5 February 2026

Department of Climate Change, Energy, the Environment and Water (DCCEEW)

GPO Box 3090

Canberra ACT 2601

EPBC Act Compliance Report for EPBC 2017/8007 - Saint Elmo Vanadium Project - October 2024 - October 2025

This compliance report has been compiled for the Saint Elmo Vanadium Project (the Project), approved under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2017/8007) on 29 March 2021 and being delivered by Multicom Resources Pty Ltd (Multicom). In accordance with condition 16 of the approval of the action:

- "*The approval holder 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.* "

Approval condition 16a states the approval holder must:

- "*publish each compliance report on the website within 60 business days following the relevant 12 month period.*"

On 31 October 2023 a notification letter was sent informing the Department of Climate Change, Energy, the Environment and Water (DCCEEW) that the project officially commenced on **30 October 2023**.

The project Offset Strategy has been active since 2 February 2021. Thus far compiled four previous compliance letters have been submitted to the department in June 2022, July 2023, November 2023 and January 2025.

This compliance report will cover the period **30 October 2024 to 30 October 2025** and is required to be published on the project's website by 5 January 2026.

This following report outlines Multicom's compliance against all approval conditions described in **Annexure A** of the final EPBC Act approval of the Project.

The following personnel fulfil the project roles described in Part C – Definitions of the project EPBC Act approval:
• Independent suitably qualified expert - Greg Mifsud
• Suitably qualified field ecologist - Terry Reis, Brett Taylor and Maria Mahon
• Suitably qualified researcher - Dr Andrew Baker of Queensland University of Technology (QUT)
• Suitably qualified environmental manager - Lyndy Skea of Southern Gulf Natural Resource Management

Compliance Report Findings

The Project formally commenced on 30 October 2023 and is progressing through the initial construction phase for processing infrastructure. The Project's Offset Strategy activities have been ongoing since 2022. The assessment of the Project compliance with the EPBC Act approval conditions is detailed in **Table 1**. The Project is considered to comply with 14 of the approval conditions. The remaining eight approval conditions are not considered applicable to the Project at this stage. Multicom is happy to discuss any of the items outlined in this compliance report.

Kind Regards,

Andrew Napier
Chief Executive Officer
Multicom Resources Pty Ltd
Level 2, 310 Vulture Street Kangaroo Point
Brisbane Qld 4169

SAINT ELMO PROJECT

ANNUAL ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION (EPBC) REPORT

30 October 2024 – 30 October 2025

Reference: SEP-RPT-EV-00030

Date	Description	Originator	Reviewer	Approver
22/01/2026	Version 1	K. Evans	N. Higgins	A. Napier

Contents

1 EXECUTIVE SUMMARY

Multicom Resources Limited (Multicom) continues to implement the environmental offset commitments associated with the Saint Elmo Vanadium Project, located approximately 25 km east of Julia Creek, Queensland (EPBC 2017/8007). As the Project involves shallow strip mining of vanadium-bearing ore, an Environmental Offset Strategy was required under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) to address potential impacts on the Julia Creek dunnart (Sminthopsis douglasi), listed as Vulnerable and recognised as a Matter of National Environmental Significance (MNES).

The Offset Strategy is being implemented through a combination of applied research, targeted monitoring and threat abatement actions. These activities are delivered in partnership with:

- **Southern Gulf Natural Resource Management (SGNRM)** – leading on-ground monitoring, feral cat management and ecological assessments across key properties in the Mitchell Grass Downs; and
- **Queensland University of Technology (QUT)** – delivering scientific research on JCD ecology, distribution, predator–prey interactions and the development of advanced detection methods.

During this reporting period Multicom has maintained consistent implementation of the Offset Strategy and continues to meet all applicable EPBC approval conditions. Key achievements include:

- Ongoing camera-trap monitoring and feral cat abatement programs delivered by SGNRM, confirming the presence of Julia Creek dunnarts in 2024–2025 and recording substantial reductions in feral cat populations on the implementation site.
- Eradication of over 1,950 feral cats between July 2024 and June 2025, with average daily detections at the implementation site decreasing
- Assessment of ecological conditions, including impacts of a native long-haired rat population boom (2023–2024) and severe flooding in early 2025, which influenced both dunnart and feral cat activity.
- Collection of data to inform habitat suitability and predator–prey interactions, providing a foundation for ongoing conservation management and future research initiatives.

The integrated approach, combining landscape-scale threat mitigation, improved species detection, research on predator dynamics and targeted habitat assessments, continues to advance the long-term conservation prospects of the JCD and supports the overall objectives of the Offset Strategy.

Table 1 provides an assessment of the Project's compliance with the EPBC Act approval conditions. Fourteen conditions are considered applicable and have been addressed as compliant. The remaining eight conditions are not currently applicable to the Project.

Table 1. Assessment of Project compliance with EPBC Act approval conditions

Condition number	Condition	Status 30 October 2024 – 30 October 2025	Compliance
Maximum clearance limits			
1	To limit the impacts of the action on the Julia Creek Dunnart (Sminthopsis douglasi), the approval holder must not clear more than 7,419 hectares (ha) of Julia Creek Dunnart habitat within the project area.	Clearing for the Project has thus far been minimal and restricted to a small area associated with lands for mining processing infrastructure and track access. No mining has taken place as yet although initial works are expected to commence in early 2026. Clearing has occurred within the designated approved boundary of the project area	Complies
2	The approval holder must not clear outside the project area.	Clearing has only occurred within the designated approved boundary of the project area	Complies
Pre-clearance surveys and relocation program			
3	To minimise the impacts of the action on Julia Creek Dunnarts, the approval holder must undertake pre-clearance surveys of all Julia Creek Dunnart habitat within the project area. Preclearance surveys must be undertaken within one month prior to clearing any area of Julia Creek Dunnart habitat and undertaken by a suitably qualified field ecologist in accordance with the Survey Guidelines for Australia's threatened mammals or in accordance with methodology endorsed by an independent suitably qualified expert in writing.	No pre-clearance surveys have been undertaken during the current reporting period, as no new areas of Julia Creek Dunnart habitat have been cleared. The most recent surveys were: May/June 2023 – conducted prior to initial disturbance works; two Julia Creek Dunnarts (*Sminthopsis douglasi*) recorded. Report provided to DCCEEW in July 2023. October 2023 – conducted ahead of vegetation clearing for refined disturbance footprint; no Julia Creek Dunnarts recorded. Report provided as Attachment A in the previous compliance submission. Both surveys were carried out by a suitably qualified field ecologist in accordance with the methodology described in the Project's Significant Species Management Plan (V4), endorsed by the Project's independent suitably qualified expert. The October 2023 survey occurred within 30 days of vegetation clearing, in accordance with approval requirements. As no further clearing has occurred since October 2023, no additional pre-clearance surveys were required during this reporting period. Further pre-clearance surveys are anticipated in early 2026, aligned with proposed ground disturbance activities.	Complies
4	The approval holder must ensure that all clearing of Julia Creek Dunnart habitat within the project area is supervised by a fauna spotter catcher with sufficient authority to ensure that clearing activities do not cause injury or death of Julia Creek Dunnarts.	No clearing of Julia Creek Dunnart habitat has occurred during the current reporting period. The most recent clearing was undertaken on 30 October 2023. A fauna spotter-catcher conducted pre-clearing inspections on the two preceding	Complies

		days (including the use of a thermal camera) and was present during the clearing. No injured wildlife was recorded. As no additional clearing has taken place since October 2023, no further fauna spotter-catcher supervision was required during the period.	
5	The approval holder must take all reasonable steps to capture all Julia Creek Dunnarts identified during pre-clearance surveys and/or clearing and release all captured Julia Creek Dunnarts within the relocation site. All capture and release of Julia Creek Dunnarts must be conducted by a fauna spotter catcher or suitably qualified field ecologist.	No Julia Creek Dunnarts have been captured or relocated during the current reporting period, as no clearing or pre-clearance surveys requiring relocation have taken place.	Complies
6	The approval holder must report the survey effort for pre-clearance surveys and all capture and release of Julia Creek Dunnarts in the next annual compliance report and upload all sighting records to the Atlas of Living Australia.	No pre-clearance surveys or capture/relocation of Julia Creek Dunnarts were undertaken during the current reporting period. As such, no new records were uploaded to the Atlas of Living Australia.	Complies
Environmental offsets			
7	To compensate for the clearance of Julia Creek Dunnart habitat identified in condition 1, the approval holder must fully implement the Saint Elmo Vanadium Project Offset Strategy.	No new pre-clearance surveys or capture/relocation of Julia Creek Dunnarts were undertaken during the current reporting period. Implementation of the Saint Elmo Vanadium Project Offset Strategy continues in line with Condition 8 of approval. Activities are conducted under the guidance of the independent suitably qualified expert, suitably qualified researcher, and suitably qualified environment manager, and include ongoing desktop, field, and laboratory works as required. Progress reports and summaries of works carried out by QUT and SGNRM remain available as Attachments B and C in previous compliance submissions. The project continues to fund and implement the Offset Strategy.	Complies
8	The approval holder must not commence the action until:		
a)	Contracts have been signed and exchanged between a suitably qualified researcher and the approval holder committing both parties to the research program	Contracts have been signed and exchanged between the approval holder and QUT, committing both parties to the 2025–2028 research program.	Complies
b)	Contracts have been signed and exchanged between a suitably qualified environmental manager and the approval holder committing both parties to the threat abatement program.	No new contracts have been signed during the current reporting period. Previous agreements remain in place, including the sub-contractual agreement between Epic Environmental and Southern Gulf Natural Resource Management (SGNRM) signed in April 2023, which covered activities through July 2025.	Complies

		Works under the threat abatement program have been completed to July 2025. Further activities are proposed to pause until Quarter 1, 2026, due to construction operations currently being scaled down to 1/100 scale.	
c)	Funding for at least the first full year of the research program has been agreed upon between a suitably qualified researcher and the approval holder in line with the milestones outlined in the Saint Elmo Vanadium Project Offset Strategy and provided to the suitably qualified researcher by the approval holder.	Funding for the 2025–2028 research program has been agreed upon and provided to QUT in line with the milestones outlined in the Saint Elmo Vanadium Project Offset Strategy. Payments continue to be made in accordance with the contractual arrangements.	Complies
d)	Funding for at least the first full year of the threat abatement program has been agreed upon between a suitably qualified environmental manager and the approval holder in line with the milestones outlined in the Saint Elmo Vanadium Project Offset Strategy and provided to the suitably qualified environmental manager by the approval holder.	Funding for the threat abatement program has been agreed upon and provided to in line with the sub-contractual agreement signed in April 2023, covering activities through July 2025. Payments have continued in accordance with the contractual arrangements. Further activities are proposed to pause until Quarter 1, 2026 due to construction operations currently being scaled down to 1/100 scale. No changes to funding arrangements have occurred during the current reporting period.	Complies
e)	Evidence that conditions 8(a) to 8(d) have been complied with is provided to the department in writing.	This report, together with the summaries of works carried out to date (provided as Attachments B and C in previous compliance submissions), continues to serve as evidence that Conditions 8(a) to 8(d) have been complied with. Additionally, new agreements entered in 2023 and 2025 for the research program (QUT) and the threat abatement program (SGNRM) are considered part of the ongoing implementation of the Offset Strategy and provide further evidence of compliance.	Complies
9	The approval holder must ensure all research results from the Saint Elmo Vanadium Project Offset Strategy are published in research articles in a gold open access peer-reviewed journal relevant to the scientific discipline and location of the project.	Research results from the Saint Elmo Vanadium Project Offset Strategy continue to be published in gold open access, peer-reviewed journals relevant to the scientific discipline and location of the project. Additional research articles have been published since the previous reporting period, include: • Venz, M., et al 2024 – Julia Creek dunnart, *Sminthopsis douglasi* Targeted species survey guidelines. • Baker, A.M., et al 2025 - Mammal craniodental remains in owl pellets provide new tooth row measurements for the threatened Julia Creek dunnart (Sminthopsis douglasi)	Complies

		• Charley, C.L., et al 2025 - Identification of Planigale ingrami and Planigale tenuirostris from mandibles deposited in eastern barn owl (Tyto javanica delicatula) pellets • Charley, C.L., et al 2025 - Owl Pellet Content Analysis Proves an Effective Technique to Monitor a Population of Threatened Julia Creek Dunnarts (Sminthopsis douglasi) Throughout a Native Rodent Plague. • Lockhart, D.A., et al 2025 - The Hidden Diet: Determining the Distribution of the Threatened Julia Creek Dunnart (Sminthopsis douglasi) Using Eastern Barn Owl (Tyto javanica delicatula) Pellets. • Gray, E.L., et al 2025 A pilot study using eDNA collected from soil and active air samplers to detect terrestrial vertebrates in an open grassland habitat of central Queensland, Australia.	
10	The approval holder must provide annual reports to the department on progress towards the objectives of the Saint Elmo Vanadium Project Offset Strategy within 60 business days of each anniversary of the commencement of the action or an alternative date agreed to by the department.	The summaries of works carried out to date (provided as Attachments B and C in previous compliance submissions) continue to demonstrate progress towards the objectives of the Saint Elmo Vanadium Project Offset Strategy. These reports, together with this annual compliance report, satisfy the reporting requirements of Condition 10 for the current reporting period.	Complies
11	The approval holder must publish the Saint Elmo Vanadium Project Offset Strategy on the website prior to commencement of the action and keep the Saint Elmo Vanadium Project Offset Strategy published on the website until the end date of this approval.	The Saint Elmo Vanadium Project Offset Strategy remains published and accessible on the project website: https://saintelmoproject.com.au/offset-strategy-2/. The Strategy was initially published in 2022 and will continue to be available until the end date of the approval.	Complies
Commencement of the action			
12	The approval holder must notify the department in writing of the date of commencement of the action within 10 business days after the date of commencement of the action	On behalf of Multicom, Epic Environmental sent a notification letter on 31 October 2023 to the Post Approvals Section of DCCEEW, confirming that the project officially commenced on 30 October 2023. No additional notifications were required during the current reporting period.	Complies
13	If, at any time after five years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not commence the action without the written agreement of the Minister.	The project has commenced within five years of the date of approval (21 March 2021).	Not applicable
Compliance records			
14	The approval holder must maintain accurate and complete compliance records.	Multicom has been maintaining accurate and complete compliance records regarding relevant Project activities.	Complies

15	If the department makes a request in writing, the approval holder must provide electronic copies of compliance records to the department within the timeframe specified in the request.	Not relevant at this stage	Not applicable
Annual compliance reporting			
16	The approval holder 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 approval holder must:		
a)	Publish each compliance report on the website within 60 business days following the relevant 12-month period	The 2023–2024 compliance report was uploaded to the project website prior to 30 January 2025, meeting the required publication deadline. The report remains available at https://saintelmoproject.com.au. The 2025 compliance report will be submitted to DCCEEW and subsequently published on the project website within 60 business days of submission, in accordance with approval requirements.	Complies
b)	Notify the department by email that a compliance report has been published on the website and provide the weblink for the compliance report and documentary evidence showing the date of publication within five business days of the date of publication	The 2025 compliance report will be submitted to the Post Approvals Section of DCCEEW, and the department will be notified by email with the weblink and documentary evidence showing the date of publication within five business days of the report being published on the project website.	Complies
c)	Keep all compliance reports publicly available on the website until this approval expires	All compliance reports, including the 2023–2024 report and the forthcoming 2025 report, are or will be publicly available on the project website: https://saintelmoproject.com.au and will remain accessible until the approval expires.	Complies
d)	Exclude or redact sensitive ecological data from compliance reports published on the website	The summary reporting of Offset Strategy activities carried out so far has been redacted from the version of the compliance report published on the website due to confidentiality concerns.	Complies
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	The summary reporting of works carried out so far has been provided in Attachment B and Attachment C as submitted to the DCCEEW in the complete version of the compliance report.	Complies
Reporting non-compliance			
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:	No incident and/or non-compliance with conditions or commitments has occurred as a result of the Projects operations	Not applicable
a)	Any condition which is or may be in breach		
b)	A short description of the incident and/or non-compliance		

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.		
18	The approval holder must provide to the department the details of any incident or noncompliance 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:	No incident and/or non-compliance with conditions or commitments has occurred because of the Projects operations	Not applicable
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		
c)	The method and timing of any remedial action that will be undertaken by the approval holder.		
Independent audit			
19	The approval holder must ensure that independent audits of compliance with the conditions are conducted when requested in writing by the Minister.	No audit has been requested for the Project.	Not applicable
20	For each independent audit, the approval holder must:	No audit has been requested for the Project.	Not applicable
a)	Provide the name and qualifications of the independent auditor and the draft audit criteria to the department		
b)	Only commence the independent audit once the audit criteria have been approved in writing by the department		
c)	Submit an audit report to the department within the timeframe specified in the approved audit criteria		
21	The approval holder must publish the audit report on the website within 10 business days of receiving the department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	No audit has been requested for the Project.	Not applicable
Completion of the action			
22	Within 20 business days after the completion of the action, the approval holder must notify the department in writing and provide completion data.	Not relevant at this stage of the Project	Not applicable

2 SGNRM – SUMMARY OF 2024-2025 MONITORING AND MANAGEMENT ACTIVITIES

During the 2024–2025 reporting period, SGNRM undertook a comprehensive program of predator monitoring, feral cat abatement and ecological assessment across Wensley, Proa and Alexmere Stations within the McKinlay Shire region. These sites have been well documented as habitat for Julia Creek dunnart.

Two camera-trap monitoring events (January to April and May to June 2025) were completed using Reconyx Hyperfire 2 Professional White Flash and Reconyx Hyperfire 2 Security Covert IR. The data obtained throughout the reporting period (event 5 & 6) were as follows:

- Total of 120 trapping days
- 595 feral cats detected at the Implementation site
- 736 feral cats detected at the Control Site
- No detections of Julia Creek dunnarts
- On ground surveys did not yield any Julia Creek dunnart detections

A targeted threat abatement program was undertaken between July 2024 and June 2025 which showed elevated daily feral cat detection rates across both control and treatment sites. These results are consistent with ongoing regional predator pressure trends. A total of 1958 feral cats were eradicated.

Elliott trapping events undertaken throughout 2024 coincided with a population boom of *Rattus villosissimus,* this reduced the effectiveness of Elliott traps to capture Julia Creek dunnart as traps were frequently occupied by rats.

The significant rodent plague (Rattus Villosissimus) occurring through 2023 and 2024 is believed to have contributed to rapid increases in feral cat numbers. Rodent activity dropped sharply by late 2024, with few detections recorded in 2025.

Widespread flooding across the McKinlay Shire early in 2025 disrupted habitat use and likely affected the detectability of both feral cats and Julia Creek dunnarts.

Elevated feral cat numbers prompted increased local government involvement, including bounty programs and state-level advocacy for coordinated predator control.

SGNRM has identified several opportunities to strengthen future monitoring and offset performance, subject to funding availability. Recommended next steps include the introduction of detection dogs to improve JCD survey effectiveness, additional thermal camera monitoring, expanded use of artificial intelligence for image processing, and further investigation into interacting pressures such as invasive prickly acacia. Ongoing landscape scale predator management, supported by refined monitoring tools and improved understanding of habitat dynamics, will continue to be essential to meeting the conservation objectives of the Julia Creek Dunnart Offset Strategy.

3 QUT – SUMMARY OF 2024-2025 RESEARCH ACTIVITIES

Throughout 2024 and 2025, Multicom continued its support for QUT's multi-year research program into the ecology, distribution and detection of the Julia Creek dunnart. The research program is now in its fourth year and forms a central component of the Offset Strategy.

Program funded research aims to monitor known populations of Julia Creek dunnart to better understand their behaviour and distribution. Various methods including Elliott trapping, camera trapping, analysis of owl pellets, examination of feral cat stomach contents, and the use of eDNA are used to assess the ecological values and improve understanding of the Julia Creek dunnart.

QUT has found that each detection method has their own advantages and limitations, depending on the research being undertaken. For example, camera trapping provides a good indication of whether the Julia Creek dunnart is present in an area, whereas Elliott trapping can provide a greater indication of gender composition of the population.

This year QUT's work program included:

- Long-term monitoring at Bladensburg National Park using standardised Elliott trapping grids to maintain a consistent population dataset.
- Regional distribution surveys across multiple pastoral and conservation properties, using both Elliott trapping and habitat-based assessments to refine understanding of species occupancy.
- Assessment of efficacy in conservation detection dogs.
- Vegetation and habitat condition assessments, providing improved insights into microhabitat characteristics influencing JCD presence.
- Owl pellet monitoring and dietary analysis, continuing the successful predator-based survey method developed in earlier years.
- Airborne eDNA testing, building on recent methodological advancements and exploring landscape-scale detection feasibility.
- Multiple peer-reviewed articles were published during this period in open-access journals, fulfilling EPBC approval requirements and contributing to broader scientific knowledge. These publications cover:

Collectively, these works provide tangible, high-quality outcomes from the Offset Strategy and directly support improved species management within the region.

4 CONCLUSION

During the 30 October 2024 to 30 October 2025 reporting period, Multicom Resources Pty Ltd has continued to implement the Offset Strategy for the Saint Elmo Vanadium Project in full compliance with the EPBC Act approval conditions (EPBC 2017/8007). No non-compliances or incidents were reported, and all applicable approval conditions have been met.

Key outcomes from this reporting period include:

- Ongoing field monitoring and threat management delivered by SGNRM, including camera-trap surveys, feral cat control, and ecological assessments across priority properties.
- Continued research and methodological advancement undertaken by QUT, encompassing population monitoring, habitat assessments, dietary analyses, and eDNA testing.
- Publication of research findings in peer-reviewed open-access journals, contributing to scientific understanding of the Julia Creek dunnart and informing evidence-based conservation management.

The integrated approach combining applied research, targeted monitoring, and landscape-scale predator management continues to enhance understanding of the species, refine detection techniques, and support effective delivery of the Project's Offset Strategy.

Multicom remains committed to maintaining compliance with all EPBC Act conditions and to ongoing collaboration with key partners to ensure the long-term conservation of the Julia Creek dunnart. Future activities in 2026 will continue to strengthen monitoring effectiveness, research outputs, and threat mitigation to meet the objectives of the Offset Strategy.

5 GLOSSARY

Parameter or Term	Description
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC 2017/8007).
EPBC	Environment Protection and Biodiversity Conservation
Epic	Epic Environmental Consultants
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EA	Environmental Authority - Permit P-EA-100119386
Ha	Hectares
M	Meters
JCD	Julia Creek Dunnart (Sminthopsis douglasi)
SGNRM	Southern Gulf Natural Resource Management
The Project	Saint Elmo Vanadium Project
OWSF	Offsite Water Storage Facility
QUT	Queensland University of Technology
QLD	Queensland

8. APPENDIX A

SIGNIFICANT SPECIES MANAGEMENT PLAN SECTION 6.1

MULTICOM

SAINT ELMO MINE

Significant Species Management Plan

Reference: MCR-PLA-EV-00013

UNCONTROLLED DOCUMENT WHEN PRINTED

Revision Date	Description	Originator	Reviewer	Approver
22-Mar-2022	Rev 1	T. Reis	B. Taylor / A. Siddaway	C. Schloss
22-Aug-2022	Rev 2 – Change 40km/hr to 60km/hr		T. Vidler B. Ogilvie	C. Schloss
22-May-2023	Rev 3 – update pre-clearance survey method		B. Taylor G. Mifsud	C. Schloss
1-May-2024	Rev 4 - updated		B. Taylor L. Crawford	A. Napier
28 July 2025	Rev 5 – Review		L. Crawford	

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1. INTRODUCTION

This Significant Species Management Plan (SSMP) has been prepared for implementation by Multicom and their contractors to provide management measures to protect the Julia Creek Dunnart (*Sminthopsis douglasi*) at the Saint Elmo Vanadium Project (the Project). The Julia Creek Dunnart is listed as Vulnerable under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Endangered under the Queensland *Nature Conservation Act 1992* (NC Act). Project construction and operation activities will be conducted across lands located on Mining Lease (ML) ML100162, the Offsite Water Storage Facility (OWSF) and associated infrastructure located on ML100244, ML100245 and ML100246 (refer **Figure 1** for location). For the purpose of this plan, 'Project area' comprises the mine site, OWSF and associated infrastructure.

1.1 Purpose and Scope

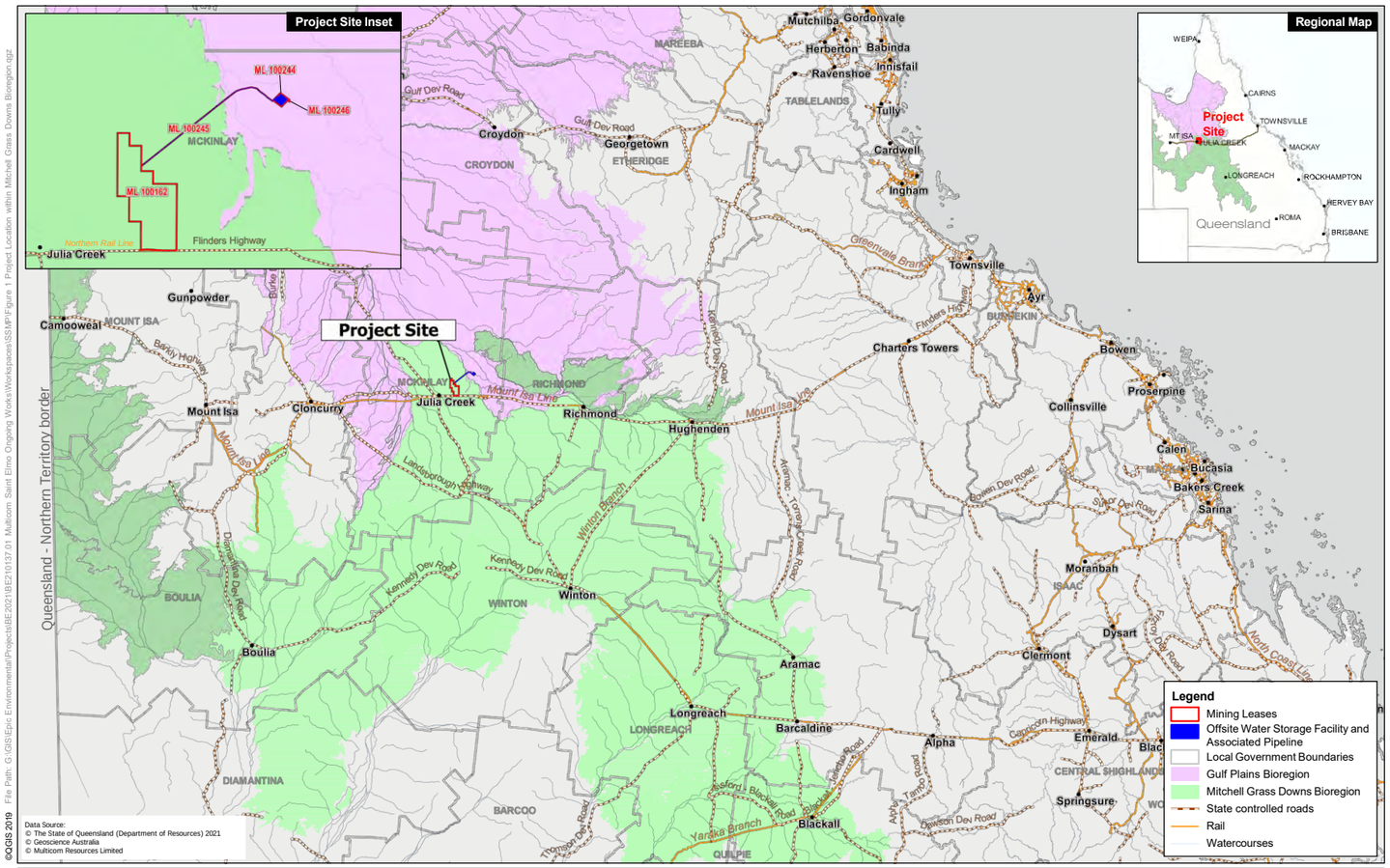
Multicom have approval to construct, operate and rehabilitate a vanadium mine and associated infrastructure under an EPBC Act referral (referral number - 2017/8007) and Environmental Authority issued by the Queensland Department of Environment and Science (DES) (EA number: P-EA-100119386). As part of the assessment of the *Environmental Impact Statement (EIS) assessment report for the St Elmo vanadium project* the DES (2020) stated the requirement of an SSMP be developed for threatened species (namely Julia Creek Dunnart) associated with the Project.

Conditions of EPBC Act approval specific to the action and development of the SSMP include:

- To limit the impacts of the action on the Julia Creek Dunnart, Multicom must not clear more than 7,419 ha of Julia Creek Dunnart habitat within the Project area
- The approval holder must not clear outside the Project area
- To minimise the impacts of the action on Julia Creek Dunnarts, Multicom must undertake pre-clearance surveys of all Julia Creek Dunnart habitat within the Project area. Preclearance surveys are also noted as required under the DES assessment of the Project EIS.
- Multicom must ensure that all clearing of Julia Creek Dunnart habitat within the project area is supervised by a fauna spotter-catcher with sufficient authority to ensure that clearing activities do not cause injury or death of Julia Creek Dunnarts
- Multicom must take all reasonable steps to capture all Julia Creek Dunnarts identified during pre-clearance surveys and / or clearing and release all captured Julia Creek Dunnarts within the relocation site. All capture and release of Julia Creek Dunnarts must be conducted by a fauna spotter-catcher or suitably qualified field ecologist
- Multicom must report the survey effort for pre-clearance surveys and all capture and release of Julia Creek Dunnarts in the next annual compliance report and upload all sighting records to the Atlas of Living Australia

The objective of this SSMP is to describe the actions to be implemented to avoid, mitigate, and manage impacts on the Julia Creek Dunnart and its habitat. The SSMP is applicable to activities carried out within the Project area throughout the pre-clearing, construction, operation, and decommission phases of the Project. Specifically, this SSMP:

- Outlines ecological attributes, site assessment results and key threats relevant to Julia Creek Dunnart
- Details methods / controls used during pre-clearance surveys
- Describes management methods to minimise impacts to Julia Creek Dunnart implemented by Multicom throughout each phase of the Project
- Presents monitoring, reporting and review standards



0 100 200 300 km

Scale: 1: 3,500,000@ A3

Datum: GDA94

Multicom Resources Limited
Saint Elmo Vanadium Project
Significant Species Management Plan

Figure 1
Project Location within Mitchell Grass Downs Bioregion

BE210137.01 Rev 0 01/12/2021

2. LEGISLATIVE REQUIREMENTS

2.1 Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the key piece of Commonwealth legislation governing environmental protection in Australia. Administered by the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE), the EPBC Act defines and protects nine matters considered to be of National Environmental Significance (MNES) including:

- World Heritage properties
- National Heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource in relation to coal seam gas development and large coal mining development

Under Part 3 of the EPBC Act, a person must not undertake an action (e.g. a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things) that will have, or is likely to have, a significant impact on a protected matter, without approval from the Minister for the Department of Agriculture, Water and the Environment (DAWE) (the Minister).

The EIS submitted by Multicom provided significant impact assessments for two EPBC listed threatened fauna species:

- Star Finch (eastern sub-species, Neochmia ruficauda ruficauda), listed as Endangered
- Julia Creek Dunnart (Sminthopsis douglasi), listed as Vulnerable

The assessments concluded that the project would be unlikely to cause an impact on the Star Finch, and is likely to cause an impact on the Julia Creek Dunnart.

Multicom proposed an Offset Strategy (**Appendix A**) as a positive means of improving the conservation outcomes for Julia Creek Dunnart, its habitat, and the landscape in which it occurs. Multicom believes that this responsible approach is in line with expectations around demonstrating a social licence to operate as well as contributing to the scientific base of knowledge necessary to responsibly manage conservation significant species.

2.2 State

Nature Conservation Act 1992

The *Nature Conservation Act 1992* and subordinate documents (*the Nature Conservation (Animals) Regulation 2020* (NC Animals Regulation) and *Nature Conservation (Plants) Regulation 2020* (NC Plants Regulation) regulate the environmental impacts of the mining industry through the requirement for vegetation clearing permits, species management programs and other permits.

Where mining activities involve tampering with animal breeding places, the tampering may be authorised by application to the DES through an approved species management program.

Vegetation clearing is one of the main threats for the loss of Julia Creek Dunnart's habitat and measures to mitigate the impact on the species are provided in **Section 6**. The DES acknowledged this conclusion in the assessment report in response to the EIS and recommended the development of this SSMP for the Julia Creek Dunnart.

3. PROJECT ENVIRONMENTAL MANAGEMENT

Multicom is dedicated to positive contributions to society and the environment through implementation of initiatives that result in community benefits, reduced carbon dioxide emissions, environmental enhancements and reduced consumption.

Multicom is embarking on a fully integrated Environmental, Social and Governance strategy. Going beyond just compliance, this aims to enhance the local environment through habitat restoration and also integrates reduced water consumption and energy saving strategies.

The low impact of our operation and the opportunity for ecological enhancements are evident in the proposed investigation of managing Julia Creek Dunnart habitat, re-establishment of Mitchell Grass Downs vegetation and the targeted removal and eradication of Prickly Acacia (*Vachellia nilotica*).

Multicom is committed to a range of measures to minimise impacts to MNES and general ecological values associated with Project area. In the first instance, the final design process for the Project will reduce the area of impact to areas representing habitat for threatened species as much as is feasible for the construction of infrastructure. Where avoidance is not possible, a range of mitigation strategies will be implemented under an overarching Project Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP). The CEMP and OEMP will be informed by a number of management plans including this SSMP. Other management plans / programs relevant to potential impacts on MNES include (but are not limited to):

- PLN-011 Weed and Pest Management Plan
- PLN-023 Erosion and Sediment Control Plan
- PLN-019 Receiving Environment Monitoring Program
- PLN-022 Waste Management Procedure
- PLN-012 Progressive Rehabilitation and Closure Plan

The CEMP, OEMP and various sub-plans will comprise a range of measures that will also mitigate potential impacts to MNES in addition to the measures within this SSMP as detailed in **Section 6**.

3.1 Roles and Accountabilities

Multicom assumes all responsibility for managing activities associated with the Project in an environmentally responsible manner. All Project personnel and contractors are responsible for carrying out works in accordance with this SSMP. The roles and responsibilities for the implementation of the SSMP are provided in **Table 1**.

Table 1 – Key Roles and Accountabilities

Role	Responsibilities
Senior Site Executive (SSE)	▪ Manage site during all phases of construction, operation, and decommissioning ▪ Oversee principal contractor during construction, including monitoring the principal contractor's performance to ensure all mitigation measures are implemented ▪ Liaise with Site Environmental Manager to ensure mitigation initiatives from this management plan are implemented onsite ▪ Ensuring all incidents are adequately reported, investigated and managed
Site Environmental Manager	▪ Manage Project in compliance with all relevant environmental approvals / conditions ▪ Assumes overall responsibility for Project compliance within this SSMP ▪ Reports all incidents of non-compliance to relevant regulatory bodies (i.e. DES and DAWE) ▪ Ensure Site Manager(s) are resourced sufficiently to implement works within this SSMP ▪ Oversee environmental compliance with regulatory approvals / conditions (including this SSMP) through implementing Project and site audits ▪ Ensure environmental management documentation is current and subject to regular review and updated where required
Environmental Officer	▪ Conduct environmental inspections, monitor, and report environmental data as necessary ▪ Ensure compliance with the SSMP ▪ Develop site-specific induction and ensure all staff / contractors are inducted before working onsite ▪ Supervise / assist with training of Project personnel on environmental matters where required (e.g. during toolbox meetings) ▪ Notification of relevant Project personnel / regulatory authorities where non-compliance with this SSMP is recorded and investigation / reporting of all such incidents ▪ Review and updating of SSMP where required ▪ Report to the Site Environmental Manager on environmental matters including all associated reporting documentation as required

Role	Responsibilities
General site personnel (including contractors)	▪ Undertake all site inductions and relevant training to carry out works in the Project area ▪ Undertake all works for the Project in compliance with the SSMP or as directed by the SSE / Site Environmental Manager ▪ Immediate notification of incidents of non-compliance with this SSMP to SSE / Site Environmental Manager
Suitably qualified field ecologist / Fauna spotter-catcher	▪ Carry out pre-clearance surveys (field ecologist) ▪ Responsible for handling fauna during pre-clearance survey (field ecologist) or clearing activities (fauna spotter-catcher) and determine if relocation is required ▪ Monitor, report and review environmental performance. ▪ Fauna spotter-catcher holds a current rehabilitation permit (fauna spotter-catcher) as issued by the DES under the *Nature Conservation (Administration) Regulation 2017*

4. JULIA CREEK DUNNART - ECOLOGICAL INFORMATION

4.1 Ecological Values of the Project Area

The Project is predominantly located within Mitchell Grass Downs (MGD) bioregion (refer **Figure 1**) and is comprised of open grasslands used for grazing purposes, consistent with the MGD bioregion. The bioregion covers an area of approximately 33,532,000 ha, with approximately 23,788,550 ha of this area located in north-west Queensland. The OWSF and part of the pipeline are in the Gulf Plains bioregion, which covers 12,110,000 ha, wholly within Queensland.

The MGD bioregion is dominated by Mitchell Grass (*Astrebla* spp.) tussock grasslands on rolling plains (downs). The soils consist predominantly of deep, heavy clays. The plains are interspersed with drainage lines, supporting open grasslands, herblands or eucalypt woodlands and isolated remnant plateaus. The grasslands comprise a significant natural resource used historically for cattle grazing. The Project area, OWSF and associated infrastructure are strongly dominated by grasslands, with weak representation of eucalypt communities on ephemeral waterways (DERM 2009a).

The Gulf Plains bioregion encompasses low-lying country and offshore islands of north-western Queensland. Major river systems dissect the broad alluvial plains – the Nicholson, Gregory and Leichhardt drain from the Northwest Highlands bioregion; the Cloncurry, Flinders and Norman from the MGD bioregion; and the Gilbert, Staaten, Nassau and Mitchell from the Einasleigh Uplands bioregion. A major environmental pressure on the bioregional biota is the combination of generally flat grazing country and monsoonal climate that can result in alternating periods of inundation during the wet season followed by a long dry season (QG 2015).

Potentially suitable habitat for Julia Creek Dunnart occurs throughout the Project area. There is road reserve associated with the pipeline that will connect the mine site to the OWSF at Flinders River. A stock route is present but is subject to ongoing grazing by livestock and variable levels of infestation by Prickly Acacia. All lands associated with the Project reflect similar levels of grazing use, weed infestation and presence of feral pest animal species. Given the history of grazing pressure and active threatening processes, it is possible that the species has never occurred on the Project areas but given the difficulty in demonstrating the presence of Julia Creek Dunnart even from areas it is known to occur, a prolonged

survey effort over many years would be required to adequately indicate absence. Multicom have taken a conservative approach toward potential for the species to use habitat associated with the Project and committed to improving this potential through management of known threatening processes – grazing, feral animals and Prickly Acacia.

4.2 Julia Creek Dunnart

Julia Creek Dunnart is a small, cryptic marsupial carnivore restricted to the Mitchell Grass downs country of north-west Queensland, which are characterised by tussock grass-covered cracking clay soils. Males have a head-body length of 130-135 mm with a tail length of 120-130 mm. Females are smaller with a head-body length of 110-125 mm and a tail length of 110-120 mm. It is grey-brown in colour and has a distinct facial stripe between the eyes. The tail may be 'fattened' in appearance with dark hairs on the tip (Van dyck et al. 2008). Two other dunnart species may also occur in the same habitat: Fat-tailed Dunnart (*Sminthopsis crassicaudata*), and the widespread and relatively common Stripe-faced Dunnart (*Sminthopsis macroura*). Julia Creek Dunnart is larger than both species and has a rufous wash on the cheeks.

The species feeds on a range of invertebrates and small reptiles. It shelters in cracks when the soil is dry and ground cover is sparse and in vegetation when the cracks close after rain (DERM 2009b). It occurs in areas of both dense and sparse ground cover and a variety of soil cracking conditions but prefers sites with a high density of cracks and dense vegetation (Lundie-Jenkins 2012). Soil cracks and holes provide shelter from predators, fire and excessive temperatures in dry seasons and abundant ground cover provides shelter from predators during wet conditions (Mifsud 1999). Soil cracks and substantive ground cover are necessary for the species' survival (McAlpine & Howes 2005 in DERM 2009b). The species may be nomadic within its home range, sheltering at the end of their night-time foraging in any nearby crack or hole. A study of radio-collared animals in Bladensburg National Park found no individual, including a female with young in the pouch, reused the same daytime resting site over a period of up to nine consecutive days. Given that breeding occurs during the wet season, when cracks and holes may close, females may continue to be nomadic and use temporary nests, perhaps in vegetation (Woolley 2017).

Image: Julia Creek Dunnart from Multicom project area, Epic Environmental June 2023

4.3 Habitat within Project Site

No individuals were recorded during targeted field surveys undertaken as part of the EIS and there was no evidence of Julia Creek Dunnart being previously known from within the Project area, although older database records occur approximately 5 km south. Suitable habitat for the species was identified onsite, albeit considered degraded to varying degrees by known threatening processes of cattle grazing, feral pest animals and Prickly Acacia infestation. This is also the case for the OWSF and associated pipeline corridor. Subsequently, following good seasonal rainfall, two individuals of the species were recorded within the eastern portion of the mine Project area during an initial pre-clearance survey in June 2023.

Significant areas of ground-truthed Regional Ecosystems (REs) identified as potential habitat for Julia Creek Dunnart will be cleared for the Project. Prior to European settlement, the Project area, OWSF and pipeline was a largely treeless native grassland, with scattered trees on stony rises, typical of much of the Mitchell Grass Downs and consistent with being a mosaic of REs 4.9.1c and 4.9.2b. Many of these stony areas are very small and contain only a few well-spaced trees. The Project, OWSF and associated infrastructure areas now have substantial areas with woody cover, dominated by the listed weed species Prickly Acacia, especially near water and along drainage lines. The site and its surrounds (including the OWSF and associated infrastructure) are subject to three of the four known and published major threatening processes to biodiversity in the bioregion, namely, grazing by livestock, feral predators and exotic weeds (specifically Prickly Acacia which binds soil and reduces soil cracking); all of which were confirmed through site surveys. These threatening processes are also relevant specifically to Julia Creek Dunnart, as stated in the species' Recovery Plan, and the habitat quality for the species is compromised in this regard. The infestation of Prickly Acacia varies in density with location and the impacts of cattle are focused on water sources.

4.4 Relevant Conservation Documents

Table 2 summarises the relevant Commonwealth and State documents applicable to the species recovery.

Table 2 – Key Data on Julia Creek Dunnart

Julia Creek Dunnart (*Sminthopsis douglasi*)	
Recent synonyms	None
Status	Vulnerable (EPBC Act), Endangered (NC Act)
Habitat	Julia Creek dunnart occurs on treeless or lightly timbered tussock grasslands on cracking clay soils (DERM 2009b; Woinarski et al. 2014). Habitat use appears to be based on soil crack and hole density as this is a more reliable and predictable source of shelter than vegetation cover (Mifsud 1999).
Distribution	Julia Creek dunnart is endemic to north-western Queensland where it occurs in the Mitchell Grass Downs and Desert Uplands bioregions. Its extent of occurrence is about 60,000 km^2 (Woinarski et al. 2014).
Recovery Plans	A key document developed for the recovery of the Julia Creek dunnart is the *National recovery plan for the Julia Creek dunnart* (DERM 2009b). This replaced the *Recovery plan for the Julia Creek dunnart (*Sminthopsis douglasi*) 2000–2004* (Lundie-Jenkins & Payne 2000). Recovery plans set out the research and management actions necessary to stop the decline, and support the recovery, of listed threatened species. A new Recovery Plan is required (DAWE 2021).

Julia Creek Dunnart (*Sminthopsis douglasi*)	
Threat Abatement Plans	For Julia Creek Dunnart, the following Commonwealth Threat Abatement Plans are considered relevant (DAWE 2021): ▪ *Threat abatement plan for predation by feral cats* (DE 2015) ▫ Sets out four objectives for controlling feral Cats (Felis catus) including control in different landscapes, effectiveness of control options, alternative strategies to aid threatened species recovery and public support for cat management ▪ *Threat abatement plan for predation by the European red fox* (DEWHA 2008) ▫ Sets out prioritising management areas including ascertain the degree of threat to the survival of threatened species and communities, the potential for recovery of threatened species and communities, threatened species likely to benefit through Red Fox (*Vulpes vulpes*) control in specific areas, and cost efficiency and effectiveness of Red Fox control in a particular area.

5. POTENTIAL PROJECT IMPACTS TO JULIA CREEK DUNNART

Activities of the Project may result in the loss, and subsequent rehabilitation, of approximately 7,419 ha of Mitchell Grass Downs and Gulf Plains habitat, some of which may provide suitable habitat for the species should it utilise the area in the future.

The greatest threats to Julia Creek Dunnart are from threatening processes outlined in the species' Recovery Plan (DERM 2009b) - introduced predators (particularly Cats), invasion of Prickly Acacia, which binds the soils reducing potential areas of refuge during periods of excessive temperatures, and by livestock grazing which compacts the soil and degrades habitat value (Maxwell et al. 1996; McAlpine & Howes 2005; Woinarski et al. 2014). Potential threatening processes include fire and small population size, which leaves the species susceptible to local extinctions (DERM 2009b; Woinarski et al. 2014). Four exotic species were recorded during the terrestrial ecology field surveys, feral Cat, feral Pig (*Sus scrofa*), Goat (*Capra hircus*) and Dingo (*Canis familiaris dingo*). All these threatening processes are active across the Project area. Specific description of each threat relevant to the Project is provided hereunder.

5.1 Habitat Loss

The clearing of vegetation is the most significant and direct impact of the Project on the ecological values of the site. The removal of habitat reduces the size of local populations of flora and fauna dependent on that habitat. These impacts are immediate and significant in the short-term. Impacts may persist in the long-term if habitat created during mine rehabilitation does not closely resemble pre-mining ecosystems. In addition, if sufficient habitat refuges are not maintained locally prior to the maturation of rehabilitated land, local extinction of certain species may occur. Mining involves the disturbance of the soil profile. Soil cracks provide both potential shelter and foraging habitat for the species.

The Progressive Rehabilitation and Closure Plan is designed to support the Environmental Management Plan and describes the approach to managing rehabilitation during construction and operation of the Project.

The outcomes of progressive rehabilitation for the Project as they relate to the Julia Creek Dunnart are as follows:

- Early (progressive) establishment of Mitchell Grass as vegetative cover with composition, structure and function based on pre-mining condition
- Simple hydrology reinstated on all sites of disturbance
- Pre-existing contours reinstated on sites of disturbance (except the Tailings Storage Facility and Evaporation Pond)
- Rehabilitation trial(s) to replicate the drying and wetting cycles that will result in the types of cracks that might be more indicative of pre-mining condition (and of benefit to the Julia Creek Dunnart)
- Removal of Prickly Acacia, a threatening process on all sites of disturbance
- Return of a functioning ecosystem post-mining / post-infrastructure

Overall, the goal of progressive rehabilitation is to improve the conservation outcomes for Julia Creek Dunnart, keeping with guidelines such as the *National recovery plan for Julia Creek Dunnart* (DERM 2009b) which sets out the research and management actions necessary to stop the decline of, and support the recovery of, the species.

The Environmental Authority (P-EA-100119386) issued for the approval of the Project contains conditions associated with rehabilitation management.

The objectives of the Plan are to:

- Ensure rehabilitation is undertaken to meet the completion criteria as set out within the approval conditions
- Ensure rehabilitation monitoring is undertaken to comply with approval conditions

The targets of the Plan are to:

- Obtain certification by an appropriately qualified person that the approval conditions associated with rehabilitation have been met
- Comply with the auditing schedule

A Progressive Rehabilitation and Closure Plan for the four Project MLs has been approved by the DES under the *Environmental Protection Act 1994* (EP Act) (PRCP schedule PRCP_P-EA-100119386_V1). Obligations under the PRCP schedule include:

- 3-yearly audits by a rehabilitation auditor
- Provision of the rehabilitation auditor's report within four months of the audit

Under the EP Act, Multicom must comply with the following matters stated in the schedule:

- Each rehabilitation milestone and management milestone
- When each rehabilitation milestone and management milestone is to be achieved

5.2 Injury and Mortality

Clearing of vegetation for the Project presents a risk of direct mortality or injury to Julia Creek Dunnart. The species is at risk of injury or death from heavy machinery and vehicular movements during the construction of the Project and to a lesser extent during operations. Indirect mortality may occur due to:

- Loss, modification and / or degradation of habitat
- Reduction in prey abundance
- Impediments to movement
- Competition with other native carnivores encountered due to movement into surrounding habitat

- Reduced foraging efficiency due to disturbance of surrounding habitat by construction and operation activities

To minimise the possible impacts of the action on Julia Creek Dunnart, pre-clearance surveys will be conducted in suitable habitat within the Project area. All reasonable steps to capture all Julia Creek Dunnarts identified during pre-clearance surveys and / or clearing will be taken. All captured Julia Creek Dunnarts will be released within the relocation site. All capture and release of Julia Creek Dunnarts will be conducted by a fauna spotter-catcher or suitably qualified field ecologist.

5.3 Weeds and Pest Animals

The following introduced predator and weed species are known threats to Julia Creek Dunnart and are identified as present and active on the Project site:

- Predation by Cat
- Invasion of habitat by Prickly Acacia

The *Threat abatement plan for predation by the European red fox* (DEWHA 2008) is considered relevant to Julia Creek Dunnart (DAWE 2021). Red Fox was not recorded during surveys on the Project and the closest known database record is approximately 35 km to the south (QG 2021). Pest animal mapping by the Queensland Government (DAF 2021) identifies Red Fox as being 'occasional and 'widespread' in the area, though the Project is at the northern limit of its distribution in the region.

The following activities associated with the Project have the potential to promote the proliferation of weeds and pests within the Project area, or introduce new weeds and pests from surrounding areas:

- The use of construction machinery, plant and materials sourced from outside the region and increased vehicular traffic in general may introduce and spread weed seeds if biosecurity hygiene measures are not in place
- Inappropriate disposal and storage of putrescible wastes may attract feral animals

The pest animal and weed species currently occurring within the Project area are not expected to significantly proliferate in response to the Project activities. The main risk is the introduction of new weeds to the area via contaminated vehicles or soils.

The Project Weed and Pest Management Plan will be implemented to mitigate these risks.

5.4 Dust, Noise and Lighting

The Project may result in indirect impacts adjacent to works areas including dust generated during construction, noise generated during both construction and operation, and light spill impacts generated during operation.

Earthworks and vehicular traffic associated with Project construction and operation can generate substantial amounts of dust during dry weather. Increased dust may result in respiratory issues in fauna, adverse impacts on plant photosynthesis and productivity (Chaston & Doley 2006), although evidence of these impacts is scarce. Dust has been known to provide adsorption surfaces for volatile contaminants that are subsequently deposited either by dry or wet deposition, causing respiratory ailments in animals.

The progressive nature of the proposed earthworks means that any one block of vegetation will only be exposed to significant levels of dust for a short period. The pronounced wet and dry seasons in northern Australia may make vegetation in these areas less susceptible to the impacts of dust. This is because most or all annual growth occurs during a period of the year when rainfall is highest. This coincides with the time of year when dust is least problematic, as rain inhibits the dispersal of dust in the air, and washes dust from leaves.

During the construction and operational phases of the Project, noise-generating activities will include, but may not be limited to:

- Noise generated by plant, equipment and vehicles (e.g. beepers, safety alarms, exhausts, vehicle horns and pump stations associated with the OWSF)
- Noise generated during construction activities (e.g. building of processing plant, OWSF and associated infrastructure)
- Noise generated from mining activities

Understanding of the impacts of noise on fauna is limited and much is taxon or taxa-specific. Noise can affect an animal's physiology and behaviour and, when at chronic levels or frequency, can have deleterious effects on energy budget, reproductive success and longevity. Excessive noise may lead some species to avoid areas, which could result in the localised fragmentation of habitat at the species or individual territory level. However, many species may interpret a new noise as a potential danger at first, but rapidly learn the noise is not associated with any threat (Radle 2007).

There is little available information of the effects of noise on Australian mammals. Without specific research it not possible at this stage to assess the likely impacts of Project-generated noise on Julia Creek Dunnart. There is no current government policy or guideline that recommends thresholds or limits in relation to fauna. It is noted that no blasting is proposed for mining operations. A Noise Management Plan will be implemented.

Little is known of the effects of artificial light on Australian mammals. Laboratory studies have shown that two species of dasyurid, Stripe-faced Dunnart (*Sminthopsis macroura*) (Cassone 1987) and Kowari (*Dasyuroides byrnie*) (Kennedy et al. 1989) and two species of bandicoot (Lyne 1981) may alter their activity patterns. But the nature and degree of change varied with species and, for the bandicoots, varied between individuals, with some continuing to be active during the night regardless of the light (Lyne 1981). There has been little study of the effects of artificial light on free-ranging wild animals (Robert et al. 2015), as opposed to captive bred and held individuals.

The Project site is native grassland, with few barriers to block light. Study of the effects of light in grasslands has shown that certain predators, including Red Fox, are more likely to take paths near lights, which may alter predation rates and distribution of prey species (Longcore & Rich 2017). Should Julia Creek Dunnart be present it is possible that artificial light may affect its behaviour, reproductive success and abundance but the nature and intensity of any changes are unknown. The final design phase of the Project will investigate night-time lighting required during operations and develop and implement low-lighting / shielding measures.

5.5 Fragmentation of Habitat

Highly fragmented habitats support fewer species than connected blocks of habitat of the same size. This is because fragmentation restricts dispersal of fauna and plant seeds between available habitats. The impacts of habitat fragmentation depend on the type of habitat(s) present, degree to which dispersal is inhibited by habitat gaps, the size of the remaining habitat fragments, and ecological attributes of the species.

Most of the habitat in the Project is a naturally treeless grassland. This habitat extends on all sides of the Project and is the dominant habitat in the MGD bioregion. There are small stony rises with some native tree species present scattered within potentially suitable Julia Creek Dunnart habitat. This treed habitat type is not suitable for Julia Creek Dunnart and its removal will not affect its movement of the species across the landscape. Only riparian areas within the Project support any number of native trees and this habitat is also not suitable for the dunnart.

It is anticipated that Julia Creek Dunnart will not move through areas being mined or areas highly modified by mine-associated infrastructure. However, the Project will not stop the species from moving through the surrounding habitat and mined areas will be rehabilitated, facilitating future movement through areas that may act as temporary barriers. The Project is likely to temporarily preclude use of areas of habitat by

Julia Creek Dunnart but is not expected to prevent landscape scale movement of the species. The Project is therefore very unlikely to cause fragmentation of habitat suitable for the species.

5.6 Fire

Fire is generally only possible in the Mitchell Grass Downs bioregion after an adequate wet season, which promotes sufficient vegetative growth. When burnt with adequate soil moisture, Mitchell Grass responds well to fire and is known to seed profusely after recovering from a burn. Despite this, the bioregion is rarely widely burnt, due to the high fodder value of Mitchell Grass species (QPWS 2012). The lack of burning in times of good grass growth has sometimes led to extreme fire events as well as the invasion of some acacia species into the grasslands. Lack of fire, or fire regimes that allow or promote the encroachment of woody species are detrimental to the grazing and biodiversity values of the Mitchell Grass Downs.

In general, the Project is not expected to cause substantial changes to local fire regimes. The most likely change is the reduced frequency of fire as a result of fuel reduction from clearing. This is likely to benefit the fire-sensitive vegetation occurring along the periphery of drainage lines. Any change is expected to be short-term, as rehabilitated sites are expected to develop a grass layer with the potential to support fire within the first one to two years of development. Active fire exclusion from rehabilitated sites will be practiced for at least ten years, to allow for the establishment of trees and shrubs where that reflects the original native vegetation.

6. SSMP Management Measures, Monitoring and Reporting

Proposed mitigation measures for managing potential impacts to Julia Creek Dunnart associated with the Project are detailed in **Table 3**. Monitoring of the outcomes of the management measures will be ongoing throughout the life of the Project. Nonetheless, regular monitoring events are required for some actions of the SSMP and are outlined in **Table 3** where required.

A review of the SSMP measures will be conducted annually or based on an occurrence of incident reporting associated with Project activities (refer **Section 7.1**). The annual review will be informed by reporting of the results of monitoring events and ongoing data collection associated with SSMP management actions (e.g., recording of fauna occurrences associated with Project activities).

The requirement for SSMP-associated reporting events (including annual audits of Project data) and the Project personnel responsible for overseeing the implementation of the SSMP (refer **3.1**) are also provided in **Table 3**. A record of all documentation associated with the SSMP will be kept for the life of the Project and will be accessible to relevant regulatory bodies (such as the DES) where required.

Project data associated with this SSMP will be maintained as follows:

- All data collected from Project site assessments and monitoring events will be entered into the Project GIS system
- Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures
- Results of all site ecological assessments and monitoring events are to be documented and maintained in a central location by the Site Environmental Manager

In **Table 3**, pre-mining construction activities for the Project site involve site preparation works which will include, but not be limited to, the following:

- Clearing of site (vegetation)

- Establishment of fencing, safety signage, contact signage, temporary amenities e.g., portable toilet, waste receptacles, erosion and sediment controls
- Earthworks for establishment of:
  - Water management infrastructure including levees, the OWSF, and associated pipelines
  - Mining Infrastructure Area (MIA) including sewage treatment plant and effluent disposal area, administration offices, amenities, processing facilities, flammable and combustible liquid storage, waste storage area, power station, carpark, vehicle manoeuvre areas, plant / equipment workshop, laboratory and washdown facilities

Site preparation works will be undertaken in accordance with the Project's CEMP. Site preparation works will be staged to minimise the extent of habitat to be cleared at any one time.

Mining for the Project site includes, but is not limited to excavation of shallow open cut pits whereby topsoil and subsoil will be removed and stockpiled for future re-use during rehabilitation works and on the final landform and removal / stockpiling of overburden.

6.1 Pre-clearance Surveys

Pre-clearance surveys for Julia Creek Dunnart provide the most substantial mitigation measure for vegetation clearing activities and are required under the EPBC Act approval conditions for the Project and the DES's assessment of the EIS.

Approval condition 3 of the final decision notice issued by DAWE (29 March 2021) states the following:

"*the approval holder must undertake pre-clearance surveys of all Julia Creek Dunnart habitat within the project area. Preclearance surveys must be undertaken within one month prior to clearing any area of Julia Creek Dunnart habitat and undertaken by a suitably qualified field ecologist in accordance with the Survey Guidelines for Australia's threatened mammals or in accordance with methodology endorsed by an independent suitably qualified expert in writing*."

Multicom have engaged an '*independent suitably qualified expert*' and advisor for Project activities associated with the Julia Creek Dunnart, including the Multicom Offset Strategy.

The survey method described in the *Survey Guidelines for Australia's threatened mammals* (DEWHA 2011) requires 400-500 trap nights for a 5 ha area. This is impractical given the extent of the Project. The following detailed approach to the pre-clearance survey program has been developed in discussions with an independent suitably qualified expert, the methods will be implemented whenever such surveys are conducted (as per **Table 3**).

6.1.1 Site Habitat Quality Assessment

Disturbance of land for the mine will be sequential (i.e. lands will be disturbed progressively over the life of the mine). Habitat within the Project area is currently subject to varying levels of suitability for Julia Creek Dunnart due to substantial infestations of Prickly Acacia (a known threat to the species).

The pre-clearance survey approach adopts the following assessment of lands designated for vegetation clearing in order to assess the required survey effort for each area. Lands designated for clearing will be initially assessed for the presence of Prickly Acacia via indicative mapping associated with the Project Weed and Pest Management Plan (refer **Appendix B**). Areas identified as subject to moderate to high density infestation of Prickly Acacia will be designated as 'low quality' habitat for Julia Creek Dunnart. All other areas will be designated 'moderate / high quality' habitat for the species.

6.1.2 Survey Effort

The lands designated for clearing will be assessed for pre-clearance survey effort as per the following approach based on the progressive nature of clearing activities for the Project:

- Two survey sites (covering approx. 100 ha each) for every 500 ha block of lands designated for clearing of moderate/high quality habitat for Julia Creek Dunnart (i.e. if 1,000 ha is proposed for clearing then four survey sites will be required)
- One survey site for every 500 ha (or less) block of lands designated for clearing of low quality habitat for Julia Creek Dunnart
- One survey site for blocks that comprise 100-300 ha of lands designated for clearing of moderate/high quality habitat for Julia Creek Dunnart
- Where clearing is for less than 100 ha then the number of transects comprising one survey site will be decreased commensurate with the area being cleared (as described in **Section 6.1.3**)
- The number of survey sites may be increased where proposed disturbance blocks are not contiguous e.g. where proposed disturbance expansion areas are split up by existing works then additional sites can account for this

6.1.3 Survey Method

Pre-clearance surveys will be carried out as per the following method:

- Surveys will be undertaken with the presence of a suitably qualified field ecologist as defined in the Project EPBC Act approval conditions:
  - at least three years of work experience designing and implementing surveys for the Julia Creek Dunnart, or
  - at least five years of work experience designing and implementing surveys for other Dasyurid mammal species
- Surveys will be carried out within 30 days of the beginning of vegetation clearing / disturbance in each block of lands designated for clearing (as described in **Section 6.1.2**)
- Where the clearing pertains to blocks of lands a survey site will consist of the following:
  - On larger blocks (>100 ha) - five transects consisting of 25 baited box-type (generic Elliott A) small mammal traps
  - On smaller blocks (<100 ha) – number of transects will be commensurate with the extent of proposed clearing (i.e. if proposed clearing is 80 ha in size then the survey site will comprise four transects, if 60 ha in size the site will comprise three transects and so on)
  - Traps will be located 50 m apart along a straight transect (1.2 km long transect)
  - Transects will be a minimum of 200 m apart within each site (approximate area of trapping coverage per survey site = 100 ha)
  - On smaller blocks it may not be possible to locate the transect lines within the confines of the designated clearing area. In this case the surveyor will decide whether to extend the transect lines beyond the clearing area, or reduce the distance between traps along the transect (<50 m apart) and/or reduce the minimum distance between transects (<200 m apart). The approach taken will be on a case-by-case basis depending on site restrictions at the time (i.e. trapping may not be able to extend beyond the designated clearing area at the time).
- Where the proposed clearing is linear (narrow) in nature transects will be arranged to suit area (i.e. transects may be located along a central line within the clearance area)
- Traps will be left open for five nights
- Where a Julia Creek Dunnart is trapped during the pre-clearance survey:

- All relevant characteristics will be recorded (e.g. head-body and tail length, sex and age), the individual will be photographed and scats collected where possible
- The individual will be relocated to a predetermined location within the Project area denoted as 'retained remnant habitat' as identified within the Project Offset Strategy (refer **Appendix A**) or other agreed designated relocation area (e.g. Julia Creek Aerodrome)
- Traps at the site will be left open for an additional two nights (seven nights in total) to provide further opportunity for any other individuals potentially in the area to be trapped

6.1.4 Review of Survey Method

The Project's Offset Strategy has been developed to compensate for potential significant impacts to Julia Creek Dunnart as a result of the Project (**Appendix A**). The Offset Strategy features a substantial research program based on locating and monitoring populations of the species. This will include research in improving techniques to locate and survey for the species. As such, the pre-clearance survey method will be subject to annual reviews in order to ensure the most reliable method is being employed to locate the species during the Project pre-clearance surveys. Any change of method will need to be endorsed by the Project's '*independent suitably qualified expert*'.

Table 3 – Project SSMP Impact Management Measures, Performance Objectives and Monitoring Requirements

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
Vegetation clearing *Performance objectives*: ▪ Minimise overall vegetation clearing to the extent that is practical for the Project ▪ No unnecessary clearing of Mitchell Grass (*Astrebla* spp.) and Flinders Grass (*Iseilema* spp.) tussock grassland occurring on level to gently undulating downs, most notably (but not confined to) RE 4.9.1c and RE 2.9.1		
Pre-construction: ▪ Identification of areas to be cleared that are potentially suitable for Julia Creek Dunnart ▪ Pre-clearing survey of areas for short-term and long-term infrastructure if habitat is suitable grasslands ▪ Pre-clearing surveys for Julia Creek Dunnart conducted as per the methods described in **Section 6.1** of this SSMP ▪ Pre-clearance surveys begin within 30 days of commencement of clearing of each 500 ha (or similar area as practicable) of Julia Creek Dunnart habitat ▪ Should Julia Creek Dunnart be recorded the individual will be assessed and relocated as per **Section 6.1.3** of this SSMP	▪ Ongoing reporting of pre-clearance survey results to Site Environmental Manager ▪ Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures ▪ Ongoing uploading of sighting records of Julia Creek Dunnart to Atlas of Living Australia as per DAWE approval condition ▪ Annual compliance reporting of survey results as per DAWE approval condition	▪ Site Environmental Manager ▪ Suitably qualified ecologist
Construction: ▪ Site preparation works will be undertaken in accordance with the Project's CEMP. Site preparation works will be staged to minimise the extent and duration of vegetation clearing / disturbance at any one time. ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements through the Project induction program which will include information on Julia Creek Dunnart as identified within this SSMP ▪ All clearing works will only be undertaken with the approval of the Site Environmental Manager	▪ Ongoing monitoring of clearing activities ensuring clearing outside demarcated areas does not take place ▪ Memo reporting providing Project data relevant to this SSMP (fauna spotter activities and clearing extent) will be maintained as follows: ▫ All data collected from Project site assessments and monitoring events will be entered into the Project GIS system	▪ Site Environmental Manager (overseeing contractor personnel) ▪ Suitably qualified ecologist ▪ Suitably qualified fauna-spotter catcher ▪ All site personnel and contractors

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
▪ Extent of vegetation clearing required will be clearly demarcated prior to clearing works ▪ All clearing works will be undertaken in accordance with relevant permits as issued under the EPBC Act, NC Act and State Environmental Authority (EA) conditions ▪ A suitably qualified ecologist / fauna spotter catcher will be present during vegetation clearing / disturbance where Julia Creek Dunnart is identified as present during pre-clearance surveys ▪ Any occurrence of Julia Creek Dunnart recorded during vegetation clearing / disturbance activities will be immediately reported to the Site Environmental Manager	▫ Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures	
Operation: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements through the induction program which will include information on Julia Creek Dunnart as identified within this SSMP ▪ Identification of sequential areas to be cleared for progressive mining operations that are potentially suitable Julia Creek Dunnart habitat and planning of survey locations and timing as per **Section 6.1** of this SSMP ▪ Pre-clearance surveys will be carried out as per the method described in **Section 6.1** of this SSMP ▪ Should Julia Creek Dunnart be recorded during pre-clearance surveys the individual will be assessed and relocated as per **Section 6.1.3** of this SSMP ▪ All clearing / disturbance works will only be undertaken with the approval of the Site Environmental Manager ▪ Extent of vegetation clearing / disturbance required during mining will be clearly demarcated prior to clearing works ▪ All clearing works will be undertaken in accordance with relevant permits as issued under the EPBC Act, NC Act and State Environmental Authority (EA) conditions ▪ Areas that have been subject to clearing / disturbance and no longer required for mining operations will be restored to the previous land use as per the Progressive	▪ Ongoing monitoring of clearing activities, including presence of a fauna-spotter catcher as required ▪ Memo reporting providing Project data relevant to this SSMP will be maintained as follows: ▫ All data collected from Project site assessments and monitoring events will be entered into the Project GIS system ▫ Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures ▫ Results of all ecological assessments and monitoring events are to be documented and maintained in a central location by the Site Environmental Manager.	▪ Site Environmental Manager (overseeing contractor personnel) ▪ Suitably qualified ecologist ▪ Suitably qualified fauna-spotter catcher ▪ All site personnel and contractors

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
Rehabilitation and Closure Plan as soon as is practical following the end of Project activities in the area ▪ A suitably qualified ecologist / fauna spotter catcher will be present during vegetation clearing / disturbance where Julia Creek Dunnart is identified as present during pre-clearance surveys ▪ Should Julia Creek Dunnart be recorded the fauna spotter catcher will (where possible) capture the individual for health assessment and relocation as per **Section 6.1.3** of this SSMP ▪ Any occurrence of Julia Creek Dunnart recorded during vegetation clearing / disturbance activities will be immediately reported to the Site Environmental Manager	▪ Ongoing uploading of sighting records of Julia Creek Dunnart to Atlas of Living Australia as per DAWE approval condition ▪ Annual compliance reporting of survey results as per DAWE approval condition ▪ Monitoring of rehabilitated lands as per the Progressive Rehabilitation and Closure Plan	
Mortality *Performance objectives*: ▪ Minimal occurrences of injury / mortality of fauna during vegetation clearing works ▪ No occurrences of injury / mortality of fauna due to Project vehicular movements		
Pre-construction: ▪ Where possible the overall Project footprint will be refined and minimised further during the final design refinement process in order to reduce impacts to potential habitat for Julia Creek Dunnart ▪ Maximum site speed limits for Project-associated vehicles applied at 60km/hr, including pre-clearing survey staff ▪ Pre-clearing surveys for Julia Creek Dunnart conducted as per the method described in **Section 6.1** of this SSMP ▪ Should Julia Creek Dunnart be recorded during pre-clearance surveys the individual will be assessed and relocated as per **Section 6.1.3** of this SSMP ▪ Subject to captures and relocation of Julia Creek Dunnart during vegetation clearing / disturbance, an annual monitoring program will be developed and implemented within the relocation area as part of the Project offset strategy to monitor the success of relocations	▪ Ongoing reporting of pre-clearance survey results to Site Environmental Manager ▪ Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures ▪ Ongoing uploading of sighting records of Julia Creek Dunnart to Atlas of Living Australia as per DAWE approval condition ▪ Annual monitoring program of relocated individuals (where required) as per Project Offset strategy • Annual compliance reporting of survey results as per DAWE approval condition	▪ Site Environmental Manager (overseeing contractor personnel) ▪ Suitably qualified ecologist ▪ Suitably qualified fauna spotter-catcher

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
Construction: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements through the induction program which will include information on Julia Creek Dunnart as identified within this SSMP ▪ Pre-clearance surveys will be carried out by a suitably qualified expert, where required. ▪ All vegetation clearing / disturbance works will only be undertaken with the approval of the Site Environmental Manager ▪ Extent of vegetation clearing required will be clearly demarcated prior to clearing works ▪ Ensure clearing is carried out in a staged manner and in a way that allows wildlife to escape away from machinery and disturbed areas and into neighbouring natural areas ▪ Trenching required for the construction of the water supply pipeline associated with the OWSF will require a fauna spotter catcher to be present at all times ▪ During trenching works the fauna spotter catcher will inspect any open trenches for fauna trapped overnight each morning before any works commence ▪ Any Julia Creek Dunnart captured during pre-clearance surveys, clearing or while the pipeline trench is open is relocated as per **Section 6.1.3** of this SSMP ▪ All clearing works will be undertaken in accordance with relevant permits as issued under the EPBC Act, NC Act and State Environmental Authority (EA) conditions ▪ Any occurrence of Julia Creek Dunnart recorded during vegetation clearing / disturbance activities will be immediately reported to the Site Environmental Manager	▪ Ongoing monitoring of clearing activities, including presence of a fauna spotter-catcher as required ▪ Memo reporting providing Project data relevant to this SSMP will be maintained as follows: ▫ All data collected from Project site assessments and monitoring events will be entered into the Project GIS system ▫ Site data will be stored and managed by the Site Environmental Manager in accordance with standardised Project-specific data management procedures ▫ Results of all ecological assessments and monitoring events are to be documented and maintained in a central location by the Site Environmental Manager. ▪ Ongoing uploading of sighting records of Julia Creek Dunnart to Atlas of Living Australia as per DAWE approval condition ▪ Annual compliance reporting of survey results as per DAWE approval condition	▪ Site Environmental Manager (overseeing contractor personnel) ▪ Suitably qualified ecologist ▪ Suitably qualified fauna-spotter catcher
Operation: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements through the induction program which will include information on Julia Creek Dunnart as identified within this SSMP	▪ Ongoing monitoring of clearing activities, including presence of a fauna spotter-catcher as required ▪ Memo reporting providing Project data relevant to this SSMP will be maintained as follows:	▪ Site Environmental Manager (overseeing contractor personnel) ▪ Suitably qualified ecologist ▪ Suitably qualified fauna spotter-catcher

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
▪ Identification of sequential areas to be cleared for progressive mining operations that are potentially suitable Julia Creek Dunnart habitat and planning of survey locations and timing as per **Section 6.1** of this SSMP ▪ All clearing works will only be undertaken with the approval of the Environmental Manager ▪ Extent of vegetation clearing required during mining will be clearly demarcated prior to clearing works ▪ Ensure clearing is carried out in a staged manner and in a way that allows wildlife to escape away from machinery and disturbed areas and into neighbouring natural areas ▪ Should Julia Creek Dunnart be recorded during pre-clearance surveys the individual will be assessed and relocated as per **Section 6.1.3** of this SSMP ▪ All clearing works will be undertaken in accordance with relevant permits as issued under the EPBC Act, NC Act and State Environmental Authority (EA) conditions	▫ All data collected from Project site assessments and monitoring events will be entered into the Project GIS system ▫ Site data will be stored and managed by the Environmental Manager in accordance with standardised Project-specific data management procedures ▫ Results of all ecological assessments and monitoring events are to be documented and maintained in a central location by the Environmental Manager. ▪ Ongoing uploading of sighting records of Julia Creek Dunnart to Atlas of Living Australia as per DAWE approval condition ▪ Annual monitoring program of relocated individuals (where required) as per Project Offset Strategy ▪ Annual compliance reporting of survey results as per DAWE approval condition	
Weeds and Pest Animals *Performance objectives*: ▪ No introduction of previously un-recorded weeds or pest animals to the area as a result of Project activities ▪ No increase in the extent or abundance of existing weeds and pest animals in the area as a result of Project activities		

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
Pre-construction: ▪ Weed mapping carried out across Project area to measure existing extent and abundance of weed species including identification of species listed as WoNS and / or as 'restricted matters' under the *Biosecurity Act 2014* ▪ Weed mapping will include an assessment of the density of Prickly Acacia infestation across the Project area to inform an assessment of suitability for the presence of Julia Creek Dunnart ▪ A Project-specific Weed and Pest Management Plan (WPMP) PLN-011 has been developed and implemented in line with the *North west Queensland regional weed and pest animal management strategy 2020 – 2024* (Curry et al. 2020) and will include management / control measures for weeds considered relevant to the Project area	▪ Weed mapping report for Project following survey(s) ▪ Weed and Pest Management Plan approved	▪ Site Environmental Manager ▪ Suitably qualified flora ecologist (botanist)
Construction: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements including existing weed and pest animals associated with the Project area through the Project induction program ▪ A Project-specific weed washdown area will be established for all vehicles entering the Project area ▪ Large plant / machinery will be certified weed free prior to entering the Project area ▪ Putrescible food waste will be disposed of in designated containers and regularly emptied offsite to eliminate any potential attraction of pest animal species to the site ▪ No pets allowed onsite ▪ Regular weed inspections will be carried out in areas subject to vegetation clearing as a result of the Project ▪ Weed management measures implemented as per the WPMP where weed outbreak / proliferation is observed within Project area ▪ Regular site inspections to ensure Project infrastructure / construction materials are not sheltering resident pest fauna species ▪ Where pest fauna species are detected sheltering in Project infrastructure implement viable control measures as per WPMP	▪ Areas subject to vegetation clearing will be subject to weed inspection following rehabilitation works. Inspection method and reporting as per the PRC Plan (PLN-012). ▪ Regular visual inspection of site infrastructure / construction materials for weeds and resident pest fauna ▪ Internal reporting of weed inspections and management actions (where required) and pest fauna records for Project as per WPMP ▪ Monitoring program for feral predators in focus areas as identified in WPMP (PLN-011) developed and implemented ▪ Reporting to relevant State department (DNRME) as per EA conditions	▪ Site Environmental Manager (oversee site inspections and inductions) ▪ Weed management contractor (where required) ▪ Fauna ecologist / pest animal contractor (as required) ▪ General site personnel

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
▪ Monitoring for feral predators (feral Cat and Red Fox) in relocation area for Julia Creek Dunnart (refer **Section 6.1.3** of this SSMP) ▪ Where feral predators (feral Cat and Red Fox) are detected in relocation area implement viable control measures ▪ Project personnel encouraged to report observations of weed outbreak / proliferation and pest fauna species ▪ Project complaints register in place to allow surrounding landowners to report occurrences of weed outbreak / proliferation resulting from Project activities.		
Operation: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements including existing weed and pest animals associated with the Project area through the induction program ▪ Regular weed inspections will be carried out in areas subject to vegetation rehabilitation activities and Project infrastructure, including tracks and the pipeline easement ▪ Project personnel encouraged to report observations of weed outbreak / proliferation and pest fauna ▪ Weed management measures implemented where weed outbreak / proliferation is observed ▪ Monitoring for feral predators (feral Cat and Red Fox) in relocation area for Julia Creek Dunnart (refer **Section 6.1.3** of this SSMP) ▪ Project complaints register in place to allow surrounding landowners to report occurrences of weed outbreak / proliferation resulting from Project activities.	▪ Annual weed monitoring of rehabilitated areas and relocation area ('retained remnant habitat') as per WPMP (PLN-011) ▪ Regular monitoring of Project infrastructure. Inspection method and reporting as per the WPMP ▪ Annual monitoring program for feral predators in focus areas as identified in WPMP ▪ Reporting to relevant State department (DNRME) as per EA conditions	▪ Site Environmental Manager ▪ General site personnel ▪ Vegetation rehabilitation contractors ▪ Fauna ecologist / pest animal contractor (as required)
Dust, noise and lighting: *Performance objectives* ▪ Minimise indirect impact of Project activities on Julia Creek Dunnart in adjacent habitat		
Pre-construction: ▪ The final Project design will be refined and incorporate measures to reduce indirect impacts to fauna including the following:	N/A	▪ Site Environmental Manager ▪ Project engineering design personnel

Mitigation Measures	Monitoring / Reporting Requirements	Responsible Project Personnel
▫ Minimise the requirement for Project lighting to that required for site security purposes and operations ▫ Incorporation of low luminance lighting and directing / shielding permanent lighting away from adjacent vegetation ▫ Incorporation of components (mechanical) and design elements to reduce ongoing operational noise from permanent Project infrastructure that has potential to impact adjacent fauna habitat.		
Construction: ▪ All Project employees and contractors will be made aware of environmental obligations and compliance requirements through the induction program ▪ Regular inspection and maintenance of Project-associated vehicles and plant to ensure Project noise is minimised ▪ Monitoring of weather conditions will be ongoing during construction activities to anticipate high wind conditions to anticipate potential for increased dust entrainment activity ▪ Project areas with exposed soils including tracks, topsoil piles and areas subject to vegetation clearing will be subject to regular dust suppression (dependent on weather conditions) using water trucks ▪ Where possible soil stockpiles will be covered to prevent dust entrainment ▪ Maximum site speed limits for Project-associated vehicles applied at 60km/hr to minimise dust entrainment	▪ Ongoing maintenance activities as required ▪ Ongoing weekly visual monitoring of dust levels on vegetation adjacent to clearing / construction areas and as per EA requirements	▪ Site Environmental Manager ▪ General site personnel
Operation: ▪ Ongoing inspection and maintenance of Project-associated vehicles and plant to ensure Project noise is minimised ▪ Areas subject to vegetation clearing for construction and not required for operational purposes will be subject to the Progressive Rehabilitation and Closure Plan and reinstate vegetation communities and reduce potential for long-term dust entrainment impacts due to exposed soils	▪ Ongoing maintenance as required ▪ Annual monitoring of revegetation progress and reporting as per PLN-012 Progressive Rehabilitation and Closure Plan	▪ Site Environmental Manager ▪ General site personnel ▪ Vegetation rehabilitation contractors

7. REPORTING AND REVIEW OF SSMP PROCEDURES

A critical component of the Project's management strategy is Multicom's commitment to plan, implement and evaluate outcomes, to learn from these outcomes and where necessary adjust management plans and improve procedures throughout the life of the Project. Adaptive modification of these plans and procedures will enhance effectiveness and deliver better outcomes. Adaptively implementing the plan is critical to achieving the plan's objectives, for example where modified actions and arrangements can be developed to enhance effectiveness and deliver improvements to site habitat condition.

To maintain an adaptive approach, Multicom will:

- Collect and incorporate new data / information as a result of implementing the plan, with new findings from data collected or from new information derived from external sources
- Monitor systematically to provide data that informs decisions on risk management, auditing and reporting activities
- Periodically review risks in response to new information, changed circumstances or from implementing corrective actions
- Undertake an annual review of the effectiveness of management measures with significant levels of uncertainty and relatively long implementation timeframes, upon which the plan is highly dependent
- Report and address the consequences of significant environmental incidents
- Review the plan as soon as possible when there are indications of failure(s)

7.1 Reporting

Any activity resulting in the unauthorised / illegal removal of native vegetation or causing death or injury to fauna from Project activities must be reported to the Site Environmental Manager immediately. Any impacts to significant fauna, flora or vegetation communities must be reported to the DES within 24 hours of the incident occurring.

All data collected from ecological assessments will be entered into the GIS system and stored and managed in accordance with data management procedures. A record of all documents required by the SSMP will be kept for the life of Project.

Details below will be noted in a memorandum and provided to the Site Environmental Manager, to be kept on file and produced at the request of the DES. As a minimum, details must include:

- Total area of disturbance required for the Project works
- Total area of potential Julia Creek Dunnart habitat within the area of disturbance
- Location and type of any habitat features within the Project footprint identified by the ecologist during pre-clearing inspection
- Results of pre-clearance surveys including location and other details of any Julia Creek Dunnart captures or observations
- Details of any relocations of Julia Creek Dunnart
- All fauna species observed and / or relocated by the fauna spotter-catcher during site preparation works will be recorded in a specific fauna register, as required by administering authority permitting for Project activities
- Locations of designated stockpile areas for soil and vegetation management

7.2 Corrective Actions

In the event of an incident or failure to comply with this SSMP, the following actions will be taken:

- Conduct investigations into why directions are not being carried out by the responsible person(s)
- Carry out additional training with employees / contractors
- Where appropriate, management and control actions will be identified and implemented to prevent future occurrence of the incident / non-conformance

No serious limitations or potential threats to the implementation of the SSMP have been identified. With the implementation of SSMP review processes and an adaptive management approach the proposed impact management strategies contained within are expected to be effective.

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Appendix A – Offset Strategy

Multicom Resources Limited

Offset Strategy

Multicom Resources Limited

Offset Strategy

2 February 2021

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1 Purpose

Multicom Resources Limited (Multicom) is seeking to mine and process vanadium pentoxide (V_2O_5) and alternative vanadium-based products. Multicom proposes to take advantage of the increasing supply gap associated with high-strength steel production, the growth market of vanadium batteries and the emergence of vanadium based compounds as a revolutionary metal in new technologies. There is increasing global demand for lighter weight and higher strength steels in addition to increasing global demand for renewable and reliable energy, making vanadium a valuable resource. The Saint Elmo Vanadium Project is the action (EPBC 2017/8007) and includes a greenfield mine site, Offsite Water Storage Facility (OWSF) and associated infrastructure.

The action would occur within a number of Mine Lease Application (MLA) areas located approximately 25 kilometres (km) east of Julia Creek, in north-western Queensland. The MLAs comprise an area of approximately 9,246 hectares (ha) and the action would impact approximately 7,418 ha of land relevant to this Environmental Offsets Strategy (Offset Strategy).

This Offset Strategy provides offsets for a significant residual impact (SRI) to Julia Creek Dunnart *Sminthopsis douglasi*, a Matter of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), that are relevant to SRI criterion 'modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline'. The Offset Strategy is prepared in accordance with the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (EOP), *National recovery plan for the Julia Creek dunnart* (Sminthopsis douglasi) (DERM 2009), approved *Conservation Advice for* Sminthopsis douglasi *Julia Creek Dunnart* (TSSC 2016) and *The Action Plan for Australian Mammals 2012* (Woinarski et al. 2014).

The Offset Strategy:

- Outlines the impacts to potential habitat for the Julia Creek Dunnart, as a result of the action
  - This includes a description of the action, its relevance to Julia Creek Dunnart, and the dunnart's ecology in a local and regional context;
- Describes the assessment process, including the SRI;
- Identifies threatening processes, land use / tenure challenges and options for improved ecosystem function and resilience;
- Identifies the preferred offset approach and how it meets the EOP; and
- Includes offset management measures that are measurable and bound by specific timeframes.

2 Project Description

This Offset Strategy will deliver offsets to improve the scientific understanding of Julia Creek Dunnart *Sminthopsis douglasi*, its life history and the thresholds of threats (alone and in combination) and applicable criteria for future successful, direct land-based offsets. The offsets described in this Offset Strategy will facilitate rehabilitation of known habitat for the species and ultimately, conservation of an important population of the species.

The Offset Strategy includes components that are staged, with timing of their implementation dependent on the completion and results of earlier stages as well as actual operating production of the mine. A core component of the Offset Strategy, regarding the important population of Julia Creek Dunnart at the Julia Creek aerodrome, can be implemented prior to commencement of the action.

2.1 Description of the Action

The location of the action is approximately 25 km east of Julia Creek in the North West Minerals Province in north-western Queensland, within McKinlay Shire Local Government Area (LGA) (**Figure 1**).

The action will consist of a shallow open cut mine to obtain access to large known deposits of vanadium bearing sedimentary material within MLA100162. Strip mining is proposed to be carried out sequentially from mining panels. Once the material is removed, the panel will be back filled with beneficiated gangue and overburden material, then contoured and sheeted with topsoil. Revegetation will be progressive with relevant native grassland species, *Astrebla* and *Iseilema* spp. in accordance with the current grazed, pre-mined state. An OWSF is also proposed, with water to be diverted from the Flinders River, under allocation through the Water (Gulf) Plan, stored in the OWSF before being transported to the mine site by 24 km of buried pipeline. The OWSF and associated infrastructure will be rehabilitated in line with the mine. The OWSF and associated infrastructure comprise three (3) separate mine (infrastructure) lease components: MLA100244 – OWSF infrastructure area, MLA100245 – pipeline from OWSF to Project site and MLA100246 – aqueduct from the Flinders River to the OWSF.

Operational production is scalable and based on market demand, with an initial target of 5,000-10,000 tonnes per annum (tpa) and a maximum tonnage of 20,000 tpa V_2O_5 product over a 30 year mine life. This means that implementation of the Offset Strategy will also be scalable, reflecting actual operation of the mine and the subsequent impacts to potential Julia Creek Dunnart habitat.

2.1.1 Local and Regional Context

The action is located wholly within the McKinlay Shire LGA, within the Flinders River Catchment. The Flinders River Catchment measures approximately 10,900,000 ha and comprises the Flinders, Cloncurry and Saxby Rivers, which drain to the Gulf of Carpentaria, north of the action.

Historically, the region and land use associated with the action has been used for cattle grazing on unimproved pastures comprising native grasslands. The action tenement lies within freehold, leasehold, stock route and reserve land.

2.1.2 Ecological Features of the Action

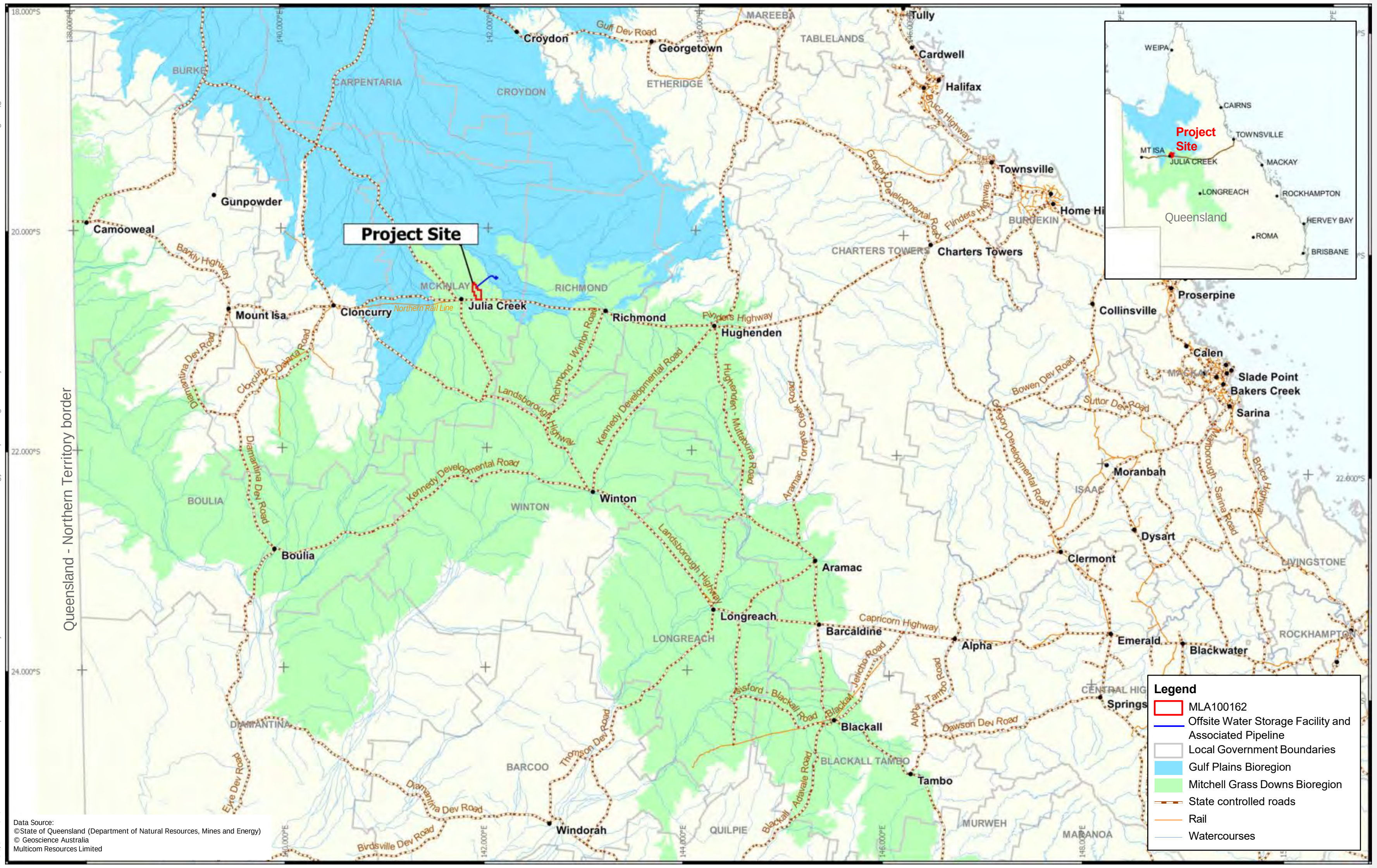
The action is predominantly located within Mitchell Grass Downs (MGD) bioregion (**Figure 1**) and is comprised of open grasslands used for grazing purposes, consistent with the MGD bioregion. The bioregion covers an area of approximately 33,532,000 ha, with approximately 23,788,550 ha of this area located in north-western Queensland. The OWSF and part of the pipeline are in the Gulf Plains bioregion, which covers 12,110,000 ha wholly within Queensland.

The MGD bioregion is dominated by Mitchell Grass (*Astrebla* spp.) tussock grasslands on rolling plains (downs). The soils consist predominantly of deep, heavy clays. The plains are interspersed with drainage lines, supporting open grasslands, herblands or eucalypt woodlands and isolated remnant plateaus. The grasslands comprise a significant natural resource used historically for cattle grazing. The Project area, OWSF and associated infrastructure are strongly dominated by grasslands, with weak representation of eucalypt communities on ephemeral waterways.

The Gulf Plains bioregion encompasses low-lying country and offshore islands of north-western Queensland. Major river systems dissect the broad alluvial plains – the Nicholson, Gregory and Leichhardt drain from the North West Highlands; the Cloncurry, Flinders and Norman from the MGD bioregion; and the Gilbert, Staaten, Nassau and Mitchell from the Einasleigh Uplands bioregion. A major environmental pressure on the bioregional biota is the combination of generally flat grazing country and monsoonal climate that can result in alternating periods of inundation during the wet season followed by a long dry season (QG 2015).

2.1.3 Julia Creek Dunnart

Julia Creek Dunnart is a small, cryptic marsupial listed as Vulnerable under the EPBC Act and Endangered under Queensland's *Nature Conservation Act 1992* (NC Act). The Recovery Plan for the species (DERM 2009) identifies habitat critical to the species as Mitchell Grass (*Astrebla* spp.) tussock grasslands which grow in areas of dominant summer rainfall. These grasslands are treeless or lightly timbered and occur on rolling plains (downs) on deep cracking clay soils.



0 100 200 300 km

Scale: 3,500,000@ A3

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Offset Strategy

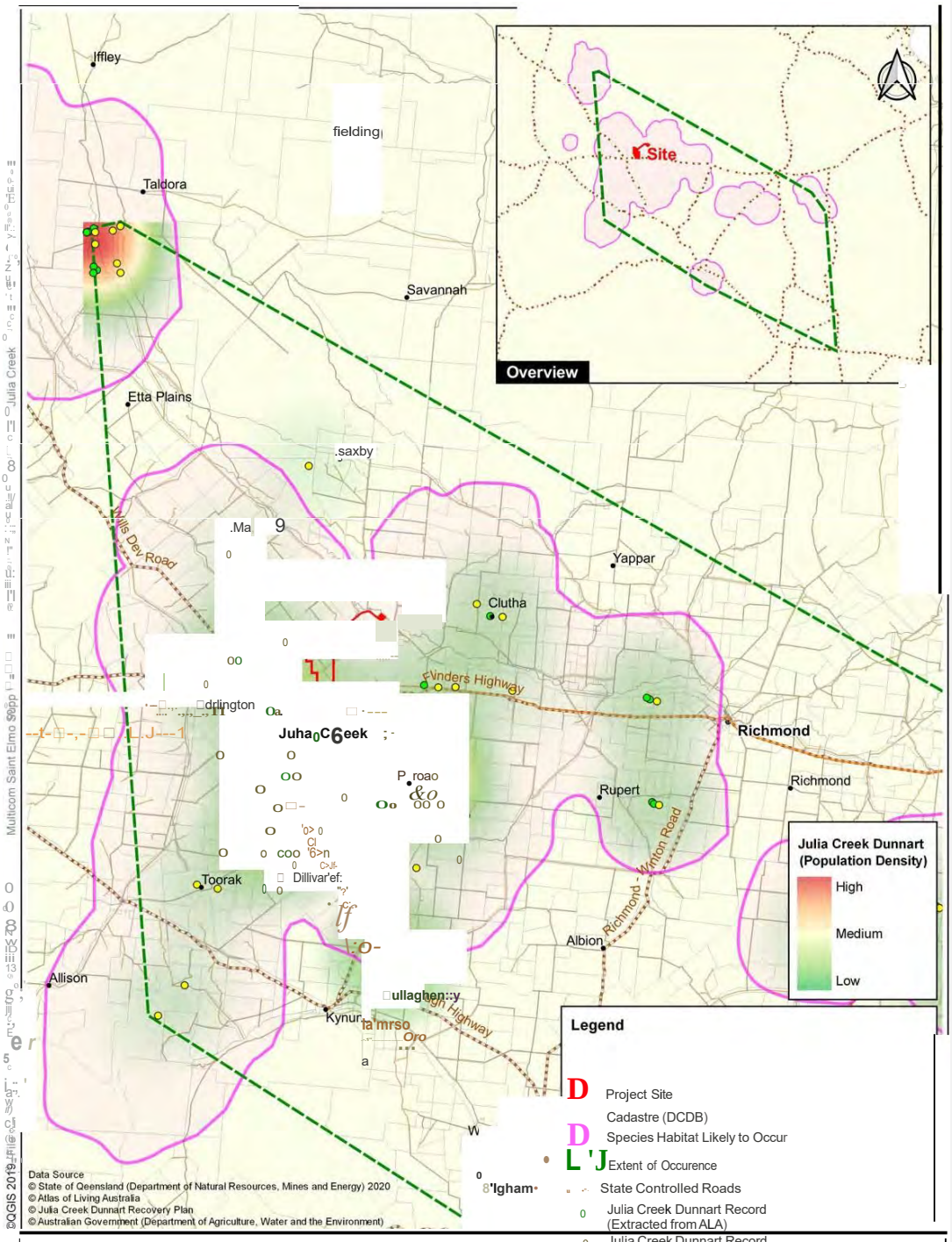
Figure 1
Project Location within Gulf Plains and Mitchell Grass Downs Bioregions

BE190034.01 Rev 3 May 2020

Analyses by McAlpine and Howes (2005) and Smith et al. (2007) used land tenure, soil type, seasonal variability, Prickly Acacia *Vachellia* (*Acacia*) *nilotica* densities and livestock movements as the key variables affecting habitat suitability. A range of values for ground cover abundance, soil cracks and grazing pressure were used to define suitable habitat. Due to the relationship between habitat suitability and land tenure, protected areas (e.g. Bladensburg National Park) were predicted as having the greatest probability of high habitat suitability, while stock routes and wide road reserves were predicted to have medium-high habitat suitability in wet season scenarios (McAlpine & Howes 2005). In these areas, grazing pressure is low or absent and the density of Prickly Acacia and stock watering points is low (DERM 2009). Smith et al. (2007) found ground cover as the most influential factor on habitat suitability, followed by grazing pressure, which directly influences ground cover. An exclusion experiment on Proa station, which supported a population of Julia Creek Dunnart, found that sheep had no apparent effect on the vegetation and soil characteristics, but the stocking rate was 'modest'. The effect of cattle was not tested (Lundie-Jenkins & Payne 2000).

Julia Creek Dunnart is not known from within the action area and none was recorded during field surveys undertaken as part of the Environmental Impact Statement (EIS). The surveys were undertaken by suitably qualified and experienced persons, including those with specific experience in trapping the Julia Creek Dunnart (CVs available on request). There is habitat onsite that may be associated with the species, albeit degraded to varying degrees by known threatening processes of cattle grazing, feral pest animals and Prickly Acacia infestation. This is also the case for the OWSF and associated infrastructure corridor.

There are two *Atlas of Living Australia* (ALA) records within three km of the Project area, a Queensland Museum specimen, date of collection unknown but published in 1979, and a Department of Environment and Heritage Protection (DEHP) record (ALA 2018) from 2000 (refer **Figure 2**). Both are from Garomna Station, located immediately south of the action. There are 669 Wildlife Online (WO) records within 50 km of the action (QG 2020). None of these is in the immediate area of the action and the closest is the 2000 record above (duplicated datum across databases). Based on habitat modelling by Smith et al. (2007), areas associated with the action are not associated with a known or potential population of importance for the species. The overall accuracy of the model predictions was 89 percent, indicating a moderate-high level of discrimination, with a high proportion (93 percent) of low suitability sites correctly predicted, though only 43 percent of medium suitability sites and no high suitability sites were correctly predicted (Smith et al. 2007).



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Saint Elmo Vanadium Project

Offset Strategy

Figure 2

Modelled Occurrence of Julia Creek Dunnart and Nearby Records

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The species has a patchy distribution and low abundance. Most survey records indicate the species occurs in small, dispersed populations and local abundance can fluctuate significantly in relation to seasonal conditions (Mifsud 2001 in DERM 2009). The species may be difficult to trap even in areas that it is known to occur. For example, Woolley (1992) reported a trapping success rate never greater than 0.8 percent, surveys at Lyrian in 1995 failed to capture any individuals despite the species being present in 1992 and 1994 (Mifsud 1999 in DERM 2009) and it took five (5) years of short annual surveys to record the species in Moorrinya National Park (DERM 2009).

Given the history of grazing pressure and active threatening processes, it is possible that the species has never occurred on the action areas but given the difficulty in demonstrating the presence of Julia Creek Dunnart even from areas it is known to occur, a prolonged survey effort over many years would be required to adequately indicate absence. Multicom have taken a conservative approach toward potential for the species to use habitat associated with the action and committed to improving this potential through management of known threatening processes – grazing, feral animals and Prickly Acacia.

2.1.4 Julia Creek Dunnart Habitat Clearing Schedule

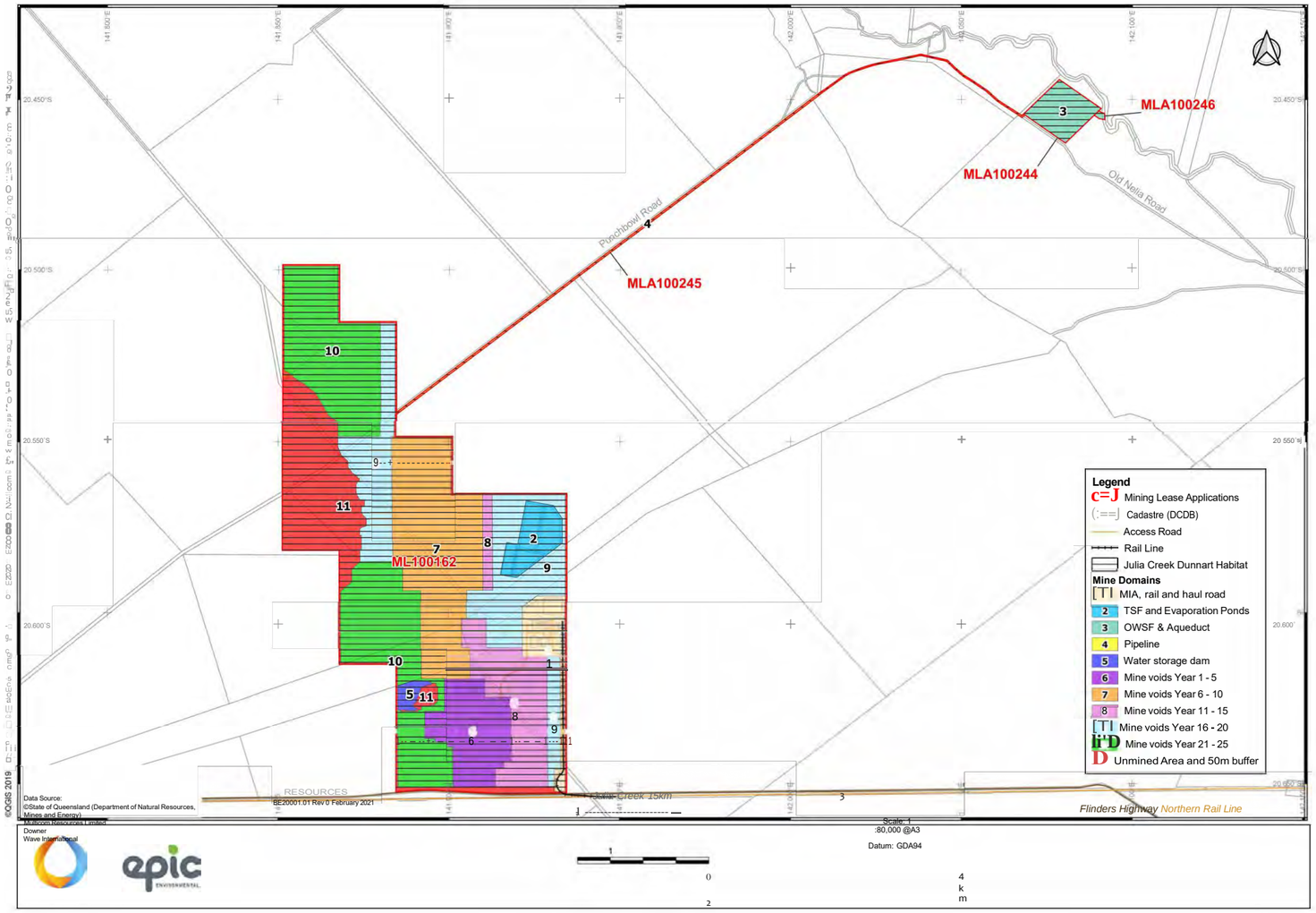
The Project has been separated into 11 mine domains based on the mining infrastructure layout and sequencing (refer to **Figure 3**). **Table 1** provides the staged clearing schedule for Julia Creek Dunnart habitat within the Project, OWSF and associated infrastructure areas, including and the total area of disturbance within each mining domain, timing of initial disturbance, as well as commencement and finalisation of rehabilitation during the 30 year mine life.

Table 1: Mine Domain, Sequence and Timing

Disturbance Domain	Descriptions	Disturbance Area (ha)	Initial Disturbance	Rehabilitation Commences	Rehabilitation Completion Goal
Domain 1	MIA, rail and haul road	595	Year 0[1]	Year 25	Year 30
Domain 2	TSF and Evaporation Ponds	259	Year 0[1]	Year 25	Year 30
Domain 3	OWSF & Aqueduct	197.5	Year 0[1]	Year 25	Year 29
Domain 4	Pipeline	20	Year 0[1]	Year 25	Year 29
Domain 5	Water storage dam	61	Year 0[1]	Year 29	Year 30
Domain 6	Mine voids Year 1 - 5	656	Year 1	Year 2	Year 9
Domain 7	Mine voids Year 6 - 10	1,551	Year 6	Year 7	Year 14
Domain 8	Mine voids Year 11 - 15	845	Year 11	Year 12	Year 19
Domain 9	Mine voids Year 16 - 20	1,469	Year 16	Year 17	Year 24
Domain 10	Mine voids Year 21 - 25	2,276	Year 22	Year 23	Year 28
Domain 11	Unmined Area and 50 m buffer	1,428	None	None	None

Note:

[1] Initial disturbance will occur during construction, prior to mine operations commencing.


MLA100246
MLA100244
MLA100245
Punchbowl Road
Old Nelia Road
ML100162
Legend
Mining Lease Applications
Cadastre (DCDB)
Access Road
Rail Line
Julia Creek Dunnart Habitat
Mine Domains
MIA, rail and haul road
2 TSF and Evaporation Ponds
3 OWSF & Aqueduct
4 Pipeline
5 Water storage dam
6 Mine voids Year 1 - 5
7 Mine voids Year 6 - 10
8 Mine voids Year 11 - 15
Mine voids Year 16 - 20
Mine voids Year 21 - 25
Unmined Area and 50m buffer
Julia Creek 15km
Flinders Highway
Northern Rail Line
RESOURCES
BE20001.01 Rev 0 February 2021
Data Source:
©State of Queensland (Department of Natural Resources, Mines and Energy)
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km
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igure 3 Staged Clearing of Julia Creek Dunnart Habitat

3 Assessment Process

The *Survey guidelines for Australia's threatened mammals, EPBC Act survey guidelines 6.5* (DSEWPC 2011) recommend survey techniques to detect the presence of Julia Creek Dunnart in areas up to 5 ha in size. The guideline recommends 400-500 trap nights per 5 ha area (100 traps for four to five consecutive nights). The total disturbance area of potential Julia Creek Dunnart habitat associated with the action is approximately 7,418 ha of Mitchell Grass downs or similar Gulf Plains habitat. To comply fully with the guideline would require a minimum of 5,935 nights of trapping for one 2-person team (assuming no trap failure or having to close traps due to weather conditions). It is not feasible to comply with the recommended guidelines for such a large area.

The environmental impact associated with this scale of trapping has not been quantified but would be considered detrimental to habitat quality in and of itself given it would involve repeatedly traversing substantial areas of grasslands in vehicles. Trapping survey effort for Julia Creek Dunnart habitat associated with the action was 2,225 box trap (generic Elliott A) trap nights, 110 remote camera trap nights and 108 hair tube trap nights.

> Note: The survey guidelines state on page 1: ***These guidelines are not mandatory.*** *Proposals failing to meet these survey guidelines for reasons of efficiency, cost or validity will not necessarily default to a judgement that referral is required (that is, that a significant impact is likely), especially where the proponent issues an evidence-based rationale for an alternative survey approach. Alternatives to a dedicated survey may also be appropriate. For example, a desktop analysis of historic data may indicate that a significant impact is not likely*.

Julia Creek Dunnart is assessed under the relevant significance criteria for a Vulnerable species (refer to Section 17.13.2.2 in Chapter 17 in the EIS). These criteria refer to an 'important population'. The action area is not identified in the *National recovery plan for the Julia Creek dunnart (Sminthopsis douglasi)* (DERM 2009) as supporting an important population.

Potentially suitable habitat for Julia Creek Dunnart occurs throughout the action area. There is road reserve associated with the pipeline that will connect the action to the OWSF at Flinders River. A stock route is present but is subject to on-going grazing by livestock and variable levels of infestation by Prickly Acacia. All lands associated with the action reflect similar levels of grazing use, weed infestation and presence of feral pest animal species.

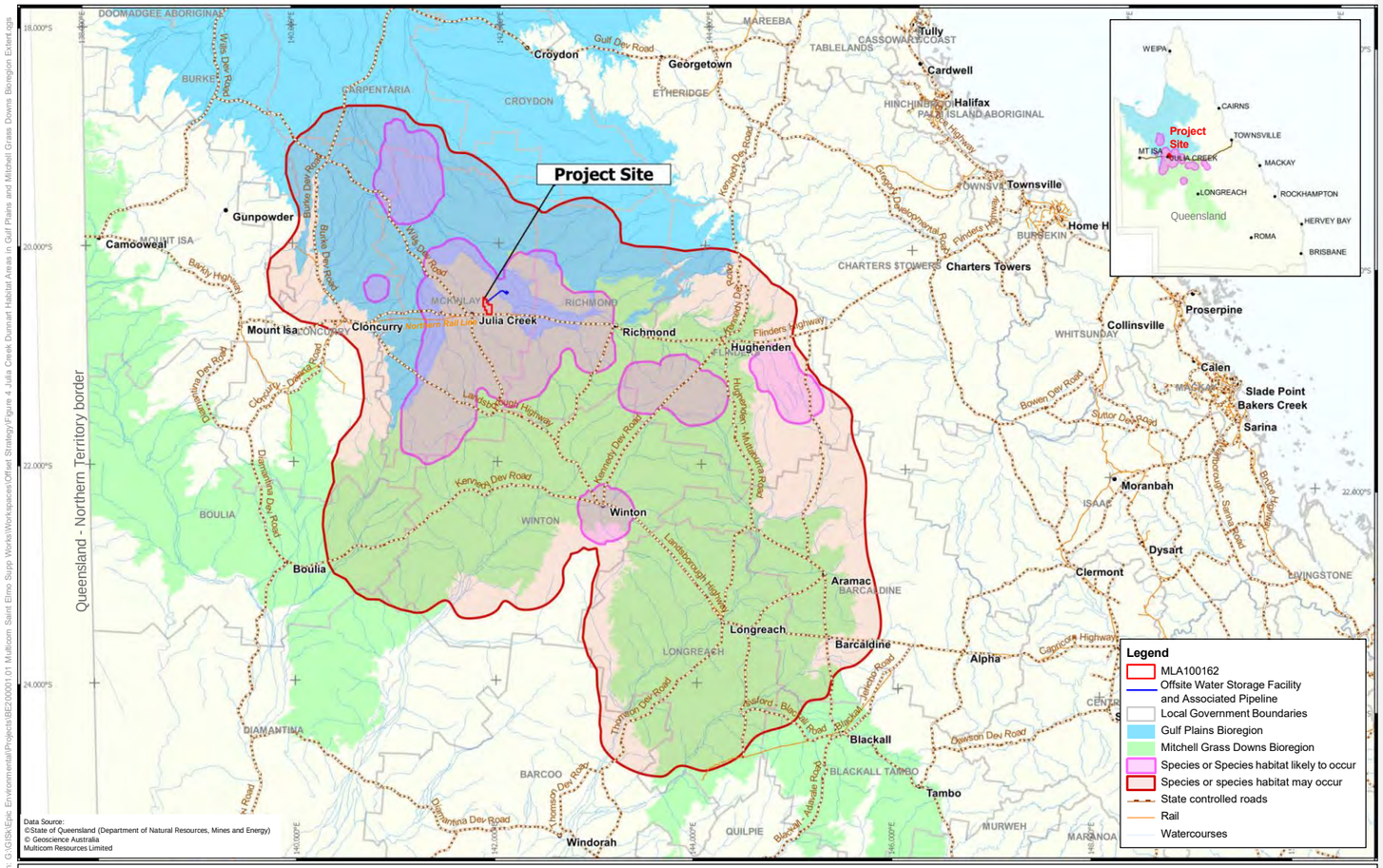
3.1 Significant Impact Assessment

The action may result in the loss, and subsequent rehabilitation, of approximately 7,418 ha of Mitchell Grass Downs and Gulf Plains habitat, some of which may provide suitable habitat for the species should it utilise the area in the future. **Table 2** describes the significant impact assessment under the *MNES Significant impact guidelines 1.1* (DEE 2013) for Julia Creek Dunnart.

Table 2: MNES Significant Impact Assessment - Julia Creek Dunnart

Criterion	Assessment against Significance Criteria (Vulnerable)
Julia Creek Dunnart *Sminthopsis douglasi*	
Lead to a long-term decrease in the size of an important population of the species	Julia Creek Dunnart is restricted to the Mitchell Grass downs country of north-west Queensland and is historically known to occur within the vicinity of the Project, however it has not been recorded within the actual Project site itself. The MGD bioregion covers an area of approximately 33,532,000 ha (**Figure 4**). Heavy clay soil (cracking clay), which is considered a suitable habitat for the species, has been identified as occurring across the Project site. The Project site is not identified within the *National recovery plan for the Julia Creek Dunnart* (Sminthopsis douglasi) (DERM 2009) as an area known to support an important population for the species. Any possible population is not near the known limits of the species' range (ALA 2018).
Reduce the area of occupancy of an important population	No important population of the species has been identified to occur within the Project areas (DERM 2009). Therefore, the Project will not result in a reduction of the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The Project site is not identified as supporting an important population (DERM 2009). The species is sparsely distributed across its range. Therefore, the Project is not expected to further materially fragment any existing population(s), whether or not those populations are considered important or not.
Adversely affect habitat critical to the survival of the species	The *National recovery plan for the Julia Creek Dunnart* (Sminthopsis douglasi) (DERM 2009) identifies habitat critical to the species as Mitchell Grass (*Astrebla* spp.) tussock grasslands, which grow in areas of dominant summer rainfall. These grasslands are typically treeless or lightly timbered and occur on rolling plains (downs) on deep cracking clay soils, covering an area of approximately 33,532,000 ha (**Figure 4**). Previous analyses used land tenure, soil type, seasonal variability, Prickly Acacia *Vachellia nilotica* densities and livestock movements as key variables affecting habitat suitability. A range of values for ground cover abundance, soil cracks and grazing pressure were also used to define suitable habitat. The program found that due to the relationship between habitat suitability and land tenure, protected areas such as Bladensburg National Park were predicted as having the greatest probability of high habitat suitability, while stock routes and wide road reserves were predicted to have medium-high habitat suitability in wet season scenarios. In these areas, grazing pressure is low or absent and the density of Prickly Acacia and stock watering points are low (DERM 2009). Potentially suitable habitat for Julia Creek Dunnart occurs throughout the Project site, but due to the presence of key threatening processes, it is not considered critical to the survival of the species. Further, the land tenure is not protected, and the Project site does not include a road reserve. A road reserve is present in the proposed pipeline alignment associated with the OWSF but disturbance to this will be very short-term and impacts negligible. A stock route is present; however, it is subject to on-going livestock grazing activities and variable densities of infestation by Prickly Acacia. The stock route also contains the largest dam in the Project site, which is subject to the heaviest infestation of Prickly Acacia. The Project area is identified as an area of core infestation of Prickly Acacia in the *North West Queensland Regional Weed and Pest Animal Management Strategy 2020 – 2024* (Curry et al. 2020). These characteristics limit the suitability of the stock route for Julia Creek Dunnart. The habitat present in the Project site is heavily disturbed and does not appear to be critical habitat for the species. As a result, the Project is not considered to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	As indicated in the species recovery plan (DERM 2009) the Project site is not identified as supporting an important population. Therefore, the Project will not disrupt the breeding cycle of an important population. In addition, as identified in the assessment of critical habitat for the species (Smith et al. 2007; DERM 2009) any individuals, if present within the Project site, are not identified as part of an important population.

Criterion	Assessment against Significance Criteria (Vulnerable)
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Julia Creek Dunnart occurs in north-west Queensland, and its preferred habitat is Mitchell Grasslands, which are widespread across the area. The area of land that has been determined to support the occurrence of the species is estimated at 6,000,000 ha, refer **Figure 4** (Woinarski et al. 2014; TSSC 2016). Given the degraded nature of the potential habitat within the Project site, it is not expected the Project will modify, destroy, remove or isolate or decrease the availability of quality of habitat to the extent that the species is likely to decline. In fact, mining and eventual rehabilitation of the Project site is likely to result in an improvement in the quality of habitat that could be available for the species, primarily through removal of current threatening processes known to restrict the species. Regardless of rehabilitation however, it is based on this SRI that an offset has been deemed necessary. The disturbance to potential habitat for the species could lead to further decline and it is for these reasons that an offset is proposed.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	Invasive species considered to be threats to the Julia Creek Dunnart include feral Cat *Felis catus* and Prickly Acacia. Both species are already present within the Project site, with large areas infested with the latter species. The Project lies in an area of core infestation of Prickly Acacia (Curry et al. 2020). The Project will not result in the establishment of an invasive species harmful to Julia Creek Dunnart. The Project may act to reduce the prevalence of an existing invasive species, ultimately resulting in a reduction to known threatening processes and improvement in habitat quality. Weed and pest control measures will be incorporated into the Project Construction and Operational Environmental Management Plans, as part of a Weed Management Plan. This plan will be implemented to control the introduction and spread of weed species across the Project site. The Weed Management Plan will be in place for the life of the Project and will minimise the potential for weed invasion and in the long-term potentially improve habitat condition within vegetation communities located adjacent to Project infrastructure.
Introduce disease that may cause the species to decline	The Project Weed Management Plan will incorporate the management of invasive species and assist in the prevention of pest plant introduction and associated diseases resulting from Project activities. Project equipment sourced from overseas will be suitably quarantined as required under State and Commonwealth legislation. The Project is not expected to introduce disease that may result in the decline of the Julia Creek Dunnart.
Interfere substantially with the recovery of the species	The *National recovery plan for the Julia Creek Dunnart* (Sminthopsis douglasi) (DERM 2009) includes six specific objectives and 16 actions. The Project will not preclude or inhibit any of the objectives and actions and may, through a potential offset program, aid in protection of suitable habitat, implement weed control programs and promote awareness of the species (as per Actions 2.1, 3.2 and 5.1). The Project would require realignment of the stock route which, as identified above, has the potential to contain medium to high habitat suitability for the species during wet season scenarios (DERM 2009). It is important to note the stock route is currently subject to grazing pressure, a large artificial water source and infestations of Prickly Acacia, substantially limiting its suitability for Julia Creek Dunnart. If possible, the realignment could be placed to provide better quality habitat by removing and/or avoiding Prickly Acacia infestations. Stock route management is Action 2.3 of the recovery plan. The Project is not expected to interfere with the recovery of the species.


Project Site
Queensland - Northern Territory border
Croydon
Georgetown
Tully
Cardwell
Halifax
Townsville
Gunpowder
Camooweal
Mount Isa
Cloncurry
Julia Creek
Richmond
Hughenden
Charters Towers
Proserpine
Collinsville
Calen
Slade Point
Bakers Creek
Sarina
Moranbah
Dysart
Clermont
Winton
Boulia
Aramac
Longreach
Barcaldine
Alpha
Blackall
Tambo
Windorah
Home H
Legend
MLA100162
Offsite Water Storage Facility and Associated Pipeline
Local Government Boundaries
Gulf Plains Bioregion
Mitchell Grass Downs Bioregion
Species or Species habitat likely to occur
Species or species habitat may occur
State controlled roads
Rail
Watercourses
WEIPA
CAIRNS
TOWNSVILLE
MACKAY
ROCKHAMPTON
HERVEY BAY
ROMA
BRISBANE
Queensland
Data Source:
©State of Queensland (Department of Natural Resources, Mines and Energy)
© Geoscience Australia
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Scale: 3,500,000 @ A3
Datum: GDA94
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Figure 4
Julia Creek Dunnart Habitat Areas within
Gulf Plains and Mitchell Grass Downs Bioregions Extent
BE200001.01 Rev 0 February 2021
©QGIS 2019
File Path: G:\GIS\Epic Environmental\Projects\BE200001.01 Multicom Saint Elmo Supp Works\Workspaces\Offset Strategy\Figure 4 Julia Creek Dunnart Habitat Areas in Gulf Plains and Mitchell Grass Downs Boregion Extent.qgs

4 Offset Strategy

The Offset Strategy is developed in response to the SRI criterion: 'modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline' due to the loss of 7,418 ha of potential Julia Creek Dunnart habitat.

The Offset Strategy will benefit Julia Creek Dunnart through accurate scientific assessment and description of the ecology of the species and its preferred habitat. This will include quantitative assessment of the thresholds of known threatening processes and how they influence the species' local abundance and distribution. Community involvement and long-term monitoring of threatening processes and their management will provide additional social benefits. This Offset Strategy proposes practical actions that will be used to select and secure lands to restore habitat for the species as well as expand and protect a known important population.

4.1 Julia Creek Dunnart Recovery Plan (DERM 2009) Actions

The key actions required to promote the recovery of Julia Creek Dunnart have been considered for the Offset Strategy. These recovery actions include:

- Conducting surveys to clarify the extent of the species' distribution;
- Negotiating voluntary management agreements for key Julia Creek Dunnart sites and encouraging landholders to protect and manage such sites;
- Continuing and expanding implementation of pest animal and plant control programs (e.g. feral Cats, Prickly Acacia), and Julia Creek Dunnart population monitoring programs; and
- Investigating interactions between predators, water sources and grazing management.

4.2 Supporting Information

Detailed information associated with the Offset Strategy is described in the following technical reports and EIS Chapters:

- Terrestrial Ecology Technical Report (2019) undertaken by Epic Environmental (Appendix A20);
- Terrestrial Ecology Technical Report for Offsite Water Storage Facility (2020) undertaken by Epic Environmental (Appendix A33);
- Chapter 8 – Flora and Fauna;
- Chapter 17 – MNES; and
- Chapter 20 – Offsite Water Storage Facility and Associated Infrastructure.

4.3 Offset Strategy Objectives

The overarching objective of the Offset Strategy is to provide strong empirical evidence for conservation gain that would improve viability of any local Julia Creek Dunnart population and increase scientific understanding of the species and its habitat at a broader scale. The Offset Objectives are detailed in **Table 3**.

4.3.1 Field Surveys to Determine Distribution

Confirm the existing distribution, populations and identify habitat preference of the Julia Creek Dunnart through a long-term field survey program to inform monitoring and management within the region. The focus of the surveys will be to quantify the habitat quality characteristics of importance to the species and how these characteristics change as a result of thresholds for threatening processes.

4.3.2 Population and Habitat Monitoring

Establish a monitoring program for up to 20 years at five known populations within the species known distribution. The monitoring program will be established with scientific experts to ensure it is scientifically robust and able to detect changes in the population and distribution.

4.3.3 Threat Abatement Program

Undertake a threat abatement program through a feral cat control program across the distribution range (as informed by the field surveys in objective 1). One aim of the program will be to reduce predation by feral cats. This will include information on the current status of feral cats within the species known distribution, develop a suitable methodology, implementation plan and a monitoring plan.

Undertake research for the removal of Prickly acacia to identify and quantify the relative benefits to Julia Creek Dunnart habitat quality within the MGD bioregion as a result of removal of Prickly Acacia.

4.3.4 Habitat and Breeding Program

Retain and protect approximately 1,000 ha of suitable habitat for the Julia Creek Dunnart within the Saint Elmo property (located outside of the Mine Lease that will not be affected by mining activities). An additional small, experimental area has been identified within the Saint Elmo property and will be retained to conduct various trials in fencing, rehabilitation / revegetation and stocking rates.

Re-instate Julia Creek Dunnart sanctuary at Julia Creek Aerodrome and re-establish the breeding program to facilitate the reintroduction of the species into appropriate habitat at sites where the species had been known historically and where new habitat is identified as achieving quality criteria.

4.4 Offset Strategy Actions

The following actions will be implemented to achieve each objective (outlined in Section 4.3) of the Offset Strategy and are justified with costs in **Table 3**:

4.4.1 Field Surveys to Determine Distribution

The field surveys are an indirect offset and will address knowledge gaps in ecology, management actions and monitoring for the Julia Creek Dunnart.

To determine the extent of the Julia Creek Dunnart and its potential habitat within the MGD, the field surveys will involve the following:

- Undertake broadscale mapping and data gathering;
  - Obtain and review historical records from Queensland Government;
  - Consult with experienced persons who were involved in previous captive breeding and field surveys for Julia Creek Dunnart;
- Develop a trapping program;
  - Conduct trapping survey within sites across the species known distribution, including Toorak Research Station which held an important population of Julia Creek Dunnart (DERM 2009);
  - Trapping methods will be in accordance with trapping and data collection methods outlined in Mifsud 2000 and 2001;
  - Gut analysis of predators (feral cats) and owl pellets (opportunistic collection) will also assist in identifying the presence of Julia Creek Dunnarts in survey areas where trapping has been unsuccessful;
- Review field survey data and provide updates to the community regarding progress of the research and key findings;
- Provide all survey data to the QLD and Commonwealth Government, which will also be made available to the public; and
- Publish research findings upon completion of surveys;
  - Survey data will be reviewed and published in suitable, peer-reviewed journals. The survey method and data will be reviewed by a suitably qualified expert/environmental professional.

Field surveys will be undertaken by a suitably qualified expert (i.e. a person who has had previous experience in undertaking targeted surveys for the species and been successful in finding the species) as well as University students who will be trained and supervised by a suitably qualified expert.

The survey method will also be peer reviewed by a suitably qualified expert prior to implementation.

4.4.2 Population and Habitat Monitoring

Habitat monitoring is an indirect offset that will assist in addressing knowledge gaps and management actions for the Julia Creek Dunnart.

The monitoring program will involve:

- Engage a suitably qualified expert who has experience in the Julia Creek Dunnart;
  - This person will be involved in and will supervise all staff working on the field surveys;
- Develop habitat monitoring program;
  - Habitat quality will be determined in accordance with the Queensland Guide to determining terrestrial habitat quality (2007);
- Implement a monitoring program;
  - Monitoring will be undertaken by suitably qualified environmental consultants / professionals with experience in Julia Creek Dunnart;
  - The method for long term monitoring will be in accordance with the methods and data collection standards outlined in Mifsud 2000;
- Trapping events would consider:
  - Either end of the breeding season to determine breeding success and recruitment of the population in each year;
  - After significant fire / flood events to identify impacts on the populations; and
- Publish results of monitoring program.

The monitoring program would be undertaken by a suitably qualified expert (i.e. a person who has had previous experience in the Julia Creek Dunnart and would train and supervise all staff involved in the monitoring program.

4.4.3 Threat Abatement Program

The threat abatement (feral cat control) program will aim to reduce the number of feral cats in Julia Creek Dunnart habitat and better understand the impact of weed removal on the species habitat.

The threat abatement program will involve:

- Consultation with Southern Gulf NRM to identify programs currently being run / trialled within the region and their success;
- Undertake desktop review of publicly available data;
- Plan and develop feral cat control program;
  - Implement / trial improved feral cat control methods;
- Implement a trapping / culling program for feral cats to obtain gut samples:

  - Consultation with QLD National Parks, Council and landowners would occur prior to implementation;
  - Persons involved in this program would hold the appropriate licences;
  - All animals would be culled in a human way;
  - Gut samples will be analysed by a suitably qualified person; and
- Select and monitor sites where landowners are actively managing Prickly Acacia;
  - Identify a population of Julia Creek Dunnart confirmed to be present after trapping surveys on a property where there is no or little Prickly Acacia present. Compare this to an adjacent property or area where no Julia Creek Dunnarts appear to be present where there is also Prickly Acacia. Trapping surveys would be undertaken subsequent to the removal of Prickly Acacia to confirm if the Julia Creek Dunnarts colonise the cleared area after Prickly Acacia is removed.
- Publish results of feral cat control and weed management program.

Conservation gain will be achieved indirectly through improved understanding of the impacts of feral cat and prickly acacia removal on Julia Creek Dunnart habitat. The findings will inform the management actions in this offset package and assist land managers in managing feral species on their properties to assist with increasing habitat quality for the Julia Creek Dunnart.

4.4.4 Habitat and Breeding Program

Conservation gain will be achieved directly through retention of habitat with potential to support Julia Creek Dunnart and by reinstating a breeding program for the species. Success will inform rehabilitation programmes across the MGD bioregion that are seeking to enhance habitat for the species.

The habitat improvement and breeding program will involve:

- Desktop and field assessment of potential sites within the species known distribution;
- Undertake habitat quality assessment of the impact site (i.e. mine site) and proposed offset site in accordance with the methodology outlined in the *Qld Guide to determining terrestrial habitat quality* (2017).
- Secure a parcel of land for the purpose of the offset that is outside of the proposed Saint Elmo Vanadium Project mining area. This land will not be affected by mining activities. If required, seismic testing could be undertaken to confirm that mining and ancillary activities would not have a vibration impact on the Julia Creek Dunnart

The reinstatement of the sanctuary and breeding program would facilitate re-introductions of the species into the suitable habitat at sites with known historical distribution and newly established habitat that meets the habitat quality criteria.

- Undertake consultation with DES to determine permits required to reinstate the breeding program (i.e. capture of wild individuals and numbers required to prevent inbreeding);
- Repair fencing to exclude predators and other threatening processes;
- Undertake surveys within the sanctuary to trial different methods such as radio tracking, thermal imaging, standard camera traps and/or Elliott traps;
- Consult with a research body regarding further research on preferred bait types and general species behaviour;
- Facilitate research on preferred bait type and general species behaviour; and
- Facilitate breeding program.

4.5 Threatening Processes

The greatest threats to Julia Creek Dunnart are from threatening processes outlined in the species' Recovery Plan (DERM 2009) - introduced predators (particularly Cats *Felis catus),* invasion of Prickly Acacia, which binds the soils reducing potential areas of refuge during periods of excessive temperatures, and by livestock grazing which compacts the soil and degrades habitat value (Maxwell et al. 1996). Potential threatening processes include fire and small population size, which leaves the species susceptible to local extinctions (DERM 2009). Four (4) exotic species were recorded during the terrestrial ecology field surveys, including feral Cat, feral Pig *Sus scrofa*, Goat *Capra hircus* and Dingo *Canis familiaris dingo*. All these threatening processes are active across the action areas.

4.6 Ecosystem Function and Resilience

The 2019 floods in the region were of such scale as to affect not just habitat quality of the Mitchell Grass downs, but also ecosystem function.

Fundamental and potentially irreversible losses in ecosystem function become more likely as a result of intensive commodity production (Fischer et al. 2006). With the action, there will be a temporary loss of ecosystem function acting beyond even intensive grazing. However, Multicom will rehabilitate the landscape. An appropriate diversity of species across functional groups is required for ecosystem function to be maintained.

Highly focused management actions may be required to maintain keystone species and threatened species, and to control invasive species (Fischer et al. 2006). The predicted resilience of affected habitats, notwithstanding the disturbance regimes to which they are currently subject, and the retention of relevant species within the surrounding landscape mean that rehabilitation of the action areas will be supplemented by recolonisation given the lack of barriers to movement. A high level of manipulation is not considered necessary if the subsequent substrate is suitable and the correct plant species re-establish. Control of Prickly Acacia may mean that eventually ecosystem function on the rehabilitated land is closer to a natural state than what currently exists.

The action may result in the loss, and subsequent rehabilitation, of approximately 7,418 ha of Mitchell Grass downs habitat. This habitat may have some potential for Julia Creek Dunnart and an assemblage of species specialised for life in a grassland and, in some cases, utilisation of the soil cracks typical of the habitat.

The action will not fragment the landscape given the comparative homogeneity of habitats but may result in the movement of individual animals. Creating protected areas on public and private land is a foundation for landscape resilience and to connect people with nature (Murphy et al. 2012). In this instance, removal of Prickly Acacia in the surrounding landscape, as proposed through this Offset Strategy, will increase the resilience of both the ecosystem as a whole and presumably for Julia Creek Dunnart, should it be present. This is consistent with building ecosystem resilience as per *Australia's Biodiversity Conservation Strategy 2010-2030*.

4.7 Social, Economic and/or Environmental Co-benefits

There are opportunities to deliver social, economic and/or environmental co-benefits with the proposed Offset Strategy, with Multicom committing to ensure an appropriate level of resources and funding to be invested toward scientific research, securing land and practical on the ground management measures.

Multicom have entered into a collaborative agreement with Southern Gulf NRM, a not-for-profit community organisation, which works to assist in the implementation of strategic planning and investment activities that care for natural and cultural assets. As part of the collaboration agreement, Southern Gulf NRM has and will provide advice and input into the development of the Offset Strategy, land management practices involving Prickly Acacia management and control, feral species management and general ongoing liaison and support with landowners.

Multicom is also consulting with Ms. Trish O'Hara from the School of Agriculture and Food Science, at The University of Queensland (UQ). Trish O'Hara was involved with the previous acquisition of a Julia Creek Dunnart colony in 2009 and conducted surveys for the species in 2015 and 2016. The 2015 survey located Julia Creek Dunnart within the Julia Creek Airport area and the 2016 survey, which was undertaken near Nelia, did not result in any captures. It is proposed that Trish O'Hara / UQ provide technical (physical on ground) support moving forward. This support could help lead toward the development and delivery of the Offset Strategy.

5 Offset Approach

The Offset Approach includes a range of compensatory and direct offsets. These are described below, along with justifications on their interaction, compliance with relevant Commonwealth requirements and conservation benefit.

5.1 Offset Research Program

An Offset Research Program is proposed to confirm the existence of Julia Creek Dunnart within the action area, an area proposed to be retained as a direct land-based offset (Area 1 in **Figure 5**) and the 'important population' at Julia Creek aerodrome. Area 1 within MLA100162 contains 715 ha of RE 4.9.1c (recognised potential Julia Creek Dunnart habitat) and 346 ha of mixed polygon RE 4.9.1c/4.9.2b. In the event the species is confirmed over the 5-year period of the research program, management strategies will be developed to improve the long-term viability of Julia Creek Dunnart habitat and further targeted toward research priorities on key threatening processes. If the species is not confirmed, the thresholds for threatening processes will be investigated to quantify the relevant importance or interaction of threats that may be impeding use of habitat by Julia Creek Dunnart. The Program will be undertaken in a transparent, scientifically robust and timely manner and consider the use of best practice research approaches.

It is recognised that there is currently deficient information on the following matters relevant to the species:

- Quantitative rehabilitation criteria specific to the study area and the soils of the Project that can demonstrate that the habitat requirements of the species can be recreated following relevant impacts. Important habitat requirements for the species include cracking functionality of soils, recovery of important grassland vegetation species and surface water hydrological patterns; and
- Quantitative threshold levels for known threatening processes and the relative importance or combination of factors, including grazing stocking rates and density of Prickly Acacia, that could affect the abundance and distribution of the species.

It is anticipated that findings would be published in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal. Data and information collected will have creative commons licensing and be free and accessible. Further, it is anticipated that research outputs will inform future management decisions for Julia Creek Dunnart, and where possible, be readily applicable to other similar matters.

5.1.1 Project Action Plan

The Project action plan will be carried out in line with the objectives detailed in the *National recovery plan for the Julia Creek Dunnart* (Sminthopsis douglasi) (DERM 2009) and will be developed with the assistance of Ms. Trish O'Hara and Southern Gulf NRM. The Project action plan will outline the tasks to be undertaken as part of the Offset Research Program and details are provided in **Table 3**. Costs associated with the proposed offset actions are provided in **Table 4**.

The Project action plan will include but not be limited to the level of detail provided and provides outcomes that are specific, measurable, achievable, relevant whilst being bound to specified timeframes.

The Offset Strategy is ambitious and multi-faceted. Certain components will occur subsequent to the success of others or may be redesigned due to failure or unexpected results. This is a typical aspect of scientific research. If outcomes are entirely predictable then there is no need for the research.

Certain actions, such as investigation into the Julia Creek aerodrome population, will be able to be commenced immediately after a formal agreement is reached with a research body that provides field staff. Such an agreement cannot be reached until there is certainty of the action proceeding.

Other components, such as the captive-breeding program, are dependent on the goodwill and co-operation of the Queensland Government. The advantage of such a multi-faceted strategy is that the failure of one component results in more resources being directed to another existing component or gives rise to an additional component.

5.1.2 Conformance with Commonwealth Policy

One of the eight (8) key overarching principles set out by the EPBC Act EOP is 'effectively account for and manage the risks of the offset not succeeding'. There is no certain conservation gain from securing land that may not support Julia Creek Dunnart. The difficulty in capturing the species means that it could take many years of trapping to actually identify that an offset is not succeeding due to the land in question not supporting the species. The proposed Project action plan is flexible, providing for alteration to activities should they be failing to achieve the original objective. This significantly reduces the likelihood of the proposed offset not succeeding. The EOP also states that deviation from the 90 percent direct offset requirement is only considered where:

- It can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package or;
- Scientific uncertainty is so high that it is not possible to determine a direct offset that is likely to benefit the protected matter.

The Recovery Plan identified four important populations. One of these, Toorak Station, was sold by the Queensland Government to graziers in 2012 and presumably has had its stocking rate increased. It cannot reliably be considered to remain an 'important population' without investigation. There has been no trapping since 2016 to confirm the continuance of the Julia Creek aerodrome population and, particularly given the landscape-scale and catastrophic floods of early 2019, there is currently no evidence it is present. Surveys will be undertaken within Toorak Station to validate the status of the species on the property and will be included as part of the long-term survey program.

It is likely that the only remaining 'important populations' of any certainty are in National Parks. The National Parks in question are approximately 200 km (Bladensburg) and 300 km (Moorrinya) distant from the Project, respectively. Woolley (2015) stated that the known range of the species has been extended recently but there is no published report to confirm the continued presence of animals in areas where they have been found in the past. However, data available from the Julia Creek Dunnart species profile on the Queensland Government website (QG 2020) shows that there were multiple records of Julia Creek Dunnart in Bladensburg National Park in September 2015 and August 2016. There is no more recent publicly available record. It is not known if this is simply due to a lack of survey effort if it's due to a lack of survey success or if the data are not being made available. The most recent record available for Moorrinya National Park is 1999. Again, it is not known how this should be interpreted. Surveys will be undertaken in Bladensburg and Moorrinya National Parks as part of the long-term survey program.

Uncertainty over whether or not important populations persist within National Parks indicate the uncertainty with identifying parcels of land likely to support the species. There is no record of Julia Creek Dunnart available through the species profile data (Queensland Government) for any location since 2016, when several were captured in Bladensburg National Park. The most recent record held by the *Atlas of Living Australia* is 2007.

Table 3: Julia Creek Dunnart Offset Project Action Plan

Offset Priority	Offset Description (i.e. purpose, location and outcome)	Offset Actions	Responsible Person(s) for Offset Activity	Timing (i.e. commencement, duration, frequency) and Requirements	Conservation Gain Measures	Success Measurement Criteria (measured annually)	Committed Cost[1] [3] Contribution
Field Surveys to Determine Distribution							
Conduct long-term field survey program to verify distribution and publish findings	Purpose of the surveys are to determine the extent of the Julia Creek Dunnart distribution, populations, identify habitat preference, and inform monitoring and management within the region. This will include survey of known important populations at the Julia Creek Aerodrome, Toorak Station, Bladensburg NP and Moorinya NP as well as locations across the range of the species and its potential habitat within the Mitchell Grass downs. A focus of the research will be to quantify the habitat quality characteristics of importance to the species and how these characteristics change as a result of thresholds for threatening processes. The recovery plan (DERM 2009) is scheduled to expire in 2020 and has not yet been reviewed (TSSC 2016). Any additional findings will aid the review process and enable new data to be included in the recovery plan that reflects the current status of the species and its habitat. The surveys are proposed to be conducted over spatial and temporal scales that will develop robust scientific data that will contribute directly to conservation gains for the species.	1. Broadscale mapping and data gathering; 2. Obtain historical records from Queensland Government; 3. Engage with experts who were involved in previous captive breeding and field surveys for Julia Creek Dunnart; 4. Develop trapping program; 5. Conduct trapping survey within up to 40 sites across the species known distribution, including Toorak Research Station which held an important population of Julia Creek Dunnart (DERM 2009); 6. Review field survey data and provide community with updates on the progress of the research and key findings; 7. All survey data will be provided to the QLD and Commonwealth Government and made available to the public; and 8. Publish research findings upon completion of surveys.	Surveys will be undertaken by a suitably qualified expert (i.e. a person who has had previous experience in undertaking targeted surveys for the species and been successful in finding the species) or the survey methodology will be peer reviewed by a suitably qualified expert. Survey data will be reviewed and published in suitable, peer-reviewed journals. The survey method and data will be reviewed by a suitably qualified expert/environmental professional. Partnerships will be sought with respected research institutes such as the University of Queensland to enable involvement of junior and senior research staff.	▪ Commence engagement with expert and preliminary planning phase mid October 2020; ▪ Commence baseline monitoring in Q1 2021 at known important populations; ▪ Stratify remaining likely habitat areas across the region and identify secondary survey locations. Commence secondary baseline survey program in Q3 2021; ▪ The surveys will occur at 10 sites with two survey locations at each site to be undertaken annually; ▪ Two of the 10 sites will be surveyed per year for a period of five years initially (i.e. a total of 40 surveys over five years); ▪ The surveys will be undertaken for a minimum of 5 years and up to 10 years at locations if the species is recorded; ▪ Surveys will be undertaken either side of breeding season and potentially after fire/flood events; ▪ Publish research findings in scientifically peer-reviewed journals; and ▪ Would require access to two National Parks and provision of any site records by DES.	The surveys are an indirect offset and will address knowledge gaps in ecology, management actions and monitoring. Conservation gain through this offset action is not directly measurable. Conservation gain will be achieved indirectly through improved understanding of the species' distribution, which will inform the management actions in this offset package as well as being available to be used for management actions by land managers.	This offset action is research and does not have directly quantifiable success criteria. Success will be qualitatively measured as completion of surveys and publication of results. The surveys may be opportunistic and once the species is located, subsequent long-term monitoring will be undertaken to collect habitat data.	$1,219,550 Specific cost breakdowns will be reviewed and developed once the initial survey of known important populations is achieved.
Population and Habitat Monitoring							
Population and habitat monitoring	Establish a monitoring program for up to 20 years within the species known distribution. The monitoring program will be established with scientific experts to ensure it is scientific robust and able to detect changes in the population and distribution. The monitoring will inform management actions and also provide information on the species' habitat preference, behaviour, populations and response to management actions.	1. Engage with suitably qualified expert who will be involved with the field surveys; 2. Develop habitat monitoring program; 3. Implement monitoring program; and 4. Publish results of monitoring program.	Habitat monitoring will be undertaken by suitably qualified environmental consultant/professionals. Monitoring surveys will occur on up to five properties (sites) with two survey trapping events annually. Monitoring surveys of each site will be repeated every three years. Surveys will be undertaken either side of breeding season and potentially after fire/flood events.	▪ Commence development of program in Q4 2020; ▪ Commence habitat monitoring in Q1 of 2021 for 5 sites, measured twice annually for up to 20 years; and ▪ Surveys of each site are repeated every three years.	Habitat monitoring is an indirect offset that will assist in addressing knowledge gaps and management actions. Conservation gain will be achieved indirectly through improved understanding of the species distribution, which will inform management actions in this offset package.	This offset action is research and does not have directly quantifiable success criteria. Success will be qualitatively measured as completion of monitoring and publication of results.	$4,865,470 Final costs for the monitoring program will be further refined once the level of involvement from DES and other research entities are known.

Offset Priority	Offset Description (i.e. purpose, location and outcome)	Offset Actions	Responsible Person(s) for Offset Activity	Timing (i.e. commencement, duration, frequency) and Requirements	Conservation Gain Measures	Success Measurement Criteria (measured annually)	Committed Cost[1] [3] Contribution
Threat Abatement							
Feral cat control	A feral cat control program will be undertaken across the distribution range (as informed by the field surveys) with the aim of reducing predation by feral cats. This will include information on the current status of the feral cats within the known distribution range, methodology, implementation plan, and a monitoring plan.	1. Consult with Southern Gulf NRM; 2. Undertake desktop review of publicly available data; 3. Plan and develop feral cat control program; 4. Implement/trial improved feral cat control methods; and 5. Publish results of feral cat control program.	Suitably qualified pest management contractor and/or environmental consultant.	▪ Commence development of program in H1 2022; ▪ Implement program in H2 2022; and ▪ five sites measured twice annually for up to 20 years.	The feral cat control program will reduce the number of feral cats in Julia Creek Dunnart habitat. Baseline surveys will be undertaken to establish baseline feral cat numbers and inform priority management areas. Feral cat surveys and Julia Creek Dunnart population surveys will be undertaken across the managed areas to measure change.	This offset action is research and does not have directly quantifiable success criteria. Success will be qualitatively measured as completion of monitoring and publication of findings.	$2,190,000 initial estimate, then TBD for a larger-scale program.
Research prickly acacia removal benefits	Purpose is to quantify the relative benefits to Julia Creek Dunnart habitat quality within the MGD bioregion as a result of removal of Prickly Acacia.	1. Consult with Southern Gulf NRM; 2. Undertake desktop review of publicly available data; 3. Select and monitor sites where landowners are actively managing Prickly Acacia; and 4. Identify a population of Julia Creek Dunnart confirmed to be present after trapping surveys on a property where there is no or little Prickly Acacia present. Then compare this to an adjacent property or area where no Julia Creek Dunnarts appear to be present where there is also Prickly Acacia. Trapping surveys would be undertaken subsequent to the removal of Prickly Acacia to confirm if the Julia Creek Dunnarts colonise the cleared area after Prickly Acacia is removed.	Research will be conducted by a suitably qualified environmental professional.	▪ Commence planning and development of research in H1 2021; and ▪ Commence identification of 5 sites where weed management is active H2 2021; and ▪ Monitor the 5 sites once annually over 20 years.	Research is an indirect offset and will assist in addressing knowledge gaps and management actions. Conservation gain through this offset action is not directly measurable. Conservation gain will be achieved indirectly through improved understanding of the impacts of prickly acacia removal on Julia Creek dunnart habitat. The findings will inform the management actions in this offset package and assist land managers.	This offset action is research. Habitat quality criteria will be quantified over time as the habitat responds to the removal of the weed. Success will inform rehabilitation and weed removal programmes across the region that are seeking to enhance habitat for the species.	$806,450
Habitat Improvement and Breeding Program							
Retain and protect approximately 1,000 ha of habitat within the Saint Elmo property	Legally secure approximately 1,000 ha of potential habitat suitable for Julia Creek Dunnart within the Saint Elmo property. This area is outside of the proposed Saint Elmo Vanadium Project Mine Lease boundary and will not be affected by mining activities. A further small, experimental area has been identified within the Saint Elmo property and will be retained to conduct various trials in fencing, rehabilitation / revegetation and stocking rates.	1. Undertake desktop and field assessment of potential sites within the species known distribution; 2. Undertake habitat quality assessment of the impact site (i.e. mine site) and proposed offset site; and 3. Secure offset parcel of land.	Proponent (Multicom).	▪ Commence 2025.	Conservation gain through this offset action is directly measurable. Conservation gain will be achieved directly through retention of habitat with potential to support Julia Creek Dunnart. Success will inform rehabilitation programmes across the MGD bioregion that are seeking to enhance habitat for the species.	This offset is a direct land-based offset. Habitat quality criteria will be quantified over time as the habitat responds to rehabilitation / revegetation.	$372,103 initial estimate, however TBD based on the results from monitoring research and research actions that will quantify habitat quality criteria and thresholds for threatening processes.
Re-instate sanctuary at Julia Creek Aerodrome and re-establish breeding program	Re-instate sanctuary for the species at Julia Creek Aerodrome, including re-establishment of breeding program. The breeding program will facilitate re-introductions of the species into appropriate habitat at sites where the	1. Repair fencing to exclude predators and threatening processes; 2. Undertake surveys within the sanctuary to trial different methods such as radio tracking, thermal imaging, standard camera traps and/or Elliott traps;	Suitably qualified contractor for fencing repairs as directed by Multicom. Surveys will be undertaken by a suitably qualified expert.	▪ Commence re-instatement / repair works of the sanctuary at the aerodrome in H2 2021; ▪ Consult with a research body in late 2020;	Conservation gain through this offset action is directly measurable. Conservation gain will be achieved directly through protection of habitat to	This offset is a combination of a direct and indirect offset. Habitat quality criteria will be quantified over time as the habitat responds to	$908,115

Offset Priority	Offset Description (i.e. purpose, location and outcome)	Offset Actions	Responsible Person(s) for Offset Activity	Timing (i.e. commencement, duration, frequency) and Requirements	Conservation Gain Measures	Success Measurement Criteria (measured annually)	Committed Cost[1] [3] Contribution
	species had been known historically and where new habitat is identified as achieving quality criteria. The item will contribute to ongoing extension programs being delivered by the McKinlay Shire Council and Southern Gulf NRM.	3. Consult with a research body regarding further research on preferred bait types and general species behaviour; 4. Facilitate research on preferred bait type and general species behaviour; and 5. Facilitate breeding program.	Epic (suitably qualified/ environmental professionals) and Multicom will facilitate the research program with a research body. Breeding program will be facilitated by a suitably qualified environmental professional.	▪ Commence surveys within sanctuary 2021; ▪ Facilitate breeding program (pending trapping survey findings) over 5 year period; and ▪ Provide ongoing funding for the program for a 20 year period.	support Julia Creek Dunnart. Success of the breeding program will inform future research of the species, including management of the species and its habitat.	rehabilitation / revegetation. Success will also be measurable through the successfully produced offspring in the breeding program and re-introductions into the wild.	
						Total:	**$10,361,688**

Notes:
= high priority (most beneficial for the species)
= moderate priority (could be beneficial for the species)
[1]Includes in-kind and direct contribution
[2]Noting that the best Mitchell Grass land for Julia Creek Dunnart is also the best grazing country in the area, this will also depend on community and stakeholder education. Further work is required to determine alternative programs in the event landowners do not wish to agree.
[3]Indicates the cost is an average value based on the total cost over a 20 year period, including 3% rise in CPI per annum.

Table 4: Offset Costing

Offset Priority	Cost Component	Estimated Itemised Costing	Timing / Staging	Cost[1 2 3]
Field Surveys to Determine Distribution				
Conduct long-term field survey program to verify distribution and publish findings ***Note:*** *Surveys have been costed to show the cost break-down as a total over the five year program. There will be 10 sites selected with two surveys conducted at each site. Each year two sites will be surveyed until all sites are completed after five years (i.e. four surveys per year). Subsequent surveys will have the same amount of funding allocated as shown in this table. Costings are shown as a total for the whole program.* *The survey costs include wages and accommodation costs. Student involvement will not require wages or any wages will be paid at a reduced rate. Accommodation costs for locations such as Bladensburg NP will be substantially less. Any savings on survey costs will be allocated to other components as required or additional surveys will be conducted.*	**Indicative Costing for the program over five years (10 sites, 2 surveys per site and 2 sites surveyed per year for five years, assuming there are initially 40 surveyed sites)**	-	Surveys will be undertaken for a minimum of 5 years and up to 10 years at locations if the species is recorded	**$1,219,550 total**
	Desktop preparation and review of historical information (including preparation of mapping / shapefiles)	$60,000	November 2020	
	Develop trapping programs for four study areas	$62,500	November 2020	
	Engagement with a research body	$50,000	Mid October 2020	
	Ongoing survey preparation (site specific)	$48,000	-	
	Implementation of trapping program per survey period per location			
	Travel costs (return flights for 2 people and hire car)	$32,650	Commence surveys May 2021	
	Accommodation 12 nights for 2 people (possibly relevant only for Julia Creek) per survey	$40,000	-	
	Personnel labour – 2 people for 13 days including travel (one expert and one university student)	$330,000	-	
	Fauna trapping equipment (per survey): - Elliott traps (125 traps) - Bait mix - Camera traps - Survey quadrat, star pickets and flagging tape - GPS - Digital camera (site photos) - Batteries - Satellite Phone - Freight	 $12,500 $800 $13,000 $550 $6,500 $650 $800 $2,600 $10,000	-	
	Sundries (e.g. food, fuel, PPE etc.)	$44,000	-	
	Review of field survey data	$250,000	-	
	Provision of updates to community	$30,000	-	
	Publication of findings upon completion of surveys (multiple articles, determined by results)	$125,000	-	
	Refinement of survey program (site specific)	$100,000	Once surveys of known important populations complete, stratify remaining likely habitat across the region and identify secondary survey locations. Commence secondary baseline survey program in Q3 2021.	
Population and Habitat Monitoring				
Population and habitat monitoring ***Note:*** *Monitoring program will be for five sites surveyed twice (i.e. pre and post breeding season) every three years for up to 20 years within the species known distribution (informed by field surveys).* *Student involvement will not require wages or any wages will be paid at a reduced rate. Accommodation costs for locations such as Bladensburg NP will be substantially less. Any savings on survey costs will be allocated to other components as required or additional surveys will be conducted.*	Engagement with suitably qualified expert panel (e.g. a research body and Southern Gulf NRM)	$268,704	Expert panel to run for 20 years and meet once per year (commence 2020)	**$4,865,470 total**
	Development of habitat monitoring program: - Engagement of suitable expert (such as Dr Patricia Woolley, Greg Mifsud or Dr Andrew Baker) - Expert provision of guidance for a post-graduate student - Post-graduate student labour	$268,704	Expert to provide expert assistance to the program every year for 20 years	
	Implementation of habitat monitoring program (total for 90 surveys):			
	Travel costs (return flights for 2 people and hire car)	$325,266	First survey June 2021	
	Accommodation 5 nights for 2 people (possibly relevant only for Julia Creek)	$241,883	-	
	Personnel labour – 2 people (1 expert and 1 university student) for 6 days including travel	$2,176,500	-	
	Sundries for 2 people (e.g. food, fuel, PPE etc.)	$290,200	-	
	Equipment: - Elliott traps (125 traps) - Bait mix - Camera traps - Survey quadrat, star pickets and flagging tape - GPS - Digital camera (site photos) - Batteries - Satellite Phone - Freight	 $151,146 $6,046 $96,733 $2,284 $48,367 $4,837 $4,837 $19,347 $120,917	-	
	Review of field survey data	$671,759	-	
	Publication of results of monitoring program	$167,940	-	
Threat Abatement				
Feral cat control	Consult with Southern Gulf NRM	$1,000,000	Commence H1 2022 and undertaken annual for 20 year period	**$2,190,000**

Offset Priority	Cost Component	Estimated Itemised Costing	Timing / Staging	Cost[1 2 3]
Note: *program will be undertaken at 5 sites, measured twice annually for up to 20 years*	Undertake desktop review of publicly available data	$240,000	Commence H1 2022 and undertaken annual for 20 year period	
	Plan and develop feral cat control program suitable for the Mitchell Grass downs: - Engagement of suitable expert (such as Professor Sarah Legge, Dr John Read or Dr Katherine Moseby) - Expert provision of guidance for a post-graduate student - Post-graduate student labour	$200,000	Commence H1 2022 and undertaken annual for 20 year period	
	Implement / trial improved feral cat control methods (methods unknown at this stage)	$500,000	Commence 2022 and undertaken annual for 20 year period	
	Publication of results of the trial	$250,000	-	
Research prickly acacia removal benefits ***Note:*** *sites will be monitored once annually for up to 20 years. Student involvement will not require wages or any wages will be paid at a reduced rate. Any savings on monitoring costs will be allocated to publication as required or additional monitoring events will be conducted.*	Consult with Southern Gulf NRM, in part to identify suitable sites	$50,000	H1 2021	**$806,450**
	Undertake desktop review of publicly available data and complete planning and development of research	$24,000	H1 2021	
	Select and monitor 5 sites where landowners are actively managing Prickly Acacia (sites monitored once annually for 20 years):		H2 2021	
	Travel costs (return flights for two people and/or hire car)	$51,500	-	
	Accommodation eight nights for two people	$32,000	-	
	Personnel labour – two people (one expert, one university student) for five days including travel	$300,000	-	
	Sundries (e.g. food, fuel, PPE etc.)	$40,000	-	
	Equipment: - Star pickets & flagging tape - GPS - Digital camera (site photos) - Satellite phone - Batteries	 $450 $7,000 $700 $400 $400	-	
	Review of field survey data	$250,000	-	
	Publication of results of monitoring program	$50,000	-	
Habitat Improvement and Breeding Program				
Retain and protect approximately 1,000 ha of habitat within the Saint Elmo property	**Undertake habitat quality assessment of the impact site (i.e. mine site) and proposed offset site:**		2025	**$372,103** initial estimate, however TBD based on the results from monitoring research that will quantify habitat quality criteria
	Desktop assessment of potential sites within the Mine Lease that have not been previously mined	$6,000	Commence 2025	
	Desktop assessment of impacted sites	$6,000	Commence 2025	
	Negotiate and secure land access through voluntary agreement with relevant landholders. Includes minor legal costs to draft the agreements	$2,500	-	
	Achieve compensation agreement for access to land for the duration of the offset. The terms of the agreement will be to compensate for the loss of full stock production levels over the designated offset area, reducing stocking rates during key grass growing periods (post-wet season) or periods of extended drought. The compensation value is not a purchase price, but simply to account for reduced stocking rates and provision of access to the land for the duration of the offset	$143,500	-	
	Habitat field assessment and monitoring (one trip every five years for entire program):		H2 2020	
	Travel costs (return flights for two people (one expert, one university student) and hire car)	$10,300	-	
	Accommodation five nights for two people (one expert, one university student)	$6,400	-	
	Personnel labour – two people (one expert, one university student) for six days including travel	$60,000	-	
	Sundries (e.g. food, fuel, PPE etc.)	$8,000	-	
	Equipment: - Elliott traps - Bait mix - Star pickets and flagging tape - GPS - Digital camera - Satellite phone - Batteries	 $5,000 $200 $55 $1,400 $140 $560 $80	-	
	Secure offset parcel of land	$25,000	-	
	Establish cattle exclusion fencing	$94,868	Commence 2025	
	Allowance for gates or grids at approximately 1km intervals (as needed)	$2,100	Commence 2025	
Re-instate sanctuary at Julia Creek Aerodrome and re-establish breeding program ***Note:*** *ongoing funding will be provided for the program over a 10 year period.*	Consult with a research body regarding further research on preferred bait types and general species behaviour. Utilise existing McKinlay Shire Council labour and understanding of issues to be addressed at the site	$10,000	H2 2020	**$908,115** Note: this is an estimate only. Actual costs would be determined in consultation with McKinlay Shire Council, research bodies, DES and other key stakeholders.
	Undertake survey trials within the sanctuary:		2025	
	Travel costs (return flights for two people (one expert, one university student) and hire car)	$26,900	-	
	Accommodation five nights for two people (one expert, one university student)	$20,000	-	
	Personnel labour – two people (one expert, one university student) for six days including travel	$138,000	-	
	Sundries (e.g. food, fuel, PPE etc.)	$24,000	-	

Offset Priority	Cost Component	Estimated Itemised Costing	Timing / Staging	Cost[1 2 3]
The cost of the surveys is incorporated in Offset Priority 1 above, other than additional equipment costs as identified.	Undertake surveys within the sanctuary to trial difference methods such as radio tracking, thermal imaging, standard camera traps and/or Elliott traps: - Thermal imaging camera (one off purchase) - Titley Electronics model LT2 transmitters (or equivalent) - Yagi AY/C antenna (or equivalent) - Regal 2000 receiver (or equivalent) - Camera trap hire - SD cards - Camera trap bait - Batteries - Star pickets and flagging tape (for camera traps)	 $1,000 $5,000 $1,000 $2,500 $3,000 $800 $100 $690 $125	Commence surveys April 2021	
	Facilitate research on preferred bait type and general species behaviour (some information will be gleaned from trapping surveys but most would be derived from a captive breeding program)	$50,000	-	
	Facilitate breeding program for 10 year period (this component is dependent on the cooperation of the Queensland Government)	$625,000	Over 5 year period	
			TOTAL	**$10,361,688**

Notes:
= high priority (most beneficial for the species)
= moderate priority (could be beneficial for the species)
[1] Assumes 3% rise in CPI per annum
[2] The costings in this table will be reviewed and updated periodically to reflect any changes in the program as a result of seasonality, climate, threat abatement success etc.
[3] Indicates the cost is an average value based on the total cost over a 20 year period, including 3% rise in CPI per annum.

5.2 Improved Scientific Base Understanding

5.2.1 Julia Creek Aerodrome and Toorak Station

Through the items described above, it is proposed that the first step in the Offset Strategy is to develop a survey plan to verify if the species is still in the area of the action. In 2005 one (1) Julia Creek Dunnart was found adjacent to the Julia Creek Aerodrome. Subsequent to negotiations with McKinlay Shire Council in 2007, vermin proof fencing was installed, encompassing 273 ha. Twenty (20) captive-bred individuals were introduced to the aerodrome as a pilot program. Trapping was conducted on two separate occasions (August 2007 and April 2008), however no released animal was recaptured. The Recovery Plan was written in 2009 and despite the lack of captures in 2007 and 2008 this artificially enhanced population (the natural population apparently of unknown size) was considered an 'important population'. The reinstatement of the sanctuary for the Julia Creek Dunnart, including the re-establishment of the breeding program would assist with informing future research of the species, including management and its habitat. It would also contribute to ongoing extension programs being delivered by McKinley Shire Council and the Southern Gulf NRM.

Funding for the study of the population at the aerodrome ceased some years ago and it is unknown if the population is extant. The most recent captures were of six (6) individuals in 2015. None was captured in 2016 and no trapping has been conducted at the site since that year. Toorak Station was sold by the QLD Government. It is important to understand whether the species is still located in the area and whether Toorak Station is still a known important population.

A survey of these locations of important populations is especially important given the widespread flooding that occurred in the region during February 2019[1], which was estimated to have killed more than 600,000 head of cattle. Anecdotal information from the Julia Creek community indicated the flood was devastating for local wildlife, including dunnarts. Should the local Julia Creek Dunnart population have been substantially reduced in number, or possibly extirpated, then compensatory purchase or undertaking of conservation agreements on other areas of suitable habitat would be of little value. A re-introduction program may need to be considered based on re-establishment of captive breeding. Flooding is mentioned as a threat in the Recovery Plan (DERM 2009).

[1] https://www.abc.net.au/news/2019-02-05/drone-shows-extent-of-flooding-at-julia-creek/10782036; https://www.theland.com.au/story/5906136/queensland-floods-decimate-native-wildlife/; and https://theconversation.com/catastrophic-queensland-floods-killed-600-000-cattle-and-devastated-native-species-120753

5.2.2 Retained Habitat

Habitat within the mine site footprint but separate to the area of impact may be retained (**Figure 5**). This remnant habitat will not be cleared or mined. The Area 1 includes 715 ha of RE 4.9.1c and 346 ha of RE 4.9.1c/4.9.2b. Area 2 contains 41 ha of RE 4.9.1c. RE 4.9.1c is recognized as habitat for Julia Creek Dunnart and the mixed polygon of RE 4.9.1c/4.9.2b will contain areas that are potentially suitable habitat.

Areas of retained habitat are currently subject to varying degrees of infestation by Prickly Acacia and cattle grazing, similar to the action area. A trapping survey and quantitative assessment of habitat criteria should be implemented prior to mining in adjacent areas.

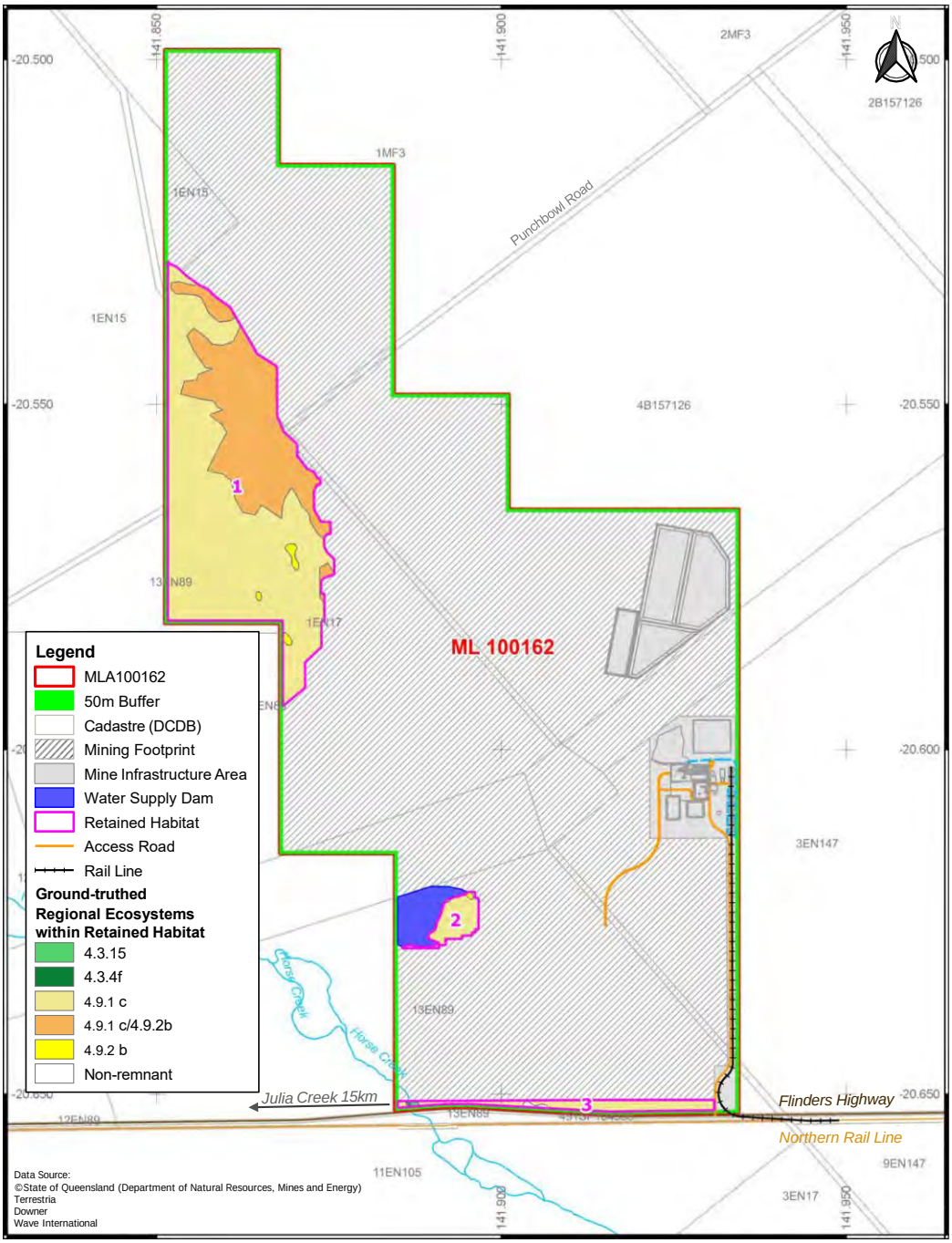
If Julia Creek Dunnart is found to be present, the current land use can be modified regarding grazing intensity and Prickly Acacia management (or the use of existing areas of variable infestation) to study the impact thresholds of these threats to Julia Creek Dunnart. Research can also investigate the impacts of artificial water sources. Should there be no evidence of the presence of the dunnart then the species could be re-introduced assuming the proposed captive breeding program has gone ahead.

5.2.1 Positive Land Management Activities

Management activities including a feral Cat program (addressing key priority actions in the *Threat abatement plan for predation by feral cats* (DE 2015)) and a major weed program have been considered to provide a conservation gain to the Julia Creek Dunnart. Such programs have the potential to improve the viability of the Julia Creek Dunnart and/or avert any threats of extinction and future loss, degradation or damage of their habitat from threatening processes.

Predation by feral Cats is recognised as one of the primary factors in the decline and extinction of several native mammal species in Australia (Woinarski et al. 2014). Implementation of feral Cat control measures in areas that may not currently support Julia Creek Dunnart will have a flow-on effect in that it will reduce recruitment of Cats in areas that do. That is, it is not strictly necessary to confirm the presence of Julia Creek Dunnart before control of Cats could be implemented in a particular location as long as the habitat is suitable for the dunnart. Feral Cat control will also benefit other native species, not just Julia Creek Dunnart, which is an additional benefit of any program.

Cats predate on Julia Creek Dunnart as a direct threat, and compete with it for food resources, as an indirect threat. The effects of feral predators such as Cats are exacerbated where grazing pressure reduces vegetation cover during wet conditions when soil cracks are closed. It is then more difficult for dunnarts to avoid predation due to a lack of shelter.



File Path: G:\GIS\Epic Environmental\Projects\BE2020\BE200001.01 Multicom Saint Elmo Supp Work\Workspaces\Offset Strategy\Figure 5 Retained Remnant Habitat within the Project site.qgs

MULTICOM RESOURCES

epic ENVIRONMENTAL

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Datum: GDA94

Multicom Resources Limited
Saint Elmo Vanadium Project
Offset Strategy

Figure 5
Retained Remnant Habitat within the Project site

Control techniques already in use in Australia include:

- Exclusion fencing, either netted fences that use an electrified wire mounted 15 cm from the top and 10 cm outward from the fence or non-electrified fencing incorporating a netted ceiling, or a curved overhang;
- Shooting, which is humane when the shooters are experienced but is expensive, labour intensive and time consuming. It may be appropriate inside the fenced habitat at Julia Creek aerodrome if Cat control is found to be required. It is not considered appropriate at large scales. Daytime shooting in open habitats such as Mitchell Grass downs may be practical as Cats take refuge in the canopy of low trees along drainage lines;
- Leg-hold traps with padded jaws placed at sites where territorial markers, such as faecal deposits and claw-marking, are noticed. Otherwise fish oil and/or a visual stimulus such as bird feathers hung from a bush or stick can be used as an attractant;
- Cage traps, baited; and
- Poisoning, using fresh meat baits containing 1080, under permit.

The Offset Strategy includes trapping surveys to ascertain if the 'important population' as identified by the Recovery Plan at Julia Creek aerodrome exists. The Offset Strategy proposes repair to fencing of the site, eradication of feral predators, such as Cats, and re-introduction of Julia Creek Dunnart, all as required. Any population that persists or is re-introduced will be monitored. Given the success elsewhere in re-establishing populations of native mammals threatened by feral predators through predator-proof exclusion fencing, the possibly of expanding the fenced area at the Julia Creek aerodrome will be explored.

A major motivation behind the research components of this offset strategy is that there is insufficient knowledge of Julia Creek Dunnart biology, distribution and thresholds for threatening processes. The research is intended to achieve the baseline data that is necessary to determine the abundance and distribution of the threat of Prickly Acacia, timeframes for its control and measurable criteria for whatever target is being considered.

5.3 Offset Assessment Guide: Offset Calculator Tool

To provide a comparative size and cost quantum for a direct land-based, data collected from multiple field surveys and sites was used to inform required inputs to the DAWE *Offset Assessment Guide: Offset Calculator tool*. The results of the calculator tool are presented in **Appendix A** and demonstrate that the proposed offset items in **Table 3** above are in excess of the value for a direct land-based offset alone.

For comparative purposes, the values entered into the calculator in **Appendix A** identified an offset of approximately 48,500 ha in area to replace the habitat lost to the action. For the purposes of this comparison against the proposed offset, Multicom have assumed an offset area of 50,000 ha. At an estimated $143.50/ha to secure a covenant to reduce stocking rates, this would equate to $7,193,400. If Multicom relied upon this figure to acquit the offset, there is no certainty that the land would be of any benefit to Julia Creek Dunnart, for the reasons described above. Including the requirements to secure, monitor and manage the land the total cost of the offset would be $9,914,100 over a period of 20 years.

The *Offset Assessment Guide* supports the requirements of the EOP through a balanced spreadsheet approach to determine suitable offsets for threatened species and ecological communities.

5.4 Offset Management Plan

An Offset Management Plan (OMP) will be developed to provide scientifically robust management measures to address the Project's potential impacts to Julia Creek Dunnart. Appropriate management activities will be based on relevant conservation advice, the latest recovery plan, threat abatement plans and ecological descriptions for the species.

The OMP will describe:

- Offset requirements of the Project in accordance with the EPBC Act EOP;
- Management activities to meet the recovery plan and threat abatements plan objectives, the offset requirements of the Project, in accordance with the EPBC Act EOP and associated Offsets Assessment Guide; and
- Monitoring, reporting, auditing and continuous improvement systems to ensure the best outcomes for the Julia Creek Dunnart.

The overall objective of the OMP is to improve site characteristics for Julia Creek Dunnart foraging and breeding habitat.

5.4.1 Adaptive Management

As part of the OMP, Multicom will adaptively implement the plan to address experiences and to mitigate uncertainty where the plan is not delivering improvements to site habitat condition. The adaptive management cycle is based on core adaptive management principles, outlined in **Figure 6.**

Adaptively implementing the plan is critical to achieving the plan's objectives, for example where adjustment actions and arrangements can be made to enhance effectiveness and deliver improvements to site habitat condition. To maintain an adaptive approach, Multicom will:

- Collect and incorporate new data / information as a result of implementing the plan, with new findings from data collected or from new information derived from external sources;
- Effectively schedule monitoring on an annual basis to make informed decisions on risk management, auditing and reporting activities;
- Commit to periodically reviewing risks, including those in response to the changing risk level, new information, changing circumstances or the results from implementing corrective actions;
- Undertake an annual review of the effectiveness of management measures with significant levels of uncertainty and relatively long implementation timeframes, upon which the plan is highly dependent;
- Indicate that the consequences of significant environmental incidents are addressed; and
- Review the plan as soon as possible when there are indications of OMP failure/s.

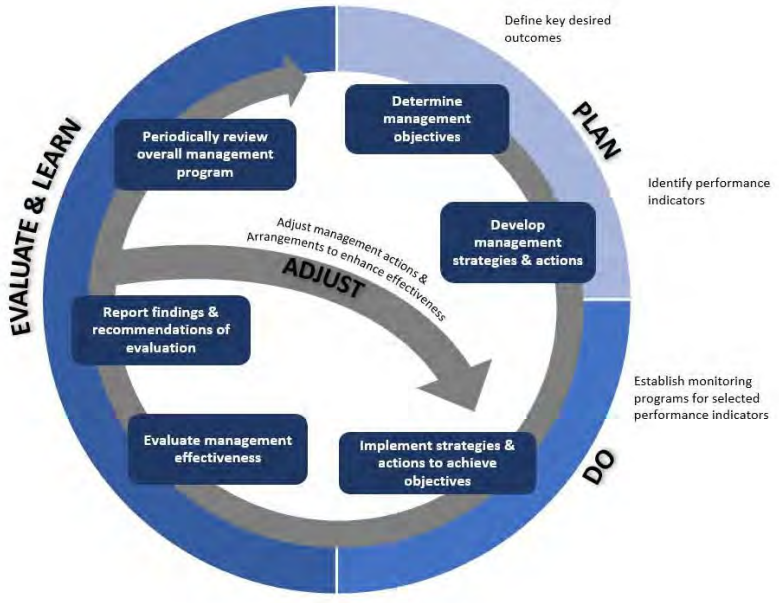


Figure 6: Adaptive Management Cycle

5.5 Compliance with Principles of EPBC Act EOP

An assessment of the proposed Offset Strategy's compliance with the principles of the EPBC Act EOP (as mentioned in **Section 3.2**) is provided in **Table 5**.

Table 5: Assessment against Principles of EPBC Act EOP

	EPBC Act EOP Principles	Offset Strategy Compliance
1	Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.	Through a combination of compensatory and direct offsets, the Offset Strategy will deliver an overall conversation outcome for Julia Creek Dunnart that improves or maintains the viability of the species. The proposed offset approach will result in an overall beneficial conservation outcome.
2	Be built around direct offsets but may include other compensatory measures.	A conservation benefit to the Julia Creek Dunnart is expected to be achieved through direct offsets as well as increasing the proportion of other compensatory measures in an offset package.
3	Be in proportion to the level of statutory protection that applies to the protected matter.	The Julia Creek Dunnart is listed as Vulnerable under Commonwealth legislation. The proposed offsets will contribute directly to the actions and strategies described in the relevant recovery plan. Accordingly, the proposed offsets are considered to be in proportion to the level of statutory protection applied to the species.
4	Be of a size and scale proportionate to the residual impacts on the protected matter.	The likely residual impacts from the Project are difficult to determine, based on a lack of either confirmed or database records from the Project area. Any possible residual impact is likely to affect the potential use of habitat by the species, should it be present now or in the future. Therefore, the proposed offsets are considered to be of an appropriate size and scale to the residual impacts because it will provide a direct and relevant improvement of the conservation outcomes for the species.
5	Effectively account for and manage the risks of the offset not succeeding.	The offset approach includes a range of research-based outcomes that will be suitably robust both in terms of spatial and temporal variability. This will be appropriate to manage the risk of inadequate experimental design and to ensure there is sufficient data for analyses and interpretation.
6	Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action.	Largely, the offsets are in addition to what is required by law. However, the offsets will also build on current land management requirements, especially for weeds, to encourage broader scale beneficial outcomes. There is no other required offset for the Project. The proposed offset will contribute directly to an improved conservation outcome for Julia Creek Dunnart.
7	Be efficient, effective, timely, transparent, scientifically robust and reasonable.	**Efficient** – The OMP will ensure the efficient delivery of the proposed offset package. Prior to commencing, a detailed research plan will be submitted to DAWE. This will ensure accountability and efficient delivery of the offsets. **Effective** – The proposed measures will be devised to contribute to the future viability of Julia Creek Dunnart habitat and deliver an overall conservation outcome that improves or maintains the viability of Julia Creek Dunnart as compared to what is likely to have occurred if neither the action nor the offset had taken place. **Timely** – The research will be undertaken in a timely manner. Securing the retained habitat could occur immediately following approval of the action. **Transparent** – The research will be undertaken in a transparent manner. The research will be targeted towards key actions identified in recovery

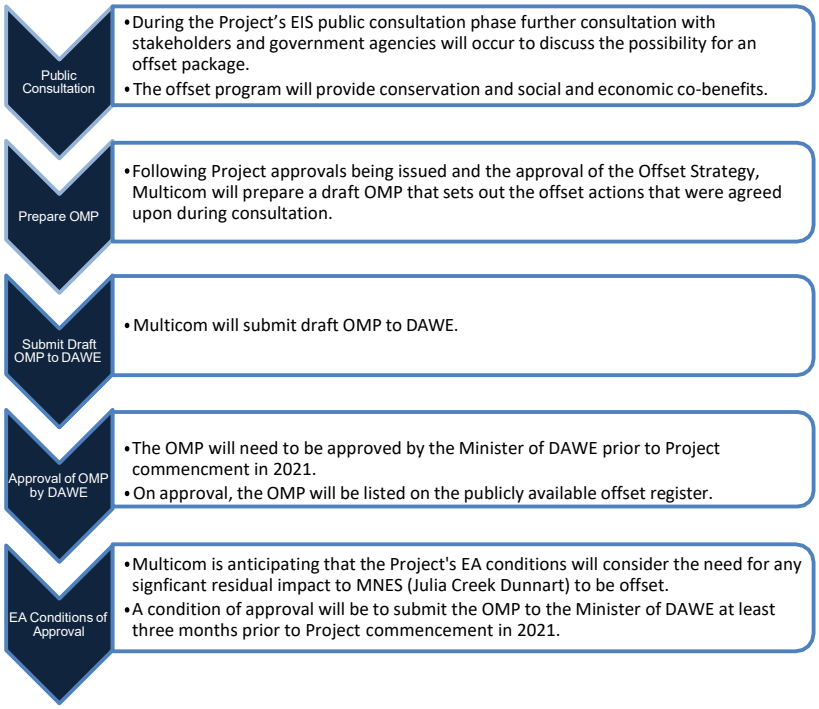
EPBC Act EOP Principles		Offset Strategy Compliance
		plans, threat abatement plans and management plans. It is anticipated the research will present findings that can be peer-reviewed and published in a peer-reviewed scientific journal. Land secured through direct offsets will be clearly identified and protected under relevant mechanisms. **Scientifically robust** – The proposed offsets will be undertaken in a scientifically robust manner and consider best practice research approaches. **Reasonable** – A conservation benefit to the Julia Creek Dunnart is highly likely to be achieved through the proposed measures.
8	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The OMP will detail monitoring, reporting, auditing and continuous improvement systems to ensure the offset requirements are attained and maintained during the action's period of approval.

5.6 Conclusion

The proposed Offset Strategy will contribute to the future viability of Julia Creek Dunnart habitat and deliver an overall conservation outcome as compared to what is likely to have occurred if neither the action nor the Offset Strategy had taken place. Based on prevalence of known threatening processes at and adjacent to the action areas, the combination of direct and compensatory offset management actions will contribute to the following improved conservation outcomes for the species:

- Research into thresholds of threats, alone and in combination, to better understand Julia Creek Dunnart ecology and success criteria for direct land-based offsets;
- Secure land containing suitable Julia Creek Dunnart habitat
    - Land has been identified adjacent an important population (the Julia creek Aerodrome) and in the vicinity of the mining activity; and
- Restoration and maintenance of a captive breeding program, facilitating re-establishment or enhancing of populations.

6 Next Steps and Timing



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GLOSSARY

Table 6: Abbreviations

Abbreviation	Term
ALA	Atlas of Living Australia
EP Act	*Environmental Protection Act 1994* (Queensland)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EO Act	*Environmental Offsets Act 2014* (Queensland)
EOP	Environmental Offsets Policy
DAWE	Department of Agriculture, Water and the Environment
DBMP	Direct Benefit Management Plan
DE	Department of the Environment
DEE	Department of Environment and Energy (former)
DERM	Department of Environment, Resources and Mining
DES	Department of Environment and Science
DEWHA	Department of the Environment, Water, Heritage and the Arts (Commonwealth)
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)
ha	Hectares
km	Kilometre
LGA	Local Government Area
m	Metre
MIA	Mine Infrastructure Area
ML	Mining Lease
MLA	Mining Lease Application
MNES	Matters of National Environmental Significance
Offset Strategy	Environmental Offset Strategy
OMP	Offset Management Plan
Project	Saint Elmo Project
RE	Regional Ecosystem
TOR	Terms of Reference
tpa	Tonnes per annum
V_2O_5	Vanadium pentoxide
VM Act	*Vegetation Management Act 1999*

Table 7: Glossary of Terms

Term	Definition
Critically Endangered	A listing category defined under the EPBC Act for individual native species and ecological communities.
Ecological Community	An assemblage of species occupying a particular area.
Endangered	A listing category as defined under the EPBC Act, NC Act and/or VM Act.
Environmental offsets	Environmental offsets compensate for unavoidable impacts on significant environmental matters, such as highly valuable species and ecosystems.
Essential Habitat	Essential habitat is an area of remnant vegetation where species listed as endangered, vulnerable, or near threatened under the NC Act have been recorded and are mapped by DES.
Habitat	An area or areas permanently, periodically or occasionally occupied by a species, population or ecological community, including any and all biotic and abiotic features of the area or areas occupied.
Least Concern	Listing category as defined under the VM Act.
Likelihood of Occurrence	▪ Known to occur includes species/communities previously recorded in the Project area or directly adjacent to the Project area.

Term	Definition
	▪ Likely to occur includes species/communities previously recorded in proximity to the Project area and suitable habitat features are available in the Project area which support the species. ▪ May occur includes species / communities where suitable habitats are present in the Project area, and where the known distribution of the species overlaps the Project area, but where there are no known records in the area. ▪ Unlikely to occur includes species / communities for which the Project area offers limited or no potential habitat, is outside their known range and/or is without broader habitat requirements.
Migratory Species	Species listed as 'migratory' under the EPBC Act. Migratory species are those animals that migrate to Australia and its external territories or pass through or over Australian waters during their annual migrations. All species on the list of migratory species are matters of national environmental significance under the EPBC Act.
Near Threatened	Listing category as defined under the NC Act. Refer to definition of 'NC Act conservation status' for meaning of near threatened under the NC Act.
Project area	The Project area is defined as the Mining Lease area (ML 100162) which is approximately 8,882 ha.
The Project	The Project refers to the Saint Elmo Project, which is located in Julia Creek, Queensland.
Regional Ecosystem	A vegetation community, within a bioregion, that is consistently associated with a particular combination of geology, landform and soil. REs may be classified under the *Vegetation Management Regulation 2012* as endangered, of concern or least Concern.
Remnant Vegetation	Vegetation where the dominant canopy has >70 percent of the height and >50 percent of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy (Neldner et al. 2019).
Significant Residual Impact	As defined in the *Environmental Offsets Act 2014*, generally, a significant residual impact is an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that— ▪ remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site mitigation measures for the prescribed activity; and ▪ is, or will or is likely to be, significant.
Threatened	▪ Flora and fauna species which have been designated as extinct in the wild, endangered or vulnerable under the NC Act. ▪ Flora and fauna species which have been designated as critically endangered, endangered or vulnerable under the EPBC Act
Vulnerable	Listing category as defined under the EPBC Act and/or NC Act. Refer to definitions of 'EPBC Act conservation status' and 'NC Act conservation status' for meaning of 'vulnerable' under these Acts.

Appendix A *Offset Assessment Guide: Offset Calculator tool*

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Julia Creek Dunnart
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	7419	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g.Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

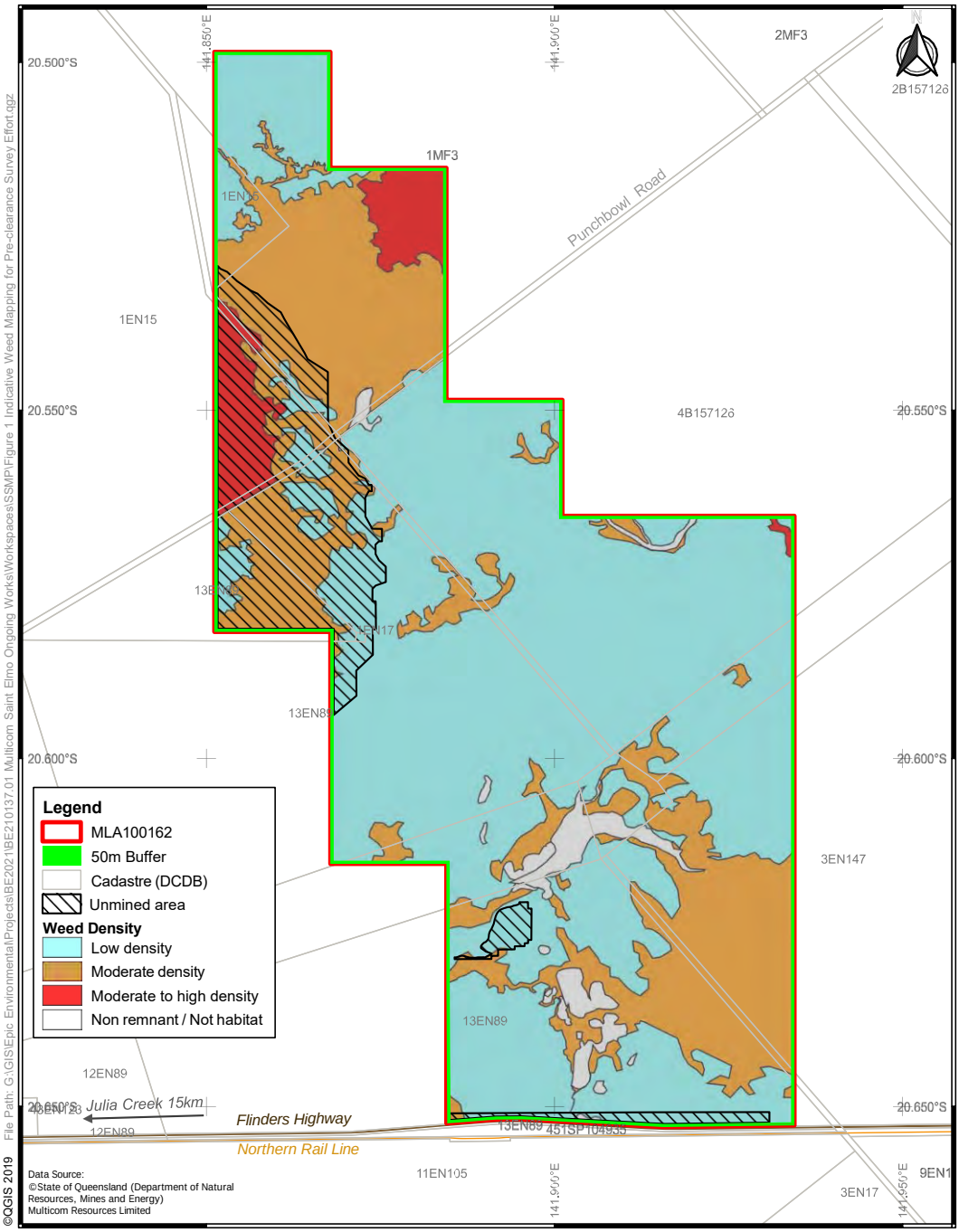
Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	3709.50	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	48500	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	3728.01	100.50%	Yes	
									Future area without offset (adjusted hectares)	48500.0	**Future area with offset (adjusted hectares)**	48500.0								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	5	**Future quality without offset (scale of 0-10)**	5	**Future quality with offset (scale of 0-10)**	6	1.00	80%	0.80	0.77				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g.Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	**Other compensatory measures ($)**	**Total ($)**
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	3709.5	3728.01	100.50%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Appendix B – Indicative Prickly Acacia Mapping (St Elmo Mine area)



0 1 2 3 km

Scale: 1:60,000 @ A4

Datum: GDA94

Multicom Resources Limited
Saint Elmo Vanadium Project
Significant Species Management Plan

Figure B1
Indicative Weed Mapping for Pre-clearance Survey Effort

BE210137.01 Rev 0 04/03/2022

9. APPENDIX B

SOUTHERN GULF CATCHMENTS – 2025 PROJECT UPDATE

Southern Gulf NRM

Julia Creek Dunnart Offset

Public Summary Report

2023 - 2025

Annual Report prepared for
EPIC Environmental Pty Ltd and Multicom Resources Pty Ltd

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This report has been prepared to inform on the works delivered by Southern Gulf NRM for the *Multicom Resources Limited Offset Strategy 2021.*

Southern Gulf NRM Ltd, together with its employees and sub-consultants, accepts no responsibility or liability for use of this report beyond its intended purpose within the Offset Strategy.

Contents

EXECUTIVE SUMMARY

Multicom Resources Limited (Multicom) operates the Saint Elmo Vanadium Project, located 25 km east of Julia Creek, QLD (EPBC 2017/8007); this project focuses on the mining and processing of vanadium pentoxide (V^2O^5) and other vanadium-based products. The mining of the vanadium ore includes shallow strip mining (15 m depth).

The project activities triggered a requirement for an Environmental Offset Strategy for the Julia Creek dunnart (*Sminthopsis douglasi*) as it is listed as Vulnerable and a Matter of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* Cth (EPBC Act).

Southern Gulf NRM (SGNRM) has partnered with EPIC Environmental to support the implementation of actions under *Multicom Resources Limited's Offset Strategy 2021*. The environmental offset entails research to improve scientific understanding of the Julia Creek dunnart and aid future conservation efforts for the species.

SGNRM's involvement included the research and implementation of a feral cat monitoring and abatement plan in conjunction with Julia Creek dunnart (JCD) population monitoring to quantifiably measure the impacts of feral cats on the species.

Key Results

Southern Gulf NRM successfully delivered Julia Creek dunnart monitoring, feral cat monitoring and feral cat abatement actions. The project outcomes included:

Camera Trapping Surveys

- Julia Creek dunnarts were detected across both sites in 2023, had the highest number of detections in the 2024 surveys and no detections in 2025 surveys.
- Feral cats were detected across both sites during 2023 – 2025 with a total of 5818 sightings.
- The average daily detections per monitoring event for feral cats decreased at both sites.
    - Implementation Site decreased from 17.93 sightings (2023) to 4.85 (2025).
    - Control Site decreased from 14.17 sightings (2023) to 7.10 (2025).

Elliott Trapping Surveys

- No dunnarts were captured in Elliott trapping surveys (2023 – 2024).
- Long-haired rats (*Rattus villosissimus*) trap saturation likely prevented dunnart captures.

Feral Cat Abatement Program

Eradication of 1958 feral cats (1366 in 2024, 592 in 2025), with operations spanning July 2024 to June 2025.

Ecological Conditions

Rat Plague

- A major outbreak of *Rattus villosissimus* occurred from April 2023 through to late 2024.
- Rat numbers declined sharply between October and November 2024 and were largely absent by 2025.
- The plague likely contributed to the exponential growth of feral cat populations during 2023–2024.

Weather and Environmental Conditions

- Severe flooding in the McKinlay Shire during early 2025 disrupted habitats and contributed to reduced detections of both feral cats and Julia Creek dunnarts.

Regional Feral Cat Infestation

- The extent of the feral cat infestation gained regional media attention.
- Local councils (Cloncurry and Richmond Shire) implemented bounty programs, which led to calls from the Member for Traeger for a state-funded cat bounty across the region.

Looking forward

In the future, Southern Gulf NRM is committed to continuing its monitoring efforts and recommends incorporating the use of detection dogs to identify Julia Creek dunnart presence before camera monitoring installation, thermal monitoring, artificial intelligence for image analysis, and studies on the impacts of invasive prickly acacia, which will build on the work completed to date. When paired with landscape-scale predator control on the Mitchell Grass Downs, these efforts will be crucial to enhancing our understanding of the drivers and pressures that influence Julia Creek dunnart population dynamics.

1 INTRODUCTION

1.1 Background

The Julia Creek dunnart (*Sminthopsis douglasi*) is listed as:

- Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* Cth (EPBC Act),
- Endangered under the *Nature Conservation Act 1992* Qld (NCA).

This marsupial species is endemic to the cracking clay soils of the tussock grasslands within the Mitchell Grass Downs and the Desert Uplands bioregions in northwest Queensland. The consensus typically leans towards an understanding that Julia Creek dunnart populations are declining (Burnett & Winter 2008). Still, conservation actions lack robust guidance due to a lack of comprehensive scientific knowledge about the Julia Creek Dunnart.

The Conservation Advice (2016) for the species pinpoints predation by feral cats as a threat to the dunnart (Woolley 2012). Similarly, the National recovery plan for the Julia Creek dunnart (*Sminthopsis douglasi*) (2009) emphasises earlier research (1998 and 2012) by Mifsud & Woolley, detailing discoveries of dunnart remains within feral cat stomach contents. Furthermore, in 1999, Mifsud observed increased dunnart capture rates following reductions in feral cat numbers. These studies highlight that feral cats are a predator of Julia Creek dunnarts (JCD) and that controlling feral cat numbers may lead to increases in JCD populations.

Currently, there is a lack of adequate species data, which prohibits the ability to conduct a full assessment of population size and trends for the dunnart. Consequently, additional research is necessary to offer substantial, measurable scientific evidence for guiding future conservation efforts for the Julia Creek dunnart.

Southern Gulf NRM was commissioned by EPIC Environmental to conduct the following:

- Julia Creek Dunnart Monitoring Program,
- Threat Abatement (Feral Cat) Program,

at two locations within the species' known range as part of *Multicom Resources Limited's Offset Strategy 2021* delivery for the Julia Creek Dunnart.

1.1.1 Julia Creek dunnart morphology

Dunnarts are small carnivorous marsupials native to Australia. Their morphology is a small, sleek, slender body covered in soft fur with a tail that is slightly shorter than their body length ((Baker & Gynther 2023)). They have two pairs of legs with paws and claws, large, prominent ears and eyes, a pointed snout, and sharp, pointed teeth.

The Julia Creek dunnart (*Sminthopsis douglasi*) is a brownish marsupial that has lighter-coloured areas around the face, a white underbody and a distinctive dark facial stripe that runs from its nose to the back of the head, a dark circle of hair around its eyes, and dark hair on the tips of its ears and tail (Woolley 2008). Its tail is slightly shorter than its body, and it tapers towards the end of the tail (Woolley 2008). The species is the largest of the *Sminthopsis* species found in Australia.

Body length*: 130-135 mm (males), 110-125 mm (females)
Weight*: 50-70 g (males), 40-60 g (females)
Hindfoot measurement*: ≥ 20 mm
* Measurements are based on fully grown adults (Baker & Gynther 2023).

Figure 1: Julia Creek dunnart (Atlas of Living Australia 2023).

1.1.2 Feral cat morphology

Feral cats are identified by their feline body shape, which is covered in fur; they can differ in size, patterns, and colours. Their triangular shaped face identifies them along with their whiskers, pointed ears, short snout and sharp teeth (ALA 2023). They have a long tail, two pairs of legs and paws with protractible and retractable claws.

Body length*: 448-740 mm (males), 380-610 mm (females)
Weight*: 3.4-7.3 kg (males), 2.5-5.0 kg (females)
Tail length*: 235-345 mm (males), 230-316 mm (females)
* Measurements are based on fully grown adults (Baker & Gynther 2023).

Figure 2: Feral cat (Queensland Government DAF 2023).

1.2 Aims and objectives

The *Multicom Resources Limited Offset Strategy 2021* aims to support Julia Creek dunnart conservation by improving our understanding of their ecology, habitat distribution, and the impact of feral cats on their populations.

The key actions from *Multicom Resources Limited's Offset Strategy 2021* that relate to this report include:

- Surveys to clarify the extent of the species distribution,
- Negotiation of voluntary management agreements for key Julia Creek dunnart sites and encourage landholders to protect and manage such sites,
- Implementation of a pest animal control program for feral cats,
- Investigations of the interactions between predators, water sources and grazing management.

1.2.1 Julia Creek dunnart monitoring program

The aim of the Julia Creek Dunnart Monitoring Program is to:

- Provide population and habitat distribution data across project areas.
- To quantify the habitat quality characteristics of importance to the species and how these characteristics change due to thresholds for threatening processes.

1.2.2 Threat abatement (Feral cat) program

The aim of the Threat Abatement (Feral cat) Program is to:

- Reduce the populations of feral cats and their predation of Julia Creek dunnarts within project areas.
- Monitor and quantify interactions between Julia Creek dunnarts and feral cats.

2 SURVEYS

2.1 Survey sites

Project works were carried out at two sites that are not adjacent to one another and are located within the McKinlay Shire. The sites are located on Ashy Downs country, which has been well-documented as a habitat for the Julia Creek dunnart, specifically within the dominant Mitchell grass cracking clay soils. The sites are identified as:

- Implementation Site – threat abatement works conducted,
- Control Site – no threat abatement works were undertaken.

2.2 Survey events

Southern Gulf NRM completed two types of surveys between 2023 – 2025:

- Elliott trapping surveys for Julia Creek dunnarts (JCD) using Elliot Traps,
- Camera trapping surveys for focal species: Julia Creek dunnarts and feral cats.

During the project delivery for the camera trapping surveys, limited access to the project sites at various times resulted in variations in monitoring durations between camera deployment and collection and differences in how long each individual camera was operational in the field due to hardware and site-related factors. To address this, results are reported as raw and standardised. The raw data is reported as total sightings per monitoring event, and the standardised data as the average sightings per monitoring day for each monitoring event. The daily rate was calculated by dividing the total number of sightings by the average number of days each camera was operational in the field, measured from deployment to the date of the last image captured for each monitoring period. The appendix provides a comprehensive summary of the deployment dates, the date the last photo was recorded for each camera and the corresponding event.

Table 1: Survey events

Event	Deployment Date	Survey Type	Target Species
Event 1	26/8/2023 – 01/11/2023	Camera trapping	Julia Creek dunnart Feral cat
	25/05/2023 – 2/9/2023	Elliott trapping	Julia Creek dunnart
Event 2	11/04/2024 – 15/07/2024	Camera trapping	Julia Creek dunnart Feral cat
	26/05/2024 – 01/06/2024	Elliott trapping	Julia Creek dunnart
Event 3	15/07/2024 – 9/10/2024	Camera trapping	Julia Creek dunnart Feral cat
Event 4	9/10/2024 – 5/11/2024	Camera trapping	Julia Creek dunnart
Event 5	22/01/2025 – 01/05/2025	Camera	Julia Creek dunnart Feral cat
Event 6	01/05/2025 – 23/06/2025	Camera	Julia Creek dunnart Feral cat

2.3 Survey sites' climate and weather

Julia Creek, located in Queensland, Australia, experiences a climate characterised as hot and semi-arid. It typically has a dry and warm climate throughout the year. Summers are usually hot, with temperatures often exceeding 35°C, while winters are mild during the day but can get quite cool at night, dropping to around 10-15°C (See Figure 3 & 4). Rainfall is generally scarce, with most precipitation occurring during the summer months in sporadic, sometimes heavy, downpours or thunderstorms.

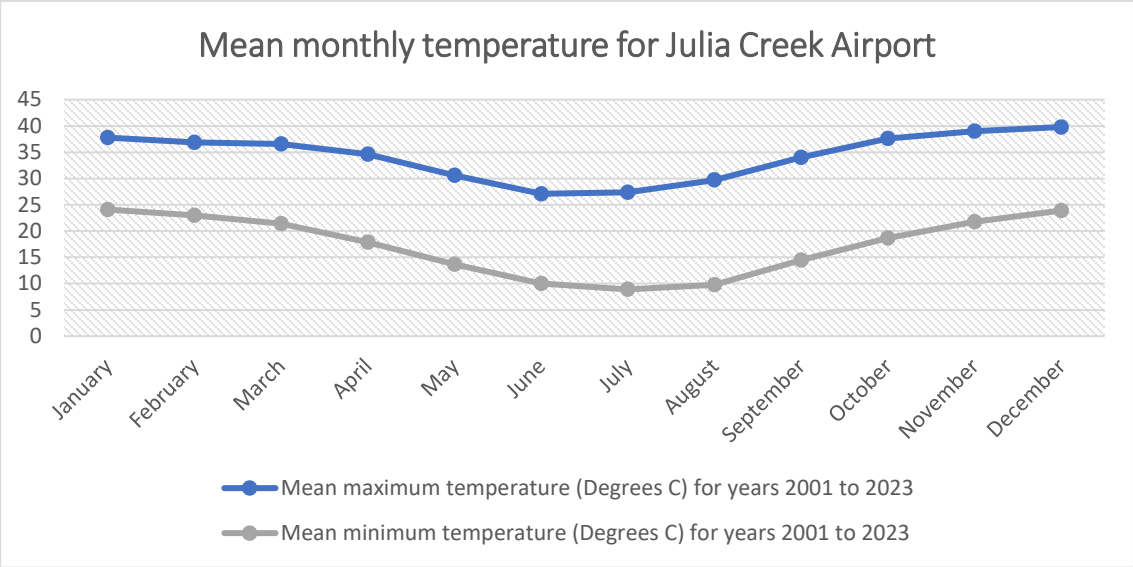


Figure 3: Mean monthly temperature for Julia Creek Airport (Bureau of Meteorology 2023).

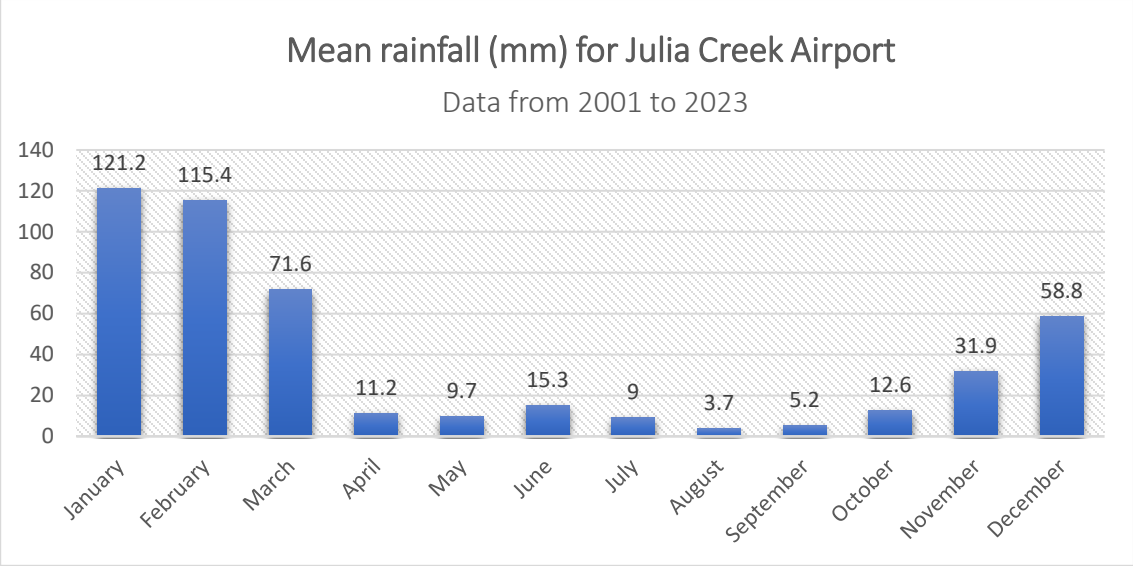


Figure 4: Mean rainfall for Julia Creek Airport (Bureau of Meteorology 2023).

2.4 Monitoring cameras

Reconyx Hyperfire 2 Professional White Flash and Reconyx Hyperfire 2 Security Covert IR (Infrared black flash) motion sensor cameras (Figure 3) were utilised across both survey sites.

The white flash cameras were set according to the methodology used in Thomas et al. (2018). Black flash cameras were set according to the NSW DPI Fact Sheet: *Guide for camera trapping wild dogs, foxes, and feral cats*.

The following information was collected and recorded for the camera trapping survey:

1. Site location (GPS coordinates),
2. Camera identification number,
3. Targeted species sighted,
4. Date of deployment, last image taken and collection,
5. Image of the camera at deployment and collection.

One observation was recorded for an animal based on the images from when it moved into and out of the camera's field of view; if it subsequently re-entered the field of view in the images, it was recorded as a new sighting. As a result, some repeated sightings are likely to have occurred.

3 FERAL CAT ABATEMENT

3.1 Feral Cat Abatement Plan

A Feral Cat Abatement Plan was developed in consultation with project partners in accordance with best practice management and legislation. Southern Gulf NRM employed a contractor to implement feral cat control on the Implementation Site between July 2024 and June 2025.

The aim of the Threat Abatement (Feral cat) Program is to:

- Reduce the populations of feral cats and their predation of Julia Creek dunnarts within project areas.
- Monitor and quantify interactions between Julia Creek dunnarts and feral cats.

3.2 Eradicat

It was anticipated that the feral cat baiting product, Eradicat, would be available for use in Queensland during the delivery of this project. However, the product was not approved for use within the state during the delivery of project works.

4 RESULTS AND DISCUSSIONS

The on-ground surveys did not yield any detections of Julia Creek dunnarts. However, motion-sensor camera monitoring conducted on all project sites successfully captured images of both target species: the Julia Creek dunnart and the feral cat.

4.1 Elliott trapping survey results

The on-ground surveys for Julia Creek dunnarts using Elliot Traps did not result in any detections.

In 2023, the survey reported a total of 700 native long-haired rats over 1000 trap nights.

In 2024, the survey reported a total of 536 native long-haired rats over 700 trap nights. The event was shorter than the 2023 survey due to a rain event that affected site access.

The surveys were undertaken during a population boom of *Rattus villosissimus,* the native long-haired rats, resulting in near-complete saturation of traps by this species. This trap saturation significantly reduced the availability of traps for capturing Julia Creek dunnarts and likely had a considerable impact on the ability to detect them using this trapping method.

4.2 Camera trapping survey results

The images from the monitoring cameras resulted in detections for both focal species, the Julia Creek dunnart and feral cat.

The average days that the cameras were operational in the field were calculated using the date of deployment for the camera and the date the last photo was recorded. An average was calculated for each monitoring event.

2023 Event 1: 21 days
2024 Event 2: 36 days
2024 Event 3: 62 days
2024 Event 4: 31 days
2025 Event 5: 85 days
2025 Event 6: 35 days

The results from the camera trapping surveys are reported in Figure 5.

CAMERA TRAPPING SURVEY RESULTS																		
SITE	CAMERA TYPE	CAMERA NUMBER	EVENT 1		EVENT 2		EVENT 3		EVENT 4		EVENT 5		EVENT 6		TOTALS	
			Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral cat	Julia Creek Dunnart	Feral Cats
Implementation	White flash	1	0	0	0	13	0	0	0	9	0	3	0		**0**	**25**
Implementation	White flash	5	0	1	0	0	2	16	0	32	0	6	0		**2**	**55**
Implementation	White flash	7			2	10	0	29	0	8	0	3	0	4	**2**	**54**
Implementation	White flash	10	0	0	0	0	7	40	0	4	0	6	0	1	**7**	**51**
Implementation	White flash	11	0	1	0	9	0	6	0	2	0	10	0		**0**	**28**
Implementation	White flash	12	0	0	0	0	1	13	0	8	0	10	0		**1**	**31**
Implementation	White flash	39	0	10	0	1	0	28	0	19	0	13	0	8	**0**	**79**
Implementation	White flash	40	1	1	0	11	1	14	0	5	0	12	0	1	**2**	**44**
Implementation	White flash	43	1	0	7	31	2	27	0	3	0	22	0	8	**10**	**91**
Implementation	White flash	44	0	0	0	0	13	6	0	11	0	5	0	2	**13**	**24**
Implementation	White flash	45	0	0	0	4	0	3	0	10	0	10	0	6	**0**	**33**
Implementation	Black flash	64	0	17	0	15	0	70	0	8	0	7	0	1	**0**	**118**
Implementation	Black flash	65	0	12	0	7	0	33	0	29	0	48	0	1	**0**	**130**
Implementation	Black flash	66	0	11	0	27	0	21	0	4	0	4	0	2	**0**	**69**
Implementation	Black flash	67	0	89	0	85	0	61	0	29	0	11	0	17	**0**	**292**
Implementation	Black flash	68	0	17	0	6	0	20	0	24	0	8	0	1	**0**	**76**
Implementation	Black flash	69	0	15	0	17	0	56	0	8	0	13	0	5	**0**	**114**
Implementation	Black flash	72	0	69	0	62	0	33	0	8	0	18	0	15	**0**	**205**
Implementation	Black flash	73	0	5	0	0	0	36	0	0	0	93	0	21	**0**	**155**
Implementation	White flash	2	1	1	0	0	0	2	0	11	0	8	0	5	**1**	**27**
Implementation	White flash	4	0	0	2	2	1	7	0	23	0	4	0	1	**3**	**37**
Implementation	White flash	6	1	2	0	1	4	1	0	15	0	7	0	7	**5**	**33**
Implementation	White flash	13	0	0	0	0	1	7	0	19	0	9	0	7	**1**	**42**
Implementation	White flash	36	0	0	0	0	1	15	0	22	0	2	0	3	**1**	**42**
Implementation	White flash	37	0	1	0	0	0	1	0	9	0	10	0		**0**	**21**
Implementation	White flash	38	0	3	0	0	0	0	0	8	0	5	0	3	**0**	**19**
Implementation	White flash	41	0	14	0	11	2	9	0	9	0	4	0	3	**2**	**50**
Implementation	White flash	42	0	0	0	0	2	8	0	25	0	7	0	3	**2**	**43**
Implementation	Black flash	61	0	37	0	60	0	20	0	35	0	20	0	10	**0**	**182**
Implementation	Black flash	62	0	11	0	31	0	3	0	7	0	7	0	1	**0**	**60**
Implementation	Black flash	63	0	7	0	30	0	40	0	78	0	14	0	3	**0**	**172**
Implementation	Black flash	70	7	7	0	23	0	5	0	3	0	5	0	8	**7**	**51**
Implementation	Black flash	71	0	2	0	8	0	35	0	13	0	9	0	8	**0**	**75**
Implementation	Black flash	74	0	7	0	227	0	29	0	36	0	9	0	11	**0**	**319**
Implementation	Black flash	75	0	36	0	6	0	38	0	22	0	5	0	2	**0**	**109**
Control	White flash	26	0	0	0	0	0	10	0	19	0	32	0	5	**0**	**66**
Control	White flash	27	0	2	0	0	1	46	0	8	0	26	0	2	**1**	**84**
Control	White flash	28	0	0	0	0	0	11	0	29	0	14	0	17	**0**	**71**
Control	White flash	29	0	0	0	6	0	62	0	20	0	12	0	10	**0**	**110**
Control	White flash	30	0	5	9	10	3	36	0	30	0	3	0	5	**12**	**89**
Control	White flash	31	0	1	1	10	4	13	0	16	0	15	0	5	**5**	**60**
Control	White flash	32	1	0	1	0	2	2	3	3	0	17	0	2	**7**	**24**
Control	White flash	33	0	0	0	0	3	22	0	14	0	10	0	4	**3**	**50**
Control	White flash	34	0	0	0	12	4	14	0	35	0	7	0	10	**4**	**78**
Control	White flash	35	6	1	2	0	10	4	0	12	0	13	0	1	**18**	**31**
Control	Black flash	46	0	0	0	11	0	21	0	14	0	40	0	27	**0**	**113**
Control	Black flash	47	0	79	0	45	0	23	0	12	0	13	0	15	**0**	**187**
Control	Black flash	48	0	90	0	47	0	1	0	18	0	31	0	17	**0**	**204**
Control	Black flash	49	0	0	0	13	0	14	0	11	0	8	0		**0**	**46**
Control	Black flash	50	0	18	0	67	0	65	0	19	0	37	0	22	**0**	**228**
Control	Black flash	51	0	29	0	2	0	96	0	44	0	29	0	4	**0**	**204**
Control	Black flash	52	0	2	0	49	0	18	0	22	0	18	0	3	**0**	**112**
Control	Black flash	53	0	2	0	17	0	19	0	8	0	13	0		**0**	**59**
Control	Black flash	54	0	9	0	1	0	37	0	31	0	9	0	3	**0**	**90**
Control	Black flash	55	0	0	0	4	0	17	0	6	0	17	0	9	**0**	**53**
Control	Black flash	56	0	15	0	16	0	24	0	0	0	44	0	12	**0**	**111**
Control	Black flash	57	0	3	0	29	0	19	0	25	0	34	0	16	**0**	**126**
Control	Black flash	58	0	14	0	60	0	89	0	78	0	15	0	14	**0**	**270**
Control	Black flash	59	0	3	0	55	0	61	0	24	0	26	0	25	**0**	**194**
Control	Black flash	60	0	24	0	38	0	83	0	32	0	7	0	18	**0**	**202**
		TOTALS	**18**	**673**	**24**	**1189**	**64**	**1539**	**3**	**1086**	**0**	**917**	**0**	**414**	**109**	**5818**
		Implementation Site	11	376	11	697	37	732	0	556	0	427	0	168	**59**	**2956**
		Control Site	7	297	13	492	27	807	3	530	0	490	0	246	**50**	**2862**
		Average days cameras working in field	21		36		62		31		85		35			
Average daily sightings per monitoring event			**0.86**	**32.10**	**0.66**	**32.68**	**1.03**	**24.69**	**0.10**	**35.51**	**0.00**	**10.79**	**0.00**	**11.95**		
		Implementation Site	0.52	17.93	0.30	19.16	0.59	11.75	0.00	18.18	0.00	5.02	0.00	4.85		
		Control Site	0.33	14.17	0.36	13.52	0.43	12.95	0.10	17.33	0.00	5.76	0.00	7.10		

Figure 5: Camera trapping survey results.

4.1.1 Julia Creek dunnart observations

Julia Creek dunnarts were detected on monitoring cameras in 2023 and 2024. No sightings were recorded in 2025. A mammal ecologist verified all photos of the Julia Creek dunnart.

2023 Event 1: A total of 18 sightings (Implementation Site – 11, Control Site – 7).
2024 Event 2: A total of 24 sightings (Implementation Site – 11, Control Site – 13).
2024 Event 3: A total of 64 sightings (Implementation Site – 37, Control Site – 27).
2024 Event 4: A total of 3 sightings (Implementation Site – 0, Control Site – 3).
2025 Event 5: No sightings (Implementation Site – 0, Control Site – 0).
2025 Event 6: No sightings (Implementation Site – 0, Control Site – 0).

The detections are graphed in Figure 5.

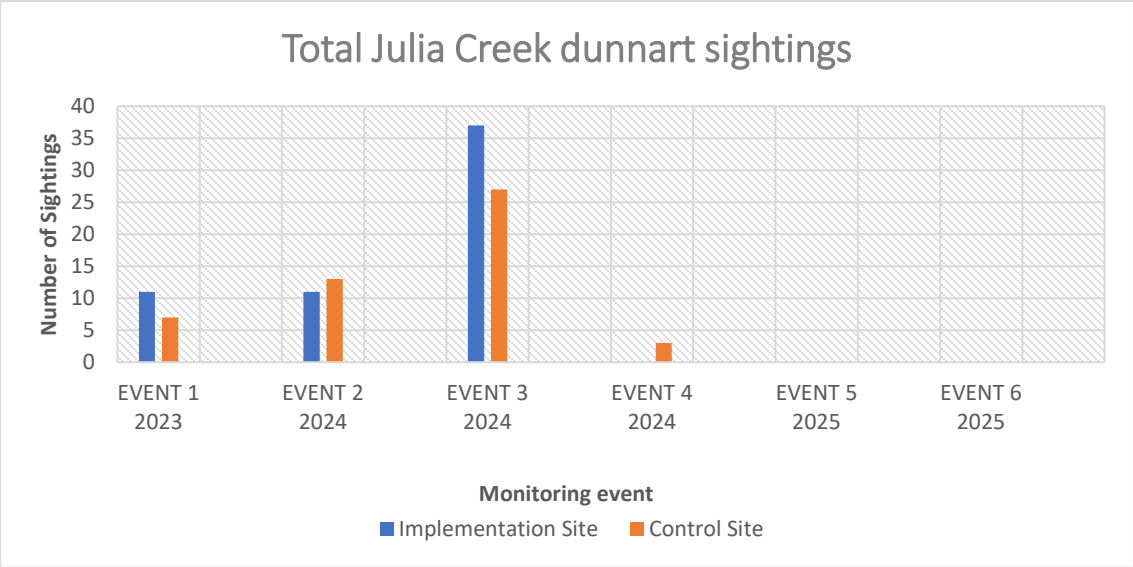


Figure 5: Total Julia Creek dunnart observations.

Data was standardised to give the average number of daily sightings per monitoring event due to the difference in the number of days the cameras were operational in the field.

2023 Event 1: Average of 0.86 daily sightings (Implementation Site – 0.52, Control Site – 0.33).
2024 Event 2: Average of 0.66 daily sightings (Implementation Site – 0.30, Control Site – 0.36).
2024 Event 3: Average of 1.03 daily sightings (Implementation Site – 0.59, Control Site – 0.43).
2024 Event 4: Average of 0.10 daily sightings (Implementation Site – 0, Control Site – 0.10).
2025 Event 5: Average of 0.66 daily sightings (Implementation Site – 0, Control Site – 0).
2025 Event 6: Average of 0.66 daily sightings (Implementation Site – 0, Control Site – 0).

The detections are graphed in Figure 6.

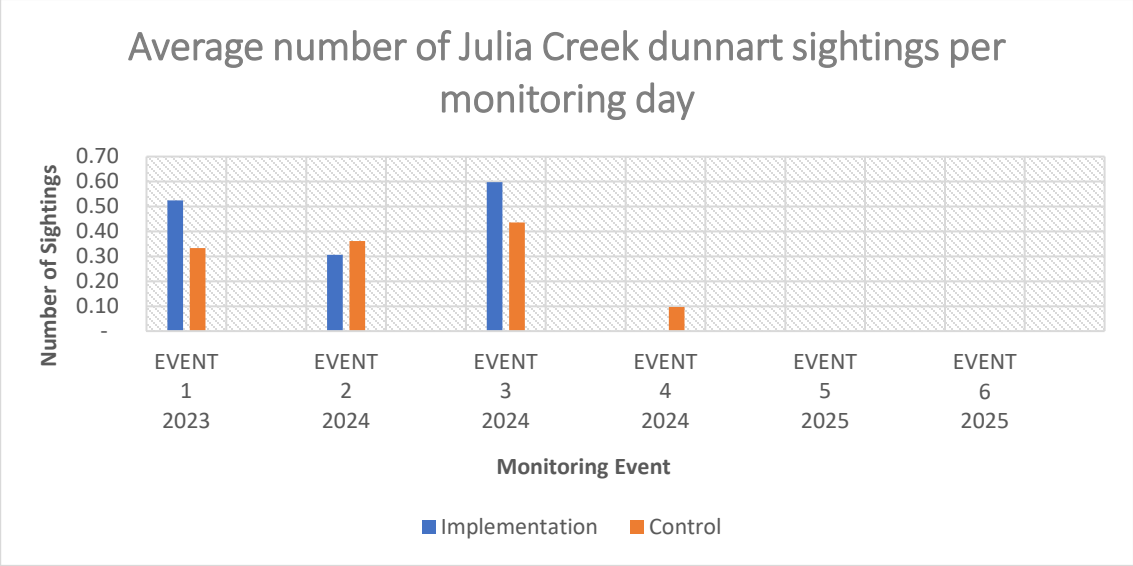


Figure 6: Average number of Julia Creek dunnart sightings per monitoring day

4.1.2 Feral cat observations

Feral cats were recorded across both the feral cat and dunnart cameras on both project sites for each monitoring event in very high numbers.

2023 Event 1: A total of 673 sightings (Implementation Site – 376, Control Site – 297).
2024 Event 2: A total of 1189 sightings (Implementation Site – 697, Control Site – 492).
2024 Event 3: A total of 1539 sightings (Implementation Site – 732, Control Site – 807).
2024 Event 4: A total of 1086 sightings (Implementation Site – 556, Control Site – 530).
2025 Event 5: A total of 917 sightings (Implementation Site – 427, Control Site – 490).
2025 Event 6: A total of 414 sightings (Implementation Site – 168, Control Site – 246).

The detections are graphed in Figure 7.

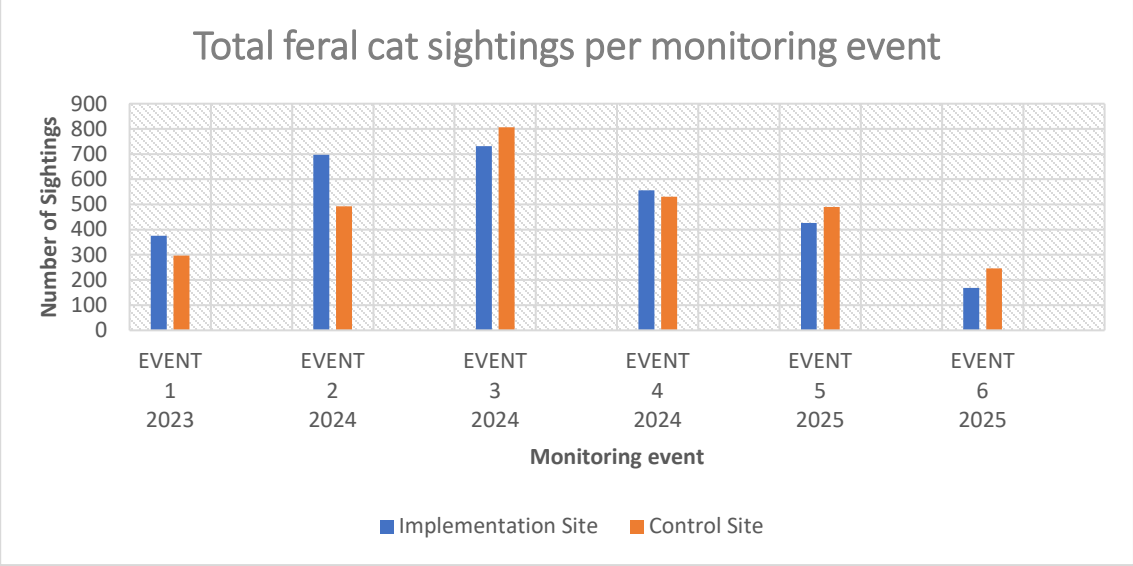


Figure 7: Total feral cat sightings per monitoring event

Data was standardised to give the average number of daily sightings per monitoring event due to the difference in the number of days the cameras were operational in the field.

2023 Event 1: Average of 32.10 daily sightings (Implementation Site – 17.93, Control Site – 14.17).
2024 Event 2: Average of 32.68 daily sightings (Implementation Site – 19.16, Control Site – 13.52).
2024 Event 3: Average of 24.69 daily sightings (Implementation Site – 11.75, Control Site – 12.95).
2024 Event 4: Average of 35.51 daily sightings (Implementation Site – 18.18, Control Site – 17.33).
2025 Event 5: Average of 10.79 daily sightings (Implementation Site – 5.02, Control Site – 5.76).
2025 Event 6: Average of 11.95 daily sightings (Implementation Site – 4.85, Control Site – 7.10).

The detections are graphed in Figure 8.

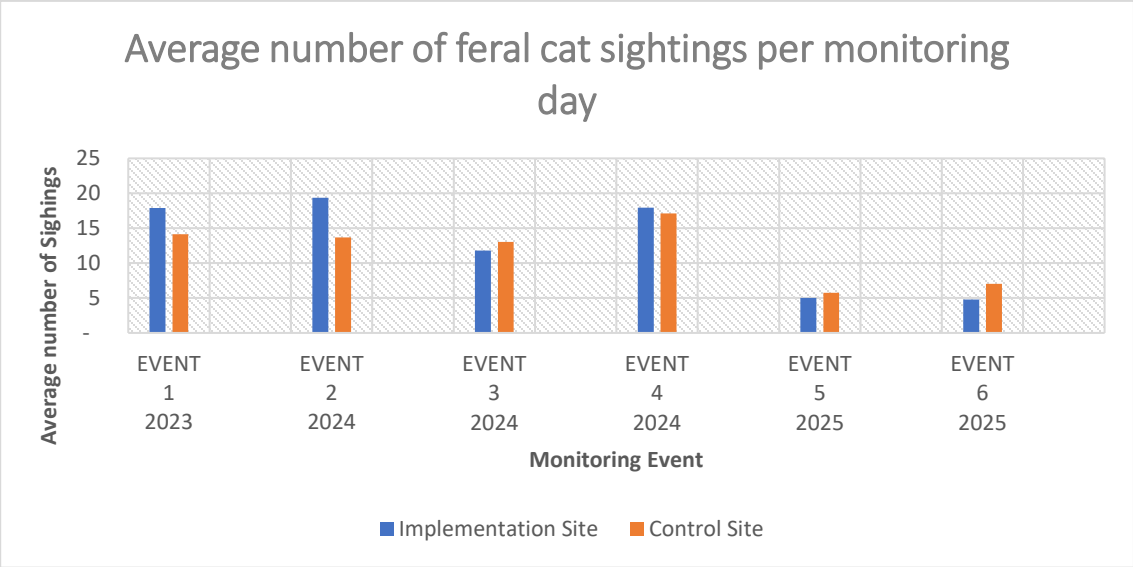


Figure 8: Average number of feral cat sightings per monitoring day

4.3 Feral cat abatement results

A feral cat control program was implemented on the Implementation Site in July 2024 and continued through to June 2025. The program aimed to reduce feral cat populations and their predation on the Julia Creek dunnart within the Implementation project area.

In 2024, a total of 1,366 feral cats were eradicated between July and November. Data analysis indicates a sex ratio of approximately 60% male and 40% female. Additionally, 4.2% of the eradicated females were heavily pregnant.

In 2025, a total of 592 feral cats were eradicated between January and June. Data analysis indicates a 1:1 sex ratio of approximately 50% male and 50% female. Additionally, 0.003% of the eradicated females were heavily pregnant.

4.4 Rat plague

The region's news of a rat plague gained national and international media attention. The rat species was identified as *Rattus villosissimus*, the long-haired rat.

Initial reports of the plague began in April 2023, and their high numbers continued for most of 2024 until they experienced a sharp decline between October and November 2024 and were largely absent by 2025.

The plague had notable impacts on the surveys. It was noted that the on-ground surveys using Elliot traps were undertaken during a boom cycle of their populations, resulting in reduced capacity for Julia Creek dunnarts to enter the traps due to the high saturation rates of the rats. The plague also likely contributed to the exponential growth of feral cat populations from 2023 to 2024 due to an increase in food source availability.

The news reports are attached in the appendix, along with Figures 9, 10, and 11, detailing the effects of the plague on the region.

Landholders in outback Queensland brace for rat plague worse than last year as rodent numbers rise

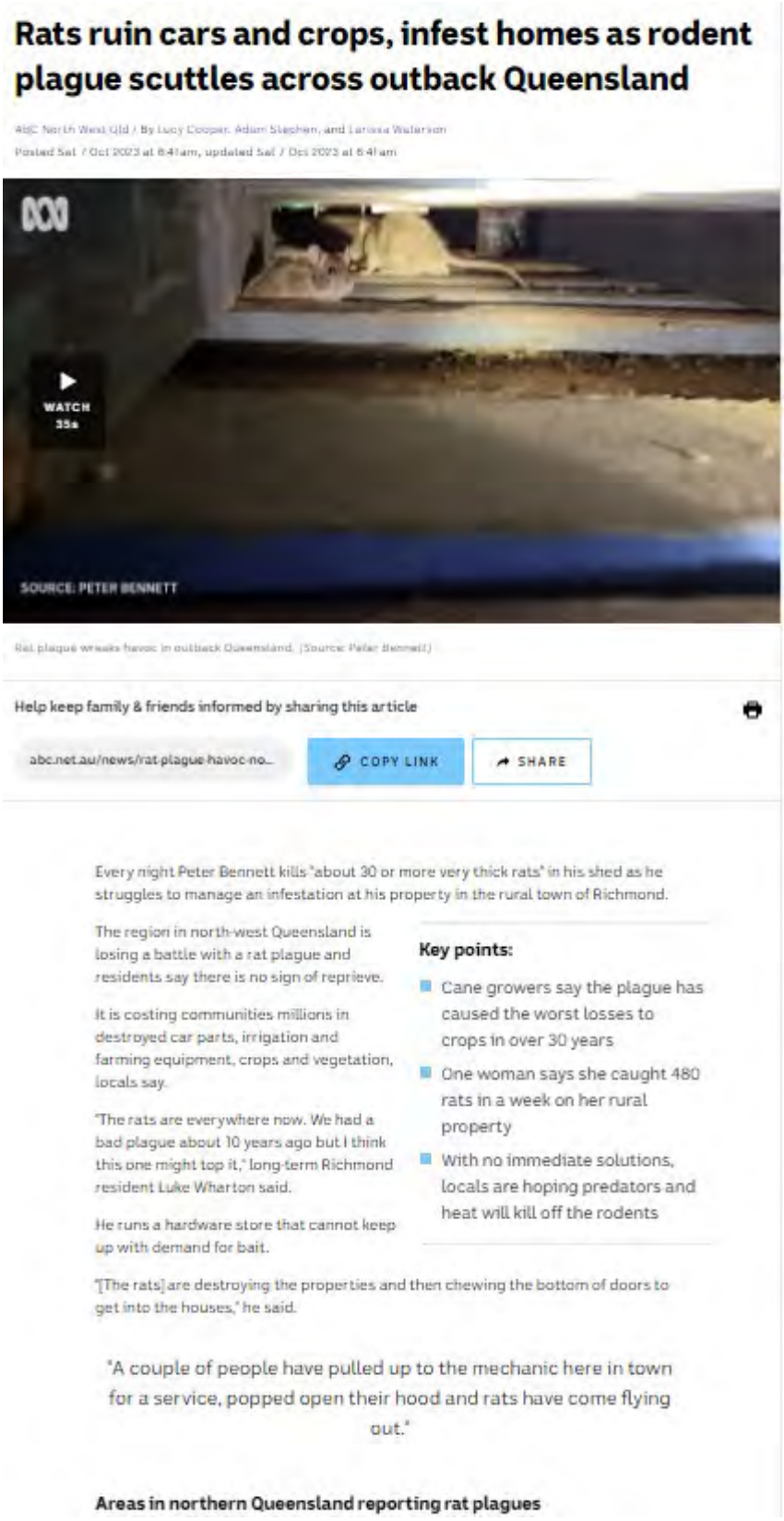
By Abbey Halter ABC Rural Pests

Wed 19 Jun 2024 at 5:50am

During the 2023 rat plague, Richmond resident Peter Bennett captured about 30 rats every night. (Supplied: Peter

Figure 9: News articles on the rat plague in Julia Creek

Figure 10: News articles on the rat plague in Julia Creek.



Rats ruin cars and crops, infest homes as rodent plague scuttles across outback Queensland

ABC North West Qld / By Lucy Cooper, Adam Stephen, and Larissa Waterson

Posted Sat 7 Oct 2023 at 6:41am, updated Sat 7 Oct 2023 at 6:41am

Rat plague wreaks havoc in outback Queensland. (Source: Peter Bennett)

Help keep family & friends informed by sharing this article

abc.net.au/news/rat-plague-havoc-no... COPY LINK SHARE

Every night Peter Bennett kills "about 30 or more very thick rats" in his shed as he struggles to manage an infestation at his property in the rural town of Richmond.

The region in north-west Queensland is losing a battle with a rat plague and residents say there is no sign of reprieve.

It is costing communities millions in destroyed car parts, irrigation and farming equipment, crops and vegetation, locals say.

"The rats are everywhere now. We had a bad plague about 10 years ago but I think this one might top it," long-term Richmond resident Luke Wharton said.

He runs a hardware store that cannot keep up with demand for bait.

Key points:

- Cane growers say the plague has caused the worst losses to crops in over 30 years
- One woman says she caught 480 rats in a week on her rural property
- With no immediate solutions, locals are hoping predators and heat will kill off the rodents

"[The rats] are destroying the properties and then chewing the bottom of doors to get into the houses," he said.

"A couple of people have pulled up to the mechanic here in town for a service, popped open their hood and rats have come flying out."

Areas in northern Queensland reporting rat plagues

Figure 11: News articles on the rat plague in Julia Creek.

4.5 Weather observations

The temperature and rainfall data presented below were collected at Julia Creek Airport (BoM station ID 29058) ~23km NW of Control Site station and ~48km NW of Implementation Site and Implementation Site stations; therefore, the figures are estimates and may not precisely reflect on-site conditions.

4.5.1 August – November 2023

As the surveys were conducted over an extended period between August and November 2023 there was a wide range of temperatures recorded between 6.9° C and 42.3° C. Only two days recorded any rainfall for the area (0.6 & 3.6 mm) and the region mostly experienced high evaporation rates, typical of a hot semi-arid climate.

The temperature and rainfall observations are graphed in Figures 12 and 13, respectively.

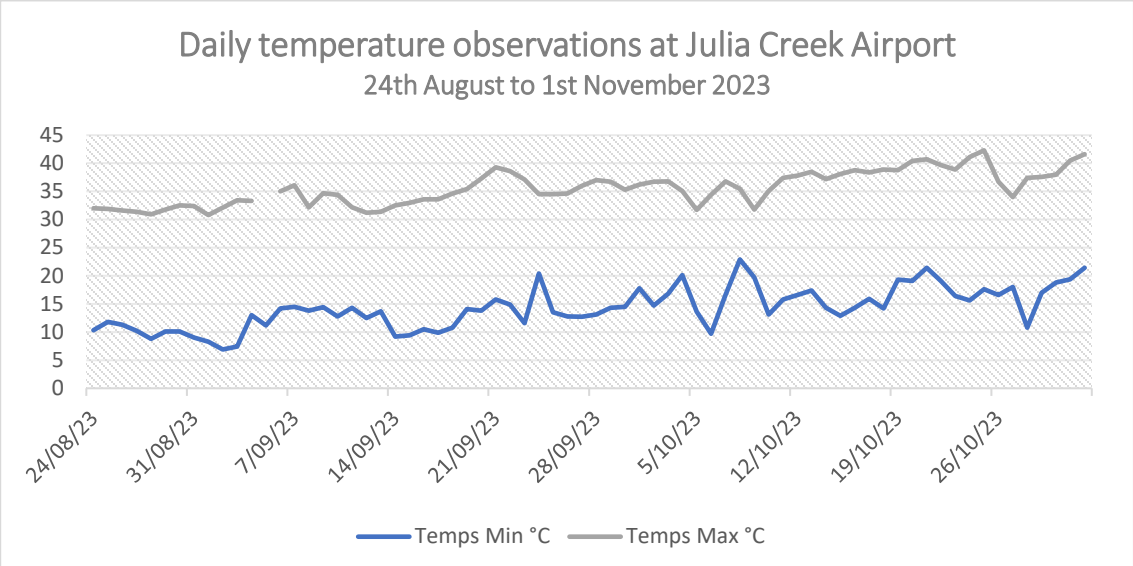


Figure 12: Daily temperature observations at Julia Creek Airport during 2023 survey period (BoM 2023).

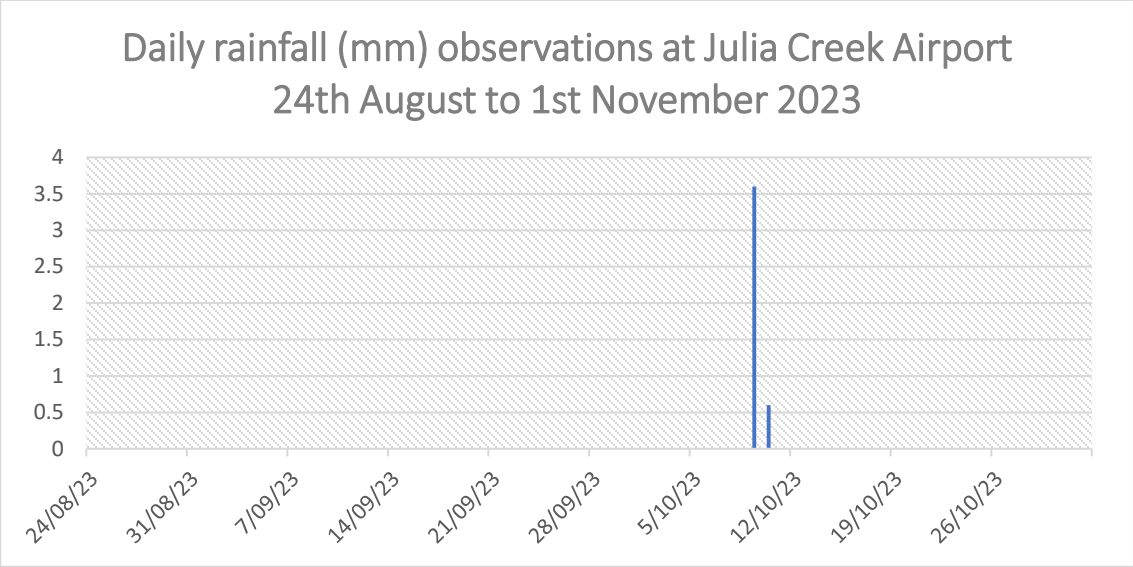


Figure 13: Daily rainfall (mm) observations at Julia Creek Airport during 2023 survey period (BoM 2023).

4.5.2 January to November 2024

In 2024, the climate at Julia Creek Airport was typical of its hot semi-arid setting, with a pronounced wet season early in the year followed by a long, dry, and increasingly hot second half. January and February were extremely hot and humid, with multiple days exceeding 40 °C, and heavy rainfall (165 mm in January and 161 mm in February). March saw a sharp decline to just 35 mm. From April through October, conditions were persistently dry, with no meaningful rainfall and consistently high daytime temperatures—often in the mid-30s or higher. The winter months (June–July) brought cooler nights, dropping to around 3–6 °C, but days remained warm, averaging in the high 20s. By late winter and spring, the heat intensified again, with maximums above 40 °C recorded in October, and November remaining extremely hot, although with a brief return of rainfall (57 mm). Overall, 2024 was characterised by an intense early wet season and an extended, harsh dry season dominated by high heat and minimal rainfall.

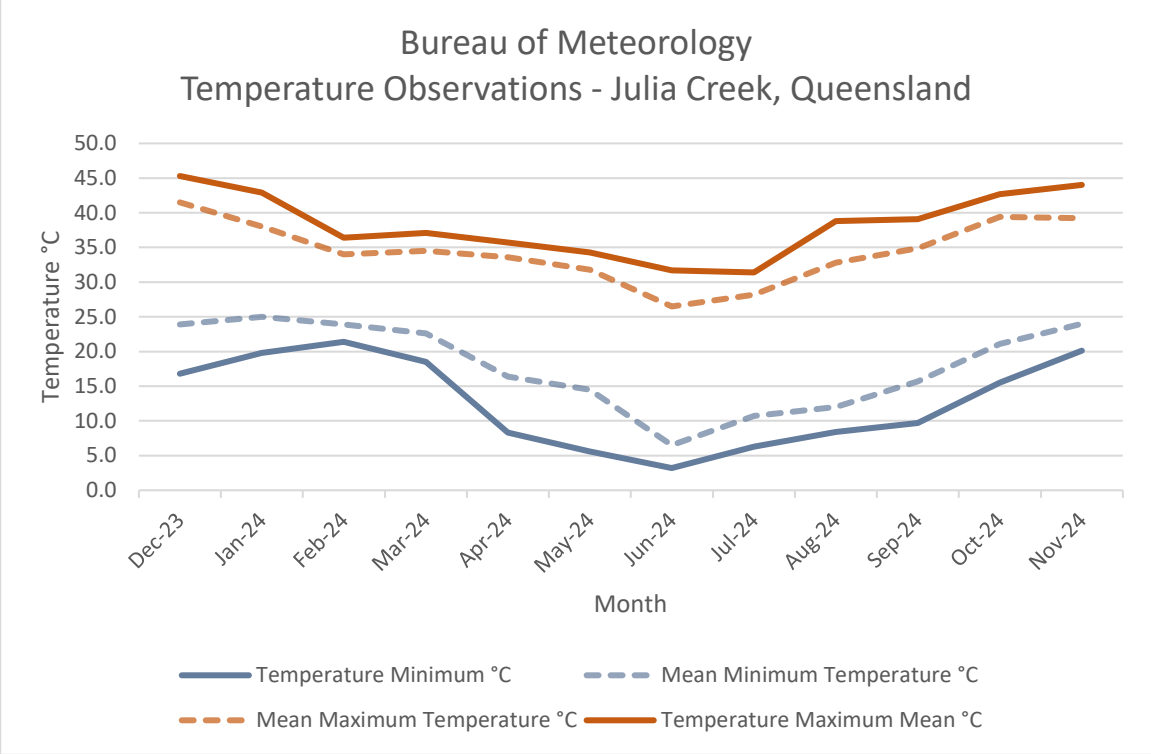


Figure 14: Temperature observations at Julia Creek, Queensland (Bureau of Meteorology 2024).

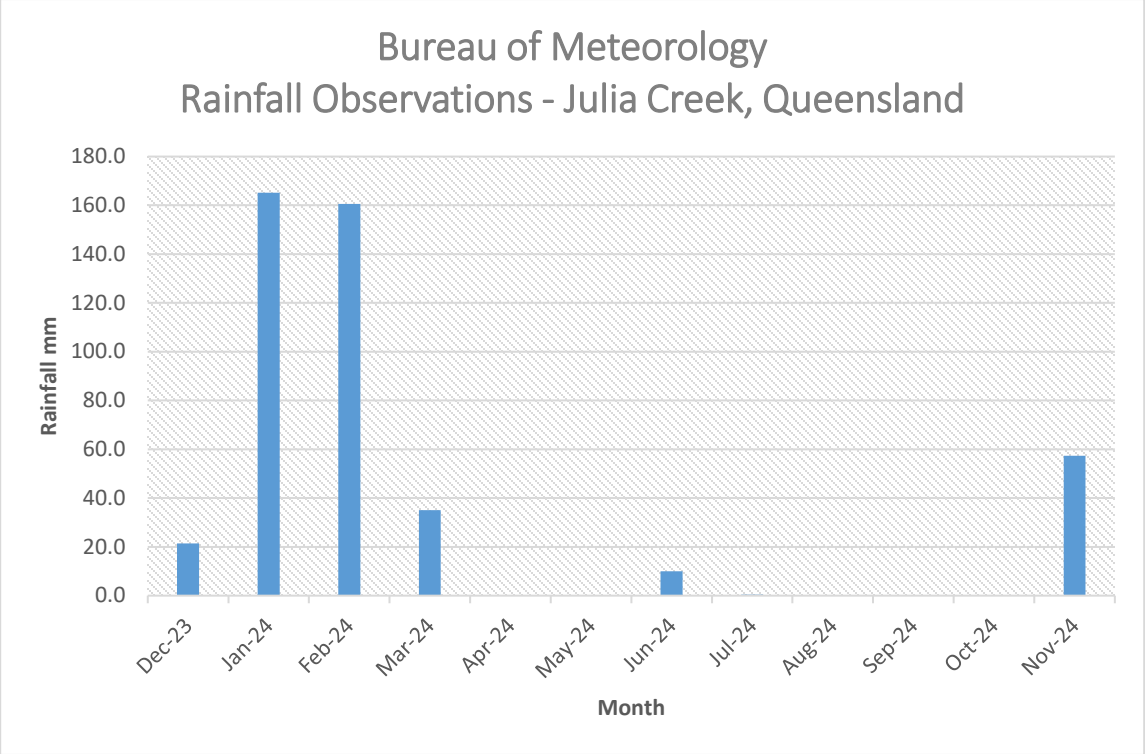


Figure 15: Mean rainfall for Julia Creek (Bureau of Meteorology 2024).

4.5.3 January – June 2025

January was unusually dry for the wet season, with only 10.2 mm of rainfall recorded. However, temperatures remained hot, with maximums averaging around 33°C. Conditions changed dramatically in February, which was the wettest month of the period, recording 282.8 mm of rain accompanied by high humidity and several intense storm events. March remained hot and humid, with an additional 185.8 mm of rain, further prolonging flood conditions across the region. From April onwards, rainfall declined sharply, with only 34.8 mm recorded, while cooler nights signalled the onset of the dry season. May and June were extremely dry, with only 3.2 mm in May and no rainfall in June, and minimum temperatures dropped significantly, reaching as low as 0.5°C in June.

Overall, the period was characterised by a short but intense wet season in February–March, followed by a rapid shift into very dry, cool winter conditions.

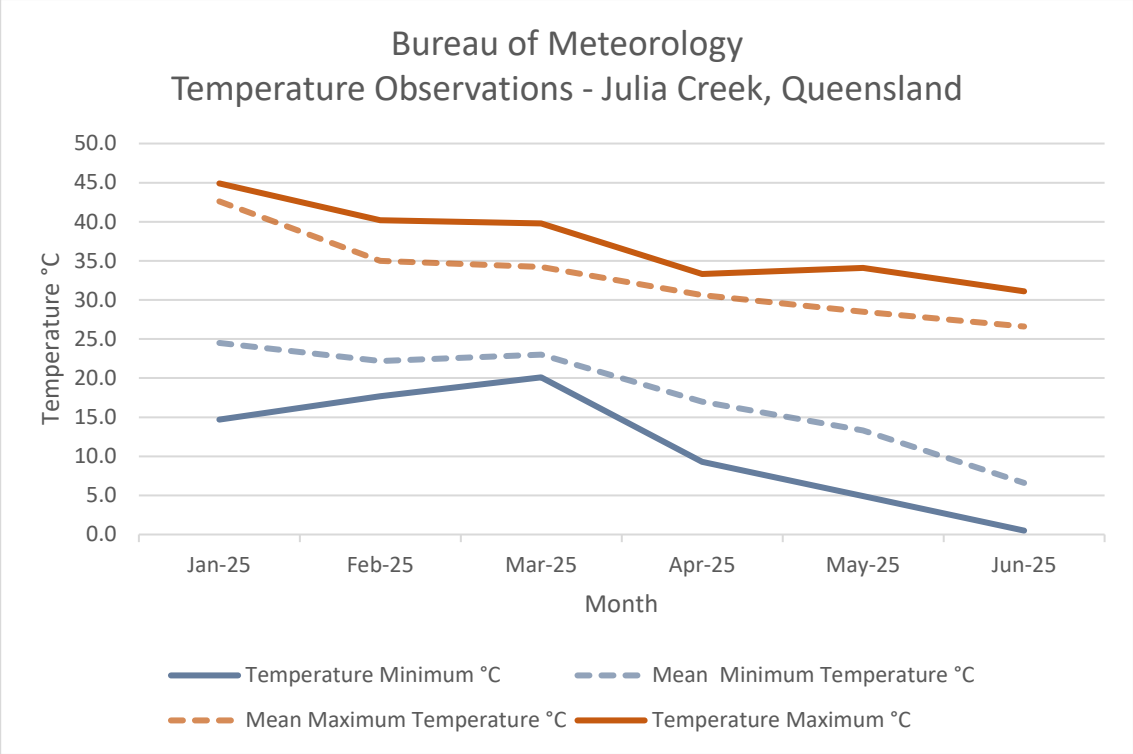


Figure 16: Temperature observations at Julia Creek, Queensland (Bureau of Meteorology 2025).

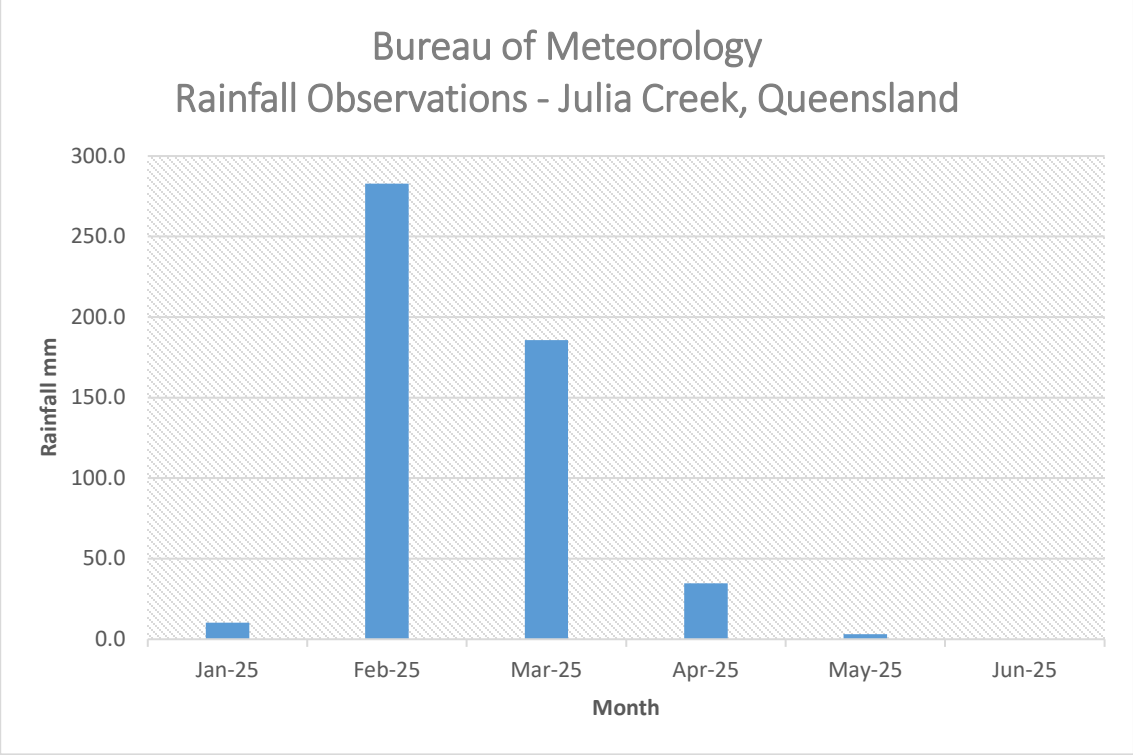


Figure 17: Rainfall for Julia Creek (Bureau of Meteorology 2025).

The weather observations used for this report were retrieved from the Bureau of Meteorology's website for their weather observations at Julia Creek Airport, QLD, and are attached in the appendix of this report.

5 CONCLUSIONS

The Julia Creek Dunnart Monitoring and Threat Abatement (Feral Cat) Programs delivered by Southern Gulf NRM under *Multicom Resources Limited's Offset Strategy (2021)* have provided important baseline insights into the ecology of the Julia Creek dunnart and its interactions with feral cats within the project areas. Despite the absence of dunnart detections in Elliott trapping surveys, camera monitoring successfully recorded Julia Creek dunnarts, confirming their persistence in the region and the suitability of motion-sensor technology as a monitoring tool.

The results strongly suggest that environmental conditions had a significant influence on survey outcomes. A prolonged rat plague from 2023 through late 2024 saturated Elliott traps, increased food availability, and elevated feral cat populations. The subsequent sharp decline in rat numbers coincided with a period of widespread flooding in early 2025, which likely further stressed small mammal populations. These combined pressures may have contributed to the difficulty of detecting dunnarts during the survey period.

Feral cat monitoring demonstrated consistently high daily detections across both sites, reinforcing their ongoing threat to dunnart populations. The feral cat abatement on ground actions achieved substantial reductions in cat numbers, with over 1900 individuals removed between July 2024 and June 2025. While reductions in survey detections were observed across both sites, the average sightings per day were 4.85 on the Implementation Site and 7.10 on the Control Site. This highlights the scale and persistence of feral cat pressure across the landscape.

Climate observations from 2023 to 2025 further contextualise these findings. The region experienced a range of extreme conditions, including intense wet seasons with widespread flooding, and unusually cold winter nights, all of which are likely to influence food sources, predator numbers, and dunnart detectability.

Overall, the project has confirmed both the presence of the Julia Creek dunnart and the significant predation risk posed by feral cats. In the future, Southern Gulf NRM is committed to continuing its monitoring efforts and recommends incorporating detection dogs, artificial intelligence for image analysis, and studies on the impacts of invasive prickly acacia, which will build on the work completed to date. When paired with landscape-scale predator control within the Mitchell Grass Downs, these efforts will be crucial to enhancing our understanding of the drivers and pressures that influence Julia Creek dunnart population dynamics.

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8 APPENDICES

CAMERA TRAPPING EVENT SURVEYS

ERA LOCAT	EVENT 1 REPORTING			EVENT 2 REPORTING			EVENT 3 REPORTING			EVENT 4 REPORTING			EVENT 5 REPORTING			EVENT 6 REPORTING		
Camera Number	Date of Deployment	Date Last Photo	Days in Field working	Date of Deployment	Date Last Photo	Days in Field working	Date of Deployment	Date Last Photo	Days in Field working	Date of Deployment	Date Last Photo	Days in Field working	Date of Deployment	Date Last Photo	Days in Field working	Date of Deployment	Date Last Photo	Days in Field working
1	2/10/2023	13/10/2023	11	12/04/2024	27/05/2024	45	27/05/2024	18/06/2024	22	26/09/2024	5/11/2024	40	23/01/2025	17/03/2025	53	1/05/2025	Faulty	
2	30/09/2023	23/10/2023	23	12/04/2024	24/05/2024	42	26/05/2024	20/09/2024	117	25/09/2024	4/11/2024	40	23/01/2025	25/04/2025	92	1/05/2025	9/06/2025	39
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75	30/09/2023	1/11/2023	32	12/04/2024	26/05/2024	44	26/05/2024	12/07/2024	47	10/10/2024	4/11/2024	25	23/01/2025	28/04/2025	95	1/05/2025	28/05/2025	27
		Average days	21		Average days	36		Average days	62		Average days	31		Average days	85		Average days	35

Landholders in outback Queensland brace for rat plague worse than last year as rodent numbers rise

By Abbey Halter ABC Rural Pests

Wed 19 Jun 2024 at 5:50am

During the 2023 rat plague, Richmond resident Peter Bennett captured about 30 rats every night. *(Supplied: Peter Bennett)*

In short:

Native bush rat numbers in outback Queensland are higher than this time in 2023 during the plague.

Residents and landholders hoped the recent floods would wash the pests away.

What's next?

North West Queenslanders are bracing for a second rat-filled summer season.

Scurrying down highways and chewing through machinery, rats are already running rampant in outback Queensland — and it's a worrying sign for the summer season ahead.

North West Queensland landholders estimate native bush rat populations have soared past last year's numbers during one of the worst plagues the region has battled.

Rats are on the move across outback Queensland. *(ABC Western Queensland: Grace Nakamura)*

Cattle grazier Nigel Simmons felt the wrath of the rats in 2023 on his property 100 kilometres south-east of Julia Creek, so he hoped the "disgusting" pests

would wash away in February's wet season.

Nigel Simmons's property near Julia Creek was heavily affected by the rat plague last year. *(ABC North West Qld: Zara Margolis)*

But even after three cyclones inundated the north-west, causing widespread flooding, Mr Simmons said numbers had increased and they were sweeping into previously unaffected areas.

"They tend to get worse and more destructive towards the end of the year," he said.

"We've had an exceptionally good season out here but unfortunately it didn't wash them away, even with some of the big floodwaters.

> **"They seem to have held on and tend to be building up in numbers again, so we're a bit worried how they're going to be later on in the year."**

Surging before peak season

Grazier at Gipsy Plains, south of Cloncurry, Clayton Curly said the number of rats roaming through outback farmlands could continue to rise.

"They are going to be a little bit of a problem," Mr Curly said.

Clayton Curly is dealing with an influx of native bush rats on his property south of Cloncurry. *(ABC Rural: Abbey Halter)*

> **"We've already had a vehicle chewed up and I've been to the repair shop, so there's going to be a bit more of that coming."**

Mr Curly said there were a few different methods of control but he was holding out hope once the ground cover disappeared that numbers would

thin out.

Rat nests are littered throughout North West Queensland properties. *(ABC Rural: Abbey Halter)*

Mr Simmons said when the rats chewed holes in his poly pipe, less water flowed out into his cattle troughs.

"Come summertime when we're struggling to keep water up to cattle, it's very inconvenient," he said.

While it's a headache for cattle producers, Mr Simmons said rat plagues had obliterated crops in North West Queensland.

"Farmers have huge costs trying to control them ... and then [they have] costs from the losses in their crops too," he said.

> **"I'd assume they'll be bad for the rest of the year, but fingers crossed something comes along and they die out,**

> **but I don't know what it would be ... I don't know what will get rid of them.**

"They really do drive you crazy ... and they're disgusting."

Controlling the spread

Cloncurry Mayor Greg Campbell said local councils were working to keep on top of the issue, but property owners should be responsible for maintaining their own homes.

Cloncurry Mayor Greg Campbell advises North West Queensland residents to take measures to control rats on their property. *(ABC Landline: Cameron Lang)*

Mr Campbell said he was aware there had already been some damage to infrastructure at the local water treatment plant, and staff were working to ensure the water remained safe for human consumption.

"Council is doing what it can do around our facilities, but a lot of it is how people can manage [rats] on their own property," he said.

Mr Campbell said residents in rural areas should also keep their yard tidy and seal all access points to their homes, as per the council's advice.

Thousands of rats washed up on the Karumba foreshore during the 2023 plague. *(Supplied: Tia Boo)*

"One thing that they need to be mindful of is if you're just baiting for anything, beware that your dog will go and [eat] rat bait not knowing that it's going to make them sick — if not worse," Mr Campbell said.

"If this coming summer is fairly typical and starts to get pretty hot pretty quick, we'll see [rats] retreat from the urban areas pretty quickly," he said.

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Posted Wed 19 Jun 2024 at 5:50am, updated Wed 19 Jun 2024 at 6:18am

North West Weekly

GENERAL NEWS >

16 July, 2025

Feral cat problem needs government intervention

Two North West leaders want the state government to play a bigger role in feral cat eradication.

By Matt Nicholls

You only have to drive along the Flinders Highway to see the massive rise of feral cats in the North West.

Richmond Shire mayor John Wharton says he supports the call of Robbie Katter for the state government to fund a feral cat bounty in the North West.

In the early 2000s, Richmond Shire was the first council in the state to put in a feral cat bounty, despite the negative attention it drew from outside the region.

"The Environment Minister at the time, Rod Welford, wrote to me and told me how terrible I was," Cr Wharton said.

"I had emails from cat lovers from across the world saying the bounty should be on my head."

The long-time mayor said the North West Queensland Regional Organisation of Councils had put forward a proposal to the state government about a feral cat program, but it was rejected by the departments.

“They say it's a local government issue,” Cr Wharton said.

“For us, there’s no benefit to introducing a feral cat bounty, other than it's the right thing to do.”

Member for Traeger Robbie Katter is calling for a state-funded cat bounty across North West Queensland, saying feral cats were wreaking havoc on native wildlife, threatening livestock, and spreading dangerous diseases.

“Feral cats are out of control – they’re tearing through native birdlife and small mammals, not just out in the bush, but right in the middle of our towns,” the KAP leader said.

“It’s a slaughter. We know they kill around 12 per cent of Australia’s birds every year –and yet we hear nothing from the green warriors who are usually first to the microphone when there’s a mining project to protest.

“If you genuinely care about the environment, you should be screaming for action on this.

The silence is deafening.”

Mr Katter praised Richmond Shire for taking initiative by offering a bounty on feral cats, but said it shouldn’t be left up to cash-strapped councils to foot the bill.

“This is a state issue. It’s an ecological disaster and a biosecurity threat,” he said.

“Feral cats can spread lethal diseases, as well, which is a real concern to livestock producers.”

Mr Katter said the state government must immediately fund a regional cat bounty scheme and overhaul the Biosecurity Act to reflect the scale of the threat posed by feral cats.

“If the state government is serious about biosecurity, public health and protecting our native species, it must act now.”

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10. APPENDIX C

QUEENSLAND UNIVERSITY OF TECHNOLOGY – 2025 PROJECT UPDATE

Adult male Julia Creek dunnart, *Sminthopsis douglasi*. Photo © Andrew Baker.

The Julia Creek dunnart, *Sminthopsis douglasi*, is a species of small, carnivorous marsupial apparently restricted to central and north-west Queensland, where it inhabits tussock grasslands on cracking clay soils. The species is currently listed as Vulnerable under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Queensland *Nature Conservation Act 1992* (NC Act).

To compensate for the clearance of suitable habitat for *S. douglasi* as part of the St. Elmo Vanadium Critical Minerals Project, Multicom Resources Ltd has committed to implementing a Research Offset Strategy for the species in accordance with the conditions outlined in the project's EPBC Act approval. As part of this commitment, Multicom Resources has financially supported ecological research led by Associate Professor Andrew Baker and Dr Emma Gray of *Queensland University of Technology* (QUT) for the past three years. This research is ongoing and presently funded until October 2028.

Since little is known about *S. douglasi*, the main aim of the research program is to better understand fundamental aspects of the ecology of the species by monitoring known populations and assessing its distribution. Various methods can be used to detect the species, and these are also being investigated as part of this project, with a view to better inform researchers and consultants of the most rapid and accurate targeted survey techniques to use under a range of environmental conditions.

Thus far, the research has investigated efficacy of varied detection techniques, including live ('Elliott') trapping, camera trapping, assessment of predator remains (owl pellets and feral domestic cat guts), conservation detection dogs and airborne environmental DNA.

We have found evidence that Julia Creek dunnart density and/or detectability fluctuates markedly in both time and space, and that each of the detection techniques has their pros and cons, dependent

on the type of data being sought (e.g., presence/absence or growth/measurements) and the conditions prior to sampling (e.g., rainfall/flooding). Our body of knowledge regarding *S. douglasi* population dynamics and distribution has grown substantially as a result of this research program, but continued research will enable us to determine its presence/absence at more sites and hopefully understand more about its preferred habitat, long-term population dynamics and resilience to threatening processes.

To date, seven scientific papers and one government report have been published (details below). Several other papers are currently in preparation. If further information about this research is required, please contact Andrew Baker (am.baker@qut.edu.au).

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