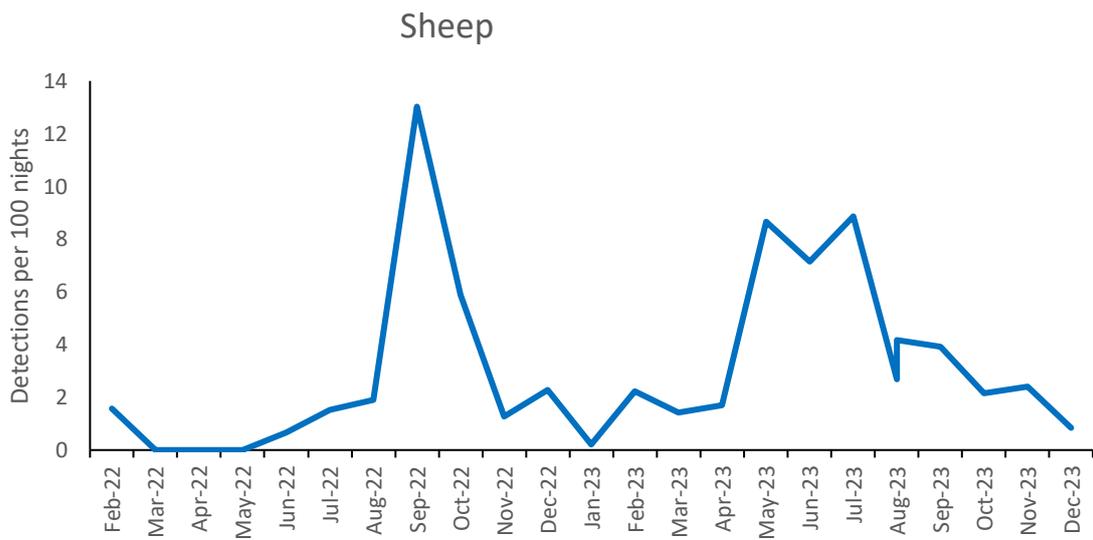
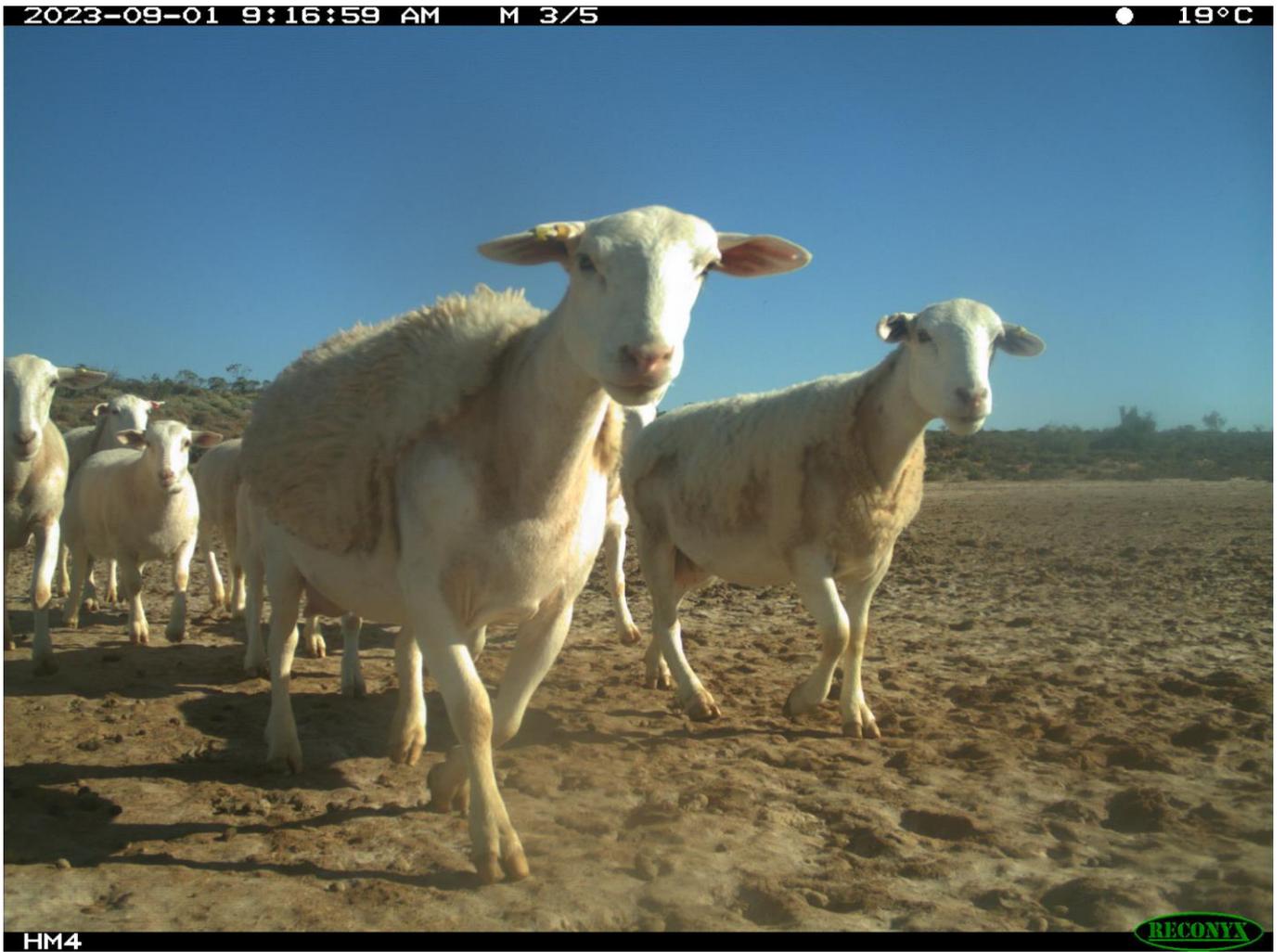


Figure 10. Sheep activity at the 16 remote cameras set to monitor feral animals.

4.4.3 Goats

Despite the large influx of domestic sheep, no goats have been detected on remote cameras inside the South Gap EPBC offset area since February 2023.

4.4.4 Rabbits

Our management of the South Gap EPBC offset area aims to reduce rabbit activity by 80 % through mapping then ripping warrens. However, monitoring began in 2020 at the end of a long drought. Rabbit activity was extremely low in 2021, and there were few active warrens. Therefore, our original aims were not necessarily relevant. Instead, over the last few years we have aimed to keep rabbit numbers low. We monitor the distribution and number of warrens across the offset area, along with broad activity of rabbits on whole EPBC offset area.

Rabbit monitoring methods: To monitor the distribution and locations of rabbit warrens, we conduct walking transects. Transects are 1–15 km long, and all rabbit warrens and sign are recorded. On each trip, we conduct at least three transects. As rabbit activity was focused on the sand habitat on the banks of Lake Torrens, we also conduct a 6 km walking transect around this habitat on every trip. This has been done four times every year since 2021. During 2023, we were able to conduct 56 km of walking transects over four different field trips (April, May, August, and December). These include four transects in the sandy banks of Lake Torrens (Fig 11). The other 16 transects were typically shorter, and focused on habitats where possible rabbit warrens were detected on satellite imagery. To monitor rabbit activity across the site, we report on rabbit detections rates on the feral animal remote cameras (see 4.3). These rates are converted to detection rate per 100 trap nights.

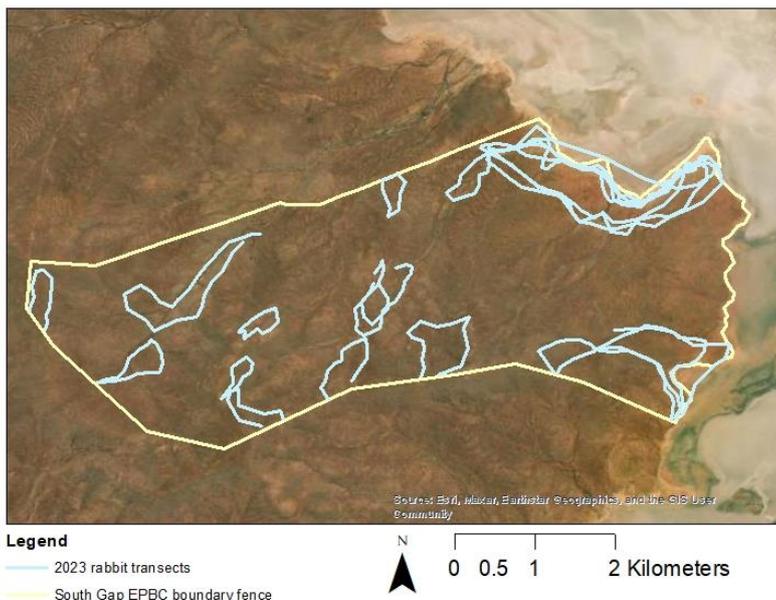


Figure 11. Map of the rabbit sign transects conducted during 2023. The tracks in the north-east corner are part of regular monitoring transect.

Rabbit activity and control: Rabbit activity fluctuated substantially during 2023. We only located active rabbit warrens in the sandy habitat. There were no active warrens outside this area. All other possible old warrens that we visited in calcite habitats were completely flat and devoid of entrances. The number of active rabbit warrens in sandy habitat peaked in April 2023 (21 warrens at 2.3 per km). After this peak was recorded, we conducted rabbit control, which involved going to all known burrows, and placing a fumigant at least 60 cm down a warren entrance. That and all other entrances were then collapsed. We revisited these warrens one month later in May 2023 to find that the majority of those rabbit warrens were re-activated (16 of the 21).

Despite many of the warrens reactivating post fumigation in May 2023, we recorded a substantial subsequent decline in rabbit activity across the South Gap EPBC offset area (Fig 12). By December, we had almost zero detections on the walking transect and on the remote cameras (Fig 13). This decline corresponds with a wider regional decline as anecdotally noted by other ecologists in the region (Dr John Read, personal communication). It is unlikely this decline is mostly attributable to our management, as it was regional and continued well after our fumigation. However, it does appear at minimum that our control is causing temporary reprieves from rabbit numbers. During 2024, we could move toward control occurring more frequently.

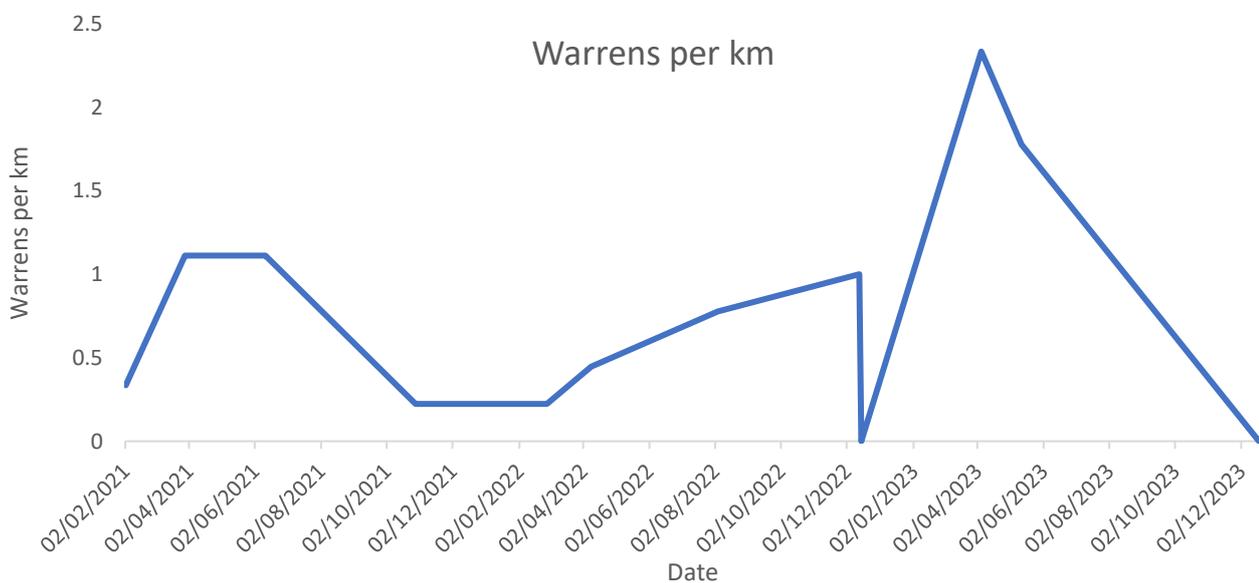


Figure 12. Count of warrens along the walking transect that includes the sandy section on the banks of Lake Torrens.

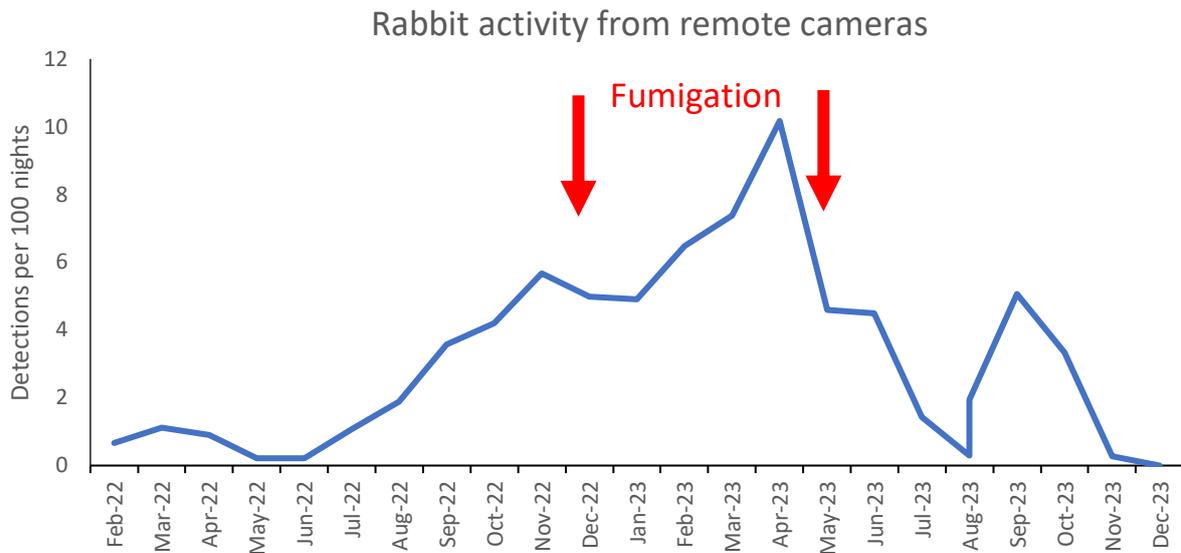


Figure 13. Activity rates of rabbits from 16 remote cameras at the South Gap EPBC offset area. Red arrows indicate when direct control of rabbits was conducted, involving collapsing and fumigating rabbit warrens.

4.4.5 Kangaroos

We measure kangaroo activity both by detection rates on remote cameras and using thermal camera point-based surveys. For the former, we count detections on the feral animal remote camera array, then average this across all cameras. For thermal camera point-counts, we drove the central road at night stopping every 500m. At each stop, all lights are turned off and we use the thermal camera to conduct a full 360° scan for animals. For each detection we measure count of individuals and distance. Kangaroo activity has steadily increased at the South Gap EPBC offset area during 2023, both as recorded on remote cameras (Fig 14) and in the thermal camera surveys (Fig 15). However, as of September, kangaroo numbers remained stable and decreased, likely due to drying conditions.

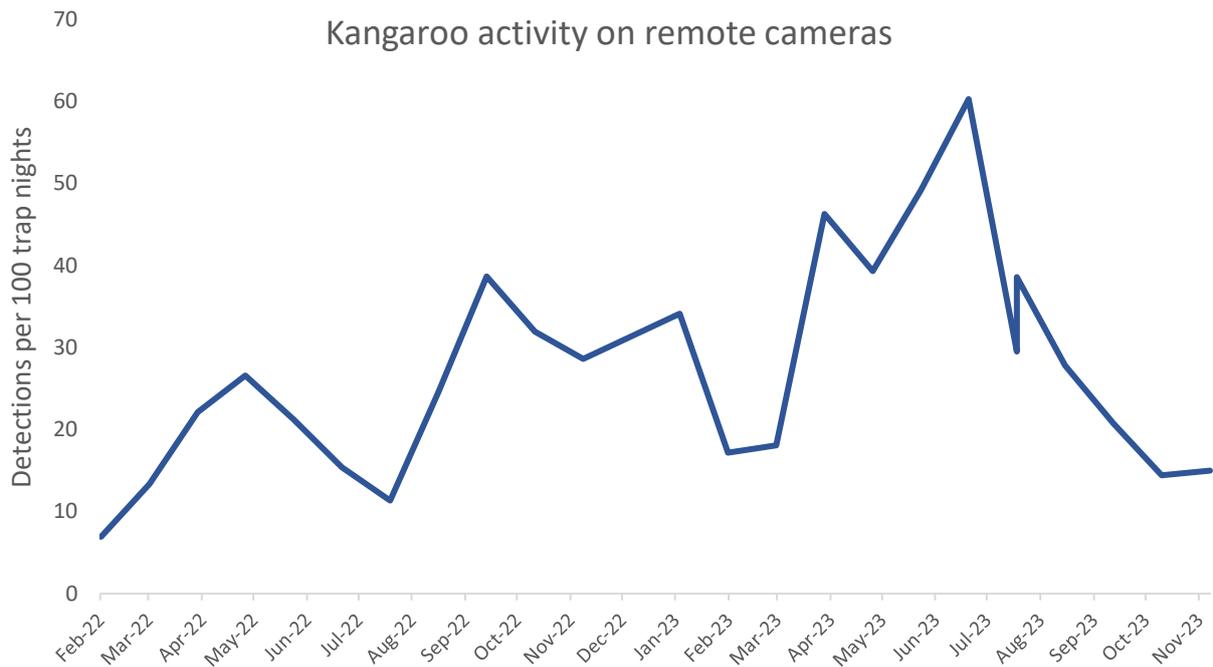


Figure 14. Activity rates of kangaroos (both Red Kangaroos and Euros) from remote cameras at the South Gap EPBC offset area.

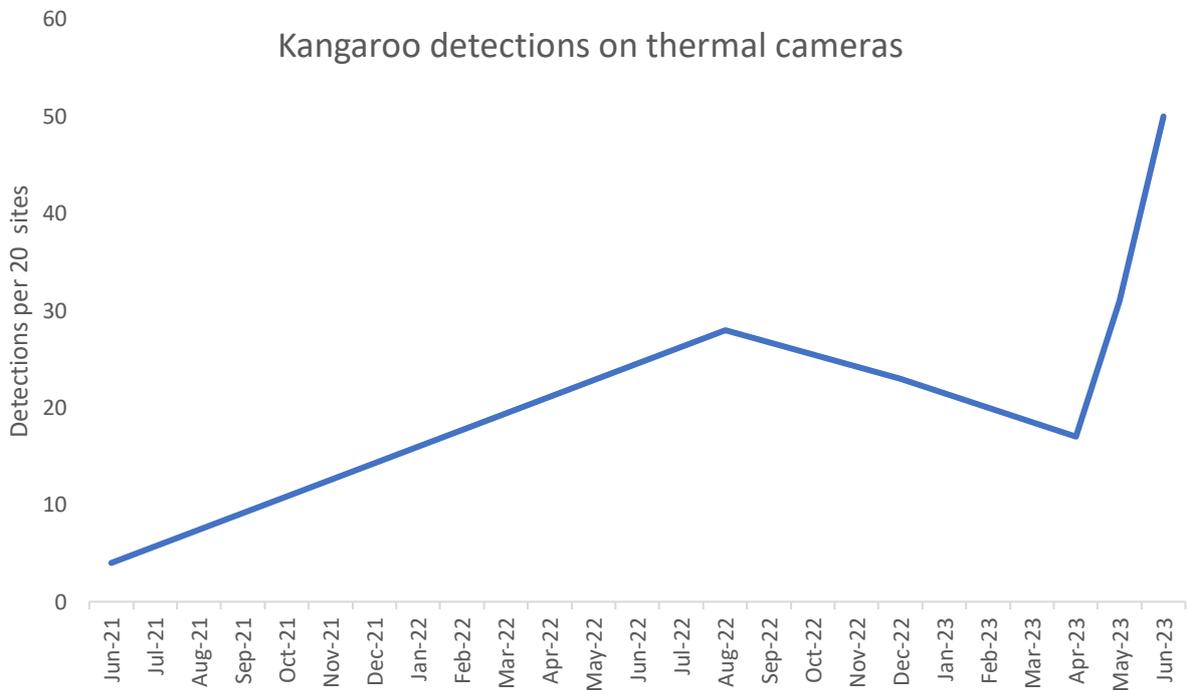


Figure 15. Count of kangaroos seen using thermal camera at 20 sites in the South Gap EPBC offset area.

4.5 Goal 5- Improve knowledge of local target species populations, including how they respond to management locally.

The only other threatened species with a high chance of being found on the South Gap EPBC offset area is the Thick-billed Grasswren (*Amytornis modestus*, Fig 16). This is a large wren, currently found in dense saltbush to the north, it has never been detected as far south as South Gap (Black, Carpenter et al. 2011), despite habitat appearing similar. There was a potential sighting on the 30th August where Field Ecologist Dr Hugh McGregor saw a large wren hopping over the road in a grasswren-like fashion. It seemed larger than a Rufous Fieldwren. Unfortunately, there was a strong wind, and it could not be enticed with call playback. The habitat around this sighting was dense old samphire and saltbush. Two remote cameras were set nearby in dense shrubs. In December 2023, these cameras were collected and targeted surveys for this species conducted at five sites. The latter consisted of call-playback followed by 20 minutes of active search. No Thick-billed Grasswrens were recorded during subsequent survey, although Rufous Field-wrens were detected at all sites. Further survey for this species will be conducted during 2024, and an audio-recording device will be set up to increase our chances of detecting them if on site.

Evening surveys were conducted for the Night Parrot on three occasions. These involved going to an ideal habitat location and listening for calls from dusk to nautical twilight. The survey was conducted by Hugh McGregor, who has seen and heard night parrots on multiple occasions at Pullen Pullen reserve in western Queensland and is a coauthor on two papers regarding their management. No parrots were heard. This is not surprising, as there have been no recent confirmed records of this species in South Australia over the last 70 years.

Other wildlife highlights over 2023 include flocks of Orange Chats (*Epthianura aurifrons*), Inland Thornbills (*Acanthiza apicalis*), nesting Blue Bonnets (*Northiella haematogaster*), and a family of Wedge-tailed Eagles (*Aquila audax*).



Figure 16. Thick-billed Grasswren from Witchelina Nature Reserve. Photo by Dr Marina Louter

6. Infrastructure

Roads have remained functional through 2023. The access road via Pernatty was accessible by 4WD, although rocky. It was graded again in late 2023. The access road via South Gap homestead is difficult yet still useable. All internal roads through the paddock are usable to a 4WD and do not require extra grading or fixing (Fig 17). So far, these roads have been adequate for all needs. We do not believe a new road is required, nor is grading on site, as the extra clearing and damage to vegetation would outweigh potential benefits at this stage.



Figure 17. Example of a road inside the South Gap EPBC offset area.

7. Future Priorities

For 2024, we will continue all ongoing monitoring and management actions. Extra priorities include:

- Maintain the northern boundary fence
- Begin survey for Plains Mice across the surrounding region
- Set at least four small grazing exclusion fences around cracking clay sites
- Begin monitoring of feral animals at a site outside the offset area where no conservation management is conducted, to better inform the impacts of our methods.
- Conduct further Thick-billed Grass-wren survey, and possibly deploy sound recording devices

8. References

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