



EML 6488 Midway Quarry PEPR Compliance Report 2025/2026

September 2026



Acknowledgements

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

Document control

CA-0000-ENV-REP-1004

Version	Description	Author	Approval	Date
1	PEPR Compliance Report 2025/26	Luke Boehm Environment Specialist Trent Anderson Environment Specialist Joshua Allen Superintendent Environment Operations	Kara Moore Acting Manager Asset Environment Approvals & Sustainability	09/09/2026

Executive summary

BHP Carrapateena submits this Program for Environment Protection and Rehabilitation (PEPR) Mining Compliance Report for the period July 2025 to June 2026 inclusive (Compliance Report); as required by the *Mining Act 1971* (SA) and associated regulations and conditions of the Midway Quarry Extractive Minerals Lease (EML 6488). This Compliance Report demonstrates compliance with the EML conditions described in the tenement document and the Environmental Outcomes and Outcome Measurement Criteria (OMC) committed to in the PEPR. This Compliance Report has been completed in general accordance with the Determination Terms of Reference 009 (TOR 009) – Mining Compliance Reports.

EML 6488 was granted on 13 July 2018 following submission of the Mining Proposal in February 2018. MPEPR2019/029 was approved in accordance with Section 70C(5) of the *Mining Act 1971* (SA) on 23 July 2020. A Program Notification outlining proposed changes to the Midway Quarry pit design and material stockpile locations was submitted on 30 October 2020 and approved without requiring amendments to the approved PEPR on 26 November 2020. BHP Carrapateena notified the Government of South Australia's Department for Energy and Mining of the commencement of mining on 7 January 2021.

The Carrapateena operation has been developed and operated by OZM Carrapateena Pty Ltd and OZ Minerals Carrapateena Pty Ltd, wholly owned by OZ Minerals Limited. On 2 May 2023 BHP Group Limited completed the acquisition of OZ Minerals Limited. The Carrapateena site has been integrated into the BHP Copper South Australia (SA) asset, also incorporating BHP's Prominent Hill mine, Olympic Dam mine and Oak Dam exploration site. Copper SA forms part of BHP's Minerals Australia business portfolio, which also includes Western Australia Iron Ore, Nickel West, Queensland Coal and New South Wales Energy Coal.

This Compliance Report covers activities at the Midway Quarry between July 2025 to June 2026. During the period, no extractive materials were mined, and no non-compliances were recorded against the OMCs or Leading Indicators nominated within the approved PEPR, and no non-compliances to lease conditions were recorded.

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1 Introduction

BHP Carrapateena submits this Program for Environment Protection and Rehabilitation (PEPR) Mining Compliance Report for the period 1 July 2025 to 30 June 2026 inclusive (Compliance Report); as required by the *Mining Act 1971* (SA) and associated regulations and conditions of the Midway Quarry Extractive Minerals Lease (EML 6488). This Compliance Report demonstrates compliance with the EML conditions described in the tenement document and the Environmental Outcomes and Outcome Measurement Criteria (OMC) committed to in the PEPR MPEPR2019/029 (OZ Minerals 2019). Proponent details are provided in Table 1.1

Table 1.1 | Proponent details

Operation name	Midway Quarry	PEPR number	PEPR MPEPR2019/029
		PEPR approval date	Date approved: 23 July 2020
Lease holder	OZ Minerals Carrapateena Pty Ltd (42%) and OZM Carrapateena Pty Ltd (58%)		
Operator	BHP		
Lease approval date	13 July 2018		
Tenements	EML 6488		
Approval document	PEPR		
Ministerial determination	The Compliance Report has been completed in general accordance with the Determination Terms of Reference 009 (TOR 009) Mining Compliance Reports (DEM 2020) and associated Mineral Regulatory Guideline (MG3) (DEM 2021)		
Site contact	Vinod Perera, General Manager, Carrapateena		
	Email	vinod.perera@bhp.com	
Site location details	Located approximately 160 km north of Port Augusta, in close proximity to the Carrapateena Arm on the western boundary of Lake Torrens. Nearby townships include Woomera (approximately 65 km west) and Roxby Downs (approximately 90 km north-west). Refer to Figure 1.1.		
Reporting period	1 July 2025 to 30 June 2026		
Date of compliance report preparation	September 2026		

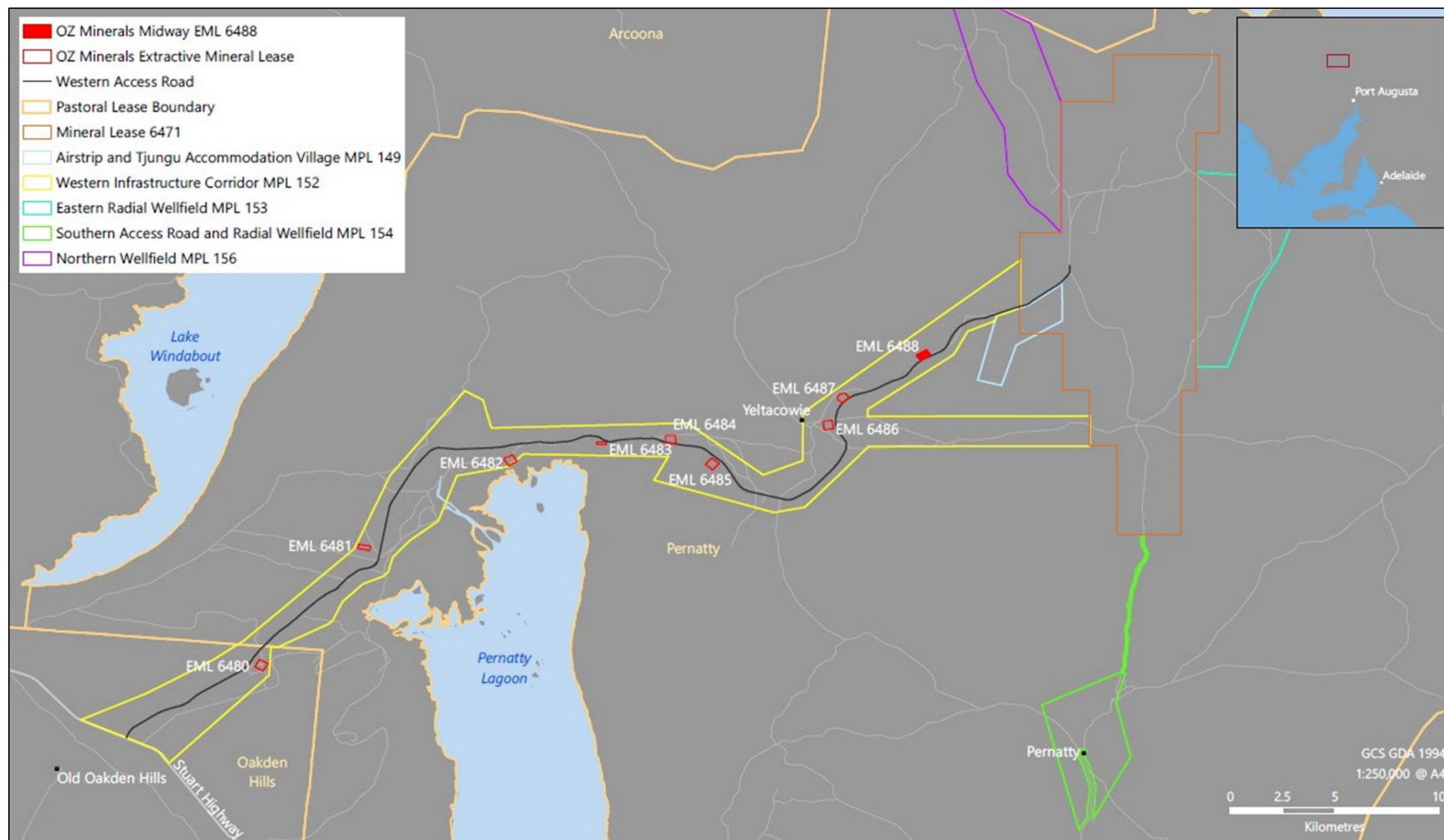


Figure 1.1 | Location of EML 6488 Midway Quarry

2 Declaration of accuracy

Person responsible for the preparation of the Compliance Report			
This document has been prepared to fulfil the requirement under sub-regulation 77(3)(b) of Mining Regulations 2020 (SA) for the tenement listed herein. The information contained in this report is to the best of my knowledge a true and accurate record of the mining activities and compliance status for the reporting period.			
Name	Position or Agent	Signature	Date
Anna Wiley	Asset President Copper South Australia		09/09/2026
Company/Agent			
Report prepared by tenement holder			
Summary of steps undertaken to review the compliance report to ensure report accuracy			
This report has been prepared by the Carrapateena Environment Team.			

3 Public liability insurance

Details of the public liability insurance for the Midway Quarry are provided in Table 3.1. A copy of the cover note for the current public liability insurance and/or a copy of the policy of insurance for BHP is included in Appendix A.

Table 3.1 | Public liability insurance details

Certificate of currency general liability	
Principal insured	BHP Group Limited and all subsidiaries' companies and all/or related and/or affiliated and/or controlled, managed, administered and associated companies or corporation and/or related joint ventures and/or partnerships and other entities.
Start date	1 July 2025
Finish date	30 June 2026
Limits of liability	US\$20,000,000
Company/Agent	
Report prepared by tenement holder	
Summary of steps undertaken to review the compliance to ensure report accuracy	
This report has been prepared by the Carrapateena Environment Team.	

4 Tenements

A summary of the existing tenement for the Midway Quarry is provided in Table 4.1. The location of the tenement is shown on Figure 1.1.

Table 4.1 | Tenement summary

Tenement	Tenement number	Tenement grant date	Tenement expiry date	Status of currency
Midway Quarry (Extractive Minerals Lease)	EML 6488	13 July 2018	2 January 2039	Current

5 Other approvals, licences, permits, waivers, native title and agreements

A summary list and the current status of approvals required to authorise the mining operations and that are relevant to the achievement of Environmental Outcomes and objectives within the approved PEPR (OZ Minerals 2019), and/or compliance with the tenement conditions, are presented in Table 5.1

Table 5.1 | Other approvals, licences, permits, waivers, native title and agreements

Approval document	Regulatory authority or other	Supporting document	Relevant outcome or tenement condition	Status of currency
Native Title Mining Agreement (NTMA) between OZ Minerals Carrapateena Pty Ltd and Kokatha Aboriginal Corporation	Kokatha Aboriginal Corporation	CA-CRL-LET-1003 NTMA (Confidential)	Outcome 6 (Tenement Condition 7) – The Tenement Holder must, during construction and operation, ensure that there is no disturbance to Aboriginal or European heritage sites, objects or remains unless prior approval under the relevant legislation is obtained	Active for the life of the Midway Quarry
Pernatty Pastoral Access and Compensation Agreement	Billa Kalina Pastoral Pty Ltd, Colin and Jillian Greenfield	CA-APR-AGR-1033 (Confidential)	NA	Active for the life of the Midway Quarry

6 Ore reserves and mineral resources

6.1 Ore reserves and estimated mine life

A statement of the estimated mine life is presented in Table 6.1.

Table 6.1 | Estimated mine life

Estimated mine life (years)	Seven (7)
Notes	Extractive mining in the Midway Quarry is estimated to continue through to 2028 with material to be used for construction activities associated with the Carrapateena expansion. Areas of the quarry no longer required will be progressively rehabilitated as the opportunity arises.

6.2 Exploration activities

No exploration activities are currently being undertaken nor proposed within the EML.

7 Compliance with environmental outcomes

Compliance for the Reporting Period is summarised in Section 7.1 to Section 7.14. No non-compliances were recorded against the OMCs or Leading Indicators (LIs) nominated within the approved PEPR (OZ Minerals 2019), and no non-compliances to lease conditions were recorded during the reporting period.

7.1 Blasting

Table 7.1 | Blasting compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must, during construction and operation, ensure that there are no public health and/or nuisance impacts from air blast, vibrations or flyrock caused by blasting.				
Tenement Condition	Sixth Schedule, Condition 1: The Tenement Holder must, during construction and operation, ensure that there are no public health and/or nuisance impacts from air blast, vibrations or fly rock caused by blasting				
Outcome Measurement Criteria	Records from the Mine Logbook demonstrate that all blast-related complaints received were acknowledged within 48 hours and resolved with the complainant within 7 days (or other time as approved by the Mining Regulator) to the satisfaction of the Mining Regulator. If complaints are not resolved to the satisfaction of the Mining Regulator blast monitoring is to occur at locations, and using methods as agreed with the Mining Regulator to demonstrate that: - air blast and vibrations levels meet limits in the Australian Standards (AS 2187.2) - there are no incidents of fly rock leaving the tenement boundary				
Outcome Measurement Criteria summary	No blasting occurred at Midway Quarry during the reporting period.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	Controls implemented included imposing blast exclusion zones, undertaking blasting activities in accordance with AS 2187.2 and visual inspections for fly rock on the perimeter of the tenement following blasting have been effective and no public health impacts have been reported.				
Supporting report reference	Midway Quarry Management Plan (CA-5410-PRM-PLN-1012) Midway Quarry Blast Design (CA-5410-CIV-REP-1029)				

7.2 Public safety (construction and operation)

Table 7.2 | Public safety (construction and operations) compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must, during construction and operation, ensure that unauthorised entry to the Land does not result in public injuries and or deaths that could have been reasonably prevented.				
Tenement Condition	Sixth Schedule, Condition 2: The Tenement Holder must, during construction and operation, ensure that there are no public injuries and or deaths resulting from unauthorised entry to the site that could have been reasonably prevented				
Outcome Measurement Criteria	Investigation and review of incident report records triggered as a result of an incident associated with unauthorised entry to infrastructure locations demonstrates that the incident could not have been reasonably prevented and that any corrective actions are closed out within 30 days or as agreed with the Director of Mines (or other authorised officer).				
Outcome Measurement Criteria summary	No occurrences of unauthorised access by members of the public were recorded during the reporting period.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	The following controls were implemented: • Access to the EML 6488 managed through perimeter fencing and gates. • Signs established at access points and limited to authorised personnel only. • Access to the Western Access Road (WAR) limited during construction with exclusion controls imposed including restriction and hazard signs at each end point. • EML 6488 and WAR is sign-posted making the public aware of hazards associated with the construction areas. • Temporary fencing installed as appropriate. • These controls have been effective at mitigating the risks associated with this aspect.				
Supporting report reference	N/A				

7.3 Public safety (post-completion)

Table 7.3 | Public safety (post-completion) compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must demonstrate that post completion, the risks to the health and safety of the public so far as it may be affected by mining-related activities are as low as reasonably practicable.				
Tenement Condition	Sixth Schedule, Condition 3: The Tenement Holder must ensure that no public injuries or deaths occur as a result of the final landform post-mine completion				
Outcome Measurement Criteria	Audit undertaken by an independent and suitably qualified expert approved by the Director of Mines (or other authorised officer) prior to application of lease surrender demonstrates that all infrastructure is removed or left in-situ as agreed with stakeholders, in a manner that risks to the health and safety of the public so far as it may be affected by mining-related activities are as low as reasonably practicable.				
Outcome Measurement Criteria summary	Extractive mining in the Midway Quarry is estimated to continue through to 2028 with material likely used for the Carrapateena expansion. Rehabilitation of areas no longer required commenced in 2022 and progressive rehabilitation will continue where practicable. As a result the OMC is not yet achieved.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	The following rehabilitation works, and controls that have been completed to date: • Surface mining infrastructure including offices, workshop and batch plant have been decommissioned and removed. • Stockpiles are being reduced to support progressive rehabilitation near EML boundaries. • Western/eastern stockpile areas have had topsoil pushed back over and contour ripped to manage surface water runoff. • Ramp bund has been constructed to limit inflow and topography surveyed to ensure low points and subsequent pooling is controlled. • Landscape Function Analysis (LFA) site installed on eastern hardstand in August 2022 and has been monitored annually, including during 2025. These controls have been effective at mitigating the risks associated with this aspect. Batter profiling to be deferred until the bottom flitches of the borrow pit are completed. Following final rehabilitation work all slopes are battered to at least a 1:3 ratio (18 degrees) and all stockpiles are to be removed as per the PEPR (OZ Minerals 2019).				
Supporting report reference	Midway Quarry Management Plan (CA-5410-PRM-PLN-1012)				

7.4 Noise and air quality

Table 7.4 | Noise and air quality compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must, during construction and operation, ensure that there are no public nuisance impacts from dust and noise generated by mining operations or mining-related traffic.				
Tenement Condition	Sixth Schedule, Condition 5: The Tenement Holder must, during construction and operation, ensure that there are no nuisance impacts to local residents from dust generated by mining operations. Sixth Schedule, Condition 12: The Tenement Holder must, during construction and operation, ensure that there are no public nuisance impacts from noise emanating from the Land.				
Outcome Measurement Criteria	Audit of stakeholder engagement records undertaken quarterly demonstrates that all traffic-related dust and noise concerns associated with access roads are responded to in accordance with the Local Area Agreement – Operating Protocols¹ within 24 hours upon notification and any corrective actions are closed out within 14 days or as agreed with the Director of Mines (or other authorised officer). If the complaint is not resolved to the satisfaction of the Director of Mines (or other authorised officer), monitoring may be required at the receptor to confirm compliance with the Environment Protection (Noise) Policy 2023.				
Outcome Measurement Criteria summary	An audit of stakeholder engagement records in Borealis shows that no traffic-related or noise concerns were formally raised.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	Dust suppression was applied on unsealed roads and surfaces and speed limit restrictions were imposed as controls. These controls have been effective at mitigating risks associated with this aspect.				
Supporting report reference	N/A				

¹See PEPR Table 5.2 for description of Local Area Agreement – Operating Protocols (OZ Minerals 2019)

7.5 Surface water

Table 7.5 | Surface water compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must during construction, operation and post Completion ensure no adverse impact to surface water quality and water dependent ecosystems, on or off the Land, as a result of contamination and sedimentation caused by mining operations or mining-related activities.				
Tenement Condition	Sixth Schedule, Condition 6: The Tenement Holder must, during construction and operation, ensure that no water contaminated as a result of mining operations leaves the Land.				
Outcome Measurement Criteria	Audit of surface water management infrastructure undertaken after rainfall events that create surface water flows demonstrates surface water management infrastructure have performed in accordance with the design and corrective actions closed out within 14 days.				
Outcome Measurement Criteria summary	A combination of drone imagery captured by BHP Carrapateena personnel and on-ground inspections were utilised to assess the integrity of surface water infrastructure. The Midway Quarry was inspected during the annual surface water infrastructure inspection in October 2025 and no erosion or sedimentation was observed.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	The following controls were implemented during the reporting period: • Bund wall/s were constructed to divert runoff into the working pit. • Stockpiles were positioned to limit interaction with surface water. • Tenement perimeter bunded was constructed at potential discharge points to minimise surface water and sediment runoff into surrounding areas. • Separation of overland surface water flows originating from undisturbed areas of the EML from the surface water run-off that has interacted with stockpiles and borrow pit. • Chemicals and hydrocarbons were stored in accordance with SA Environment Protection Authority (EPA) guidelines. • Equipment maintenance was undertaken to prevent accidental spillages. • Rehabilitation procedures and inspection program were followed. These controls have been effective at mitigating the risks associated with this aspect.				
Supporting report reference	N/A				

7.6 Heritage

Table 7.6 | Heritage compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must during construction, operation and post Completion, ensure that there is no damage, disturbance or interference to Aboriginal heritage sites, objects or remains unless it is authorised under the relevant legislation.				
Tenement Condition	Sixth Schedule, Condition 7: The Tenement Holder must, during construction and operation, ensure that there is no disturbance to Aboriginal or European heritage sites, objects or remains unless prior approval under the relevant legislation is obtained				
Outcome Measurement Criteria	- Annual audit of BHP's internal land use permits (LUP) demonstrate that infrastructure locations are within approved work areas, cultural heritage survey report conditions and have authorisation in accordance with the <i>Aboriginal Heritage Act 1988</i> (SA) prior to any ground disturbance occurring. - Annual audit of cultural heritage survey records demonstrate that upon discovery of new Aboriginal heritage sites, objects or remains at infrastructure locations were treated in accordance with the Cultural Heritage Management Plan¹ until authorisation under the <i>Aboriginal Heritage Act 1988</i> (SA) was obtained.				
Outcome Measurement Criteria summary	All land disturbance is spatially audited against LUP boundaries using survey data, drone and satellite imagery in ArcGIS to ensure works remained within approved work areas, cultural heritage survey report conditions and have authorisation in accordance with the <i>Aboriginal Heritage Act 1988</i> (SA).				
Leading Indicator Criteria	Monthly inspection (ground survey, drone flyover or suitable alternative method) of a selected infrastructure location during construction demonstrates land clearing has not been undertaken outside of areas defined in the associated LUP ² .				
Leading Indicator summary	Disturbance was reconciled to design as reported within the Carrapateena PEPR Compliance Report 2025.				
Effectiveness of existing controls	All land disturbance is spatially audited against LUP boundaries using survey data, drone and satellite imagery in ArcGIS to ensure works were completed within approved work areas, cultural heritage survey report conditions and have authorisation in accordance with the <i>Aboriginal Heritage Act 1988</i> (SA).				
Supporting report reference	Global Land Use Permit (GLUP) Procedure (37027) Cultural Heritage Management Plan (000647)				

1. BHP maintains a Cultural Heritage Management Plan (000647) to ensure that BHP employees and contractors respect local cultural heritage and protect sites of historical, cultural and religious significance or potential significance.
2. BHP maintains a Global Land Use Permit (GLUP) Procedure (37027) which requires application and approval of a Land Use Permit in BHP's GLUP system prior to undertaking any land disturbance.

7.7 Traffic

Table 7.7 | Traffic compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must during construction and operation, ensure that there are no traffic accidents involving members of the public and mine related traffic that could have been reasonably prevented by the Tenement Holder.				
Tenement Condition	Sixth Schedule, Condition 8: The Tenement Holder must, during construction and operation, ensure that there are no traffic accidents involving the public at mine access points that could have been reasonably prevented by the Tenement Holder				
Outcome Measurement Criteria	Investigation and corrective actions triggered as a result of an accident associated with mine related traffic demonstrates that the incident could not have been reasonably prevented and that any corrective actions are closed out within 30 days or as agreed with the Director of Mines (or authorised officer).				
Outcome Measurement Criteria summary	No traffic accidents involving members of the public or Midway operators were recorded during the reporting period.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	The following controls have been implemented to date: • Operators made aware of risk surrounding vehicle interaction within site inductions, toolbox meetings and targeted critical risk verifications. • Road signs displayed at mine entry and exit points, warning the public of the dangers of large trucks entering and exiting the tenement. • Traffic Management Plans and speed limits are implemented. • Area-specific and site inductions and training are conducted. No traffic incidents involving members of the public were reported.				
Supporting report reference	N/A				

7.8 Weeds and pests

Table 7.8 | Weeds and pests compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement holder must during construction and operation ensure no introduction of new species of Weeds declared or listed under relevant legislation, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the Land as a result of mining operations or mining-related activities.				
Tenement Condition	Sixth Schedule, Condition 9: The Tenement Holder must, during construction and operation, ensure that there is no introduction of new species of Weeds or Pests (including feral animals), nor increase in abundance of existing Weed or Pest species in the Land.				
Outcome Measurement Criteria	- Annual flora and fauna surveys undertaken by independent and suitably qualified ecologists at flora (including weeds) and fauna monitoring locations demonstrates no introduction of new species of weeds declared or listed under relevant legislation, plant pathogens or pests (including feral animals) as a result of mining-related activities when compared to previously recorded weed species and introduced fauna. - Annual flora and fauna surveys undertaken by independent and suitably qualified ecologists at flora (including weeds) and fauna monitoring locations demonstrated no increase in the abundance of existing weeds or pest species in the land compared to previous survey records as a result of mining-related activities.				
Outcome Measurement Criteria summary	Annual 2025 Carrapateena Fauna and Flora Survey (CA-0000-ENV-REP-1056) (Appendix B). Ongoing monitoring of LFA site on the rehabilitated western hardstand area.				
Leading Indicator Criteria	- Monthly inspection (including photographic evidence) of a selected infrastructure location identifies weeds listed in the Weed Red Alert List and triggers a review of the effectiveness of management strategies. - Quarterly audit of records maintained at the site by all contractors demonstrates that all incoming vehicle, plant and equipment have been subject to weed hygiene procedures.				
Leading Indicator summary	Weed inspections were routinely completed as inspection criteria within the LUP Health Check Inspection and General Environmental Inspection. Audit of weed hygiene certificates pertaining to mobile plant mobilised to site for the WAR Project and Carrapateena operations demonstrate compliance.				
Effectiveness of existing controls	In 2025, no new species of weeds declared or listed under relevant legislation (<i>Landscape South Australia Act 2019</i> (SA)), or plant pathogens were recorded at flora survey sites, within weed transects or opportunistically.				
Supporting report reference	2025 Carrapateena Flora and Fauna Survey (CA-0000-ENV-REP-1056) (Appendix B)				

7.9 Soil

Table 7.9 | Soil compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	- The Tenement Holder must, ensure that: - There is no contamination of land and soils either on or off the Land as a result of mining operations or mining-related activities; and - No contamination of land and soils either on or off the Land post Completion occurs as a result of mining operations or mining-related activities. - Before Completion, the Tenement Holder must satisfy the Director of Mines (or other authorised officer) that where practicable, the pre-Tenement land use of the Land can be recommenced post Completion. - The Tenement Holder must ensure that the Land is progressively and finally rehabilitated to support the future land use.				
Tenement Condition	Sixth Schedule, Condition 10: The Tenement Holder must, during construction and operation, ensure that the existing (pre-mining) soil quality and quantity is maintained.				
Outcome Measurement Criteria	- Annual inspection records of soil stockpiles show all stockpiles to have no signs of erosion (formation of rills, gullies or other evidence of soil loss). - Audit of rehabilitation activities at infrastructure locations and waste disposal records prior to application of lease surrender demonstrates that commercial and/or industrial wastes have been disposed of to an EPA licenced facility.				
Outcome Measurement Criteria summary	Topsoil was removed and stockpiled within the footprint of the tenement. The southern topsoil was covered with extractive materials due to constraints on capacity. Further works to be undertaken to verify the suitability of topsoil as a growth medium on internal pit batters given its erosive classification.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	Controls have been effective in preventing contamination of land or soils.				
Supporting report reference	N/A				

7.10 Waste

Table 7.10 | Waste compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must ensure that all commercial or industrial waste is disposed of in an EPA licensed facility.				
Tenement Condition	Sixth Schedule, Condition 11: The Tenement Holder must, during construction and operation, ensure that all commercial or industrial waste is disposed of in accordance with relevant legislation.				
Outcome Measurement Criteria	Audit of rehabilitation activities at infrastructure locations and waste disposal records prior to application of lease surrender demonstrates that all commercial or industrial waste (including contaminated soil) within the tenement was disposed of to an EPA-licensed facility.				
Outcome Measurement Criteria summary	No activity was undertaken on the EML during the reporting period, therefore no waste was generated.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	Controls are considered effective with all waste types disposed of in accordance with EPA Guidelines.				
Supporting report reference	N/A				

7.11 Groundwater

Table 7.11 | Groundwater compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must, during construction and operation, ensure that there is no adverse impact to groundwater caused by mining operations to existing users and water dependent ecosystems.				
Tenement Condition	Sixth Schedule, Condition 13: The Tenement Holder must, during construction and operation, ensure that there is no adverse impact to ground water caused by mining operations to existing users and water dependent ecosystems Sixth Schedule, Condition 14: The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(c) of the Regulations in relation to the Sixth Schedule Groundwater outcome: 14.1 Ensure that no mining is undertaken with 2 metres of the highest seasonal groundwater table level. Sixth Schedule, Condition 15: The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(d) of the Regulations in relation to the Sixth Schedule Groundwater outcome: 15.1 Collect appropriate baseline data to be used as part of the measurement criteria to ensure the criteria can measure the separation between the pit floor and the highest seasonal groundwater table level				
Outcome Measurement Criteria	Mine depth measurement taken at the completion of each stage will demonstrate that mining has occurred to the depth stated in section 3.4 and no mining is undertaken within 2 m of the estimated highest seasonal groundwater level. Further groundwater testing, undertaken at or prior to the pit floor reaching 27 m, shows no groundwater to at least 32 m				
Outcome Measurement Criteria summary	At the end of the reporting period and cessation of extractive recovery, the Midway quarry floor resides at 179 mRL (18 m depth from the pre-mining surface).				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	N/A				
Supporting report reference	N/A				

7.12 Post-mining land use

Table 7.12 | Post-mining land use compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	- Before Completion, the Tenement Holder must satisfy the Director of Mines (or other authorised officer) that where practicable, the pre-Tenement land use of the Land can be recommenced post Completion. - The Tenement Holder must ensure that the Land is progressively and finally rehabilitated to support the future land use.				
Tenement Condition	Sixth Schedule, Condition 16: The Tenement Holder must ensure that all disturbed land is progressively rehabilitated to achieve the agreed post mining land use Sixth Schedule, Condition 4: The Tenement Holder must ensure that all rehabilitation blends in with the surrounding landscape with no impact to external visual amenity				
Outcome Measurement Criteria	- Audit undertaken prior to application of lease surrender against any relevant third-party liability legal transfer agreements and Government agreements demonstrates that all infrastructure have been removed, unless otherwise agreed with Government or signed legal documentation to transfer ongoing liability of the infrastructure to third parties is provided prior to the relinquishment of the tenement(s) - Audit undertaken by an independent and suitably qualified expert approved by the Director of Mines (or other authorised officer) prior to application of lease surrender verifies that representative sites in rehabilitated areas at infrastructure locations have achieved or by trends may be confidently predicted to reach and pass sustainability thresholds as defined by Landscape Function Analysis (LFA) in order for the land to be returned to pastoral use (pre-mining) through the review of LFA monitoring results in order for the land to be returned to pastoral use (pre-mining)				
Outcome Measurement Criteria summary	Midway Quarry is within an operational phase, this is a completion criteria and as such, is not relevant.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	Areas of the tenement no longer required have been progressively rehabilitated, including the western flank where offices and associated surface infrastructure were positioned. Final rehabilitation of Midway Quarry has not been completed with further extractive material to be won. BHP Carrapateena anticipates that rehabilitation works will be completed post-2028, following construction of expansion infrastructure.				
Supporting report reference	N/A				

7.13 Protection of third-party property

Table 7.13 | Protection of third-party property compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must during construction, operation and post Completion ensure there are no impacts to third-party land use or property on or off the Land as a result of mining operations or mining-related activities other than those agreed between the Tenement Holder and the affected user or determined by an appropriate court as evidenced in its order(s) (and the Tenement Holder must provide the Director of Mines (or other authorised officer) with a copy of the order(s), which shall be placed on the Mining Register).				
Tenement Condition	Sixth Schedule, Condition 17: The Tenement Holder must, during construction and operation, ensure no unauthorised damage (including that caused by fire) to adjacent public or private property and infrastructure. Sixth Schedule, Condition 19: The Tenement Holder must, during construction and operation ensure no adverse impacts to adjacent land use.				
Outcome Measurement Criteria	Audit of stakeholder engagement records undertaken quarterly demonstrates that concerns associated with agricultural productivity of Pernatty Pastoral Lease or adjacent pastoral leases as a result of EML activities are responded to in accordance with the Local Area Agreement – Operating Protocol ¹ within 24 hours and any corrective actions are closed out within 14 days or as agreed with the Director of Mines (or other authorised officer).				
Outcome Measurement Criteria summary	An audit of stakeholder engagement records in Borealis shows that no concerns were formally raised.				
Leading Indicator Criteria	N/A				
Leading Indicator summary	N/A				
Effectiveness of existing controls	No impacts to third-party land use or property have been observed and controls are considered effective.				
Supporting report reference	N/A				

1. See PEPR Table 5.2 for description of Local Area Agreement – Operating Protocols (OZ Minerals 2019)

7.14 Native vegetation (clearance and unplanned disturbance)

Table 7.14 | Native vegetation (clearance and unplanned disturbance) compliance summary

Operation	Midway Quarry	Tenement	EML 6488	Compliance status	Compliant
Environmental Outcome	The Tenement Holder must during construction, operation and post Completion ensure that there is no loss of abundance and/or diversity of native vegetation on or off the Land unless a significant environmental benefit has been approved in accordance with the relevant legislation.				
Tenement Condition	Sixth Schedule, Condition 18: The Tenement Holder must, during construction, operation and post-mine completion, ensure that there is no loss of abundance or diversity of native vegetation on or off the Land through; 18.1 Clearance, 18.2 Dust/contaminant deposition, 18.3 Fire, 18.4 Other damage, unless prior approval under the relevant legislation is obtained.				
Outcome Measurement Criteria	Annual audit (reconciliation) of land disturbance register for infrastructure locations demonstrates native vegetation clearance does not exceed the significant environmental benefit approved under the <i>Native Vegetation Act 1991</i> (SA) and plains mouse habitat clearance does not exceed that approved under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)				
Outcome Measurement Criteria summary	Total disturbance does not exceed the amount approved in Native Vegetation Management Plans.				
Leading Indicator Criteria	Monthly inspection (ground survey, drone flyover or suitable alternative method) of a selected infrastructure location during construction demonstrates land clearing has not been undertaken outside of areas defined in the associated land disturbance permit				
Leading Indicator summary	All land disturbance is spatially audited against LUP boundaries using survey data, drone and satellite imagery in ArcGIS to ensure works were completed within approved work areas, cultural heritage survey report conditions and have authorisation in accordance with the <i>Aboriginal Heritage Act 1988</i> (SA). No fringing impacts to flora from dust were verified via capture of ortho-imagery following cessation of mining activity. No incidents of fire or damage recorded during the reporting period.				
Effectiveness of existing controls	N/A				
Supporting report reference	N/A				

**8 Compliance with non-outcome-based
tenement conditions**

Table 8.1 provides details of the compliance status of any tenement conditions of the EML that do not relate to an Environmental Outcome in the approved PEPR (OZ Minerals 2019). Evidence to support the statement of compliance is provided.

Table 8.1 | Compliance with non-outcome-based tenement conditions

Tenement condition number	Tenement condition	Compliance status	Evidence
Details of Grant of a Mining Tenement			
1	On 13 July 2018, pursuant to Part 6 of the Act, the Minister made a statutory grant of an Extractive Minerals Lease (the Mining Tenement) described in this Tenement Document.	Not applicable	Tenement document Extractive Minerals Lease EML 6488 (Midway) (CA-APR-AGR-1027)
2	The Mining Tenement is granted:		
2.1	To OZM Carrapateena Pty Ltd (ACN 007 756 443) and OZ Minerals Carrapateena Pty Ltd (ACN 149 626 255)		
2.2	For the purpose of recovering the Mineral(s) described in the First Schedule of this Tenement Document	Compliant	Recovery of extractive materials consistent with the mining operations described in the Mining Lease Proposal (OZ Minerals 2017)
3	The Mining Tenement is numbered EML6488		
4	The Mining Tenement is		
4.1	Subject to the Terms and Conditions prescribed by the Act and Regulations and specified in this Tenement Document	Compliant	Operation of the Midway Quarry consistent with the Terms and Conditions prescribed by the Act and Regulations
4.1	Subject to the Additional Terms and Conditions specified in the First and Second Schedules (respectively) of this Tenement Document	Compliant	Activities undertaken on EML 6488 consistent with State and Commonwealth legislation and regulations
5	The Mining Tenement is granted over an area of 14.99 hectares and is located in the Pernatty area, approximately 56 km east-southeast of Woomera	Compliant	Changes to the Mining Tenement area adjusted in accordance with State policies and regulations. Eastern Stockpile Extension Program Notification approved by South Australian Department for Energy and Mining (DEM) on 7 May 2021 (CA-ENV-LET-1000)
6	The location of the Mining Tenement is more specifically defined in the map and coordinates specified in the Third Schedule of this Tenement Document	Compliant	Changes to the Mining Tenement area adjusted in accordance with State policies and regulations. Eastern Stockpile Extension Program Notification approved by DEM on 7 May 2021 (CA-ENV-LET-1000)
7	The Mining Tenement is granted for the term of Twenty (20) years, One Hundred and Seventy Four (174) days. The term of the Mining Tenement commenced on 13 July 2018, and, unless it is earlier renewed, surrendered or cancelled, the Mining Tenement will cease on 2 January 2039	Compliant	Extraction operations commenced on the 7 January 2021 (CA-ENV-LET-1010).
8	The Tenement Holder shall pay, by way of rental, such sums as may be prescribed and in accordance with section 40 of the Act and regulation 42 of the Regulations	Not applicable	
9	The Minister may, at any time, require the Tenement Holder to pay to any person an amount of compensation stipulated by the Minister, to which that person is, in the opinion of the Minister, entitled in consequence of mining operations in pursuance of the rights granted and the obligations imposed by the grant of the Mining Tenement	Not applicable	
10	Pursuant to subsection 41(1) of the Act, the Minister may suspend or cancel the Mining Tenement if the Tenement Holder contravenes or fails to comply with a term or condition of this Tenement Document or a provision of the Act (which includes the Regulations).	Not applicable	
11	Pursuant to subsection 41(2) of the Act, the Minister may stipulate in the tenement document a process for suspension or cancellation that must be followed before the powers in subsection 41(1) may be exercised	Not applicable	
12	The process for suspension of the Mining Tenement shall be as stipulated in the Fourth Schedule of this Tenement Document	Not applicable	
13	The process for cancellation of the Mining Tenement shall be as stipulated in the Fifth Schedule of this Tenement Document	Not applicable	
14	The Sixth Schedule of this Tenement Document sets out outcomes contemplated in regulation 65(2) of the Regulations that the Tenement Holder is required to address in any program submitted in accordance with Part 10A of the Act	Compliant	PEPR MPEPR2019/029 (OZ Minerals 2019) Midway Quarry Management Plan (CA-5410-PRM-PLN-1012)
15	All of the restatements in this portion of this Tenement Document are included for guidance only and do not replace the substantive provisions of the Act or the Regulations	Compliant	
16	If any restatement is inconsistent with the substantive provisions of the Act or the Regulations, the restatement will be invalid and the substantive provision of the Act or the Regulations will prevail and the Tenement Holder is required to comply with the substantive provision of the Act or the Regulations	Compliant	
17	The Tenement Holder is still required to comply with any provision of the Act or Regulations that is not restated in this Tenement Document	Compliant	

Tenement condition number	Tenement condition	Compliance status	Evidence
18	The grant of the Mining Tenement confers an exclusive right upon the Tenement Holder including officers, employee(s), contractor(s) or duly authorised agent(s) of the Tenement Holder, to conduct mining operations on the Land, for the Mineral(s), subject to the provisions of the Act and the Regulations, and the terms and conditions of this Tenement Document	Compliant	
19	The grant of the Mining Tenement authorises the Tenement Holder, including officers, employee(s), contractor(s) or duly authorised agent(s) of the Tenement Holder, to sell, or dispose of, the Mineral(s) recovered in the course of mining operations conducted in pursuance of the grant or to utilise any such mineral(s) for any commercial or industrial purpose, subject to the payment of royalty	Compliant	Extractive materials used for construction of the Western Access Road, specifically sub-base, base coarse, rip-rap and cement-stabished fill.
20	The grant of the Mining Tenement does not confer any right on the Tenement Holder		
20.1	To use the Land for any purpose other than the authorised mining operations	Not applicable	
20.2	To confer any rights on any other person in relation to the Mining Tenement	Not applicable	
21	The Tenement Holder must not carry out mining operations unless there is an approved program for environment protection and rehabilitation (an Approved PEPR)	Compliant	DEM approved PEPR MPEPR2019/029 (OZ Minerals 2019)
22	A Proposed PEPR will only be approved when it complies with the requirements of Part 10A of the Act and the Regulations	Compliant	
23	To comply with Part 10A of the Act, the Proposed PEPR must		
23.1	Contain the information specified in section 70B(2) of the Act and regulation 65(2),(5),(6) of the Regulations and determinations made by the Minister under regulation 65(7) of the Regulations (if any)	Compliant	
23.2	Comply with any applicable conditions specified in this Tenement Document (if any)	Compliant	
23.3	Address any relevant environmental outcomes listed in the Sixth Schedule of this Tenement Document	Compliant	
24	In accordance with regulation 65(10) of the Regulations, the Tenement Holder must submit to the Department of the Premier and Cabinet (DPC) for ministerial approval a Proposed PEPR that fully complies with the Act and Regulations within twelve (12) months after the grant of the Mining Tenement unless the Tenement Holder has been granted an extension of time for such submission	Compliant	DEM approved PEPR MPEPR2019/029 (OZ Minerals 2019)
25	In accordance with regulation 35 of the Regulations, unless otherwise determined or agreed by the Minister, the Tenement Holder must:		
25.1	Commence mining operations in accordance with the Approved PEPR within twelve (12) months after its approval	Compliant	Mining operations associated with EML 6488 commenced on the 7 January 2021 (CA-ENV-LET-1010).
25.2	Thereafter continue mining operations in accordance with the requirements of the program in the Approved PEPR	Compliant	Operation of the Midway Quarry consistent with requirements outlined in the PEPR (MPEPR2019/029) (OZ Minerals 2019)
26	In addition to obligations about the conduct of mining operations and rehabilitation, the Act and Regulations impose other obligations on the Tenement Holder including obligations to:		
26.1	Comply with Part 3 of the Act (royalties)	Compliant	
26.2	Comply with the applicable provisions of Part 9 of the Act (entry onto land and use of declared equipment)	Compliant	
26.3	Comply with the applicable provisions of Part 9B of the Act (native title)	Compliant	NTMA – Confidential (CA-CRL-LET-1003) Cultural Heritage Management Plan (000647)
26.4	Comply with the provisions of section 76 of the Act (mining returns) to the extent relevant to an extractive minerals lease	Compliant	
26.5	Comply with section 77 of the Act (records and geological samples) and regulation 84 of the Regulations	Compliant	
26.6	Comply, as necessary, with section 83 of the Act (ministerial consent for dealings in relation to the Tenement) and regulations 44 and 70 of the Regulations	Compliant	
26.7	Comply, insofar as applicable to an extractive minerals lease, with regulation 86 of the Regulations (compliance reports)	Compliant	
26.8	Comply with the requirement in regulation 43 of the Regulations to maintain all posts, boundary indicator markers and notices in the positions required by the Regulations as applicable	Compliant	
26.9	Permit the pastoral lessee (if any) of the Land to have free access and use at all times for domestic purposes, and for the purposes of watering stock from any surface water on the land which shall not have been provided or stored by artificial means by the Tenement Holder	Compliant	Pernatty Pastoral Access and Compensation Agreement – Confidential (CA-APR-AGR-1033)
27	In accordance with section 9 of the Act, the grant of the Mining Tenement does not authorise prospecting, exploring or mining upon any exempt land unless or until the benefit of the exemption is waived under section 9AA	Compliant	
28	In accordance with section 62 of the Act, the Minister may by written notice require the Tenement Holder to pay a bond in such sum and subject to		

Tenement condition number	Tenement condition	Compliance status	Evidence
	such terms and conditions as ensure, in the opinion of the Minister, that the following will be satisfied		
28.1	Any civil or statutory liability likely to be incurred by the Tenement Holder in the course of carrying out mining operations	Not relevant	
28.2	The present and future obligations of the Tenement Holder in relation to the rehabilitation of land disturbed by mining operations	Not relevant	
29	The Tenement Holder shall pay all fees imposed by the Act and Regulations from time to time	Not relevant	
30	This Mineral Tenement shall be renewed in accordance with the Act	Not relevant	
31	The Tenement Holder may apply to surrender the Mining Tenement during its term in accordance with the Act and the Regulations	Not relevant	Midway Quarry remains in care and maintenance.
32	The Mining Tenement is subject to the forfeiture provision of the Act being sections 70 and 85	Not relevant	
33	Notices under the Act will be served in accordance with regulation 106 of the Regulations	Not relevant	
34	Section 15A of the Act requires the Mining Registrar to keep a register of, amongst other things, mining tenements. Upon payment of the prescribed fee, the public may inspect the Mining Register	Compliant	
35	As defined by section 6 of the Act “mining operations” means:		
35.1	Operations carried out in the course of prospecting, exploring or mining for minerals; or	Not relevant	
35.2	Without limiting paragraph 35.1, any operations by which minerals are recovered from any place or situation, including by recovering minerals from the sea or a natural water supply; or	Not relevant	
35.3	On-site operations undertaken to make minerals recovered from the site a commercially viable product, other operations involving such minerals, or other operations involving minerals brought on to the site of a mine for processing; or	Not relevant	
35.4	Operations for the rehabilitation of land on account of the impact of any operations under a preceding paragraph; or	Not relevant	
35.5	Operations that are directly related to any operations under a preceding paragraph; but does not include:	Not relevant	
35.6	An investigation or survey under section 15 of the Act; or	Not relevant	
35.7	Fossicking; or	Not relevant	
35.8	The surface removal of loose rock material disturbed by agricultural operations.	Not relevant	
36	This definition applies to operations that occur during all phases of the mine’s life	Not relevant	
37	The Tenement Holder must comply with regulation 98(1)(c) and 98(2).	Compliant	
37.1	If the Tenement Holder is a natural person, he or she is required to notify the Mining Registrar of a declaration of bankruptcy within fourteen (14) days of the declaration	Not relevant	
37.2	If the Tenement Holder is a company, it is required to notify the Mining Registrar of its being placed under official management, or in liquidation or receivership within fourteen (14) days of any of those events	Not relevant	
38	The Tenement Holder must comply with regulation 90, which concerns public liability insurance	Not relevant	
First Schedule Additional Terms			
1	Mining operations authorised by the grant of the Mining Tenement must:		
1.1	Only be for the recovery of extractive minerals including, but not limited to Dolomite, Limestone, Quartzite, Sandstone, Sand, Shale and Siltstone; and	Compliant	
1.2	Be consistent with the mining operations described in the mining lease proposal document Midway dated 7 February 2018	Compliant	
Second Schedule Additional Conditions			
1	The Tenement Holder agrees to the Approved PEPR and reportable incident reports, submitted in accordance with the Regulations, being made available for public inspection	Compliant	
2	The Tenement Holder must comply with all State and Commonwealth legislation and regulations applicable to the activities undertaken pursuant to this Mining Tenement	Compliant	
Sixth Schedule Environmental Outcomes			
Refer Chapter 7 of this Compliance Report			

9 Rectification of non-compliances

9.1 Reporting period

Where instances of non-compliance have occurred during the reporting period, corrective actions and/or rectification has been applied as described in Table 9.1.

9.2 Previous reporting periods

No non-compliances under Regulation 79 of the Mining Regulations 2020 have previously been reported in compliance reports.

Table 9.1 | Rectification of non-compliances

Date of the incident	Date the incident was reported	What environmental outcome/objective or tenement condition was breached?	Cause of the non-compliance	Actions taken or yet to be taken to rectify the non-compliance and to prevent the recurrence of any such non-compliance
NA	NA	NA	NA	NA

10 Disturbance and rehabilitation activities

The EML 6488 operations necessitated the clearance of approximately 26.7 hectares (ha) of native vegetation, the clearance of which is regulated by the *Native Vegetation Act 1991* (SA) (NV Act) and the Native Vegetation Regulations 2017. An NV Act-compliant significant environmental benefit (SEB) offset provision was described as a component of the greater Carrapateena Operation Mineral Lease PEPR (BHP 2025c). Land disturbance associated with the EMLs, including Midway, are incorporated into the SEB provision assuming, as a worst case, that all land within the EML was disturbed and subsequently rehabilitated.

The Midway Quarry is in care and maintenance and no further rehabilitation occurred during the reporting period. Batters remain at mined angle with 12 m of pit floor remaining unmined for future use for the potential Carrapateena expansion (subject to further approvals). BHP Carrapateena will reprofile quarry batters to 18 degrees following completion of extractives activity by 2028.

Table 10.1 provides a summary of the disturbance and rehabilitation activities completed to date and Figure 10.1 and Figure 10.2 show the disturbance and rehabilitation that has occurred to date.

Table 10.1 | Disturbance and rehabilitation activities

Area where disturbance and rehabilitation activity occurred (ha)	Description of rehabilitation works carried out to date (ha)	Amount of land disturbed during the reporting period (ha)	Estimated amount of land to be rehabilitated in the next reporting period (ha)	Total amount of land where rehabilitation works are completed (ha)
26.7	6.7	0.0	0.0	6.7

Strategies implemented to avoid or minimise disturbance:

BHP’s land use permit process ensures that work areas are safely minimised and already disturbed land is used for new works as much as reasonably possible. For temporary works the stripping of topsoil is avoided. Land disturbance areas are surveyed and barricaded to avoid any disturbance outside of the allowed area.

Summary of any potential improvements learned from previous rehabilitation activities:

Rehabilitation trials under Mineral Lease 6471 have indicated that deep contour ripping and seeding local groundcovers and shrubs is necessary to achieve successful rehabilitation. As the operation is in its early stages, further techniques will be trialed to enhance rehabilitation success (e.g. applying woody debris and watering during critical dry periods).

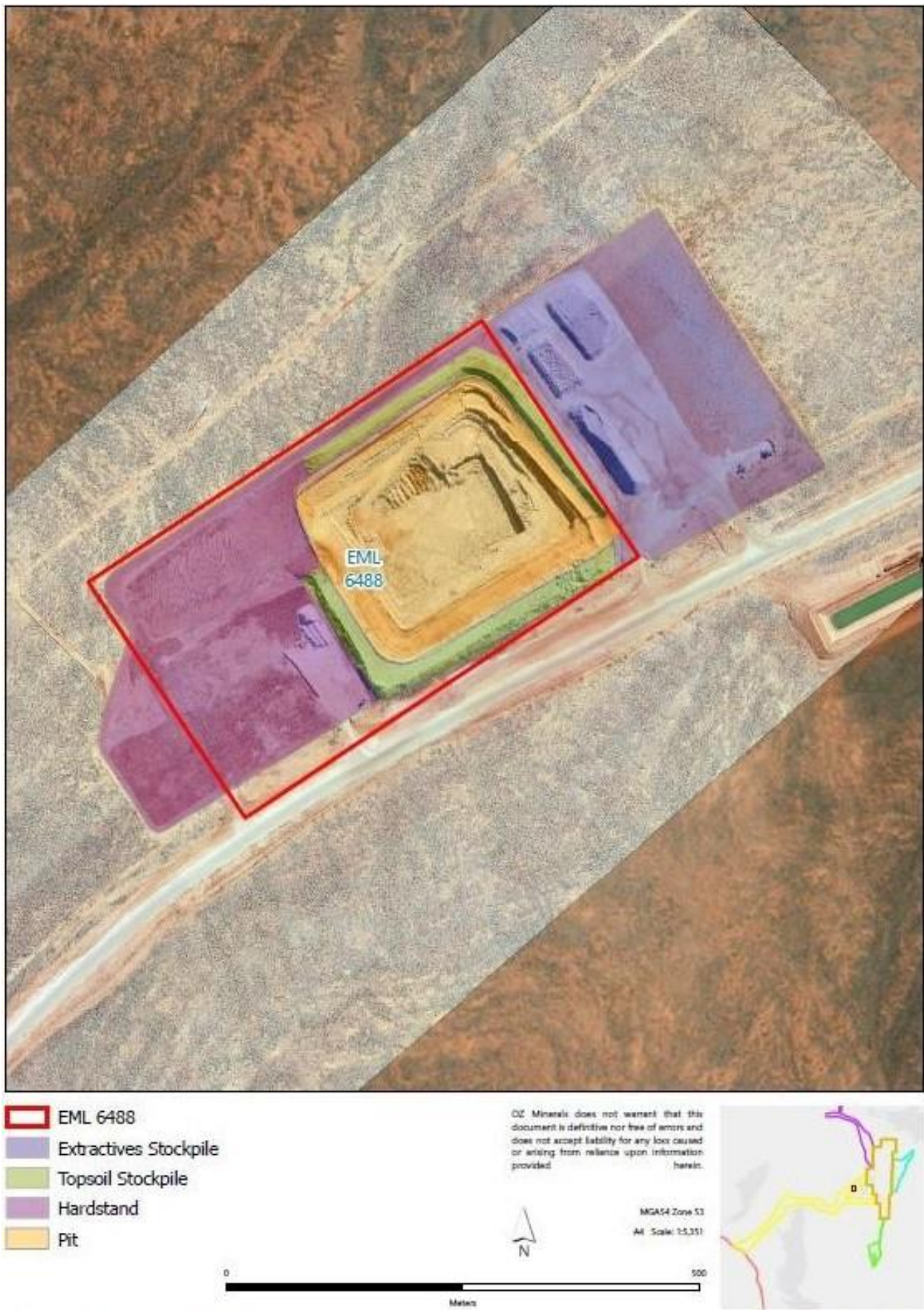
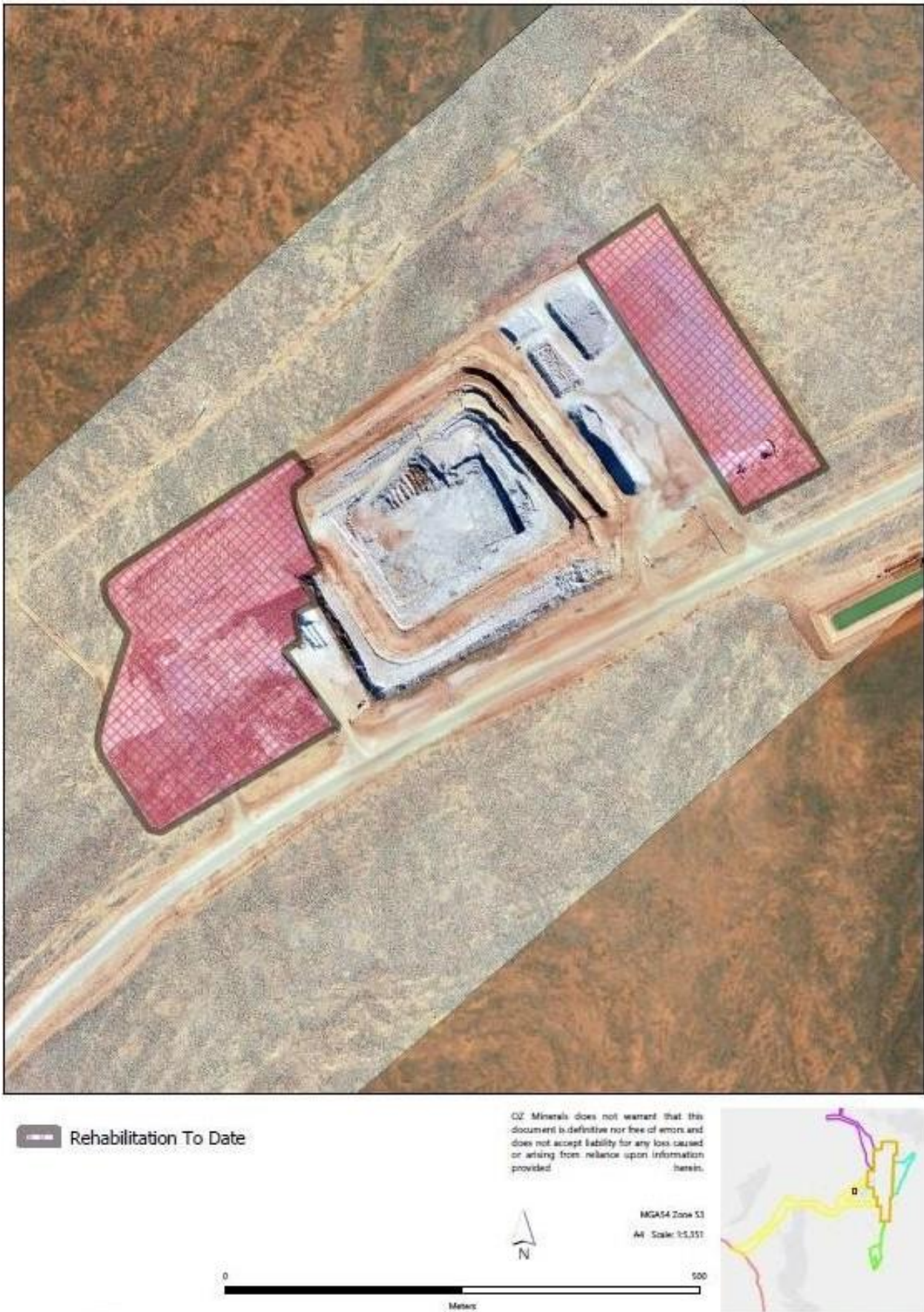


Figure 10.1 | Land disturbed and quarry layout



11 Reconciliation of native vegetation clearance

Reconciliation of native vegetation clearance is described in Table 11.1.

Table 11.1 | Summary of native vegetation clearance since commencement of the Midway Quarry

Lease	Approval	Approved maximum clearance (ha)	Total amount cleared in the reporting period (ha)	Total amount cleared to date (ha)	Estimated amount to be cleared in the next reporting period (ha)
EML 6488	MPEPR2019/029	26.7	0	26.7	0

12 Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)

Table 12.1 | EPBC Act reporting

Condition number	Condition	Compliance status	Evidence demonstrating compliance with condition
1	To manage the impacts of the action on the environment, the person taking the action must implement the conditions of the SA approval.	Compliant	The Compliance Report (BHP 2025a) associated with the granting of the Carrapateena Tenements under the <i>Mining Act 1971</i> (SA) was submitted to DEM on 28 March 2025 indicating compliance with the conditions of the state approval. The Compliance Report will be publicly available on the DEM website at DEM Carrapateena Project and on the BHP website .
2	The person taking the action must not impact more than 1,740 hectares of Plains Rat habitat within the disturbance footprint.	Compliant	Total disturbance since the commencement of the referred action is 1,669.82 ha, including 313.18 ha of Plains Rat (Plains Mouse) habitat, as shown in Figure 5.1 of the Carrapateena Operation EPBC Compliance Report 2025 (BHP 2025b), replicated here as Figure 12.2.
3	Prior to commencement of the action, to compensate for residual impacts to the Plains Rat, the person taking the action must acquire an offset property which must contain: a. a population of the Plains Rat b. no less than 1,740 hectares of Plains Rat habitat c. habitat quality equal to that of the Plains Rat habitat within the disturbance footprint.	Compliant	Following on from an 'Agreement to Underlease' (CA-APR-AGR-1037) with the Pastoral Lessee of South Gap Pastoral Station two offset areas, BHP has established two individual Underlease Agreements, one for each offset area. This secures a total of 3,251 ha of suitable Plains Mouse habitat under Northern Offset Underlease Agreement for 1,882 ha and Southern Offset Underlease Agreement for 1,369 ha (CA-APR-LET-1178). The Underlease Agreements have a 10-year expiry term, with successive Agreements to be established to total the required duration as per the approval conditions. The offset areas consist of Arcoona Tablelands habitat that is similar in quality and structure to the land disturbed at Carrapateena and are considered to represent equally viable Plains Mouse habitat. Historical observations of Plains Mouse have been recorded nearby the northern offset, and within the same stretch of continuous tablelands habitat connecting disturbed Plains Mouse habitat at Carrapateena, to the offset areas on South Gap Station.
4	The person taking the action must maintain or improve the habitat quality of the existing Plains Rat habitat at the acquired offset property for the life of this approval.	Compliant	BHP Carrapateena has developed an Environmental Offset Management Plan (CA-0000-ENV-PLN-1004) (the Plan) which aims to: • establish baseline conditions, including the distribution and condition of Plains Mouse habitat, the presence and distribution of target species, and the identification and prioritisation of local threats • define the potential presence, distribution and abundance of other target species within the offset (i.e. Thick-billed Grasswren and Night Parrot) • manage total predation pressure (fox, cat, wild dog/dingo) • enhance the condition of habitat for the benefit of Plains Mouse, through the management of total grazing pressure (i.e. stock exclusion) and invasive weeds • improve knowledge of local target species populations including an understanding of how they respond to management locally. The Plan presents fourteen (14) individual objectives grouped under eleven (11) management strategies to address EPBC Act offset liability, and associated legislative and policy obligations, for the first ten (10)-year period of management.
5	Within 2 years from commencement of the action, the person taking the action must change the tenure of the offset property for conservation purposes using an appropriate legal mechanism for long term protection.	Compliant	Underlease agreements signed, executed and back-dated from to 21 April 2020 (2 years from the commencement of the action) for the Northern Offset Area and the Southern Offset Area. The areas have been officially registered with the Lands Titles Office: two registrations, as associated with each offset area. The Agreements to Underlease clearly define that the areas are to be and set aside for environmental offset purposes. The change in land use will apply for 10 years, after which the change in land use will need to be renewed (Permission granted by the Commonwealth to manage as rolling terms to achieve the total required tenure).
6	Prior to the commencement of the action, the person taking the action must engage a suitably qualified expert to undertake a Night Parrot survey within the development envelope. The Night Parrot survey must be undertaken in' accordance with the EPBC Act Night Parrot survey guidelines. Within three months of the Night Parrot survey being completed, the person taking the action must provide the Department with the Night Parrot survey results.	Compliant	BHP Carrapateena completed a targeted Threatened Species Survey for Night Parrot in March 2018 (CA-ENV-REP-1040). There were no Night Parrots or evidence of Night Parrots detected during the survey. The results of the survey were forwarded to the Commonwealth regulator in April 2018 (DOE: CA-APR-EML-1077). Night Parrot has not been reconfirmed as locally extinct within South Australia.

Condition number	Condition	Compliance status	Evidence demonstrating compliance with condition
7	Should the Night Parrot or evidence of the Night Parrot be recorded during the survey, the person taking the action must submit for the Minister's approval, a Night Parrot Management Plan that must include: a. Details of the Night Parrot survey results, including the methodology, timing and area surveyed. b. An assessment of the impacts to the Night Parrot that will result from the action. Management actions that will avoid, minimise and/or offset both the immediate and long-term impacts of the action on the Night Parrot. d. Monitoring and reporting requirements that demonstrate the management actions are effectively being implemented and achieve the intended results. This should include the frequency, intensity and duration of monitoring. The person taking the action must not commence the action prior to the Minister approving the Night Parrot Management Plan. The approved Night Parrot Management Plan must be implemented.	Not Applicable	The targeted survey (CA-ENV-REP-1040) did not find evidence of the Night Parrot in the Operation area. Night Parrot has not been reconfirmed as locally extinct within South Australia.
8	Prior to the commencement of the action, the person taking the action must engage a suitably qualified expert to undertake a <i>Frankenia plicata</i> survey within the development envelope. The <i>Frankenia plicata</i> survey must be undertaken in accordance with contemporary survey methods. Within three months of the <i>Frankenia plicata</i> survey being completed, the person taking the action must provide the Department with the <i>Frankenia plicata</i> survey results.	Compliant	BHP Carrapateena completed a targeted Threatened Species Survey for <i>Frankenia plicata</i> in March 2018 (CA-ENV-REP-1040). <i>Frankenia plicata</i> was not detected during the survey. The results of the survey were forwarded to the Commonwealth regulator in April 2018 (CA-APR-EML-1077). Follow-up work by the engaged consultant uncovered the incorrect classification of locally collected <i>Frankenia</i> samples lodged with the South Australian Herbarium. Consultation with the SA Herbarium coupled with extensive survey work within the Carrapateena tenements and more broadly within the region has failed to detect this species, which is more likely to occur much further north of the Operation.
9	Should the <i>Frankenia plicata</i> be recorded during the survey, the person taking the action must submit for the Minister's approval, a <i>Frankenia plicata</i> Management Plan that must include: a. Details of the <i>Frankenia plicata</i> survey results, including the methodology, timing and area surveyed. b. An assessment of the impacts to the <i>Frankenia plicata</i> that will result from the action. c. Management actions that will avoid, minimise and/or offset both the immediate and long-term impacts of the action on the <i>Frankenia plicata</i>. d. Monitoring and reporting requirements that demonstrate the management actions are effectively being implemented and achieve the intended results. This should include the frequency, intensity and duration of monitoring. The person taking the action must not commence the action prior to the Minister approving the <i>Frankenia plicata</i> Management Plan. The <i>approved Frankenia plicata</i> Management Plan must be implemented.	Not Applicable	The targeted survey (CA-ENV-REP-1040) did not find evidence of <i>Frankenia plicata</i> in the Operation area. Follow-up work by the engaged consultant uncovered the incorrect classification of locally collected <i>Frankenia</i> samples lodged with the South Australian Herbarium.
10	Within 3 months following the change of tenure referred to in condition 5) the person taking the action must provide the Department with written evidence that the offset property has been secured for conservation purposes using an appropriate legal mechanism.	Compliant	Written evidence provided to the Commonwealth regulator via letter dated 16 December 2020 (CA-APR-LET-1178).
11	Within 30 days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement.	Compliant	OZ Minerals advised the Commonwealth regulator of the commencement of the action on 21 April 2018 (CA-ENV-LET-1001).
12	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.	Compliant	BHP Carrapateena maintains an Environmental Management System that includes electronic data management systems for document control (InEight), obligations management and land access (LandFolio) and consultation/correspondence (Borealis). Data collected during Carrapateena monitoring is recorded on the site environmental data management system (MonitorPro) or within ArcGIS. Data collected for the environmental offsets on South Gap station are collected, managed and reported on by a third party engaged to manage the offset (Nature Foundation) with select information captured back into the Carrapateena systems.
13	Within 30 days after completion of the action, the person taking the action must advise the Department in writing of the actual date of completion and provide a map clearly defining the date, location and actual impact within the Disturbance footprint of the action and be accompanied with a shape file.	Not Applicable	BHP Carrapateena is currently undertaking the action.
14	The approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or as otherwise agreed to in writing by the Minister. The approval holder must: a. publish each compliance report on the website within 60 business days following the relevant 12-month period; b. notify the Department by email that a compliance report has been published on the website within five business days of the date of publication; c. keep all compliance reports publicly available on the website until this approval expires; d. exclude or redact sensitive ecological data from compliance reports published on the website; and	Compliant	The EPBC 2017/7895 Compliance Report (BHP 2025b) is posted annually in April to the BHP website where copies of previous Compliance Reports can also be located.

Condition number	Condition	Compliance status	Evidence demonstrating compliance with condition
	e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication. NOTE: The first compliance report may report a period less than 12 months so that it and subsequent compliance reports align with the similar requirement under state approval.		
15	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not Applicable	BHP Carrapateena has not been directed by the Minister to commission an independent audit of compliance with the conditions of approval associated with EPBC 2017/7895.
16	If, at any time after 5 years from the date of this approval, the person taking the action has not commenced the action, then the person taking the action must not commence the action without the written agreement of the Minister.	Not Applicable	OZ Minerals commenced the action in late March 2018, as communicated to the Commonwealth regulator in April 2018 (CA-ENV-LET-1001).
17	The approval holder must notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in plans. The notification must be given as soon as practicable and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify: a. the condition which is or may be in breach; and b. a short description of the incident and/or non-compliance.	Compliant	There were no non-compliances with the EPBC 2017/7895 conditions of approval, nor non-compliances with commitments described in any plans required therein during the reporting period. There were no incidents associated with the action during the reporting period that caused, or had the potential to cause, significant impacts to matters of national environmental significance (MNES).
18	The approval holder must provide to the Department details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 30 days after becoming aware of the incident or non-compliance, specifying: a. Any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b. the potential impacts of the incident or non-compliance; and c. the method and timing of any remedial action that will be undertaken by the approval holder.	Compliant	There were no non-compliances with the EPBC 2017/7895 conditions of approval, nor non-compliances with commitments described in any plans required therein during the reporting period. There were no incidents associated with the action during the reporting period that caused, or had the potential to cause, significant impacts to MNES.

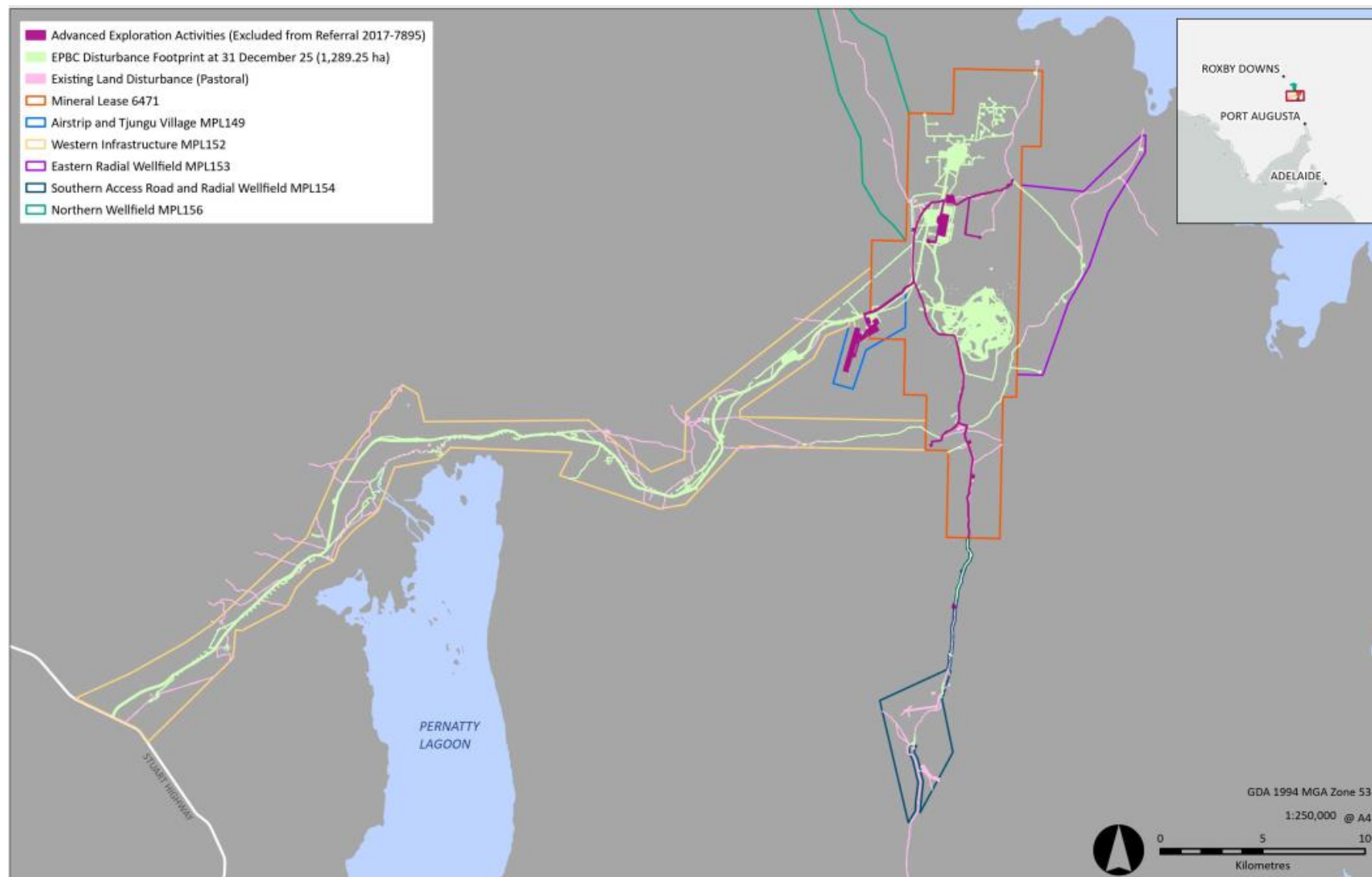


Figure 12.1 | EPBC disturbance footprint (December 2025)

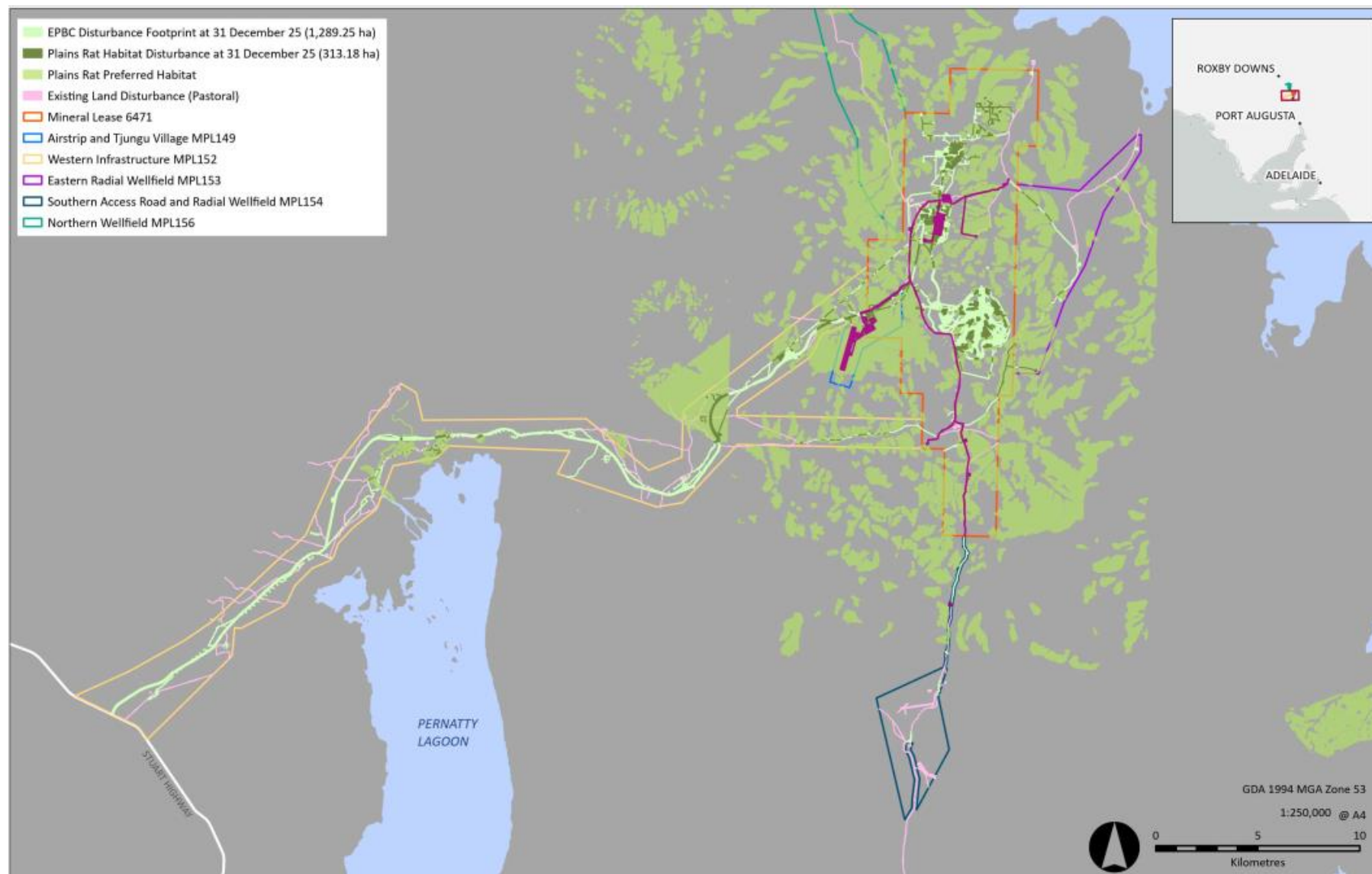


Figure 12.2 | Plains Mouse (*Pseudomys australis*) habitat disturbance (December 2025)

13 Exempt land

There is no exempt land in the vicinity of EML 6488. Relevant waivers are contained within and as part of the Pernatty Land Access and Compensation Agreement for the entirety of Pernatty station.

14 Complaints

No complaints regarding EML 6488 operations were received throughout the reporting period.

15 Changes to authorised operations and emerging environmental hazards

There were no changes to authorised operations or environmental hazards emerging throughout the reporting period.

16 Technical reports

Table 16.1 provides a summary list of all technical data, studies and reports generated during the reporting period that support the achievement of tenement conditions and environmental outcomes and objectives in the approved PEPR (OZ Minerals 2019).

Table 16.1 | Technical reports

Report Title	Author(s)
Appendix B 2025 Carrapateena Flora and Fauna Survey	Lathwida Environmental

17 Abbreviations and units of measure

17.1 Definition of acronyms

Acronym	Expansion
AS	Australian Standard
DEM	Government of South Australia's Department for Energy and Mining
EML	Extractive Minerals Lease
EPA	Government of South Australia's Environment Protection Authority
EPBC	Environment Protection and Biodiversity Conservation
LUP	land use permit
LFA	Landscape Function Analysis
LI	Leading Indicator
MPL	Miscellaneous Purposes Licence
MNES	matters of national environmental significance
NTMA	Native Title Mining Agreement
OMC	Outcome Measurement Criteria
PEPR	Program for Environment Protection and Rehabilitation
SEB	significant environmental benefit
TOR 009	Terms of Reference 009
WAR	Western Access Road

17.2 Units of Measure

Abbreviation	Expansion of Unit
\$	Australian dollars(s)
US\$	United States dollar(s)
%	percent
ha	hectare
km	kilometre
m	metre
mRL	metres reduced level

18 References

BHP (2025a) *Carrapateena Operation PEPR Compliance Report 2025. Mineral Lease, MPL 149 Airstrip, Workers' Accommodation Village, Access Road and Ancillary Infrastructure, MPL 152 Western Infrastructure Corridor, MPL 153 Eastern Radial Wellfield, MPL 154 Southern Access Road and Radial Wellfield, MPL 156 Northern Wellfield*. Dated 31 March 2026. BHP, South Australia, Adelaide.

BHP (2025b) *Carrapateena Operation EPBC Compliance Report 2025*. Dated 31 March 2026. BHP, South Australia, Adelaide.

BHP (2025c) *Carrapateena Project Program for Environment Protection and Rehabilitation. ML 6471 Mineral Lease, MPL 149 Airstrip, Workers' Accommodation Village, Access Road and Ancillary Infrastructure, MPL 152 Western Infrastructure Corridor, MPL 153 Eastern Radial Wellfield, MPL 154 Southern Access Road and Radial Wellfield, MPL 156 Northern Wellfield*. June 2025. MPEPR2025/011. OZ Minerals, South Australia, Adelaide.

DEM (Department for Energy and Mining) (2020) *Determination Terms of Reference 009 (TOR 009) Mining Compliance Reports*. Notice under Regulation 77 of the Mining Regulations 2020. Dated 11 December 2020. Government of South Australia's Department for Energy and Mining, South Australia, Adelaide.

DEM (Department for Energy and Mining) (2021) *Preparing a mining compliance report*. Mineral Regulatory Guidelines MG3, Mineral Resources Division. Dated August 2021. Government of South Australia's Department for Energy and Mining, South Australia, Adelaide.

OZ Minerals (2017) *Carrapateena Project Mining Lease Proposal and Miscellaneous Purposes Licence Management Plans*. May 2017. OZ Minerals, South Australia, Adelaide.

OZ Minerals (2019) *Carrapateena Project Midway Program for Environment Protection and Rehabilitation for Extractive Minerals Lease 6488*. December 2019. MPEPR2019/029. 30 December 2019. OZ Minerals, South Australia, Adelaide.

Appendices

Appendix A Public liability insurance

A copy of the cover note for the public liability insurance and/or a copy of the policy of insurance is attached on the following page.

Issue Date: 23 July 2026

Telephone: +61 7 3167 8500
Website: www.wtwco.com.au
Direct Line: +61 7 3167 8528
Email: stephanie.herbert@wtwco.com

To Whom It May Concern

Certificate of Placement – Public and Products Liability

In our capacity as Insurance Broker to the Named Insured shown below, we confirm having arranged the following insurance, the details of which are correct as at the Issue Date:

Named Insured:	BHP Group Ltd and all subsidiary companies and all related and/or affiliated and/or controlled, managed, administered and associated companies or corporations (now existing or hereinafter acquired, formed or incorporated) and/or related joint ventures and/or partnerships and other entities named or described herein for their respective rights and interests.
Insurer(s):	Stein Insurance Company Limited – a Captive Insurance Company and wholly owned subsidiary of BHP Group Limited currently rated A by Fitch
Policy Number:	PL/BHP/2026
Period of Insurance:	1 July 2026 to 30 June 2027, both days inclusive, local standard time at the location of the property, operations or activities insured.
Interest Insured:	The Insurers will indemnify the Insured up to the Limit of Liability stated in the Schedule for all amounts which the Insured shall become legally liable to pay by way of compensation (including claimants' costs and expenses) for and/or arising out of Personal Injury (including death) and/or Property Damage occurring during the Period of Insurance in connection with the Business of the Insured and/or the Insured's Products and/or Completed Operations
Situation and/or Premises:	Anywhere in the world but the Insurers shall not be liable to pay any claim or indemnity hereunder to the extent that payment of such would expose the Insurers to any sanction, prohibition or restriction under any United Nations resolutions or any trade or economic sanctions, laws or regulations or any applicable jurisdiction.
Limit of Liability:	\$20,000,000 any one occurrence in respect of Public Liability \$20,000,000 any one occurrence and in the annual aggregate in respect of Products Liability

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Subject to coverage and excesses under the relevant Policy Wording.



Signed for and on behalf of
Willis Australia Ltd (Willis, a WTW business)

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Appendix B 2025 Carrapateena Flora and Fauna Survey

Carrapateena Operations

Flora and Fauna Survey,

Spring 2025

BHP



LATHWIDA
ENVIRONMENTAL



March 2026
Final report

Document status

Revision	Doc Type	Reviewed By	Approved By	Date Issued
00	Final	N. Bull, R. Farrugia	Z. Bull	12/03/2026

Project details

Client	BHP – Carrapateena
Project	BHP Carrapateena Ecology Support
Project Number	LE25021
Report Subject	Flora and Fauna Survey, Spring 2025
Project Manager	Zeta Bull
Project Director	Nick Bull
Authors	Zeta Bull, Sonia Croft, Andy Delvaux
File Reference	LE25021 BHP Carra Ecology Spring 2025_Rev0

Suggested citation

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This report has been prepared on behalf of, and for the exclusive use of Lathwida Environmental Pty Ltd (Lathwida) and Lathwida's client BHP, and is subject to, and issued in accordance with, the provisions of the contract between BHP and Lathwida.

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The sole purpose of this report and the associated services performed by Lathwida is to document the 2025 Ecological Assessments for the survey area. This document and associated data will support the development of compliance monitoring reports and primary approval documentation required for the Carrapateena Mine site in South Australia. The report is based on the results of an annual flora and fauna survey for BHP. The scope of services, as described in this report, was developed with BHP.

In preparing this report, Lathwida has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the BHP and/or from other sources. Except as otherwise stated in the report, Lathwida has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

This report has been developed based on information received during its preparation and conditions encountered at the time that related investigations were carried out. As such, the information within this report, and related conclusions, are valid as at date stated in the note on currency. Lathwida disclaims responsibility for any changes that may have occurred after this time.

Lathwida collected and reviewed data and information available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Lathwida has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

Note on currency

Where possible, information contained in this Document is up to date as at March 2026. This was not possible for supporting appendices, and information based on those appendices, which were prepared by third parties (as discussed in the Disclaimer above) prior to the Document being finalised. This report and any legal issues arising from it are governed by and construed in accordance with the law as at the date of this report.

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Executive summary

Carrapateena is a copper-gold mining operation located in South Australia approximately 160 km north of the regional centre of Port Augusta. BHP (previously OZ Minerals) have an approved Program for Environment Protection and Rehabilitation (PEPR) for the Carrapateena Mineral Lease (ML 6471), and associated Miscellaneous Purposes Licences (MPLs) MPL 149, MPL 152, MPL 153, MPL 154 and MPL 156, which satisfies section 70B of the *Mining Act 1971* (SA) (Mining Act). Under the Part 10A of the Mining Act, a compliant program must be in force before carrying out operations as defined in the PEPR. The PEPR outlines specific Outcome Measurement Criteria (OMC) which BHP are required to report against.

BHP engaged Lathwida Environmental (Lathwida) to conduct the annual flora and fauna survey at Carrapateena to determine whether approval conditions and outcomes have been met, as outlined in the PEPR for ML 6471 and associated MPLs. The relevant approval conditions require flora and fauna survey to monitor the following: common native flora and fauna diversity and abundance, plant health, evidence of new weed species that are declared under legislation, increases in abundance of existing (non-declared) weed species and evidence of pathogens or feral animals as a result of the mine operation or mine related activities. In addition, approval conditions require BHP to report records of fauna species with a National Conservation Rating, with those relevant to Carrapateena, as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), being Plains Mouse (*Pseudomys australis*), Night Parrot (*Pezoporus occidentalis*) and Thick-billed Grasswren (*Amytornis modestus indulkanna*).

This report provides the outcomes of the spring 2025 survey, which builds upon the previous ecological compliance monitoring surveys undertaken since the commencement of construction in autumn 2018. The majority of surveys were conducted in spring (from September 2018), however a couple of surveys were conducted in autumn to provide an additional opportunity to capture the EPBC listed Plains Mouse. In the year preceding the 2025 survey, Carrapateena rainfall was below average and fluctuated, with only 3 larger events (November 2024 (over 60 mm), March 2025 (30 mm) and July 2025 (over 20 mm)).

Flora survey methods undertaken here, and during compliance monitoring since the commencement of construction, are generally consistent with methods that have been used at Carrapateena for baseline studies undertaken prior to construction (2012 to 2017), with minor modifications to align data collection with the outcomes and mine approval conditions. Flora methods include Jessup transects, Rangeland Assessment Methodology (RAM), canopy cover assessments, weed transects and Landscape Function Analysis (LFA) transects. These methods provide a combination of data that informs current native and exotic (weed) plant diversity and abundance, whilst canopy cover data provides an indication of tree health (and stress) within Eliza Creek downstream of the tailings storage facility (TSF). Results are compared to baseline survey data where applicable data is available. LFA was conducted at 2 sites that have begun rehabilitation. Of the 2 other LFA sites that have previously been monitored, 1 site no longer required monitoring (Tjungu) and 1 had been re-ripped and seeded in 2025, but no germination had begun at the time of the survey. Hence, a new site will be established and monitoring will occur in 2026. The results of the spring 2025 LFA were compared with 2019 to 2024 results and baseline data from corresponding representative 'analogue' sites. In future additional LFA sites and new analogue sites could be established adjacent the LFA Sites or comparisons could use the nearest flora monitoring transects for efficiency, once infrastructure locations are final, and the rehabilitation is evident.



Fauna survey methods followed a modified version of the biological survey methods, with a focus on pitfall trapping to address the tenement condition relating to common fauna (e.g. small mammals and reptiles) diversity and abundance, as well as the EPBC listed as Vulnerable Plains Mouse. A single trap line was installed at 8 established fauna sites, and bird surveys were undertaken at 20 sites, aligning with vegetation survey sites. Two unbaited camera traps were also installed at each trap line site, and Song Meters were deployed at 10 sites to record bird calls and at 2 sites to record microbat calls. Opportunistic observation / capture of all vertebrate species across the site was also recorded to provide information about overall species diversity at Carrapateena, which is comparable with previous surveys.

Despite below average rainfall for the year prior to the survey, above average rainfall events (in November 2024, March and July 2025) and reduced grazing impacts, there was an abundance of short-lived flora species and presence of the 5 main long-lived flora species at Carrapateena continues to be sustained. This likely aligns with the moderate to high numbers of reptiles (which have less reliance on sustained rainfall), and moderate diversity of small mammals reported in 2025. A lack of sustained rainfall earlier in the preceding year, and resulting lack of suitable food resources (e.g. grass seeds), has likely influenced the overall fauna records at the site in 2025, which included low to moderate rodent diversity and captures and a continued lack of detection of EPBC listed Plains Mouse, consistent with other surveys in the broader region (e.g. Olympic Dam, Oak Dam and South Gap). Bird diversity was also moderate across the location. In contrast, reptile captures and diversity remained stable.

In 2025 compliance was met across all ecology related OMCs, further detail is provided below.

ES1 Flora results

In 2025, a total species diversity of 141 native species was recorded across all flora sites, and this was the equal highest recorded flora diversity during compliance monitoring, due to a very high diversity of short-lived species being recorded. These species germinate in response to rainfall events, e.g. average rainfall received in July 2025. Grazing impact continued to be low to moderate in 2025, following widespread destocking across the mineral lease, which also likely influenced widespread increased abundance of palatable species including juveniles (e.g. Bladder Saltbush, Bush Minuria and Plains Lantern Bush). The population abundance of the 5 most abundant and/or widespread long-lived perennials declined during 2018 to 2020, but have all increased since 2021 (Bladder Saltbush, Samphire, Sea-heath, Bush Minuria, Plains Lantern Bush). The fluctuations in long-lived perennial species are attributed to yearly and long-term rainfall totals rather than mining impacts (e.g. the 100% increases in Bladder Saltbush in 2025, largely due to juveniles). Similar to 2024, in 2025 the mean total species diversity for impact sites and for control sites was not significantly different, were within the baseline range, and comparable with mean total species diversities recorded in 2018 (early compliance). Based on the above, mining activities are not considered to be impacting either short-lived or long-lived species diversity at the mineral lease. Hence, results suggest there are no impacts on native flora species diversity and abundance from mining activities, satisfying Schedule 6 Conditions of the PEPR and OMCs SWRF1, AQ2.



Impacts in Eliza Creek have the potential to occur as a result of reduced surface water flows, reduced groundwater flows and / or groundwater contamination attributed to tailings seepage from the TSF, or flood water released through activation of the decant dam spillway in a 1 in 100-year 72 annual exceedance probability (AEP) rain event. Since 2018, there has been no distinct trend in species diversity for any of the Eliza Creek sites, with only minor fluctuations occurring yearly at each site. There are also no distinct differences in species diversity between sites. There is no clear pattern emerging in species diversity data relating to the time since the TSF establishment and the distance from the TSF. Five of the most abundant long-lived woody perennials recorded at the Eliza Creek Jessup transects were separately analysed. All 5 species have shown yearly fluctuations, but no downward population trends at any of the Eliza Creek sites since 2018, and the Eliza Creek Jessup transects have shown an increase in total perennial species abundance. Canopy cover assessments have also shown positive tree health for the sites downstream of the TSF. Western Myall trees have shown an increase in foliage and recruitment (notably at Site 17 closest to the TSF) and River Red Gums have regained canopy losses reported in previous years, but there was still no recruitment of Red Gums recorded along transects. Lack of recruitment from River Red Gums along the transects (located furthest from the TSF) are likely reflective of lower than average rainfall. The results of the formal monitoring sites results would suggest there are no impacts on Eliza Creek vegetation arising from the TSF and associated mining activities, satisfying Sixth Schedule Condition 2 of the PEPR and OMC SWRF1, TSF6.

Downstream of the TSF, but upstream of Site 17, a seepage incident at the Decant Dam has been closed out (offset has been accounted for). Whilst the Western Myall trees have not recovered, there are understory and midstorey shrubs showing recovery / regeneration. This is currently considered compliant.

Weed species were surveyed at existing flora sites; at designated weed transects, and at opportune locations throughout the lease area, including the camps and some of the dams. Most weeds recorded were annual herbs or grasses. Most annual weed records were from dams or drainage lines, areas naturally susceptible to weed invasion, and from the dune habitats, and their presence is unrelated to mining activities. There were no new weeds recorded in 2025 and no overall increase in abundance or extent of weeds declared under legislation, with the exception of a new small location of Declared species Bathurst Burr at weed transect CWM05. It is recommended that this BHP continue to work with the landholder to manage this small population when it is actively growing.

Ongoing control of Tobacco Bush (*Nicotiana glauca*), a non-declared weed, at Dawson Dam and South Eliza Dam is recommended. Fluctuations in density reflect seasonal rainfall patterns rather than mining impacts. No new species of declared weeds were recorded during spring 2025, indicating compliance with the Schedule 6 Condition 6, Schedule 2 Condition 28, and OMC WP1 and WP2.

No EPBC listed flora species were recorded during the 2025 survey. NPW Act listed flora species Rounded Sea-heath (*Frankenia subterres*) was again recorded near Flora Site 9. An area of approximately 0.8 ha was mapped including over 2,000 plants (adults and juveniles).



ES2 LFA results

The current status and trends at 2 of the 4 rehabilitation sites (Aerodrome laydown, Ventia laydown, Midway Quarry and Tjungu) were again measured by LFA, using the Established Method for both sites, and additionally using the Point Centre Quarter (PCQ) method for one of the sites. Ventia was decommissioned in 2025, but new sites will be established nearby in areas that were deep-ripped and hand seeded in 2025. Tjungu (a deep-ripped and hand seeded site) was closed out in 2024, having reached analogue status. For the 1 of the 2 sites assessed in 2025, the LFA has shown a positive trend in the number and area of plants per ha, albeit with a slight decline in plant cover recorded in 2025. Plant colonisation across sites is currently dominated by short-lived perennial species (particularly *Sclerolaena* spp.) although several longer-lived perennials were also recorded and some distant from the transects. Total species diversity continued to increase at this site. At the other LFA site assessed in 2025, plant colonisation has been very sparse and limited to a few individuals of 2 short-lived perennial species, with a decline in species (patches) recorded in 2025. It is recommended that the site be re-ripped to a greater depth and supplemented with hand direct-seeding. Whilst the short-lived species serve as an important colonising component in the stony tableland habitat, all plants improve soil stability and function. As patches establish and increase in size, the potential for resource capture and nutrient cycling improves leading to ongoing increased potential for recruitment of native species. Developed patches also provide cover and habitat opportunities for native fauna species and reduce soil loss and erosion.

Although LFA monitoring is in its early stages, there are evident differences between application of different rehabilitation techniques which may be affecting recruitment. These include deeper contour ripping and application of rocky surface strew at the Aerodrome, and Tjungu sites compared with shallower contour ripping at the Ventia and Midway Quarry site. The addition of hand seeding has also likely accelerated establishment of plants at the Tjungu site, although only a few species from the seed mix were recorded, regardless this site no longer requires formal monitoring. Ongoing LFA monitoring at the other sites will assist in informing trends and the benefits of additional intervention such as deeper or repeat ripping and seeding. Other additional intervention or restoration activities of the remaining sites could include applying native woody debris (e.g. old Myall fence posts, fallen branches), planting local groundcovers and low shrubs, and providing supplementary watering during critical periods of plant establishment.

Currently, LFA data is compared with data from a series of 'analogue sites' which were collected prior to construction at the site. Whilst this analogue data is considered broadly representative of the vegetation communities around the mine lease, and therefore a useful indicator of rehabilitation success, a more precise reference would be to establish LFA sites adjoining each rehabilitation site. For efficiency, the nearest flora monitoring 100 m Jessup transect could be used (i.e. 2 replicates of 50 m), e.g. Site 3 near Ventia, Site 16 near the Aerodrome, Site 5 near Midway Quarry, Site 16 closest to Aerodrome.

Overall, OMC LUP4 is considered to be in-progress / compliant.



ES3 Fauna results

The 2025 spring fauna survey identified a total of 87 vertebrate species from the 8 survey sites and opportunistically across the study area. Capture rates (relative to survey effort) for small mammals and reptiles were within baseline and previous compliance survey ranges. Small mammal detections were the highest recorded during the compliance monitoring period (includes camera detection). Reptile and bird species diversity across the whole of Carrapateena was also within the range of diversity that has been recorded during baseline surveys, meaning the data do not indicate that construction and early operational activities have resulted in a loss of abundance or diversity of fauna across the site more broadly. Bird diversity was within baseline and previous compliance survey range, but waterbird species presence had reduced from results of 2024 when there was temporary excess water at South Eliza Dam. Mammal total diversity was within baseline and compliance ranges, with captures lower for rodents and they were only detected at control sites. Whilst this trend is worth watching, rodents have been generally detected in smaller numbers in previous surveys and presence is most likely related to reduced rainfall over preceding years.

The common fauna species were captured in numbers within baseline ranges (e.g. Stripe-faced Dunnart, Fat-tailed Dunnart, Saltbush Ctenotus, Earless Dragons). Diversity of species and families was comparable to baseline data, and birds and reptiles showed evidence of breeding (e.g. plumage, multi-sex groupings and presence of juveniles), suggesting that mining related construction activities are not negatively impacting fauna at Carrapateena. Small mammal capture numbers were again skewed towards Stripe-faced Dunnarts, aligning with baseline and previous compliance survey outcomes, with the exception of 2022 when Fat-tailed Dunnarts were captured in higher numbers. Both species were detected at both control and impact sites in 2025. In addition, microbats were surveyed using Song Meter acoustic device at 2 opportunistic sites and 4 species were detected.

The approval conditions of the PEPR (Schedule 2 Condition 28) require that any records of 3 EPBC listed species (Night Parrot, Thick-billed Grasswren, and Plains Mouse) are documented and provided to the Biological Databases of South Australia (BDBSA), if they are recorded during ecological surveys at Carrapateena, or opportunistically during regular site activities. None of these EPBC listed species were detected during the 2025 survey. One EPBC listed as threatened species was detected opportunistically during the spring 2025 survey; Southern Whiteface (*Aphelocephala leucopsis leucopsis*) detected at weed monitoring site CWM05.

During the spring 2025 survey, there were 3 fauna species detected that had not been recorded within the lease prior to or since baseline monitoring, including the Broad-banded Swimmer (*Eremiascincus richardsonii*), Brown Goshawk (*Accipiter fasciatus fasciatus*) and Rufous Whistler (*Pachycephala rufiventris rufiventris*). The Broad-banded Swimmer (a reptile) has only been detected in low numbers during baseline (6 records in total); the two birds had only previously been detected once each opportunistically prior to baseline.

Less invasive fauna detection methods such as Song Meters and cameras have again proved useful to complement bird and fauna survey effort, particularly in the arid zone, where the local climate can affect species presence during a survey.

Overall, OMC WP1, WP2, EPBC1, EPBC2, EPBC3 are considered to be compliant.

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1 Introduction

1.1 Operation background

Carrapateena is a copper-gold mine owned and operated by BHP Group Limited (BHP) which is located in South Australia on the eastern margin of the Gawler Craton, approximately 160 km north of the regional centre of Port Augusta (Figure 1.1). Construction on Carrapateena was completed by OZ Minerals in late 2019 – early 2020, and the mine is now in a steady state of operation. The Carrapateena operation is an underground copper gold mine using a sub-level cave mining method. Onsite there is the Tjati and materials handling declines, process plant, ancillary infrastructure, Tailings Storage Facility (TSF), Tjungu village and Aerodrome. An exploration village that was temporary is also likely to be retained and updated given expansions that are in progress. OZ Minerals was purchased by BHP in 2023 and all former OZ Minerals assets are now part of BHP.

BHP have an approved Program for Environment Protection and Rehabilitation (PEPR) for the Carrapateena Mineral Lease (ML 6471), which satisfies section 70B of the Mining Act 1971 (SA) (Mining Act). Under Part 10A of the Mining Act, a compliance program must be in force before carrying out operations as defined in the PEPR. OZ Minerals was granted ML 6471 on 3 January 2018. The PEPR was updated in June 2025. In addition to the ML, the Carrapateena PEPR also includes the following Miscellaneous Purposes Licence (MPLs) for infrastructure associated with the mine:

- Airstrip, Workers' Accommodation Village, Access Road and Ancillary Infrastructure (MPL 149), granted 5 July 2017
- Western Infrastructure Corridor (MPL 152), granted 3 January 2018
- Eastern Radial Wellfield (MPL 153), granted 3 January 2018
- Southern Access Road and Radial Wellfield (MPL 154), granted 3 January 2018
- Northern Wellfield (MPL 156), granted 11 December 2018.

Jacobs were previously engaged to conduct construction and operational ecological monitoring surveys in autumn and spring of 2018, spring 2019 to 2022, and autumn 2023 in order to meet approval conditions outlined in the PEPR ML 6471. Lathwida Environmental (Lathwida) took over the ecological monitoring in 2024. This report represents the findings from the ninth compliance monitoring survey, undertaken in spring of 2025 by Lathwida. The approval conditions focus on:

- Surveying native plant species to ensure there is no decline in diversity and abundance as a result of mining activities,
- Monitoring of plant health to demonstrate that there are no detrimental impacts on plants as a result of mining activities (e.g. including impacts from raised dust levels, contaminants and/or declines in surface water flow),
- Monitoring to demonstrate that no new weed species declared under legislation have been introduced to Carrapateena, and no increase in abundance of existing (non-declared) weed species, pathogens or feral animals has occurred as a result of mining activities,



- Surveying common native fauna to ensure there is no loss in diversity or abundance, as a result of mining activities (e.g. from direct impacts, impacts to habitat, weeds and pests),
- Surveying native fauna species to ensure there is no decline in diversity and abundance of NPW Act or EPBC Act listed fauna as a result of mining activities, and
- Reporting of any records of EPBC Act listed fauna species, including migratory species, with specific objectives for several EPBC listed species (discussed below).



- Mineral Lease ML6471
- Airstrip and Tjungu Village MPL149
- Western Infrastructure MPL152
- Eastern Radial Wellfield MPL153
- Southern Access Road and Radial Wellfield MPL154
- Northern Wellfield MPL156

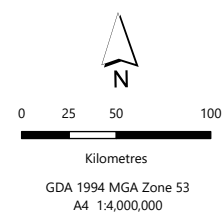


Figure 1.1: Project location
Carrapateena Flora and Fauna Survey, spring 2025



1.1.1 Relevant conditions of approval

As stated in the initial compliance monitoring report, which occurred during construction (Carrapateena Ecology autumn 2018 survey, Jacobs 2018a), the approval conditions of the PEPR for ML 6471 and associated MPLs define a number of conditions relating to fauna and flora values that occur within the lease areas, which are summarised in Table 1.1 below. The PEPR, updated in June 2025, also outlines the monitoring program including Outcome Measurement Criteria (OMC), Leading Indicators and Strategies to demonstrate compliance with the defined and agreed Outcomes, which are summarised in Table 1.2.

Table 1.1: Mineral Lease 6471 and associated MPLs fauna and flora conditions relevant to annual monitoring (BHP 2025a)

Schedule and Conditions Reference no.	Condition Environmental Outcome / OMC ID
Schedule 2 Condition 28.2 to 28.4 (ML 6741, MPL 152 to 154)	To avoid impacts to (e.g. loss of abundance and diversity) Matters of National Environmental Significance, the Tenement Holder must: 28.2. Provide data from any future sightings and records of the Thick-billed Grasswren to the Biological Databases of South Australia (BDBSA) to enable effective monitoring and record keeping, as per the Recovery Plan Actions; 28.3. Provide data from any future sightings and records of the Night Parrot to the Night Parrot Recovery Team; and 28.4. Provide data from any future sightings and records of the Plains Mouse to the BDBSA to enable effective monitoring and record keeping, as per the Recovery Plan Actions. OMC ID EPBC1, EPBC2, EPBC3 (see Table 1.2)
Schedule 6 Condition 6 and 28.1 (ML 6471) Condition 3 (MPL 156) Condition 6 (MPL 152 to 154) Condition 10 (MPL149)	The Tenement holder must during construction and operation ensure no introduction of new species of Weeds declared or listed under relevant legislation, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the Land as a result of mining operations or mining related activities. 28.1. Develop, implement and maintain appropriate management actions to ensure the control of feral animal populations, including cats and foxes. OMC ID WP1, WP2 (see Table 1.2)
Schedule 6 Condition 17 (ML 6471)	The Tenement Holder must during construction, operation and post completion ensure no adverse impact to surface water quality and water dependent ecosystems (excluding surface water in the mine subsidence zone), on or off the Land, as a result of contamination and sedimentation caused by mining operations or mining-related activities. OMC SWRF1, TSF6 (see Table 1.2)
Schedule 6 Condition 7, 6, 4 (MPL 6471, MPL 149, 152 to 154, 156)	The Tenement Holder must during construction and operation ensure no impacts to agricultural productivity for third-party land users on or off the Land as a result of mining-related activities other than those agreed between the Tenement Holder and the affected user or determined by an appropriate court as evidenced in its order(s) (and the Tenement Holder must provide the Director of Mines (or other authorised officer) with a copy of the order(s), which shall be placed on the Mining Register). OMC LUP4
Schedule 6 Condition 14 (ML 6471)	The Tenement Holder must during construction, operation and post Completion ensure no adverse change to the air quality environment as a result of particulate emissions and/or dust generated by mining operations or mining related activities. OMC AQ2 (see Table 1.2)

Table 1.2: Outcomes, Outcome Measurement Criteria (OMC) / Leading Indicator and Achievement Values (BHP 2025a)

Outcome Measurement Criteria (OMC) Code	Relevant Environmental Outcomes	OMC / Leading Indicator	Achievement Values
SWRF1	The Tenement Holder must during construction, operation and post Completion ensure no adverse impact to surface water quality and water dependent ecosystems (excluding surface water in the mine subsidence zone), on or off the Land, as a result of contamination and sedimentation caused by mining operations or mining-related activities.	Annual ecological surveys undertaken by an independent and suitably qualified expert at Eliza Creek monitoring sites.	No adverse impact on the diversity and abundance of native vegetation and water dependant ecosystems attributed to reduced surface water flows caused by mining operations when compared to baseline conditions (Appendix C5 of PEPR - Ecological Baseline BHP 2025a) unless a significant environmental benefit has been approved in accordance with the relevant legislation Linked to Native Vegetation Outcome (Schedule 6 Condition 11).
TSF6			No adverse impact on the diversity and abundance of native vegetation and water dependant ecosystems attributed to tailings seepage when compared to baseline conditions (Appendix C5 of PEPR - Ecological Baseline BHP 2025a) unless a significant environmental benefit has been approved in accordance with the relevant legislation. Linked to Native Vegetation Outcome (Schedule 6 Condition 11).
WP1	The tenement holder must during construction and operation ensure no introduction of new species of weeds declared or listed under relevant legislation, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species in the Land as a result of mining activities mining operations or mining-related activities.	Annual flora and fauna surveys undertaken by suitably qualified ecologists at flora, fauna and weed monitoring locations.	No introduction of: - new species of weeds declared or listed under relevant legislation - plant pathogens, pests (including feral animals) when compared to previously recorded weed species and introduced fauna.
WP2			No increase in the abundance of existing weeds or pest species in the land compared to previous survey records.
AQ2	The Tenement Holder must during construction, operation and post Completion ensure no adverse change to the air quality environment as a result of particulate emissions and/or dust generated by mining operations or mining-related activities.	Annual ecological survey undertaken by a suitably qualified and experienced expert demonstrates no adverse impact on the diversity and abundance of native vegetation at monitoring sites (Figure 2.1).	No adverse impact on the diversity and abundance of native vegetation at monitoring sites directly attributed to dust deposition from mining operations or mining related activities when compared to baseline native vegetation conditions (Appendix C5 Ecological Baseline of BHP 2025a) when compared to baseline native vegetation conditions unless an SEB has been approved in accordance with relevant legislation.

Outcome Measurement Criteria (OMC) Code	Relevant Environmental Outcomes	OMC / Leading Indicator	Achievement Values
EPBC1	Provide data from any future sightings and records of the Thick-billed Grasswren to the Biological Databases of South Australia (BDBSA) to enable effective monitoring and record keeping, as per the Recovery Plan Actions.	Annual monitoring for flora and fauna and opportunistic sighting provide option for records of Thick-billed Grasswren, if detected provide records to the BDBSA (Figure 2.1, Figure 2.2, Figure 2.3).	Records of the Thick-billed Grasswren provided to the BDBSA if observed. Linked to MNES Condition (Schedule 2 Condition 28.2).
EPBC2	Provide data from any future sightings and records of the Plains Mouse to the BDBSA to enable effective monitoring and record keeping, as per the Recovery Plan Actions	Annual monitoring for flora and fauna and opportunistic sighting provide option for records of Plains Mouse, if detected provide records to the BDBSA (Figure 2.1, Figure 2.2, Figure 2.3).	Records of the Plains Mouse, provided to the BDBSA if observed. Linked to MNES Condition (Schedule 2 Condition 28.4).
EPBC3	Provide data from any future sightings and records of the Night Parrot to the Night Parrot Recovery Team	Annual monitoring for flora and fauna and opportunistic sighting provide option for records of Night Parrot, if detected provide records to the BDBSA (Figure 2.1, Figure 2.2, Figure 2.3).	Records of the Night Parrot provided to the Night Parrot Recovery Team if observed. Linked to MNES Condition (Schedule 2 Condition 28.3)
LUP4	The Tenement Holder must ensure that the Land is progressively and finally rehabilitated to support the future land use.	Rehabilitation trials shall be undertaken at infrastructure locations no longer required (at least 1 area per closure domain) Figure 2.6 and ongoing (annual) assessment at LFA monitoring sites demonstrating development of trends and annual improvement of rehabilitation through LFA methodology. Should the data indicate rehabilitation not trending towards sustainability root-cause investigations will be undertaken and rectification methods be identified and implemented.	Rehabilitation has achieved, or is likely to achieve, a landscape function equivalent to that of adjacent analogue LFA sites

Note WP3 includes monthly weed inspections, this is not part of the scope of this report.



1.2 History of monitoring at Carrapateena

The history of baseline ecological monitoring at Carrapateena is summarised in Jacobs (2018a), which also represents the first of the compliance monitoring reports following commencement of construction. Briefly, baseline flora and fauna surveys were undertaken by EBS Ecology within and surrounding the Carrapateena Mineral Lease (ML 6471), biannually between autumn 2012 and spring 2016 / 2017 (references provided in EBS Ecology 2017c and Jacobs 2018a). The surveys covered a range of seasonal and yearly climatic conditions and therefore collectively provide a robust baseline data set describing the fauna and flora values present at the site, against which impacts arising from the construction and operation of Carrapateena can be compared. The autumn and spring 2018, spring 2019 to 2022 and autumn 2023 surveys represent the commencement of, and ongoing construction and operational compliance monitoring associated with the approved PEPR (Jacobs 2018a, 2019a, 2019b, 2020a, 2021b, 2022, 2023b). It is noted that whilst baseline surveys were conducted in 2017, some raw data (primarily floristic data) was not available for comparison against the compliance monitoring data. Further, baseline surveys conducted in 2012 did not include Jessup flora at sites 15 and 16.

1.3 Climate at Carrapateena

The closest Bureau of Meteorology (BoM) weather station with comprehensive temperature and rainfall records for the Carrapateena Mine area is the Woomera Aerodrome station (BoM station 16001; BoM 2025a), located approximately 70 km west of the operational area. This station has long-term climate data dating from 1949 to the present, offering valuable insight into regional climate patterns. The Carrapateena mineral lease occurs within an arid zone characterised by a hot, dry climate. The long-term mean annual rainfall for the Woomera weather station is 184 mm (BoM 2025a). While long-term mean monthly rainfall shows little seasonal variation, mean monthly maximum temperatures range from the low to mid-30s during summer to below 20°C in winter (Figure 1.2).

During the 12 months preceding the spring 2025 survey, the Woomera region experienced approximately 40 mm below the long-term mean annual rainfall, even though November and July recorded approximately 40 mm and 10 mm more rain than the long-term monthly means, respectively (Figure 1.3, Figure 1.4, and Figure 1.5). The yearly rainfall total deficit was largely due to 7 months receiving at least 10 mm less rainfall than the long-term monthly averages (Figure 1.3). Between 1 January and 30 June 2025, Woomera recorded 25 mm, well below the long-term mean of 94 mm. The remaining months were generally within 5 mm of the long-term means. The total rainfall for the 3 winter months immediately preceding the September survey, however, equalled the long-term mean of 43 mm. Additional discussion on rainfall patterns specific to Carrapateena is provided in Section 3.1.

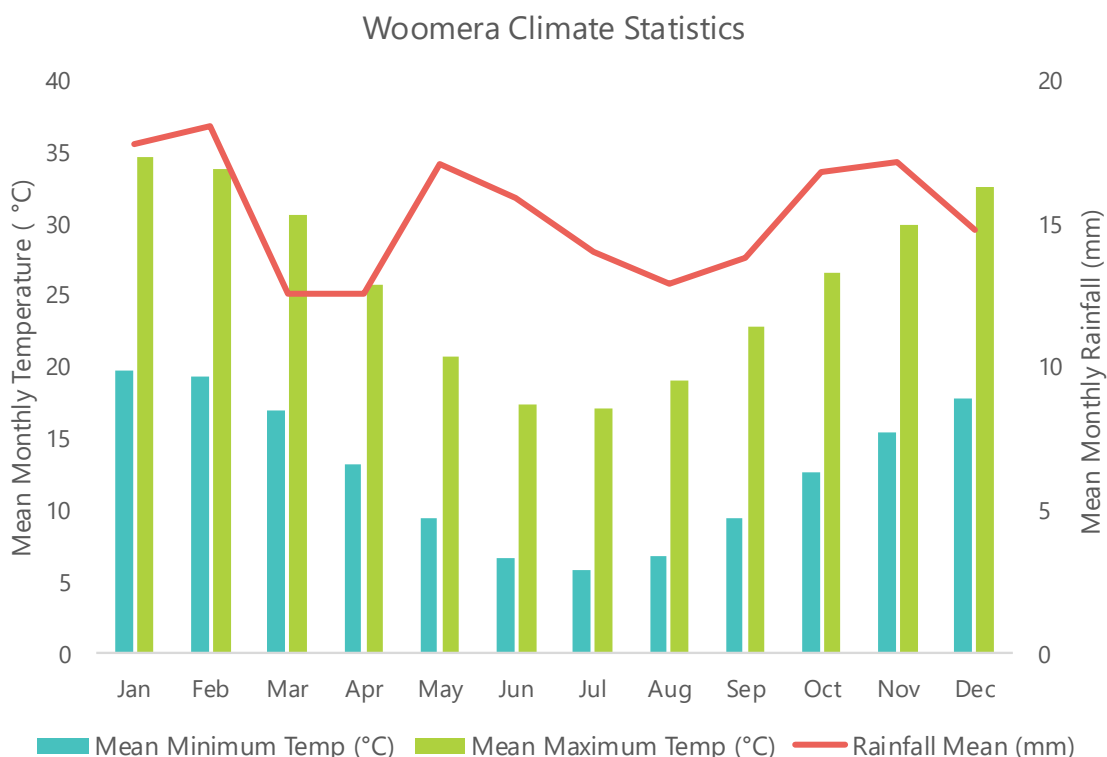


Figure 1.2: Long-term climate averages (1949-2025) for the regional weather station nearest to Carrapateena; Woomera Aerodrome

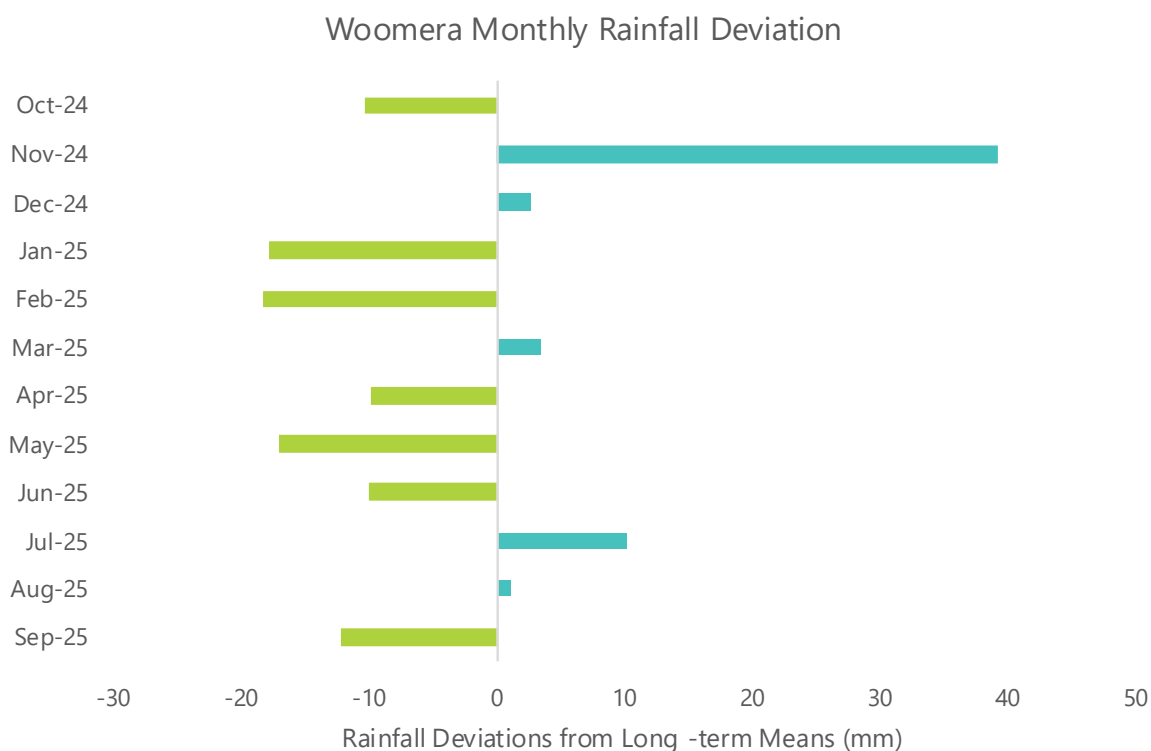


Figure 1.3: Rainfall deviations between year preceding survey and long-term averages (1949-2025) for Woomera Aerodrome

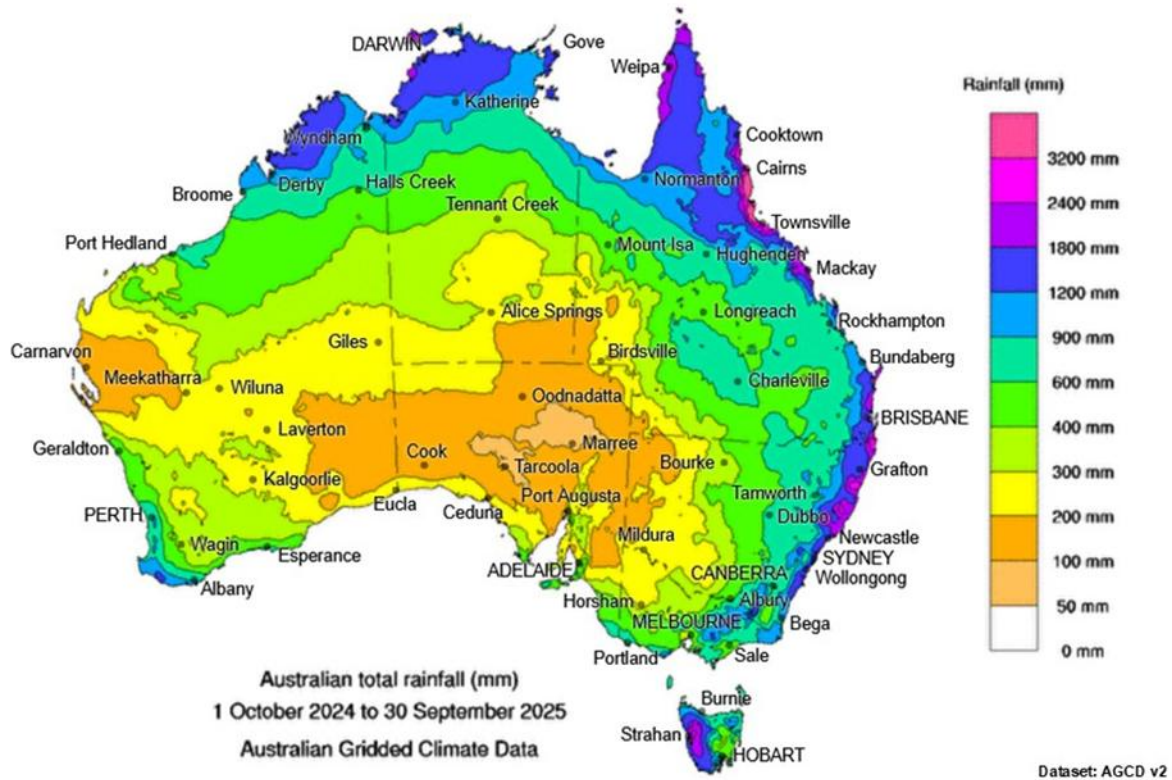


Figure 1.4: Total rainfall across Australia, 12 months preceding the spring 2025 survey (BoM 2025b)

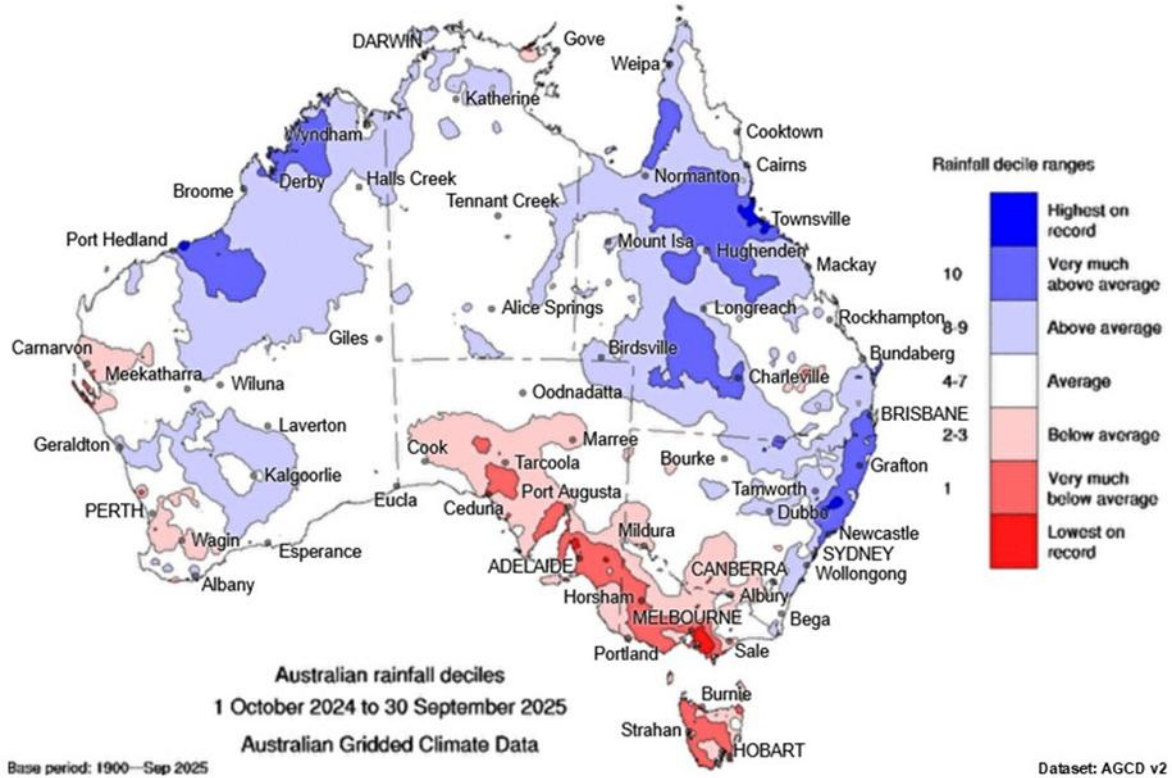


Figure 1.5: Rainfall deciles across Australia, 12 months preceding the spring 2025 survey (BoM 2025b)



2 Methods

2.1 Survey details

Lathwida undertook the spring flora and fauna surveys at Carrapateena between 18 and 26 September 2025. The survey team included the following suitably qualified personnel:

- Principal Ecologist Dr Zeta Bull undertook trap installation, morning and afternoon trap checks, bird survey, mammal and reptile identification lead, flora survey assistant, trap removal.
- Senior Associate Ecologist Greg Smith undertook trap installation, morning and afternoon trap checks, mammal and reptile identification, bird survey, flora survey, trap removal and Song Meter deployment and analysis. Greg specifically surveyed 'men only' cultural sites;
- Senior Associate Ecologist Dr Sonia Croft undertook trap installation, morning and afternoon trap checks, flora surveys, bird survey, trap removal;
- Undergraduate Ecologist Andy Delvaux provided survey assistance and undertook trap installation, assisted with morning and afternoon trap checks, assisted with flora survey, mammal and reptile identification, bird survey and trap removal. Andy assisted with survey of the 'men only' cultural sites.

BHP Environmental personnel Trent Anderson, Tina Law and Luke Boehm assisted with various logistics associated with the survey.

2.2 Permitting

Undertaking ecological research and handling/trapping of animals in South Australia can only legally be undertaken with relevant permits and licences in place. Relevant permits and licences were obtained prior to field survey commencement. All works were undertaken in accordance with permit and licence conditions; details as below.

- Permit to Undertake Scientific Research:
 - Permit # A27482-1, valid from 11/10/2024 to 10/10/2025
- Wildlife Ethics Committee Permit:
 - Application number Bull_26/2023M2 statewide fauna with semi-pitfalls, approval period 31/08/2023 to 01/09/2026
- Permit to Undertake Scientific Research for State-wide Vegetation Surveys:
 - Permit # U27347-2, valid 17/10/2024 to 16/10/2025
- Licence for 'teaching, research or experimentation involving animals':
 - Licence # 414, expires 12/8/2027



- Licence to 'possess and administer Prescription Drug'¹:
 - Licence # 2023-87672, expires 12/09/2026.

2.3 Spring 2025 Sites

The objective of the survey monitoring program is to demonstrate whether the site is compliant with the conditions of the Mineral Lease and the approved Outcomes during the mine construction, operations and rehabilitation. Table 2.1 below includes a summary of previous monitoring sites against the compliance survey sites and an explanation for any changes. Table 2.2 provides a summary of specific spring 2025 survey site details. Refer spring 2019 report (Jacobs 2020a) for further details. The locations of the spring 2025 survey sites are provided on Figure 2.1 for flora and canopy cover, Figure 2.2 for fauna sites, Figure 2.3 for weed transects, and Figure 2.6 for LFA, as part of the operational monitoring.

¹ A condition of Scientific Research Permits is that 'best practice' for biological survey work is undertaken, including vouchering of specimens of interest for the South Australian Museum (SAM). This condition is included on permits as a means of maximising value obtained from survey work across the State, to enable taxonomic specialists the chance to verify field identification, and to encourage survey records to be included in the Biological Database of South Australia for broader knowledge. As such, the project team liaised with the SAM prior to undertaking the survey to ascertain whether the Museum had particular interest in the region being surveyed. In this case, the curator of mammals and curator of reptiles requested voucher specimens and liver tissue samples be collected for target species. Pentobarbitone sodium is used to euthanize specimens, however, was not required on this survey as no animals were euthanized.

Table 2.1: Sites surveyed in spring 2025, compared with baseline survey sites

Baseline Survey Sites (2012-2017)	Compliance sites	Construction / Operational (Compliance) Monitoring Survey Sites (spring 2025)
Flora		
Jessup transects (at 16 sites) (Flora Site 1 to 16)	18 Jessup transects	Jessup transects (as per baseline Flora Site 1 to 16), plus additional Jessup sites at Eliza Creek Flora Sites 17 to 20. *In spring 2019, Sites 8 and 14 were permanently removed from the program given proximity to stock impact areas, interfering with assessment of mining impacts. Refer Jacobs Spring 2019 for additional detail (Jacobs 2020a). **Jessup sites not undertaken at Site 21, 22 sand dune habitat as per Section 2.4
Flora sites (at 16 sites) (Flora Site 1 to 16)	20 RAM sites	Flora Site 1 to 16 (excludes 8 and 14), Eliza Creek sites (Sites 17 to 20) and dune habitat sites (Sites 21 to 22). Record of all plant species and cover/abundance within a 1-ha area using Rangeland Assessment Method (RAM) (NVC 2024).
Flora cover sites (at 33 sites) (CFL01 to CFL33)	NA	Baseline surveys only, not continued. Survey sites covered 10 m x 5 m area, deemed too small to capture meaningful change in this habitat type.
Canopy cover (at 11 transects). 7 Eliza Creek transects, 4 Yeltacowie Creek transects (CCC01 to CCC11)	8 sites (Eliza Creek)	Baseline Yeltacowie Creek and Eliza Creek canopy cover sites (CCC01 to CCC11, EBS 2017c) were not assessed as per 2018-2023. Eliza Creek canopy cover transects (17A/B, 18A/B, 19A/B and 20A/B) surveyed in spring (2018 to 2022, 2024, 2025) and in autumn (2018, 2019, 2023).
Weed Monitoring (at 4 transects) (CWM01 to CWM04)	10 weed transects	Baseline weed transects (CWM01 to CWM04), CWM05 to CWM07 (established in 2018 to 2022); Northern Wellfield (MPL 156) transects (NWM01 to NWM03). Opportunistic observations of declared weed species or species listed under legislation are also recorded.
Fauna		
Reptiles and mammals (at 8 sites) Fauna Sites 1 – 6, 15, 16)	8 fauna sites	Semi-permanent pitfall trap line sites as per baseline surveys (Fauna Site 1 to 6, Fauna Site 15 to 16). As per 2018 to 2024, only 1 pitfall line was opened (6 pits per line). No Elliott traps were deployed as per baseline (2015-2017), and compliance / operation (2018 to 2024). This methodology will be continually reviewed based on an analysis of compliance monitoring trapping data for small rodents (e.g. Plains Mouse). Camera traps have also been used (1-2 per line) since 2021.
Bats	NA	Common microbat audible to humans (Dennis Mathews, pers. com.). No bats likely to be present at the site have a conservation rating. In 2024 and 2025 Song Meters were deployed to detect birds and microbats; at Sites 10 and 7 in 2025.
Bird Sites (at 16 sites, Fauna Site 1 – 16), opportunistic surveys at water points	20-22 sites, opportunistic at water points / irrigation areas	Bird surveys at 20 sites. Opportunistic surveys at water points (e.g. farm dams), camps to capture diversity across the site as per baseline surveys. Survey of water points also enables opportunistic observations of seasonal of migratory shorebirds. Song Meters were deployed to detect bird species by call at all fauna sites, Flora Site 10 (Eliza Creek), and Flora site 7 (Bosworth Creek). Water was present at site dams, but the creeks were dry.
Landscape Functional Analysis (LFA)		
Landscape Functional Analysis (CEF01 to CEF07)	4 sites, each with 2 transects	Four Landscape Functional Analysis sites (LFAAL1, LFAVOL2, LFAQUA3, LFATJU4), each with 2 transects A and B (e.g. LFAAL1A, LFAAL1B). In September 2025, 2 sites were not assessed (LFAVOL2 has been re-ripped and reseeded, awaiting germination; LFATJU4 was considered to be complete as per Lathwida 2025a). Two sites will be monitored in 2026 (LFAVOL2 and / or new sites along the WAR where seeding and ripping has occurred).

Refer to Jacobs Spring 2019 report for additional detail (Jacobs 2020a).

Table 2.2: Summary of survey sites, codes and coordinates

Survey Techniques at Site	Site Code	Start / End	Easting	Northing
Weed Transect	CWM01	Start	737108	6517520
		End	736871	6516550
	CWM02	Start	737842	6530179
		End	738177	6529435
	CWM03	Start	733610	6535627
		End	732611	6535266
	CWM04	Start	735912	6540184
		End	736548	6540963
	CWM05	Start	700638	6518508
		End	701466	6519078
	CWM06	Start	717686	6529628
		End	718673	6529505
	CWM07	Start	743694	6539567
		End	743410	6540518
	NWM01	Start	726014	6554920
		End	726937	6554923
RAM, Jessup, Fauna Trapping, Birds	NWM02	Start	726955	6569623
		End	725963	6569751
	NWM03	Start	720606	6580675
		End	720551	6581674
	Flora / Fauna 1 (CAR001)	Start	731707	6550590
	Flora / Fauna 2 (CAR002)	Start	734223	6545185
	Flora / Fauna 3 (CAR003)	Start	736001	6540156
	Flora / Fauna 4 (CAR004)	Start	736251	6534615
RAM, Jessup, Birds	Flora / Fauna 5 (CAR005)	Start	729131	6532955
	Flora / Fauna 6 (CAR006)	Start	739690	6531181
	Flora / Fauna 15 (CAR015)	Start	737123	6538106
	Flora / Fauna 16 (CAR016)	Start	732472	6535805
	Flora / Fauna 7 (CAR007)	Start	732755	6548730
	Flora / Fauna 9 (CAR009)	Start	746788	6544253
RAM, Jessup, Birds, Canopy Cover	Flora / Fauna 10 (CAR010)	Start	740538	6541973
	Flora / Fauna 11 (CAR011)	Start	734655	6536360
	Flora / Fauna 12 (CAR012)	Start	740402	6532837
	Flora / Fauna 13 (CAR013)	Start	745093	6528963
Canopy Cover only	Flora / Fauna 17, CC17A (CAR017)	Start	739269	6536920
	Flora / Fauna 18, CC18A (CAR018)	Start	739350	6537556
	Flora / Fauna 19, CC19A (CAR019)	Start	739621	6539504
	Flora / Fauna 20, CC20A (CAR020)	Start	739950	6541083
RAM, Birds	CC17B	Start	739265	6536929
	CC18B	Start	739345	6537556
Landscape Function Analysis	CC19B	Start	739676	6539434
	CC20B	Start	739959	6541060
Landscape Function Analysis	Flora / Fauna 21 (CAR021)	Start ¹	722657	6531233
	Flora / Fauna 22 (CAR022)	Start ¹	718006	6529448
	LFA Site 1 Aerodrome Laydown (Aerodrome) (LFAAL1A-B)	Start	733020	6534295
		End	733063	6534316
		Start	733052	6534277
		End	733068	6534319
	LFA Site 2 Ventia (Office) Laydown (Ventia) (LFAVOL2A-B) Not monitored in 2025, rehabilitation renewed, no germination at time of survey	Start	736103	6540338
		End	736103	6540391
	LFA Site 3 Midway Quarry Laydown (Midway Quarry) (LFAQUA3A-B)	Start	729264	6533139
		End	729291	6533097
		Start	729307	6533163
		End	729335	6533123
	LFA Site 4 Tjungu to WAR (LFATJU4A-B) Not monitored in 2025 – rehabilitation complete	Start	734595	6536191
		End	734631	6536219
		Start	734631	6536219
		End	734673	6536252

¹Refer Jacobs (2019a) for further detail;

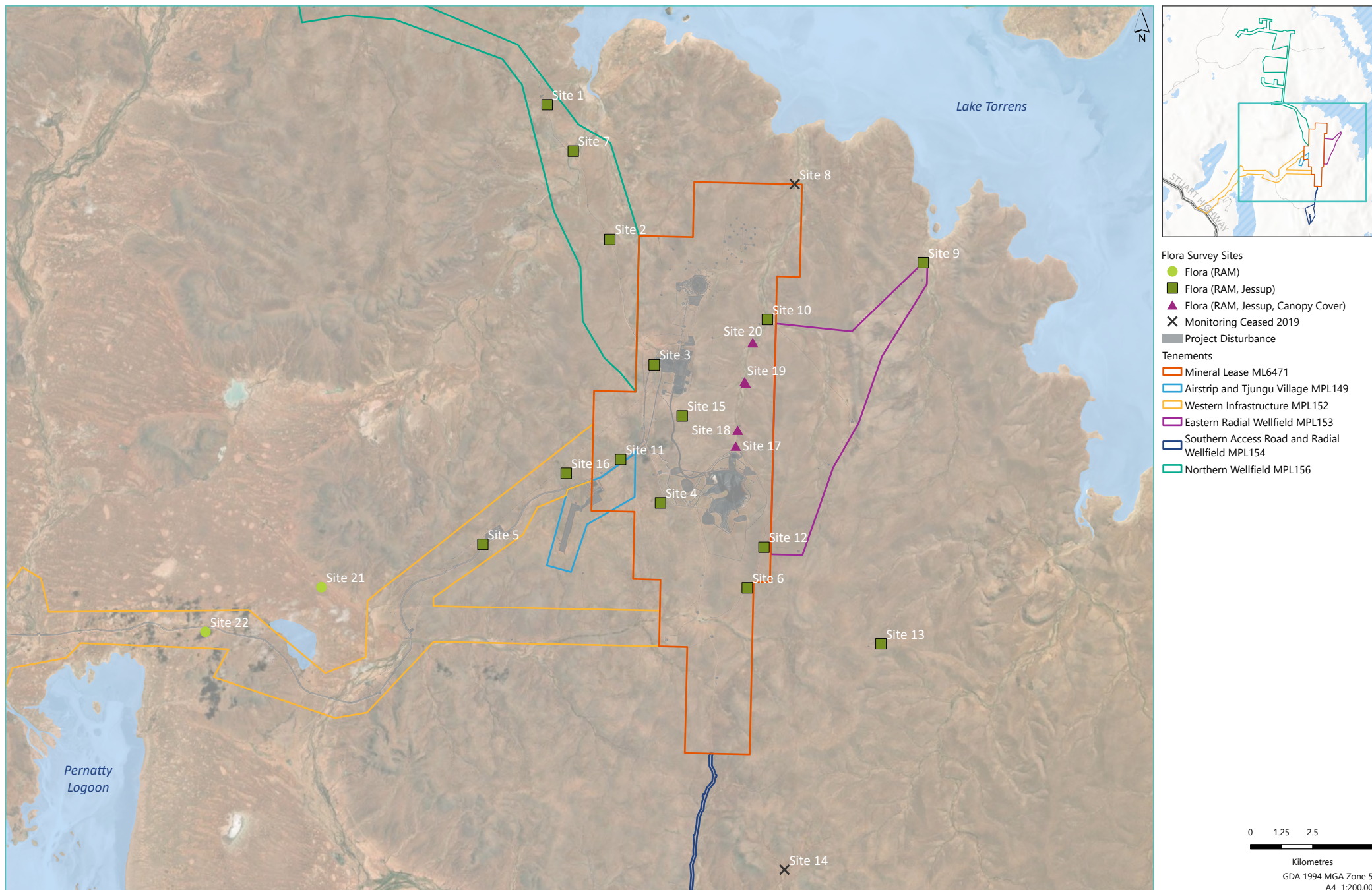


Figure 2.1: Location of Flora Sites
Carrapateena Flora and Fauna Survey, spring 2025

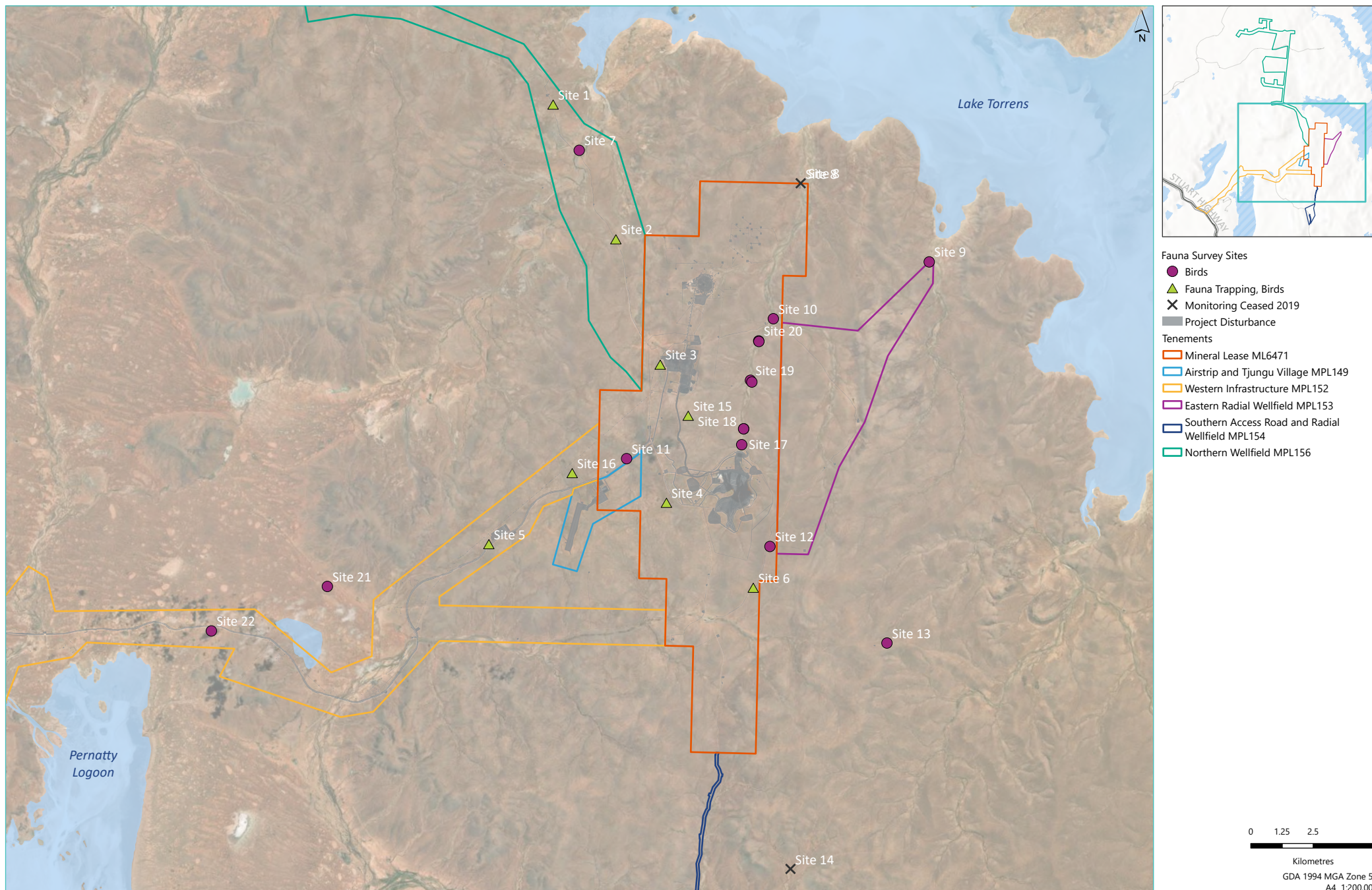


Figure 2.2: Location of Fauna Sites
Carrapateena Flora and Fauna Survey, spring 2025

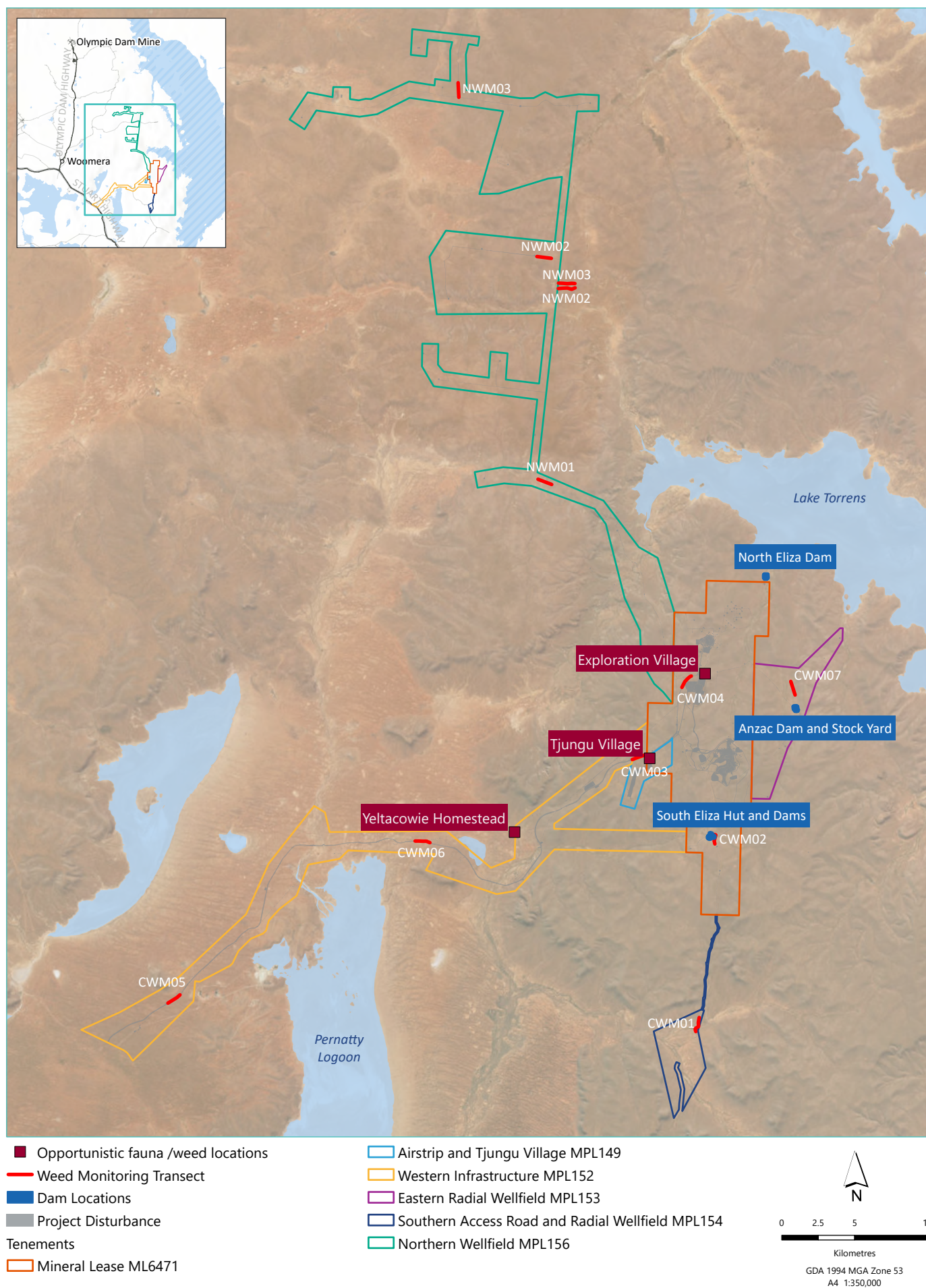


Figure 2.3: Location of Weed transects
Carrapateena Flora and Fauna Survey, spring 2025



2.3.1 Nomenclature

Survey site naming conventions remain as per previous spring surveys (Jacobs 2019a, 2020a, 2021b, 2022a, 2023b; Lathwida 2025a). It is noted that throughout this report, a simplified version of site names is often used e.g. Site 1, whereas CAR001 is the code used for data permit (refer Section 2.3.2) and the Carrapateena database.

2.3.2 Designation of control sites and impact sites

Survey sites are assigned to be either a control site (no detectable impact from mining considered likely) or an impact site (impacts on flora and/or fauna from mining activities considered possible). All sites on Eliza Creek, downstream of the tailings dam, were considered to be possible impact sites, due to potential changes in groundwater and / or surface water impacting vegetation. As such, the analysis of potential impacts in Eliza Creek involves a comparison of results over time, and with distance from the Tailings Storage Facility (TSF) embankment.

For other sites, impacts on flora and / or fauna were considered to be most likely due to increased dust, noise and / or increased vehicle presence, and for sites near the airstrip, also aerial collision of birds with aircraft. For non-Eliza Creek sites, there were considered to be potential impacts from mining activities if the site was < 2 km from infrastructure. Distances > 2 km were considered unlikely to be impacted by possible raised dust (e.g. based on air quality modelling), noise and / or increased vehicle presence, and as such, sites located > 2 km from infrastructure (including major roads) were designated as control sites for future comparison.

The initial designation in 2018 assumed the Western Access Road (WAR) would be a major thoroughfare complete at the time of the 2022 and 2023 surveys. The Midway Quarry, which is being progressively rehabilitated, is located adjacent Site 5 alongside the WAR and Site 22 (a sand dune site) is also adjacent the WAR. Site 6 located 1.5 km off the Southern Access Road (SAR), no longer used for heavy vehicle use, but 2.4 km from the south-eastern edge of the TSF was revised to a control site in 2024 due to the SAR no longer being widely used and being hydrogeologically distant and over 2 km from the TSF. Compliance monitoring to date has shown that sites > 1.5 km from major roads have not been impacted by mining activities and no change in flora or fauna is expected due to the lower vehicle activity on the SAR. Similarly, Site 4 is < 300 m from the SAR and former gatehouse, but is 1.5 km upstream of the TSF (however a temporary construction office was located at the site of the former gatehouse during the spring 2025 survey). Again, compliance monitoring to date has demonstrated no impact from mining activities on flora and fauna at this site and whilst no changes are anticipated in future, due to reduced vehicle use of the SAR. Hence, this site has also been revised to a control site, but the treatment status will be monitored as site operations change.

A site summary, including distance from infrastructure and designation as control or impact, is provided in Table 2.3 below. Control sites included Sites 1, 2, 7, 9, 13 and 21, from 2012 to 2023, but also Site 4 and 6 from 2024, given the reduction in potential impact as a result of the reduced use of the SAR. Impact sites for the 2025 survey included Sites 3, 5, 10, 11, 12, 15, 16, 17, 18, 19, 20 and 22. Site locations relevant to infrastructure, including roads are provided in Figure 2.4 and Figure 2.5 below. It is noted that degree of potential impact varies and all sites are close to roads or tracks, but some have lower levels of traffic



(e.g. Site 12). Regardless data is assessed for trends and if trends emerge further analysis is undertaken where necessary.

Rehabilitation sites (LFA sites) were assessed in 2025 at the Aerodrome Laydown (LFA Site 1 / Aerodrome), and Midway Quarry Laydown (LFA Site 3 / Midway Quarry), with 2 transects at each site (refer Table 2.3, Figure 2.6 and Section 2.5 for further information).

Weeds have been recorded at standard flora sites, designated weed transects, targeted sites (dams and villages), and opportunistically. Details of weed transect relative locations and habitat are provided in Table 2.4.

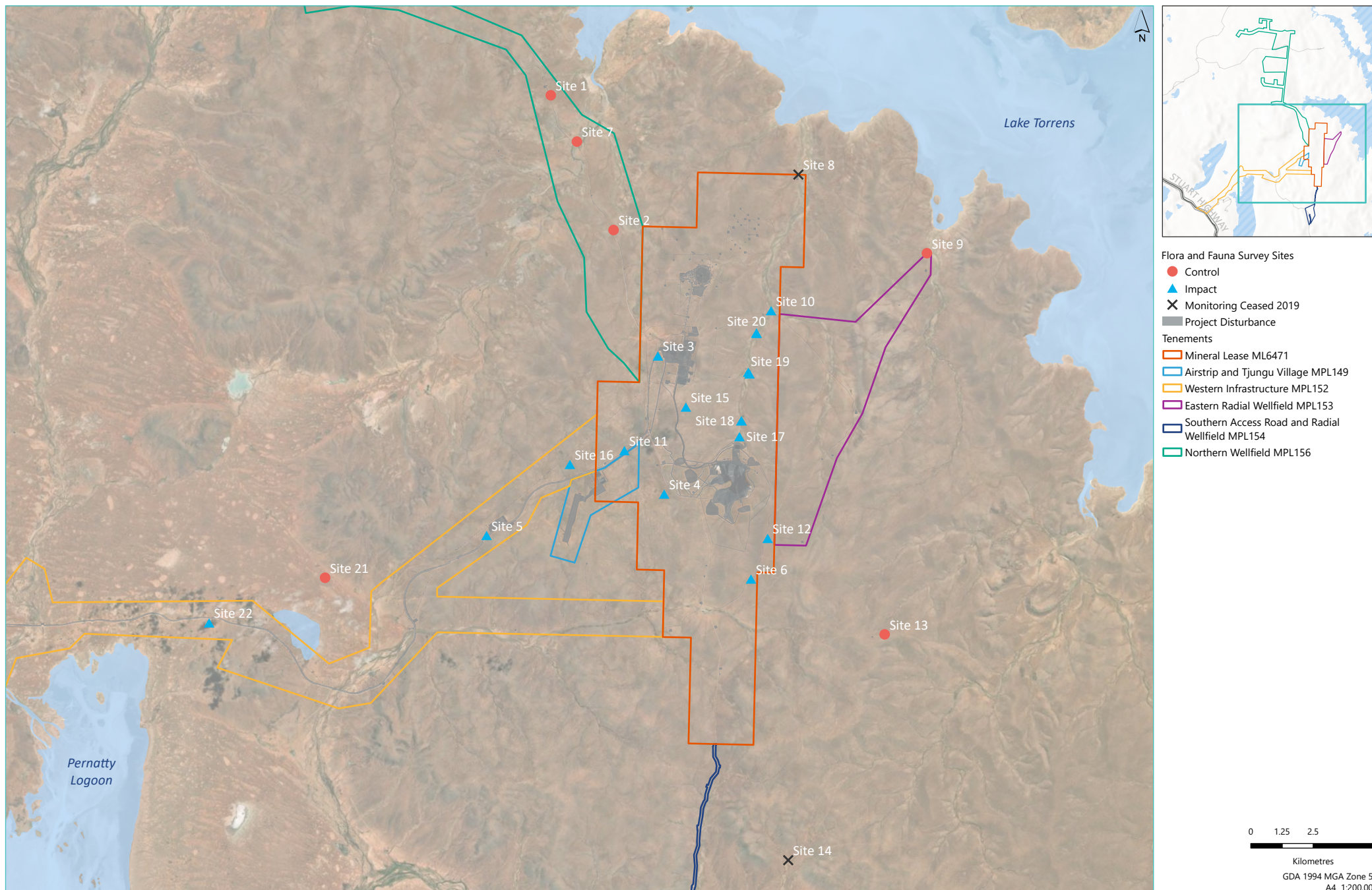


Figure 2.4: Carrapateena Control and Impact Sites (baseline to 2023 original treatment)
Carrapateena Flora and Fauna Survey, spring 2025

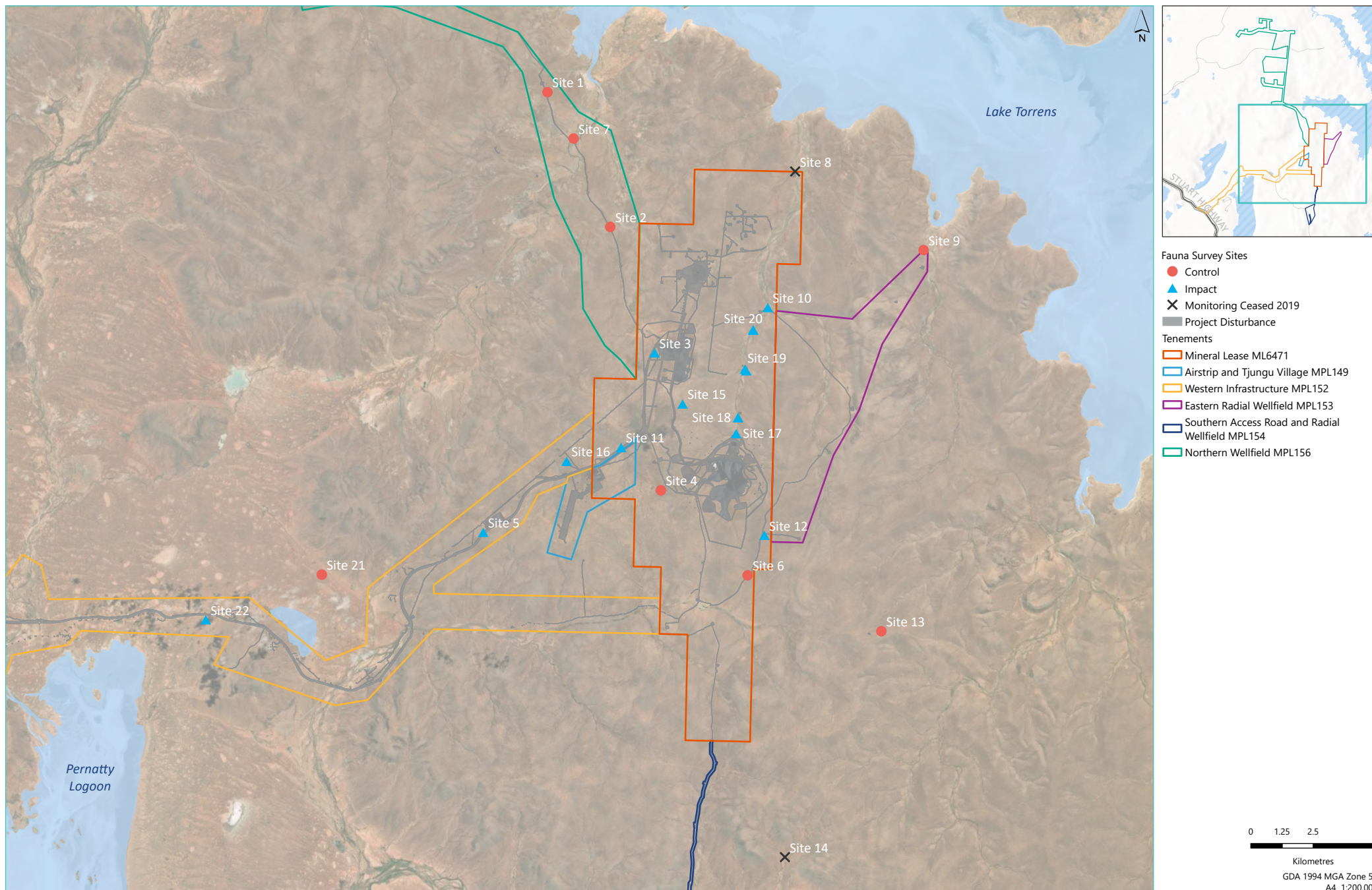


Figure 2.5: Carrapateena Control and Impact Sites (2024 onward with revised treatment)
Carrapateena Flora and Fauna Survey, spring 2025

Table 2.3: Summary of survey sites, and designation as control or impact

Site	Vegetation Association	Landform	Distance from Infrastructure	Site Type
Flora / Fauna Site 1	Bladder Saltbush (<i>Atriplex vesicaria</i>) Low Open Shrubland	Stony tableland with shallow drains	7 km from drill pad, and outside lease area, adjacent northern wellfield road (Khamzin)	Control
Flora / Fauna Site 2	Bladder Saltbush Low Very Open Shrubland	Stony tableland	Approximately 2 km west of drill Pad, adjacent Northern Wellfield Road (Khamzin). Depending on future traffic volume these sites may need to be considered as impact in the future.	Control
Flora / Fauna Site 3	Bladder Saltbush / Samphire (<i>Tecticornia medullosa</i>) Low Open Shrubland		Less than 100 m from access road, less than 200 m from Processing Plant, carparks and administration buildings	Impact
Flora / Fauna Site 4	Bladder Saltbush +/- Samphire Low Open Shrubland		Approximately 1.5 km west of TSF, < 300 m from SAR (no longer used for heavy vehicles, reduced light vehicle traffic). Site is hydrogeologically disconnected (i.e. upstream) from the TSF. In 2024, Site 4 was revised from Impact site to a Control site.	Control
Flora / Fauna Site 5			Site is ~ 40 m from WAR, <500 m from Midway Quarry, ~3.5 km from airstrip	Impact
Flora / Fauna Site 6	Bladder Saltbush Low Open Shrubland		~2 km north-east of South Eliza Dam / SAR (no longer used for heavy vehicles, reduced light vehicle traffic) ~ 2.4 km upstream from south-eastern edge of TSF, hydrogeologically disconnected. In 2024 Site 6 was revised from Impact site to a Control site.	Control
Flora / Bird Site 7			100 m west of Hilson Creek on Khamzin Rd and 3 km south of Lake Torrens. 5 km north-west of drill pad	Control
Flora / Bird Site 9	Western Myall (<i>Acacia papyrocarpa</i> *) Tall Open Shrubland on minor drainage line over Bladder Saltbush Low Open Shrubland	Minor drainage line / adjoining stony plain. Approximately 1.5 km from Lake Torrens.	12 km north-east of Tailings Dam. 600 m from Radial Pipeline.	Control
Flora / Bird Site 10	Northern River Red Gum (<i>Eucalyptus camaldulensis</i> ssp. <i>arida</i>) Low Open Woodland	Eliza Creek, junction with major tributary. 8 km south of Lake Torrens.	~ 5.5 km downstream of Tailings Dam	Impact
Flora /, Bird Site 11	Bladder Saltbush Low Open Shrubland fringed by Western Myall	Stony tableland and minor drainage line	~ 1.5 km from SAR junction. 200 m west of laydown area, and 40 m from WAR. 2 km north-east of Tjungu Accommodation Village.	Impact
Flora /, Bird Site 12	Bladder Saltbush) Low Open Shrubland	Stony tableland	~ 1 km south-east (upstream) of the TSF mid-eastern boundary	Impact
Flora / Bird Site 13	Bladder Saltbush +/- Samphire Low Open Shrubland		~ 7 km south-east (upstream) of the TSF and 6 km from Radial Pipeline.	Control
Flora / Fauna Site 15	Bladder Saltbush Low Open Shrubland		~ 300 m from haul road, < 900 m from processing plant	Impact
Flora /, Fauna Site 16			Approximately 1 km north-west of Tjungu Accommodation Village and airstrip and 500 m north of WAR / gatehouse.	Impact
Flora / Bird Site 17	Western Myall Low Open Woodland)	Major drainage line / Eliza Creek	~230 m north of the TSF Decant Dam Embankment	Impact
Flora / Bird Site 18			~870 m north of the TSF Decant Dam Embankment	Impact
Flora / Bird Site 19	Northern River Red Gum* Low Open Woodland		~3 km north of northern bank of Tailings Dam on Eliza Creek, 730 m from Injection Well.	Impact
Flora / Bird Site 20			~5 km north of northern bank of Tailings Dam on Eliza Creek and 470 m from Injection Pipeline.	Impact
Flora / Bird Site 21	Umbrella Bush (<i>Acacia ligulata</i>) Tall Shrubland	Sand dune	>2 km from WAR	Control ¹
Flora / Bird Site 22	Umbrella Bush shrubland over Sandhill Cane-grass (<i>Zygochloa paradoxa</i>) Hummock Grassland		150 m from WAR	Impact
LFA Aerodrome	Formerly Bladder Saltbush Low Open shrubland	Stony plain	10 m from airport road, 100 m from airport	Rehab monitoring
LFA Ventia	Formerly Bladder Saltbush / Samphire Low Open Shrubland	Stony tableland	5 m from WAR, 100 m from processing plant	
LFA Midway Quarry			WAR (40 m in), west of Midway Quarry	
LFA Tjungu to WAR	Formerly Bladder Saltbush (Low Open Shrubland		WAR, approximately 1.5 km from SAR junction.	

*Refer Appendix B for explanation of taxonomy; ¹Refer Jacobs (2019a) for additional detail about change of site location

Table 2.4: Weed Transects location and habitat

Transect	Road	Habitat
CWM01	Southern Access Road (SAR)	Gibber stony tableland is dominant, but the transect also includes creeks and culverts
CWM02		
CWM03	Western Access Road (WAR)	Gibber stony tableland
CWM04	Access Road west of administration and processing area	Gibber stony tableland, includes “Ventia” LFA site
CWM05	Western end of WAR	Mulga (<i>Acacia aneura</i>) woodland on sandy loam
CWM06	WAR	Gibber stony tableland, dunes and minor creek
CWM07	Minor road, north-east of Anzac Dam	Gibber stony tableland
NWM01	Northern Wellfields Road	
NWM02		
NWM03		
		Drainage Line

2.4 Techniques to address OMC

Table 2.5 summarises the survey techniques used in spring 2025 to assess each OMC. More detailed descriptions of each method (Jessup, RAM, Photopoints, Canopy Cover, Weeds) are provided in the 2018–2022 reports (Jacobs 2018a, 2019a, 2019b, 2020a, 2021b, 2022a, 2023b).

At each Flora site where a RAM (NVC 2024) was undertaken, it was within a 1-ha area. For the stony tableland sites (1 – 7, 9, 11–13, 15 and 16) this was a survey of 100 m x 100 m plot, 50 m either side of the line joining the start and end of the Jessup transect. For the Eliza Creek sites (Flora Site 10, Flora Sites 17 – 20) the 1-ha survey was confined to vegetation considered to be under the influence of the creek landform and water regime. The RAM survey area at Sites 21 and 22 is an area centred on the site coordinate, with a 55 m radius (namely a circular area of approximately 1 ha).

As per 2019 – 2024 surveys, Jessup surveys were not undertaken at Site 21 and 22 (sand dunes), given the sand dune sites were not marked in the field (due to potential heritage values).

As per 2021 to 2024 reporting, Canopy Cover results include data from spring 2018 onwards. For Canopy Cover sites, densitometer results are provided for individual transects at each site, as well as mean data results for the 2 transects at a site. Canopy Cover intactness is calculated as the extent of the individual tree's live canopy at the time of the survey compared to the potential extent of the canopy for a fully healthy tree.

Weed transect refinements were required at some locations during spring 2024 and 2025, due to realignments and substantial widening of the WAR since the initial weed transects were established. The distances (250 m, 500 m, 750 m and 1000 m) represent the distance in a straight line from the start of the transect and not necessarily the distance along the road (some transects have bends/curves). For the SAR and WAR roads, 2 photographs are taken on both sides of the road, with photo bearings being parallel with the road in each direction (i.e. 4 photos at each survey location). The area surveyed is a semicircle on either side of the road with a radius of 50 m beginning from the carriageway (the surveyed area includes the road shoulder/verge). For weed transects on the Northern Wellfield Road and narrow tracks (CWM04 and CWM07), the area surveyed is a circle with a 50 m radius from centre of road.

Table 2.5: Survey techniques used in spring 2025 to address Outcome Measurement Criteria

OMC Code	Outcome Measurement Criteria (OMC)	Technique / data collection strategy to determine if obligations are being met
SWRF1	Annual ecological surveys undertaken by an independent and suitably qualified expert demonstrates no adverse impact on the diversity and abundance of native vegetation and water dependent ecosystems at Eliza Creek monitoring sites (Figure 9.2, Figure 9.3 of the PEPR) attributed to reduced surface water flows caused by mining operations when compared to baseline conditions (Appendix C5 of PEPR BHP 2025a).	RAM survey at 5 Eliza Creek site (Sites 17, 18, 19, 20, 10) at increasing distance (downstream, 0.23 km to 5.5 km.) from the northern bank the TSF dam. Results assist with distinguishing grazing impacts from other causes of plant impact, provides inventory of species present and detection of any loss of diversity. Abundance data allows detection of changes in native and introduced species, with repeat monitoring.
TSF6	Annual surveys undertaken by an independent and suitably qualified expert demonstrates no adverse impact on the diversity and abundance of native vegetation and water dependent ecosystems at Eliza Creek monitoring sites (Figure 9.2, Figure 9.3 of the PEPR) attributed to tailings seepage when compared to baseline conditions (Appendix C5 of PEPR, BHP 2025a) unless an SEB has been approved in accordance with the NVMP.	Jessup (DENR 2011) and Canopy Cover transects at the same location as RAM sites (1 Jessup transects at each of 5 sites). Provides information on population structure of long-lived perennials, including recruitment. Eight Canopy Cover sites (2 parallel transects at each of the 5 sites) to assess possible impacts on tree health due to potential higher watertable, reduced surface water flows and / or tailings seepage. Comparing the total number of GRS (2018) densitometer foliage records along a transect over time provides an indication of changes in total canopy volume. Canopy data recorded from 100 points at each location. One transect representing instream habitat and one representing bank habitat. In summary, Jessup, RAM and Canopy Cover Assessment provides detailed information on plant species diversity, abundance and health at each site: vegetation structural layers, population data for woody perennials (number of adults and number of juveniles), and grazing impacts on woody perennials, plus notes on existing disturbance agents at each site.
WP1	Annual flora and fauna surveys undertaken by suitably qualified ecologists at flora, fauna and weed monitoring locations (Figure 9.2, Figure 9.3 and 9.4 of the PEPR) demonstrates no introduction of new species of weeds declared or listed under relevant legislation, plant pathogens or pests (including feral animals) as a result of mining related activities when compared to previously recorded weed species and introduced fauna.	Survey of 10 weed Transects (CMW01-CMW07, NWM01, NWM02 and NWM03). For each weed transect, the abundance and cover of all weeds recorded at 5 locations (250 m intervals, 50 m radius) along a 1000 m transect). Opportunistic records of all weed species whilst traversing around the whole mine site in general. Weed location, habitat, and weed population size and extent recorded. In addition, active searches of areas with a high potential for weed establishment also undertaken (e.g. dams, spill areas, and villages).
WP2	Similarly, annual flora and fauna survey results demonstrates no increase in the abundance of existing weeds or pest species in the land compared to previous survey records as a result of mining related activities.	
AQ2	Annual ecological surveys undertaken by a suitably qualified and experienced expert demonstrates no adverse impact on the diversity and abundance of native vegetation at monitoring sites (Figure 9.3 Flora of the PEPR) directly attributed to dust deposition from mining operations or mining related activities when compared to baseline native vegetation conditions (Appendix C5 Ecological Baseline of the PEPR, BHP 2025a).	Jessup Transects and RAM survey at 14 of the 16 baseline Flora Sites with the addition of collecting species cover and abundance information using both the Crown Separation Ratio scale. Survey of additional sites along the WAR within dune habitat that was not covered by the existing baseline data (Sites 21 and 22, RAM only).
EPBC1	Future records of Thick-billed Grasswren are to be provided to the Biological Databases of South Australia (BDBSA) to enable effective monitoring and record keeping if observed during annual flora and fauna surveys at monitoring sites (Figure 9.2, Figure 9.3 and 9.4 of the PEPR, BHP 2025a)	Bird surveys conducted at 14 of the 16 baseline bird monitoring sites, as well as at the 4 Eliza Creek flora sites and the 2 WAR dune sites. Opportunistic records of Thick-billed Grasswren to be recorded. Song Meters are also deployed at 10 of these sites. All records of Thick-billed Grasswren will be forwarded to Department for Environment and Water (DEW) as part of the Permit reporting requirements, which will then be uploaded into the BDBSA.
EPBC2	Future records of Plains Mouse are to be provided to the BDBSA to enable effective monitoring and record keeping if observed during annual flora and fauna surveys at monitoring sites (Figure 9.2, Figure 9.3 and 9.4 of the PEPR, BHP 2025a)	Fauna trapping surveys conducted at each of the 8 baseline fauna sites as per autumn 2017. Pitfall traps and un-baited cameras used to detect any Plains Mouse captures in spring 2025, aligning with the later years of the baseline surveys.
EPBC3	Future records of Night Parrot are provided to the Night Parrot Recovery Team to enable effective monitoring and record keeping if observed during annual flora and fauna surveys at monitoring sites (Figure 9.2, Figure 9.3 and 9.4 of the PEPR, BHP 2025a)	Bird surveys are undertaken as part of annual survey. Song Meters are also deployed, as per Thick-billed Grasswren (species not detected to date during compliance monitoring).
LUP4	Rehabilitation trials shall be undertaken at infrastructure locations no longer required and ongoing assessment at LFA monitoring at sites (Figure 9.3; CEF1-7 of the PEPR) are assessed annually demonstrating development of trends and annual improvement of rehabilitation through LFA methodology. Should the data indicate rehabilitation not trending towards sustainability root-cause investigations will be undertaken and rectification methods be identified and implemented	Following site rehabilitation, LFA is being undertaken within rehabilitation zones, and comparable data from these sites is being compared with baseline data, and future more relevant control sites will be established. Four LFA sites established (1 complete, 2 ongoing, 1 de-commissioned, but to be re-established).

Refer Appendix C (this report) for additional detail about species classification and long-lived and short-lived, flora taxonomy and identification.

2.5 Landscape function

2.5.1 LFA sites

To meet the requirements of Outcome Measurement Criteria (OMC) LUP4 in the PEPR. Landscape Function Analysis (LFA) monitoring was conducted at two sites in September 2025. The objective of LFA surveys (2019 to present) was to measure the success of returning the sites to sustainable pre-impact levels of landscape function. LFA measures various processes that contribute to the formation of self-sustaining ecosystems and can be used to monitor revegetation post-impact (Tongway & Hindley 2005). The data collected during the September 2025 survey represents the sixth year of data collection for the Airport Laydown site (LFAAL) established in 2019 and fourth year for the Midway Quarry site established in 2022. A site known as Ventia was decommissioned in 2025. The Ventia site was established in 2019 adjacent to the Carrapateena Mine Processing Plant, but as at 2024 the transects intersected only one short-lived plant, and much of the site was being used as a temporary laydown area for adjoining road construction. Due to the shallow initial ripping, the almost total absence of vegetation naturally re-establishing, and its use as a laydown area, the site was decommissioned in 2024. New ripping has occurred in 2025 near the Ventia site and once evidence of regeneration is detected LFA sites will be re-established. A further re-establishment site known as Tjungu was established in 2022. By 2024, a combination of hand seeding and natural re-establishment had exceeded the reference site plant density and cover. In 2025, re-establishment of vegetation at this site method was complete based on LFA data, and no further monitoring was necessary.

For the initial surveys of all sites, the LFA Bank and Trough assessment method was undertaken for the new sites as they comprised only non-vegetated rip lines (refer Jacobs 2023h). By the second or third survey, the ripped troughs had levelled out, and sufficient vegetation had established to convert to the Established method, whereby patches comprised plants and inter-patches comprised soil/rocks. The rehabilitation of the 4 areas has been monitored using 2 complementary methods: the LFA, following the established method, supplemented by the Point-centred Quarter (PCQ) method during the early phase of colonisation and succession (Tongway and Hindley 2005). Jacobs (2023h) provides a summary of the methodologies applied and reasoning for the change.

Table 2.6 provides a summary of where the different approaches have been applied to date. For LFA transect coordinates and location refer Table 2.2 above and Figure 2.6.

Section 2.5.2 and Section 2.5.3 below provides a summary of the methodologies applied and reasoning for the change. Table 2.6 provides a summary of where the different approaches have been applied to date.

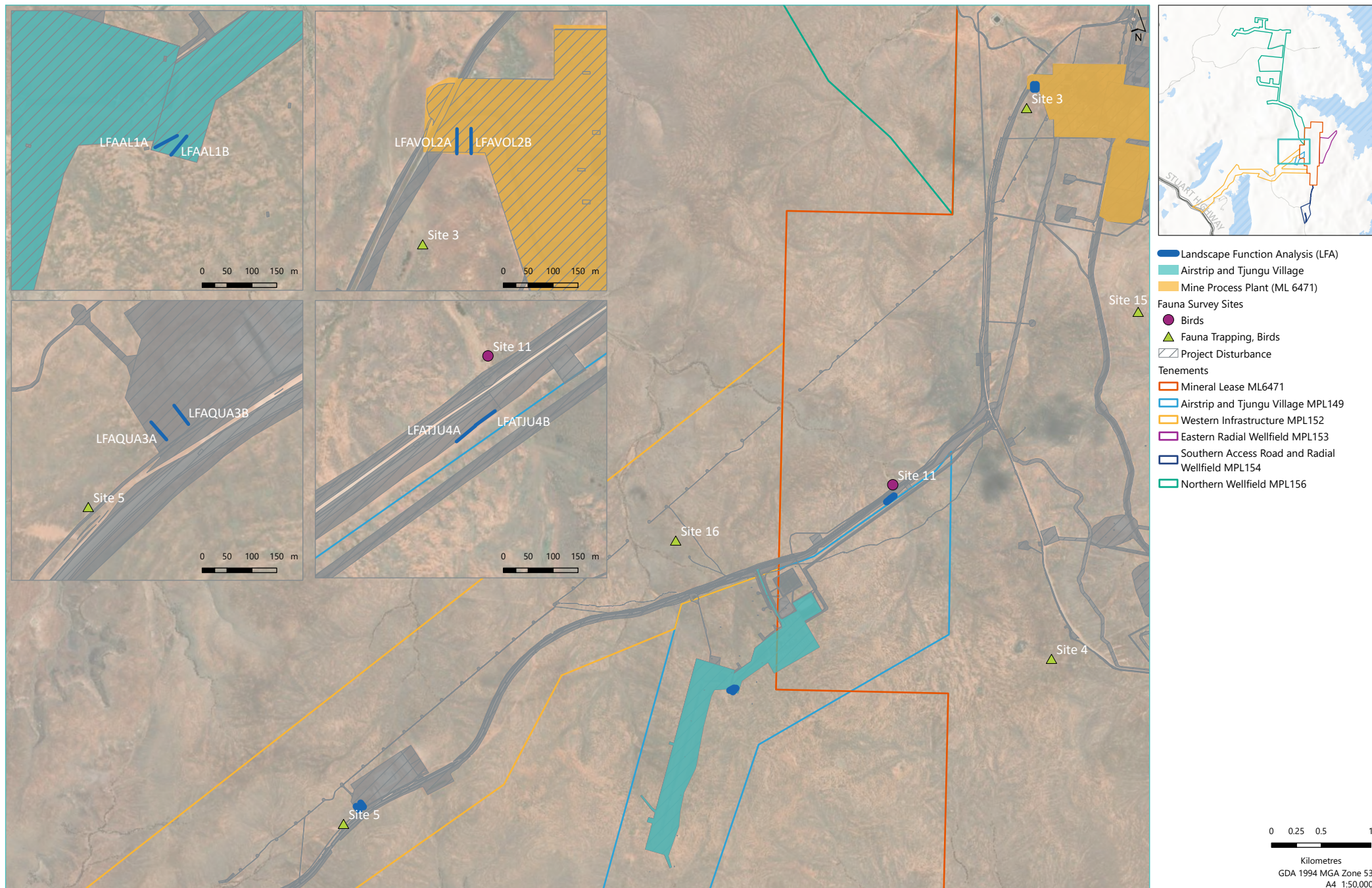


Figure 2.6: LFA Sites, Aerodrome Laydown (LFAAL), Ventia Laydown (LFAVOL), Midway Quarry (LFAQUA), Tjunga (LFATJU)
Carrapateena Flora and Fauna Survey, spring 2025



2.5.2 The LFA established method

The methodology used during compliance monitoring for the LFA 'Established Method' is as described in Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE) (2013). At each site, 2 fixed transects have been established, 50 m in length (Table 2.2). Directly beneath the transect line, the zones that occur are classified as a patch (represented by a plant/s with overlapping canopies or other resource-accumulator such as litter or logs), or interpatch (e.g. rocky surface, or bare ground). All short-lived and long-lived perennial species have been included as patches. Short-lived perennials, particularly *Sclerolaena* species, comprise a large proportion of the groundcover in the LFA site natural habitat.

2.5.3 Supplementary vegetation sampling using the Point-centred Quarter (PCQ) Method

Rehabilitation in semi-arid Australia is expected to be slow. In the early phase, plants may colonise in low abundance, or a clumped pattern, making it difficult to representatively sample using a fixed transect (Tongway and Hindley 2004). To supplement the LFA Established Method, the PCQ Method has been used in the early stages of vegetation re-establishment. The fixed transects were divided at regular intervals: 10 m, 20 m, 30 m, 40 m and 50 m. At each point, the nearest either short-lived or long-lived perennial plant up to 10 m away was located within each of 4 quadrants. No data was recorded for a quadrant where there were no perennial plants within 10 m of the sample point that had not already been sampled for a prior quadrant (Tongway and Hindley 2005). For each transect the mean distance between plants, and plant density (number of plants per unit area) were derived from the PCQ data. As more plants become established, the mean distance between plants decreases, while plant density increases. A summary of the different methods of data collection that have been applied for LFA at the Carrapateena site is presented below in Table 2.6.

Table 2.6: Summary of methods used to date for Landscape Function Analysis at Carrapateena

Survey	Sites	LFA Bank & Trough Method	LFA Established Method	LFA Soil Surface Assessment (SSA)	Point-centred Quarter (PCQ) method
2013 /2014 Baseline (EBS)	6 analogue sites	Nil	All 6 sites	X	Nil
September 2019 (Jacobs) (newly ripped soil)	2 sites with 2 transects each	1A, 1B, 2A, 2B		1A, 1B, 2A, 2B	Nil
September 2020 survey (Jacobs)		2A	1A, 1B, 2B	1A, 1B, 2A, 2B	1A, 1B, 2A, 2B
September 2021 (Jacobs)		Nil	1A, 1B, 2A, 2B	1A, 1B, 2A, 2B	1A, 1B, 2A, 2B
September 2022 (Jacobs)	4 sites with 2 transects each	3A, 3B, 4A, 4B	1A, 1B, 2A, 2B	1A, 1B, 2A, 2B	1A, 1B, 2A, 2B
May 2023 (Jacobs)		Nil	1A, 1B, 2A, 2B 3A, 3B, 4A, 4B	1A, 1B, 2A, 2B 3A, 3B, 4A, 4B	1A, 1B, 2A, 2B 3A, 3B, 4A, 4B
October 2024 (Lathwida)	3 sites with 2 transects each, 1 site with one transect	Nil	1A, 1B, 2B, 3A, 3B, 4A, 4B	1A, 1B, 2B, 3A, 3B, 4A, 4B	1A, 1B, 2B, 3A, 3B, 4A, 4B
September 2025 (Lathwida)	2 sites with 2 transects each ¹	Nil	1A, 1B, 3A, 3B	1A, 1B, 3A, 3B	3A, 3B

¹ Site LFAVOL decommissioned due to lack of vegetation reestablishing and use as a temporary laydown area for adjoining road construction; to be reinstated; Site LFATJU successfully restored by 2024 and not monitored in 2025.



2.6 Fauna survey method

2.6.1 Fauna trapping

As per 2018-2024 monitoring, fauna trapping was undertaken at 8 sites in spring 2025, with groups of 4 sites monitored over 2 consecutive trapping periods. Each site was monitored for 4 days and 4 nights between 18 and 26 September 2024. Two sites were opened on 18 September, and 2 sites were opened on the 19 September which were closed on 22 and 23 September respectively, and a second round of sites was opened on 22 September and closed on 26 September. All equipment and flagging tape was removed from each site at the end of each survey, except for semi-permanent pits which remained in-situ with lids re-established and screwed in with 'hex' (tech) screws to prevent animals entering the pits post monitoring. Trench lines for drift fencing between pit traps were backfilled.

The configuration at each of the 8 established fauna trapping sites (i.e. Sites 1-6, 15, 16) was as follows:

- A single pitfall line was opened from 1 of 4 semi-permanent baseline lines (Site 5 only has 3 semi-permanent pit lines remaining, 1 was removed in 2019).
 - Six pitfall traps were opened within each line, the minimum required by the SA Vertebrate Survey Guidelines (Owens 2000).
 - The pitfall traps were 240 mm diameter (standard PVC 225 / 250 mm pipe - internal diameter 240 mm) and 600 mm deep with a metal base to allow water drainage; used to target small to medium sized mammals and reptiles.
- A drift fence line (~80 m x 0.3 m) was temporarily installed into the ground approximately at 5-10 cm depth. The fence running across the semi-permanent pitfall traps, 10 m apart (fence extending approximately 5 m either side of the first and last pitfall trap).
- Two funnel trap pairs were placed evenly along each line.
- Two camera traps were deployed (facing each trap line at open locations, with minimal vegetation to avoid accidental triggers, or facing into a gilgai if present).
- No Elliott traps, cage traps, HARP traps or ANABAT recorders were used (Song Meters were deployed at alternative locations to target microbats).
- One Song Meter was deployed at a suitable location away from the trapping line.
- Refer spring 2019 report (Jacobs 2020a) for additional details.



2.6.2 Bird/bat detection

As per previous monitoring (2018 to 2024), bird surveys were undertaken in spring 2025 at least once at each of the 20 survey sites (Flora sites 1 to 7, 9 to 13, 15 to 16, plus sites 17, 18, 19, 20, 21 and 22) for 30 minutes in the early morning or late afternoon, when conditions were suitable. Bird data was also collected during multiple visits to the fauna trapping sites and opportunistically when driving between sites, during flora surveys, at dams and camps.

In addition, Song Meters were deployed in spring 2025 at all 8 fauna trapping sites, and 2 flora creek sites (Site 7 and Site 10), in order to detect additional species that were not detected during the day or nocturnal / crepuscular species. Song meters were deployed for a minimum of 24 hours at each site. Desktop analysis was undertaken post field to determine whether any additional species were present. Such analysis involves ecologists reviewing images and calls of bird calls and bat calls and verifying species against recognised images.

The Song Meters used were either Wildlife Acoustics® Song Meter Micro 2 Acoustic Recorders (birds only), Song Meter 4 Acoustic Recorders (birds only, larger range than Micro 2s), or Song Meter Mini Bat Acoustic Recorders (both bird and bat).

Song Meters were deployed within areas of habitat considered suitable for detection of birds approximately 100-200 m from fauna trapping lines (if present), or near habitat likely to provide specific habitat features. The units were configured to record in the acoustic mode; for 1 hour either side of both sunset and sunrise. In this configuration, for every 24 hours of deployment, each unit captured 14 hours of acoustic recordings (birds) and 4 hours of ultrasonic records (bats).

Each Song Meter was affixed to a stake or other stable object using cable ties. All cable ties were clipped short to avoid the potential for whistling interference in high winds. The location of each deployment was also marked using a GPS unit (IPAD).

2.6.2.1 Acoustic analysis

All bird recordings were processed using Wildlife Acoustics® Kaleidoscope Pro audio analysis software to detect vocalisations for visual and acoustic assessment. Analyses for these deployments followed the procedure of analysing recordings for the presence of any fauna species by detection using a combination of listening through in real time and high-speed visual spectrogram scanning. All audible taxa were noted in the order in which they appear in recordings. A total of 273.5 hours of recording were collected from 10 sites between 18-26 September 2025.

Bat data that was analysed included a total of 193 WAV sound format bat detector sound files from 2 recording sites over 7 recording nights (19 – 23 September 2025); Site 7 (near Bosworth Creek), and Site 10 (Eliza Creek). A multi-step acoustic analysis procedure was applied to the recordings. The sound files were scanned using SCAN'R, bat calls were then analysed against representative calls from southern Australia (Specialised Zoological 2025, provided in Appendix F).

Species identifications were made based on measurements of characteristic frequency and observation of pulse shape, and with reference to information in Armstrong et al. (2021b, cited in Specialised Zoological 2025). Nomenclature follows Jackson and Groves (2015, cited in Specialised Zoological 2025).

Distribution information for all bat species considered here was checked against the BatMap resource hosted by the Australasian Bat Society, Inc (<https://www.ausbats.org.au/batmap.html>) (Milne et al. 2023, cited in Specialised Zoological 2025).

2.6.3 Active reptile, track and scat search

Given the warmer conditions of the spring 2025 survey and the moderate number of reptile captures at fauna trapping sites, no active-reptiling was undertaken at trapping sites, but opportunistic searches were undertaken at flora sites when conditions were suitable. Additional reptile species were also detected as part of opportunistic observations throughout the survey, and via camera trapping.

2.6.4 Spotlighting

No spotlighting was undertaken in 2025 (usually only undertaken at Site 10 in Eliza Creek if conditions are suitable and time allows). Noting the Camera Traps (2 per site), and Song Meters were also collecting nocturnal images / acoustic data for 4 trap nights at each of the 8 fauna trapping sites (Sites 1-8, 15, 16) and Song Meters were also deployed at Site 7 and Site 10 to record birds and bats at dusk, dawn and throughout the night.

2.6.5 Opportunistic observations

Opportunistic observations make up an important component of a fauna survey and constitute any observations made while travelling around the Operations area, targeted searches at likely locations for fauna (e.g. dams), or between the survey sites. Any animals identified opportunistically, either via direct observation or by evidence, were recorded. These species were added to site species lists if identified at a survey site, or to a general survey species list if from the broader Operations area (if not attributed to a particular habitat type).

Location details for the key opportunistic observation locations are provided in Table 2.7 and on Figure 2.3.

Table 2.7: Key opportunistic survey site locations at Carrapateena

Location	Easting	Northing
Exploration Village (EV)	737500	6541120
Anzac Dam (AD)	743880	6539300
Tjungu Village (TV)	733700	6535306
South Eliza Dam (SED)	737960	6529976
Yeltacowie Homestead (YH)	724430	6530245

*MGA zone 53. GDA1994



2.6.6 Identification

Given surveys at Carrapateena have occurred since 2012, some species have undergone taxonomic revision and there have been changes to scientific and or common names. Where possible the naming conventions follows the current nomenclature of the Biological Databases of Australia flora and fauna taxonomy (DEW 2025). The following reference material and taxonomic keys were also used for species identification and classification:

Reptiles and amphibians

- A Complete Guide to Reptiles of Australia 2nd edition (Wilson and Swan 2023)
- Reptiles and Amphibians of Australia (Cogger 2014)
- Key to the Geckos of South Australia (Hutchinson and Williams 2024a)
- Key to the Skinks of South Australia (Hutchinson and Williams 2024b)
- Key to the Snakes of South Australia (Hutchinson and Williams 2024c)
- Key to the Dragons of South Australia (Hutchinson and Williams 2024d)
- Key to the Goannas of South Australia (Hutchinson and Williams 2024e)
- Checklist of the Reptile and Frogs of South Australia (Hutchinson and Williams 2024f).

Birds

- The Field Guide to the Birds of Australia, 9th edition (Pizzey et al. 2012)
- Field Guide to the Birds of Australia, 8th edition (Simpson and Day 2010)
- eGuide to Birds of Australia, application (Morcombe 2011-2019, Version 1.5 to 1.6.2)
- The Australian Bird Guide. (Menkhorst et al. 2023)
- Annotated List of the Birds of South Australia (Horton et al. 2020)
- The compact Australian Bird Guide (Davies et al. 2022).

Mammals

- A Field Guide to the Mammals of Australia (Menkhorst and Knight 2011)
- Mammals of Australia (Strahan 1995)
- Tracks, Scats and Other Traces (Triggs 2004)
- Key to Dasyuridae of SA (Kemper and Stokes 2021)
- Key to Muridae of South Australia (Kemper and Stokes 2023)
- Australian Bats (Churchill 2008).



Plants

- PlantNET - NSW FloraOnline (2025)
- Plants of Western New South Wales (Cunningham et al. 1992)
- Field guide to the plants of outback South Australia (Kutsche et al. 2023)
- South Australian Seed Conservation Centre (2025)
- The Australasian Virtual Herbarium (AVH) (2025)
- Atlas of Living Australia (ALA) (2025)
- Flora SA (Kellermann 2025).

2.6.7 Vouchering

No vouchering of fauna species was required, as all species captured had been sufficiently vouchered previously.

Flora collection occurred to facilitate in-field and post-field identification, as enabled under the conditions of relevant permits (Section 2.2).

2.6.8 Fauna survey limitations

The limitations associated with this fauna survey, consistent with most fauna surveys, are as follows:

- The results of the fauna surveys are only a 'snapshot' in time and cannot describe seasonal variation or migrations on their own.
- Scats could not always be correctly attributed to species, however where they could be confidently identified, they provide an accurate indication of the presence and habitat preferences of certain species (Triggs 2004).
- Detection of nocturnal species by spotlighting/nocturnal audio recordings does not detect all of the animals present and can be affected by environmental factors (Wayne et al. 2005).
- Read & Moseby (2001) concluded that environmental factors affected the capture rates of small reptiles. Unfortunately, planning logistics for fauna surveys around specific environmental conditions is very difficult. Planning to survey when weather conditions are generally favourable (as was done here) allows the best chance of favourable conditions during a survey and species identification. It is noted that daily conditions were considered favourable for reptiles during this survey.
- Read et al. (2015) suggest that trapping is most effective on dark nights during the first 2 nights, with higher capture rates observed when the moon illumination is less than 40%. As above, given the lead time to plan surveys, it is difficult to plan around this. However, during the survey a new moon (the darkest phase) occurred on 22 September, hence the majority of survey nights were considered suitable in relation to moon phase.



- Conditions for birds were suitable for early spring, however there were some very windy and above average (for September) warm days (e.g. 4 days of 25-31 degrees). Bird detection was also complemented at each individual site with Song Meter deployment, and opportunistic observations from across the broader Operation area (e.g. dams, tracks, camps, creeks). However, many Song Meter files were wind affected, each site was analysed for one 24-hour period and at least 2 mornings. Consequently, overall bird diversity is reduced compared to 2024. There also seemed to be more Sheep on the recordings at some sites (i.e. Site 6).
- Similar to recent surveys, for camera traps, facing the camera towards open areas, without vegetation, or roads in the field of view are noted to produce less false triggers.

3 Results

3.1 Climate during and preceding survey

3.1.1 Rainfall preceding survey

The region receives an average of about 180 mm of rain annually (BOM 2025a). Long-term mean monthly rainfall is relatively consistent throughout the year, with only a slight reduction typically occurring in late autumn and late winter. At the Woomera weather station, annual rainfall totals for 2022, 2023, and 2024 were 381.4 mm, 173.2 mm, and 174.6 mm respectively; with 2022 representing a notably wetter-than-average year.

In the 12 months prior to and inclusive of the spring survey (October 2024 to September 2025), the Carrapateena weather station recorded 169 mm of rainfall, approximately 8% below the regional annual average, primarily due to lower-than-average totals from January through June. This deficit occurred despite November 2024 and March/July 2025 combined, accounting for more than half of the year's rainfall. However, the total rainfall at the Carrapateena weather station for the 3 winter months immediately preceding the September survey, was 46 mm, very close to the regional average of 43 mm. With the exception of March, monthly totals at Carrapateena and Woomera differed by less than 10 mm during this period (Figure 3.1).

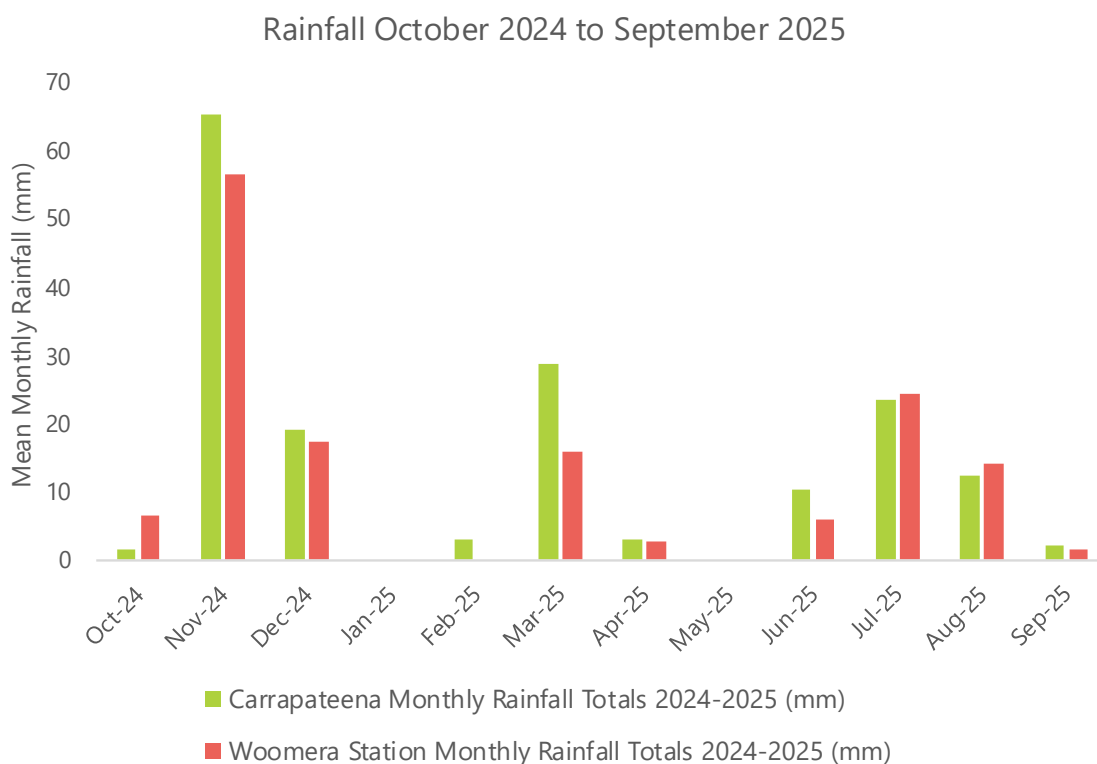


Figure 3.1: Rainfall 12 months preceding the Carrapateena spring 2025 survey (Unit – Vaisala WXT520) and at Woomera Aerodrome

3.1.2 Weather during survey

Weather conditions recorded during the survey are summarised in Table 3.1, presenting data from the on-site weather station near the Tailings Storage Facility (TSF) (a Vaisala WXT520). Temperatures were mild to warm throughout the period, with daily maximums between 19.5°C and 31.6°C, averaging 24.4°C; slightly above the regional long-term September average of 22.9°C (Woomera Aerodrome, BoM 2025a).

Minimum overnight temperatures were also mild, ranging from 8.9°C to 16.1°C and averaging 11.7°C, which is slightly warmer than the long-term September mean minimum of 9.5°C (Woomera Aerodrome, BOM 2025a).

Winds during the spring survey were generally light to moderate, with daily average speeds between 10.5 and 24.6 km/h (Table 3.1). Although no thunderstorms occurred, peak wind gusts reached 46.8 km/h on 19 September. Overall, these weather conditions were considered satisfactory for conducting bird surveys and operating Song Meters, aside from brief periods of stronger winds. The conditions were also favourable for conducting mammal and reptile trapping, daily temperatures not being either extremely hot or cold.

Table 3.1: Field survey weather (Carrapateena all weather data spring 2025)

Observation	18-Sep	19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep	25-Sep	26-Sep
Min temp (°C)	12.4	14.3	10.9	8.9	10.1	9.4	9.3	12.6	16.1
Max temp (°C)	27.8	25.5	19.5	21.1	20.4	22.0	23.7	27.4	31.6
Mean wind (km/h)	16.2	24.6	18.0	16.5	23.9	18.6	12.4	10.5	16.6
Max wind (km/h)	39.2	46.8	38.2	42.5	42.8	35.6	32.0	35.3	43.9
Rainfall total (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

3.2 Flora

3.2.1 Plant diversity

A general floristic description of each site is provided in the Carrapateena Ecology Survey – Autumn 2018 report (Jacobs 2018a). Representative photographs of each site during the spring 2025 survey are provided in Appendix A.

3.2.1.1 Total species diversity: compliance monitoring period

In spring 2025, a cumulative total of 134 native flora taxa (57 long-lived and 77 short-lived) were recorded at the 1-hectare RAM sites across the Carrapateena Operation area (Flora Sites 1 – 7, 9 – 13, 15 – 22). This was slightly above the mean diversity of 130 species recorded during the compliance monitoring period that began in autumn 2018 (Table 3.2). During compliance monitoring, the total plant species diversity

recorded at the flora sites has ranged from 111 species in spring 2018 to 141 species in both 2023 and 2024.

Since 2018, the variation in total species diversity has been largely due to variations in short-lived species diversity. Short-lived species diversity per compliance survey has ranged from 52 – 83 species; long-lived perennial species diversity has ranged from 57 – 62 species (Figure 3.2). Pre-construction comparisons of total species diversity across the Carrapateena Operation area are not possible, as Sites 17 – 22 were established in 2018. Appendix B1 contains a list of all species recorded in spring 2025, their frequency and their long-lived status Appendix B2 contains a list of all species recorded at each site in 2025, their abundance and grazing impact.

Table 3.2: Total species diversity recorded at RAM sites during compliance monitoring period (construction and operation)

Life Span	2018	2018	2019	2020	2021	2022	2023	2024	2025	2018 – 2025 range	2018 – 2025 Mean, St. Dev
	Autumn	Spring	Spring	Spring	Spring	Spring	Autumn	Spring	Spring		
Long-lived ²	58	59	61	59	62	60	58	60	57	57 – 62	59 (±1.8)
Short-lived	58	52	75	80	57	74	831	81	77	52 – 83	71 (±11.8)
Totals	116	111	136	139	119	134	141	141	134	111 – 141	130 (±11.5)

¹ amended from 2023 report to remove duplicate records; ² Long-lived woody perennials and long-lived grasses; rounded to nearest whole number; St. Dev = Standard Deviation



Plate 3.1: Purslane (*Calandrinia* sp.), an annual recorded at the dune sites



3.2.1.2 Total species diversity at control/impact sites: baseline and compliance monitoring period comparison

Flora sites 1-7, 9-13 and 15-16 were surveyed in all years both during pre-construction (baseline) and during the construction/operational phase (compliance monitoring period). Hence these sites are suitable to compare species diversity during these phases. Total plant species diversity at all individual sites in 2025 was within the baseline range for each site (Table 3.3). During both the baseline and compliance monitoring period, total plant diversity has varied widely across all sites.

In 2024, Sites 4 and Site 6 were transferred from impact to control sites due to the SAR no longer being in general use for mining activities, and there being no hydrogeological connection to the TSF. The baseline mean for control sites and for impact sites (and min/max) values therefore change at 2024 as a result of these changes. In 2025, the mean total species diversity for control and impact sites was 25.9 and 29.1, respectively and not significantly different (Welch's t-test (uneven variance) test, two-tailed $p = 0.264$, $t = -1.17$). The 2025 mean flora diversity for impact and control sites was within the baseline ranges and very close to the baseline means (Figure 3.2, Figure 3.3). The following sections indicate that the range in total native plant diversity is largely due to variations in short-lived plant diversity.

Table 3.3: Total native plant species diversity, baseline versus compliance monitoring period

Site Type	Baseline (2012-2016) and Compliance Total Diversity to (2018-2023)										Updated Treatment Baseline and Compliance Total Diversity (2004-2025)					
	RAM Site ¹	Baseline Min	Baseline Max	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	Site Type	RAM Site1	Baseline Min	Baseline Max	2024 Spring	2025 Spring
Control	1	18	40	24	17	23	18	25	27	31	Control	1	18	40	24	21
	2	9	35	14	15	21	21	14	19	21		2	9	35	28	21
	7	20	46	20	46	30	24	30	17	32		4	15	38	25	29
	9	21	42	21	42	21	18	30	34	31		6	15	38	21	28
	13	10	34	10	36	18	16	31	23	16		7	20	46	35	25
	Means	15.6	39.4	20.6	19.2	26.8	22.0	24.0	26.4	28.8		9	21	42	41	34
												13	10	34	24	23
Impact	3	16	41	23	22	29	21	17	25	34	Impact	Means	15.4	39	28.3	25.9
	4	15	38	14	25	19	17	23	25	26		3	16	41	37	30
	5	13	41	21	14	25	19	17	23	25		5	13	41	26	29
	6	15	38	15	28	23	16	18	21	24		10	26	56	24	37
	10	26	56	26	56	22	15	28	23	16		11	18	49	24	37
	11	18	49	18	49	32	25	37	28	26		12	9	32	36	21
	12	9	32	9	32	17	14	29	22	16		15	10	36	33	22
	15	10	36	10	36	17	16	27	15	17		16	10	36	20	29
	16	10	36	26	56	22	15	28	23	16		Means	14.6	41.6	28.6	29.3
	Means	14.7	40.8	22.2	19.7	30.1	23.7	20.9	24.6	29.8						

¹ Rangeland sites, as per previous reporting. Note: Comparable data for 2017 not available.

² In 2024, Sites 4 and Site 6 were transferred from impact to control sites due to the Southern Access Road no longer being in general use for mining activities, and there being no hydrogeological connection to the Tailings Storage Facility. The baseline mean (and min/max) values therefore change at 2024 as a result of these changes.

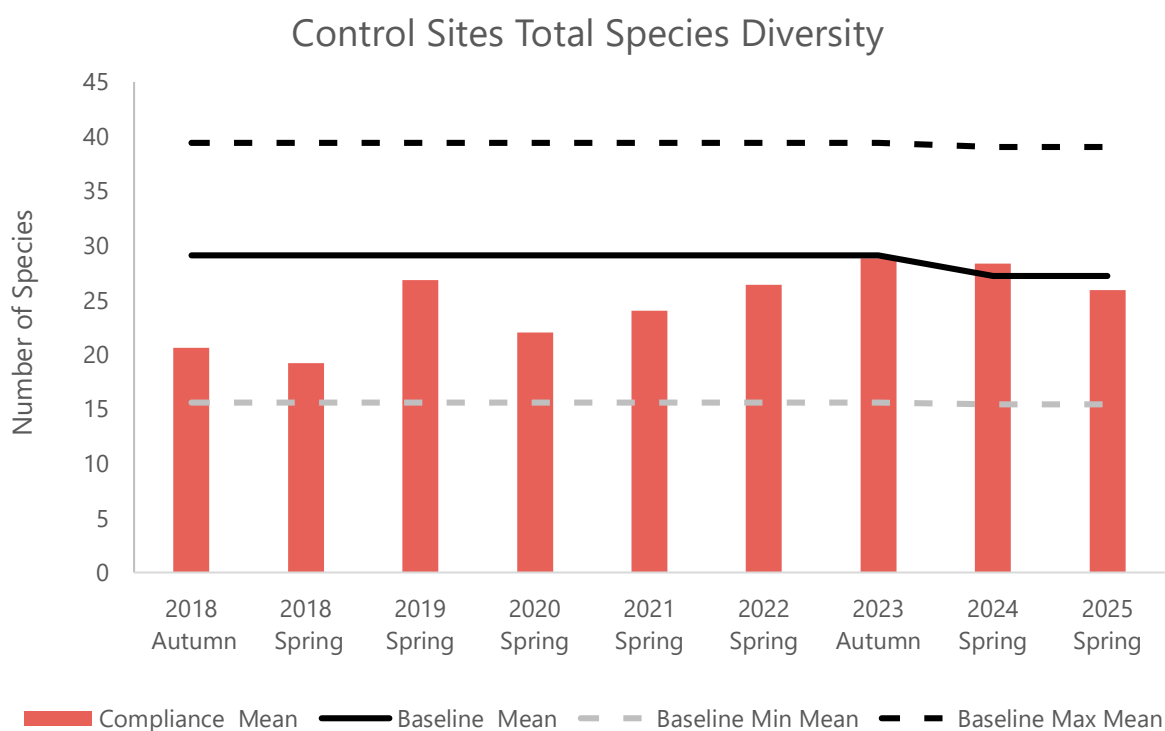


Figure 3.2: Mean total flora species diversity (long-lived and short-lived species) at control sites during compliance monitoring (compared to baseline mean, min, max)

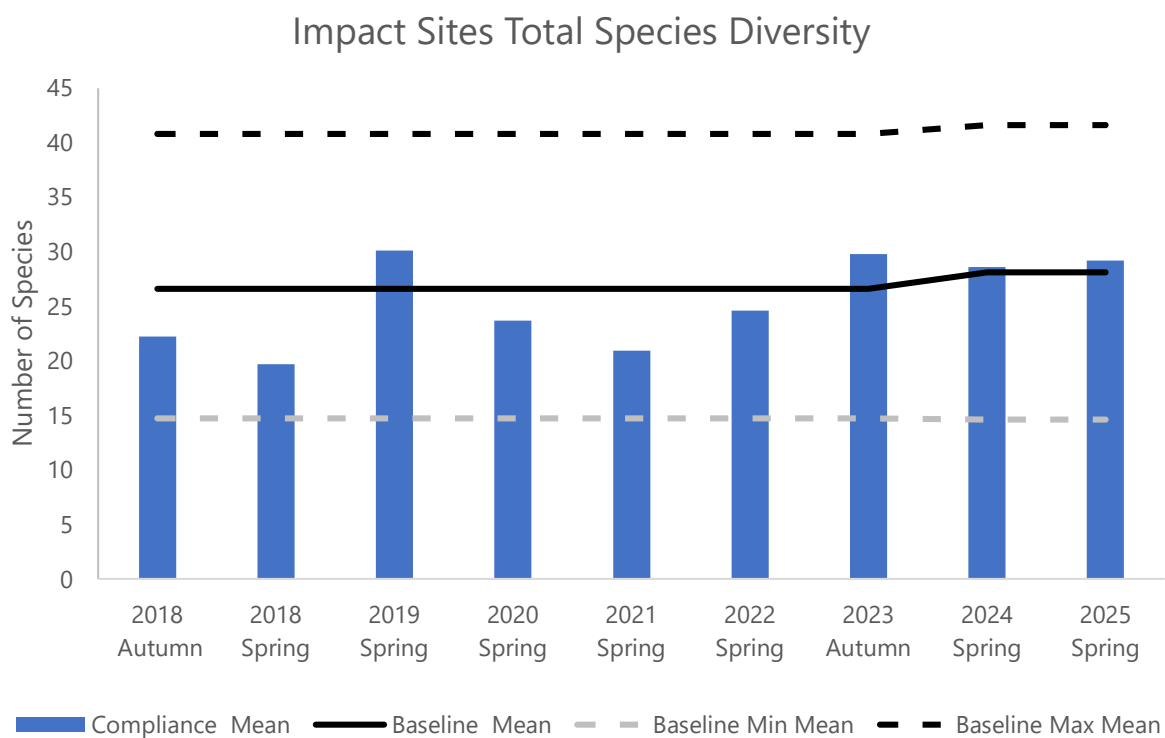


Figure 3.3: Mean total flora species diversity (long-lived and short-lived species) at impact sites during compliance monitoring (compared to baseline mean, min, max)



3.2.1.3 Long-lived species diversity: baseline and compliance monitoring period comparison

Table 3.4, Figure 3.4 and Figure 3.5 show the range in long-lived native species diversity at sites surveyed in during baseline (autumn 2012 to 2016) and compliance monitoring (autumn 2018 to spring 2025). For all compliance monitoring surveys, long-lived species diversity has been within the baseline range, both for individual sites (Table 3.4), and for mean values for control sites (Figure 3.4) and impact sites (Figure 3.5). Control and impact sites have recorded similar directional changes in long-lived species diversity during compliance monitoring. Namely, both control and impact sites recorded increases in mean long-lived species diversity in 2018, 2019, 2021, 2022 and 2024, and decreases in mean long-lived species diversity in 2020, 2023 and 2025. In 2025, total long-lived species diversity was 57 species, one fewer than the previous lowest compliance tally of 58 (recorded in both 2018 and 2023). In 2024, 1 individual plant of Australian Boxthorn (*Lycium australe*) was recorded at dune site 21, but the species was not recorded in 2025. Similarly in 2024, 1 individual plant of Tar Bush (*Eremophila glabra*) was recorded in the creek line at site 9, but was not recorded in 2025. The dune RAM site is undulating and not defined on the ground, meaning that species represented by only 1 individual can be overlooked. Similarly, the creek habitat survey area is difficult to define accurately in the field. These examples illustrate possible reasons for small variations in perennial diversity at RAM sites.

At individual impact and control sites, long-lived species diversity has fluctuated between survey periods during both baseline and compliance monitoring, but shows no obvious trends. Since 2012, long-lived diversity has ranged between 4 – 10 species at individual sites, less than the range in short-term species diversity (see below).

Table 3.4: Long-lived perennial native species diversity, baseline versus compliance monitoring period

Type	Baseline (2012-2016) and Compliance Long-lived Diversity to (2018-2023)										Type	Updated Treatment Baseline and Compliance 2024				
	RAM Site ¹	Baseline Min	Baseline Max	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn		RAM Site	Baseline Min	Baseline Max	2024 Spring	2025 Spring
Control	1	10	14	12	10	13	7	15	12	11	Control	1	10	14	11	8
	2	4	8	4	7	9	6	3	7	7		2	4	8	7	6
	7	11	19	16	17	20	10	16	19	11		4	5	10	9	7
	9	13	21	15	14	19	16	18	16	19		6	4	8	9	8
	13	4	8	4	6	6	6	6	8	8		7	11	19	18	12
	Means	8.4	14	10.2	10.8	13.4	9	11.6	12.4	11.2		9	13	21	19	19
Impact	3	5	10	9	10	10	7	8	9	10	Impact	13	4	8	10	7
	4	5	10	7	7	8	7	7	8	7		Means	7.3	12.6	11.9	9.6
	5	8	14	10	10	11	8	9	11	10		3	5	10	11	9
	6	4	8	7	6	7	7	6	6	6		5	8	14	9	11
	10	17	29	22	26	26	21	27	25	24		10	17	29	23	20
	11	11	16	18	16	17	14	15	17	19		11	11	16	18	15
	12	3	7	4	8	8	6	4	10	9		12	3	7	7	6
	15	6	10	6	7	8	10	7	7	6		15	6	10	8	7
	16	6	10	6	7	7	5	5	7	9		16	6	10	9	9
	Means	7.2	12.7	9.9	10.8	11.3	9.4	9.8	11.1	11.1		Means	8	13.7	12.1	11.0

*In 2024, Sites 4 and 6 were transferred from impact to control sites due to the Southern Access Road no longer being in general use for mining activities, and there being no hydrogeological connection to the Tailings Storage Facility. The baseline mean (and min/max) values therefore change at 2024 as a result of these changes.

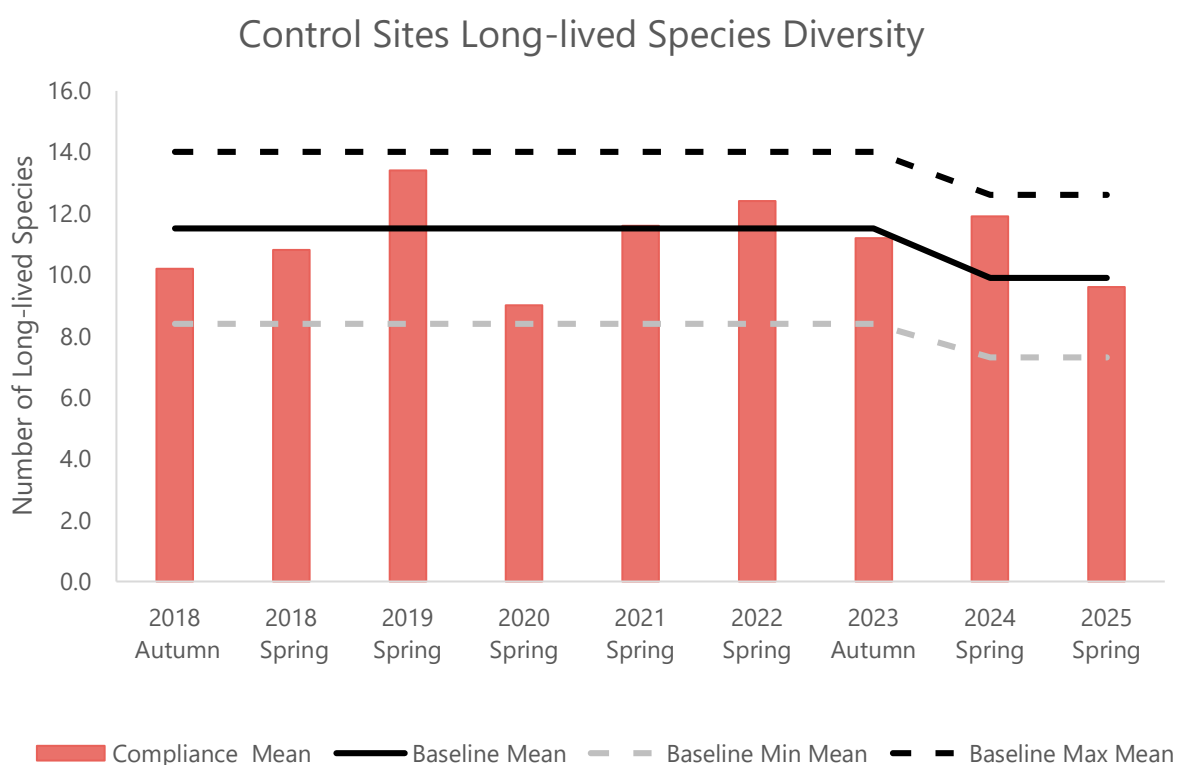


Figure 3.4: Mean diversity of long-lived flora species at control sites during compliance monitoring (compared with baseline mean, min, max)

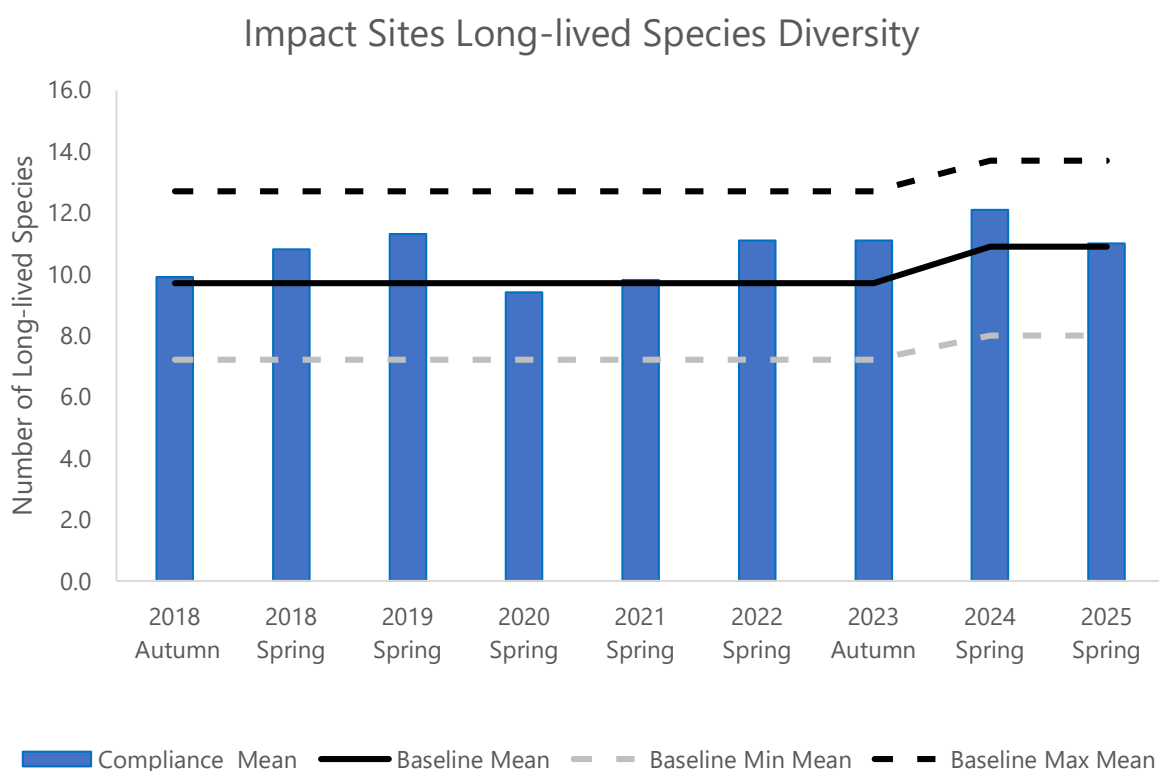


Figure 3.5: Mean diversity of long-lived flora species at impact sites during compliance monitoring (compared with baseline mean, min, max)



3.2.1.4 Short-lived species diversity: baseline and compliance monitoring period comparison

During compliance monitoring, the mean short-lived species diversity for both control and impact sites has fluctuated yearly, largely in response to fluctuations in rainfall patterns. Since 2012, short-lived plant diversity has ranged between 13 – 28 species at individual sites (Table 3.5), almost 3 times the magnitude of variation in perennial species diversity.

In 2025, the mean short-lived species diversities for control sites (16.3 species) and for impact sites (19.4 species) were the third highest and the highest totals, respectively recorded during compliance monitoring, and almost the same as the mean for baseline monitoring (Figure 3.6 and Figure 3.7). The short-lived diversity tallies for all individual sites were also within the baseline ranges (Table 3.5).

Table 3.5: Total diversity of short-lived native species, baseline versus compliance monitoring period

Type	Baseline (2012-2016) and Compliance Short-lived Diversity to (2018-2023)										Type	Updated Treatment Baseline and Compliance 2024				
	RAM Site ¹	Baseline Min	Baseline Max	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn		RAM Site	Baseline Min	Baseline Max	2024 Spring	2025 Spring
Control	1	6	28	12	7	10	11	10	15	20	Control	1	6	28	13	13
	2	4	31	10	8	12	15	11	12	14		2	4	31	21	15
	7	8	28	14	7	10	7	16	14	14		4	8	29	17	22
	9	2	25	6	4	11	18	13	18	21		6	11	24	15	20
	13	5	27	10	14	24	14	12	11	19		7	8	28	17	13
	Means	5.0	27.8	10.4	8.0	13.4	13.0	12.4	14.0	17.6		9	2	25	22	15
												13	5	27	14	16
Impact	3	10	35	14	12	19	14	9	16	24	Impact	Means	6.3	27.4	17.0	16.3
	4	8	29	14	7	17	12	10	15	18		3	10	35	26	21
	5	4	32	12	10	14	12	9	10	16		5	4	32	15	18
	6	11	24	15	9	21	16	10	12	15		10	8	28	13	16
	10	8	28	6	9	14	21	18	18	26		11	7	33	15	22
	11	7	33	14	9	20	14	11	14	18		12	6	25	13	15
	12	6	25	13	6	21	16	12	13	21		15	4	29	17	15
	15	4	29	12	9	23	13	9	12	15		16	4	30	15	29
	16	4	30	11	9	20	10	12	9	15		Means	6.1	30.3	16.3	19.4
	Means	6.9	29.4	12.3	8.9	18.8	14.2	11.1	13.2	18.7						

*In 2024, Sites 4 and Site 6 were transferred from impact to control sites due to the Southern Access Road no longer being in general use for mining activities, and there being no hydrogeological connection to the Tailings Storage Facility. The baseline mean (and min/max) values therefore change at 2024 as a result of these changes.

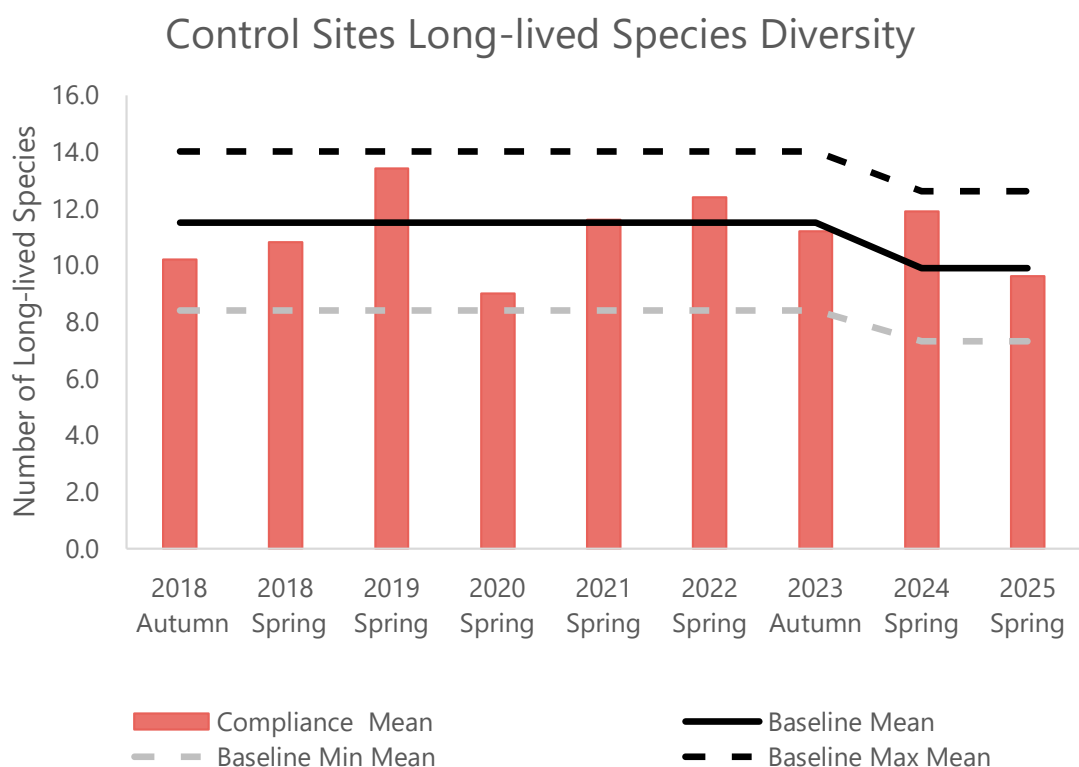


Figure 3.6: Mean diversity of short-lived flora species at control sites during compliance monitoring (compared with baseline mean, min, max)

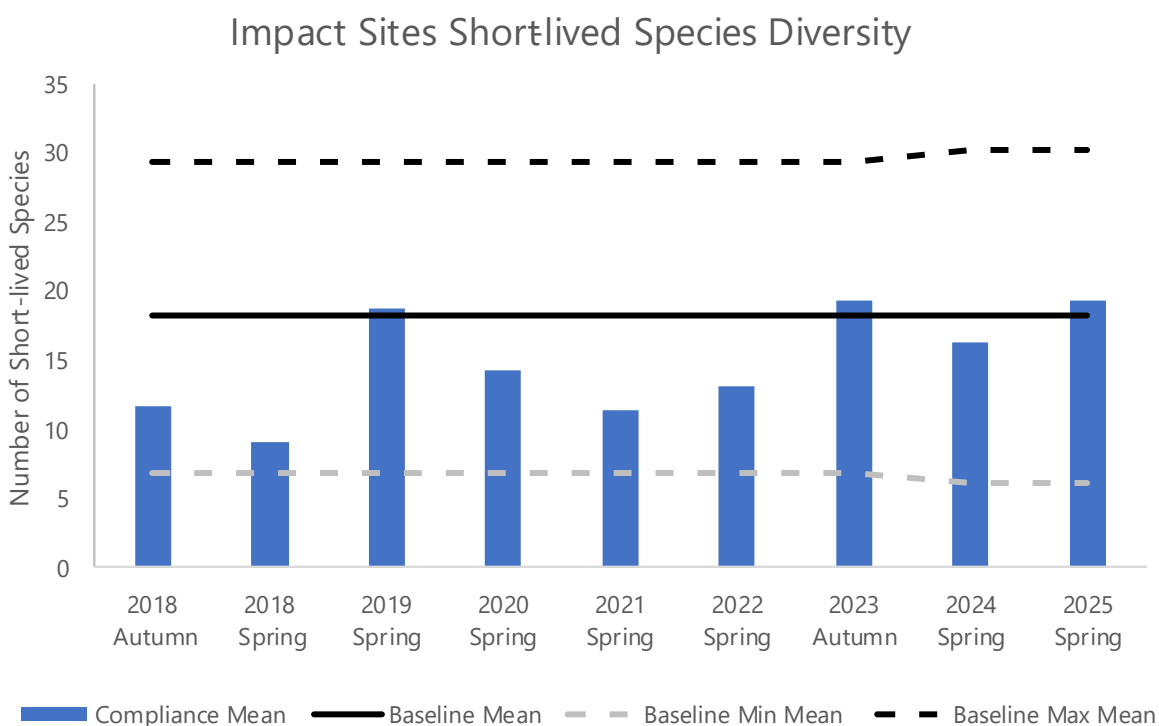


Figure 3.7: Mean diversity of short-lived flora species at impact sites during compliance monitoring (compared with baseline mean, min, max)



3.2.1.5 Comparison of long-lived species diversity by habitat type and site

Four distinct habitats were recognised at the Flora Rangeland sites: Eliza Creek (major drainage line) sites, sand dune sites, gibber sites with no drainage line, and gibber sites with a drainage line. Trends in perennial species diversity were compared between sites of similar habitat. This was done to:

1. Determine the magnitude of inherent variation between sites of similar habitats, regardless of potential impact from mining, and
2. Detect potential changes in plant diversity associated with a particular habitat, regardless of distance from mining infrastructure; namely to detect possible stressors (mining related or otherwise), impacting species diversity in specific habitats.

Potential increasing or decreasing trends for individual sites were also assessed. This was done to detect possible trends at a site level, that were otherwise being masked at a control group or impact group level.

Long-lived species diversity at Eliza Creek

The Eliza Creek Sites 17, 18, 19 and 20 were established in autumn 2018, to monitor the potential impacts of the tailings dam embankment on downstream vegetation. In addition, flora Site 10, established in 2012, is located on Eliza Creek, approximately 5 km downstream from the TSF and therefore also represents a potential impact site. The TSF construction began in 2018 and operations commenced during February 2020. As such, the 2018 and 2019 survey data represent the best 'baseline' data available for Eliza Creek survey sites 17-20, noting that natural spatial and temporal variations in species diversity are present and due to inter alia: slight habitat differences (width and depth of channel); seasonal and yearly rainfall variations; and slight variations in area surveyed at each site for each survey.

Between 2020 and 2024, mean long-lived species diversity for each site during operational monitoring was either greater than, or within 5% of construction (2018 and 2019) means (Table 3.6). However, in 2025, the long-lived species diversity for sites 10, 18 and 20 was below the construction (baseline) mean, but long-lived diversity at Sites 17 and 19 was the same or greater than construction means (Figure 3.8). Since 2020, long-lived species diversity has shown both increases and declines at sites 10, 17, 18 and 20, with only site 19 recording similar diversities each survey (Figure 3.9). However, for all sites the 2025 long-lived species diversities were similar to 2020 diversities.

In summary there is no clear pattern emerging in long-lived species diversity data relating to the time since TSF establishment and the distance from the TSF (Sites 17 being the closest (270 m) and Site 10 being the furthest away).



Table 3.6: Long-lived native plant species diversity at Eliza Creek during compliance monitoring (all sites considered potential impact sites)

RAM Site ¹	Construction Long-lived Species Diversity			Operation Long-lived Species Diversity						
	Min	Max	2018-2019 Mean	2020	2021	2022	2023	2024	2025	2020-2025 Mean
17	19	24	21	18	20	27	24	22	21	22
18	22	25	23	21	20	23	21	24	18	22
19	16	19	18	23	24	25	24	23	23	24
20	21	26	24	20	21	23	25	25	18	23
10	22	26	25	21	27	25	24	23	20	24

¹ Flora sites (1 hectare Rangeland) displayed by increasing distance from TSF, where flora Site 17 = CAR017, 18 = CAR018 and so on.

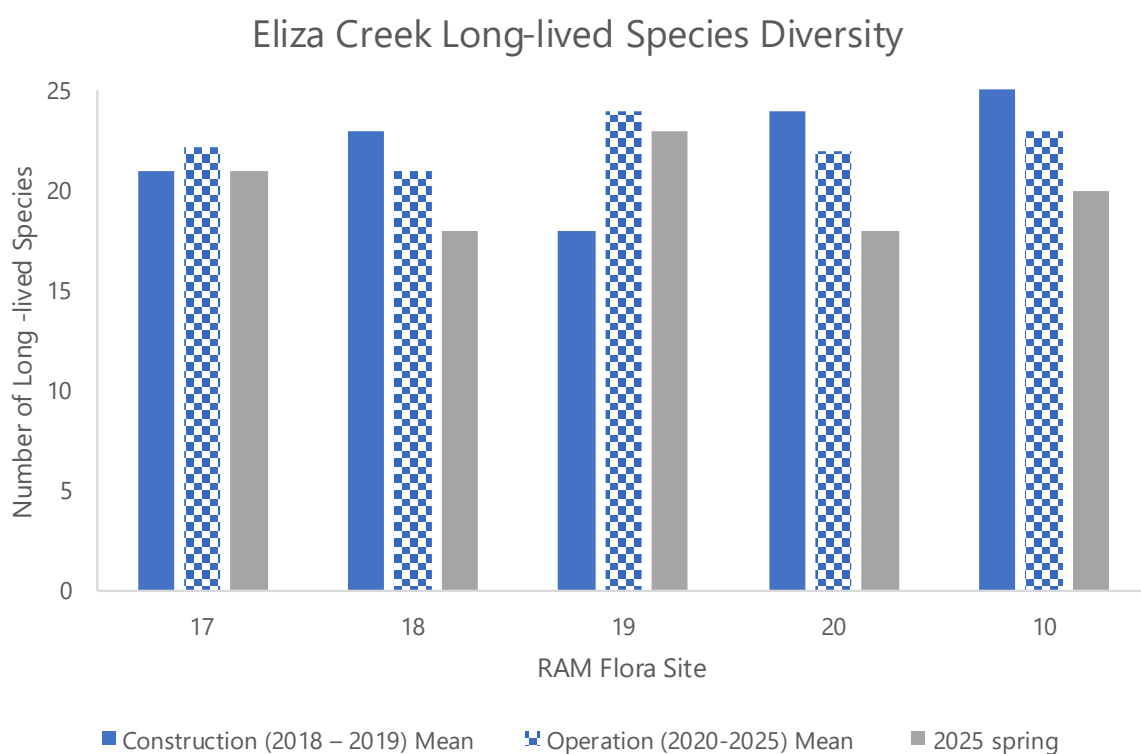


Figure 3.8: Native long-lived species diversity at Eliza Creek Rangeland Flora Sites

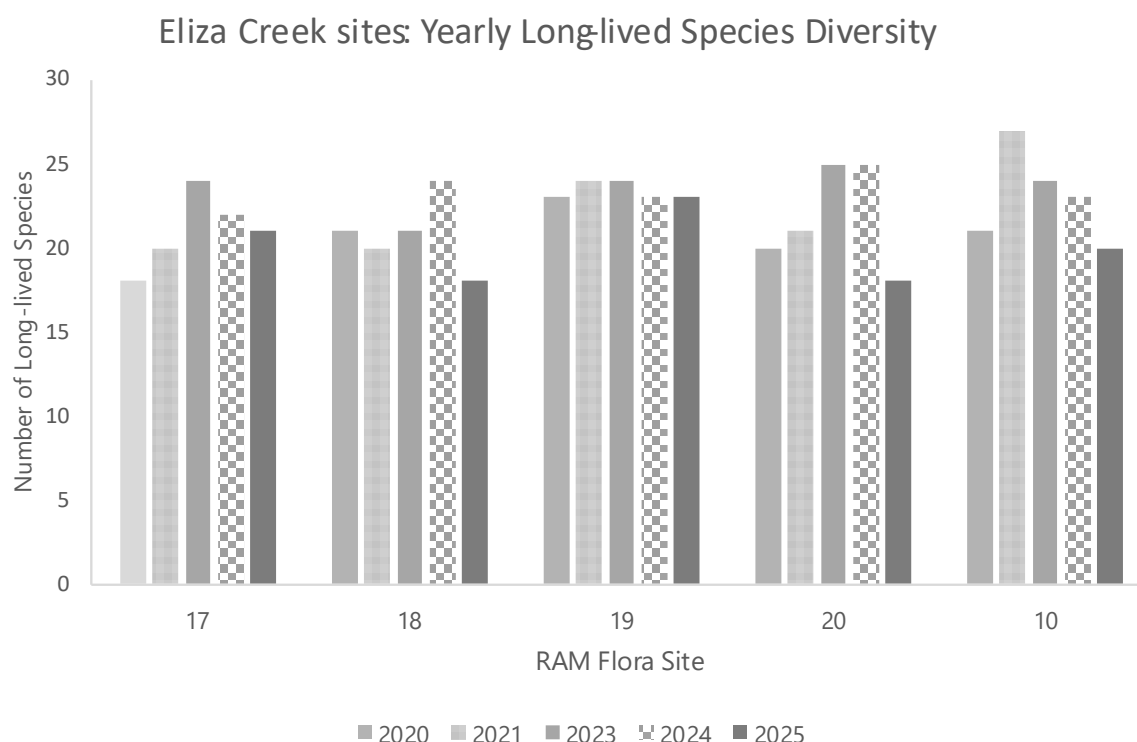


Figure 3.9: Yearly Long-lived species diversity at Eliza Creek during TSF operation (2020 to 2025)

Long-lived species diversity at sand dune habitats

Flora Sites 21 and 22 were established in May 2018 on sand dunes, a previously un-monitored habitat within the Carrapateena Operation area, with control Site 21 relocated in spring 2018 given proximity to proposed infrastructure. For both sites, perennial species diversity has fluctuated yearly (Table 3.7) without any clear trend emerging in either long-term increases or declines.

The sand dune sites are not defined on the ground. A central point is designated by an easting and northing coordinate and the site is surveyed by walking within an area defined by a 55 m radius from the central coordinate (an area equivalent to a 1 ha RAM site). Several species are present as isolated individuals only. Due to the undulating nature of the dunes and the absence of on-ground survey markers, it is possible that some perennial species of low abundance, are present but not detected during some surveys.

Table 3.7: Long-lived perennial plant species diversity at sand dune habitats during compliance monitoring

RAM Site	Site Type	Compliance Monitoring Long-lived Species Diversity							
		2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
21	Control	10	8	7	9	8	12	11	9
22	Impact	7	8	10	5	5	7	9	9

Long-lived species diversity at gibber habitats with no drainage line

Gibber habitat sites that contain no drainage line include Control Sites 2, 4, 6 and 13, and Impact Sites 3, 5, 12, 15 and 16. In 2025, the mean long-lived species diversity during compliance monitoring (2018 to 2025) varied from 6.2 species at Site 2 to 9.6 species at Site 5. Mean diversity at all sites during compliance monitoring has remained within the baseline range, and remained similar to baseline diversity (Figure 3.10). Long-lived species diversity has fluctuated yearly but there has been no obvious trend in diversity at any individual site regardless of whether designated a control or potential impact site (i.e. based on distance from mining infrastructure (Figure 3.11). Of the gibber sites with no drainage line, Site 3 and Site 5 recorded the highest perennial species diversity in 2025, both designated as impact sites and noting that Site 3 is closest to major mining infrastructure.

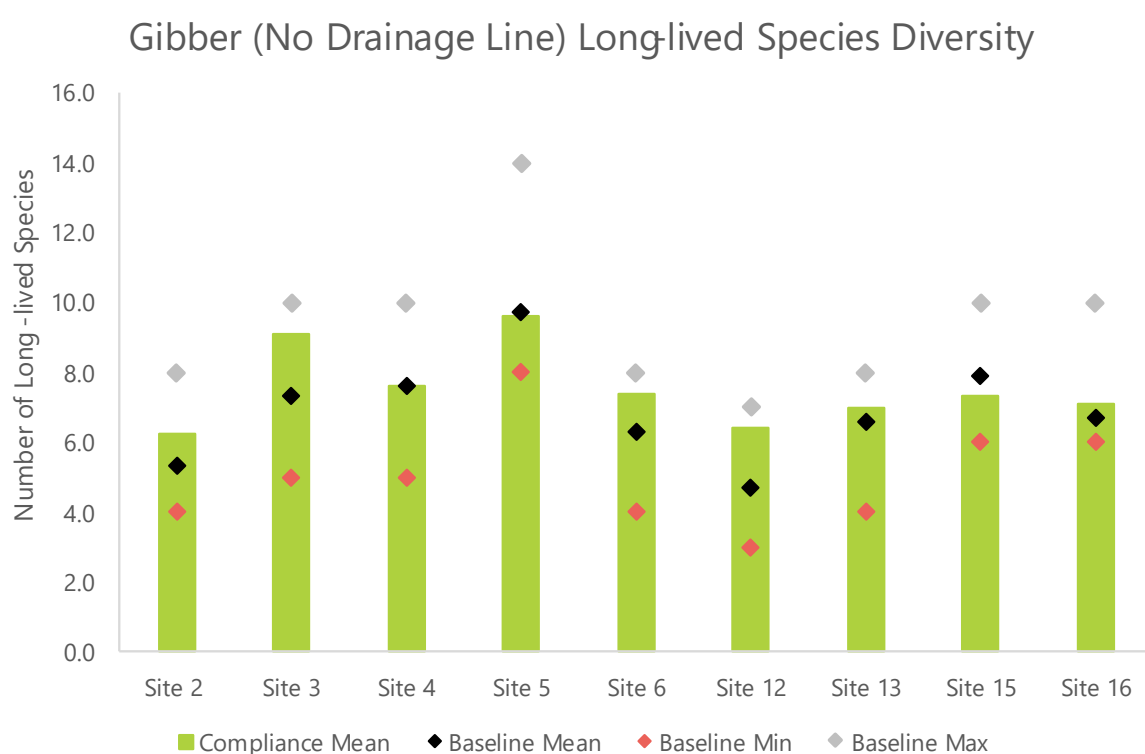


Figure 3.10: Mean diversity of long-lived species at gibber sites (no drainage line), 2025

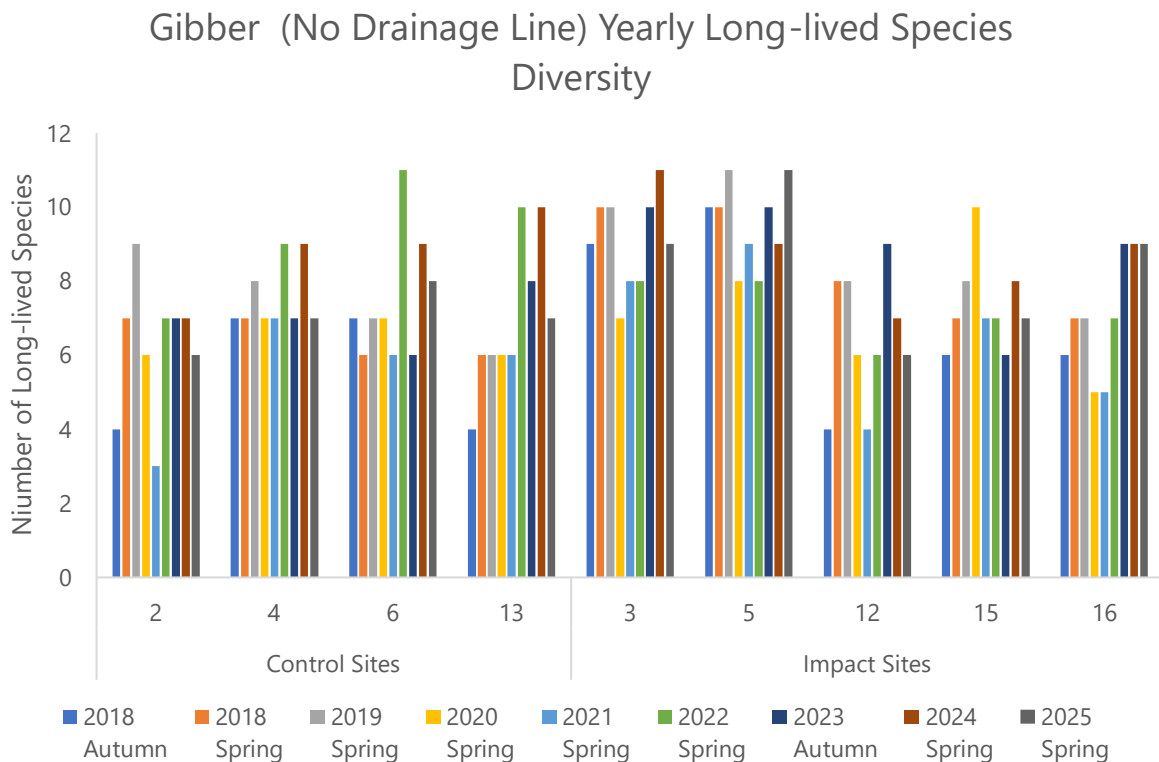


Figure 3.11: Yearly totals of long-lived species diversity at gibber sites (no drainage line)

Long-lived species diversity at gibber habitats that include a minor drainage Line

Gibber sites that included a drainage line were Control Sites 1, 7 and 9, and Impact Site 11. Mean diversity at all sites during compliance monitoring has remained within the baseline range (Figure 3.12). During both baseline and operational monitoring, diversity has fluctuated quite widely at Control Sites 1 and 7, and to a lesser extent at control Site 9 and impact site 11, but overall there are no clear trends evident (Figure 3.13).

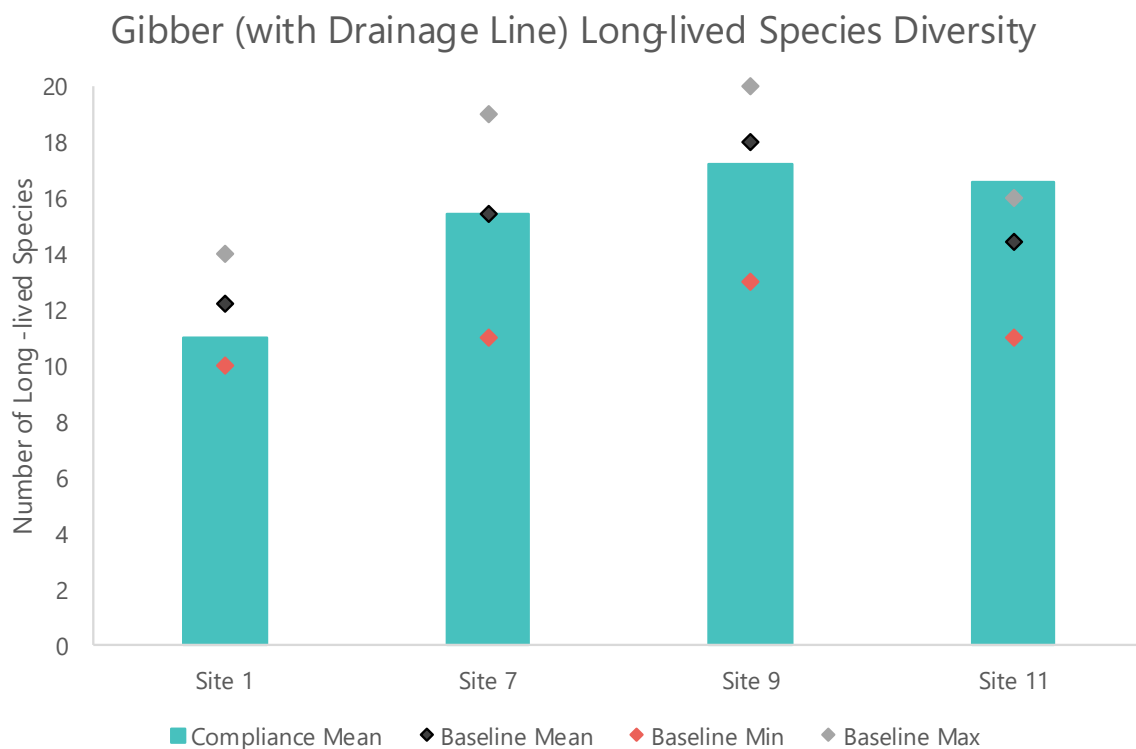


Figure 3.12: Mean long-lived species diversity at gibber sites with a minor drainage line

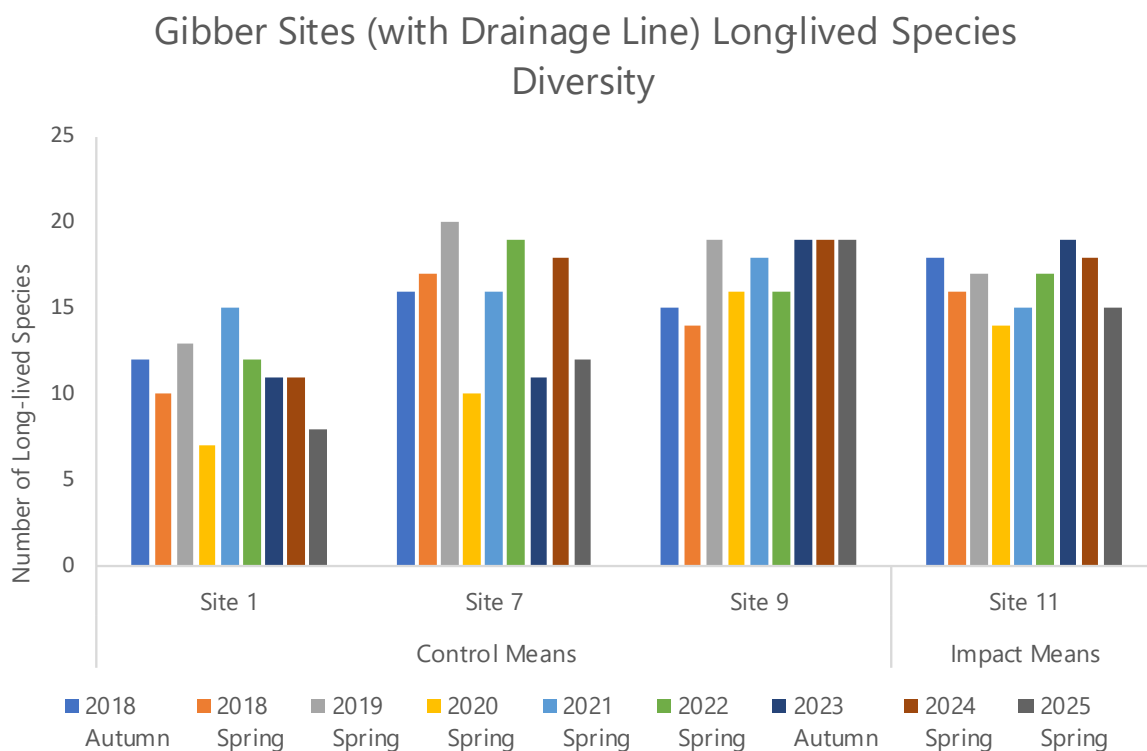


Figure 3.13: Yearly totals of long-lived species at gibber sites with a minor drainage line



3.2.2 Jessup transects – population structure of long-lived woody perennials

During compliance monitoring, Jessup transects were conducted at all 13 gibber habitat flora sites (Sites 1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 15 and 16) and at the 5 Eliza Creek flora sites (Sites 10, 17, 18, 19, 20). Baseline Jessup site data is available for comparison for the 13 gibber sites for surveys conducted in 2013, 2014 and 2015 (Sites 15 and 16 were not surveyed in 2012 and there was no data available for 2016 or 2017).

3.2.2.1 Gibber habitat Jessup transects

Jessup data (Appendix D) shows the total number of adults and juveniles of long-lived woody perennials for the flora sites, recorded in spring 2024. Jessup transects conducted in gibber habitat during both the baseline and compliance periods were Sites 1 to 7, 9 to 13, 15 and 16. For these transects, population trends of the 5 most abundant long-lived woody species are presented, including a comparison of control and impact sites, and comparison of baseline and compliance monitoring populations. Note, baseline mean populations are for 2013 – 2015, given some sites were not surveyed in 2012 and no data was available for 2016 or 2017. The 5 species assessed were:

- Bladder Saltbush (*Atriplex vesicaria*): dominates the Jessup transects. In 2025, 4,971 individuals were recorded, approximately 10 times more adult plants than the next most abundant species (*Tecticornia medullosa*). In the semi-saline gibber habitat, this species is only slightly palatable to stock.
- Samphire species (*Tecticornia* species): were widespread and common at most gibber sites (373 plants recorded in 2025) with *Tecticornia pergranulata* and *T. indica* confined to gibber sites that also contained a drainage line.
- Plains Lantern Bush (*Abutilon halophilum*): A total of 379 plants were recorded from 11 gibber sites in 2025. In the semi-saline gibber habitat, this species is only slightly palatable to stock.
- Sea-heath (*Frankenia serpyllifolia*): widespread in the gibber habitat, and in 2025 was the fourth most abundant species recorded in Jessup gibber sites (164 individuals). The relative unpalatability of the species eliminates grazing impact as a cause of potential decline. Hence likely causes of potential changes in abundance can be narrowed down to climate and/or mining impact.
- Bush Minuria (*Minuria cunninghamii*). This species is highly palatable and in 2025 was the fifth most abundant species recorded for the Jessup transects (89 individuals).

Further interrogation of the presence of these 5 species at control and impact sites, is provided below.

Bladder Saltbush

Bladder Saltbush is a drought-tolerant, long-lived woody perennial, and the dominant plant species at the gibber habitat Jessup transects (Sites 1 to 7, 9 to 13, 15 and 16). In South Australia, due to its longevity and drought tolerance, the species is used extensively as an indicator of land condition in chenopod shrublands (Baulderstone and Baird 2012). In the gibber habitat Bladder Saltbush is only moderately palatable, due to the semi-saline soils.



During compliance monitoring (2018 to 2025), population trends at impact and control sites have been similar. At impact sites, the mean population of Bladder Saltbush has either been relatively stable or increased (Figure 3.14). At control sites, the mean population of Bladder Saltbush declined noticeably in 2020, before increasing by approximately 40% in 2024 and 100% in 2025 (Table 3.8). The increase at both impact and control sites since 2023 was largely due to an increase in juveniles. However, since 2023, the total number of adult plants has also increased by 35% at control sites and by 11% at impact sites. There has also been an increase in adults at all individual sites, except site 16. (Table 3.8 and Table 3.9). The decline in adults at Site 16, however, was accompanied by 202 juveniles being recorded (compared with 15 juveniles in 2024). Future monitoring is required to determine the impact of any trends in the adult population of Saltbush at site 16.

In 2025, the mean number of Bladder Saltbush plants increased after 2024, rising to be above the baseline mean. Since compliance monitoring began in autumn 2018, the mean number of Bladder Saltbush plants at control sites has been above the baseline mean in 2018 and 2019, but below the baseline mean between 2020 and 2024. However, in 2025, following successive rises in abundance since 2023, the control population mean of Bladder Saltbush was almost 75% greater than the baseline mean (Figure 3.15). This was due largely to an increase in juveniles (Table 3.8). At impact sites the mean number of Bladder Saltbush plants has fluctuated less than at control sites and has remained within the baseline range for all but the 2020 survey (Figure 3.16). Between 2019 – 2024, the mean number of plants at impact sites has largely been just below the baseline but was above the baseline mean in 2025.

The Bladder Saltbush population at impact sites has been more stable than at control sites during compliance, and remained within the baseline range for longer periods, hence mining activities are not considered to have had an impact.

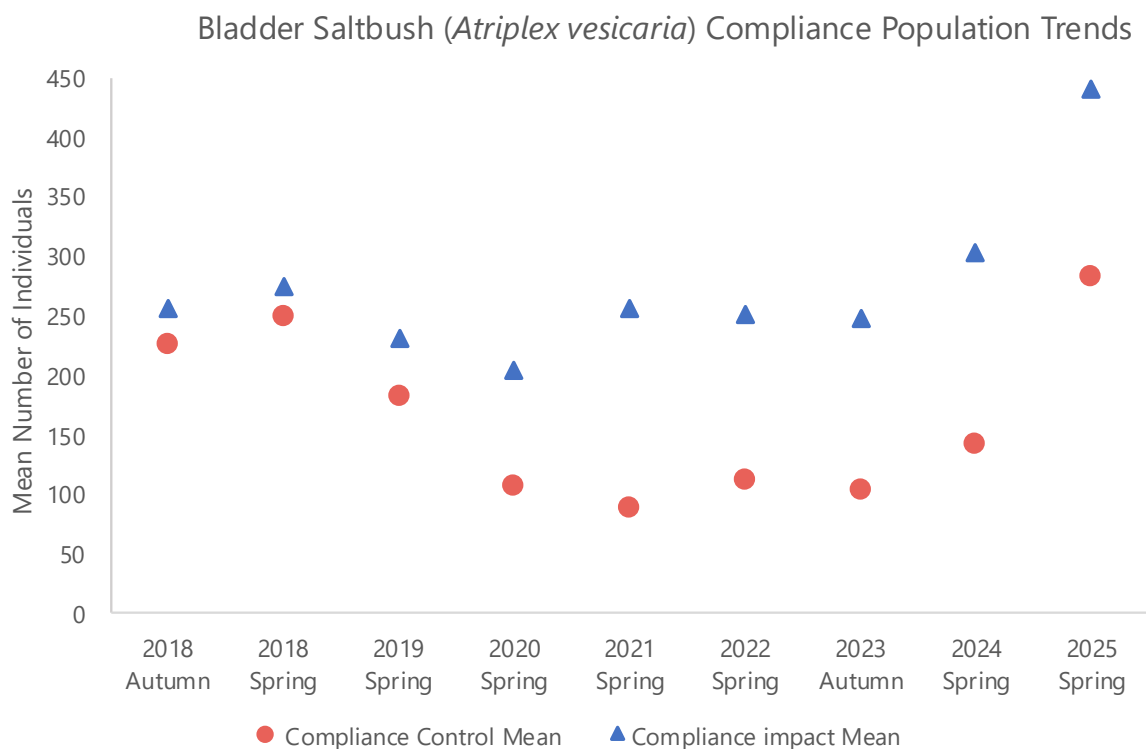


Figure 3.14: Compliance monitoring population trends in Bladder Saltbush at control and impact sites

Table 3.8: Adult and juvenile Bladder Saltbush at control sites, 2023 – 2025

Site	Adults			Adult increase ¹ 2023 - 2025	Juveniles		Juvenile increase ¹ 2024 - 2025
	2023	2024	2025		2024	2025	
1	57	86	81	24	3	61	58
2	95	112	116	21	9	60	51
3	141	143	160	21	19	69	50
4	105	173	210	105	30	279	249
5	403	314	514	111	77	236	163
6	149	152	194	45	5	102	97
7	40	51	65	25	10	22	12
9	93	104	118	25	39	207	168
11	440	498	528	88	80	194	114
12	205	228	231	26	15	156	141
13	188	180	219	31	42	252	210
15	94	93	117	23	9	42	33
16	290	324	202	-88	15	202	187

¹ Increase in the number of individual plants within the Jessup transect

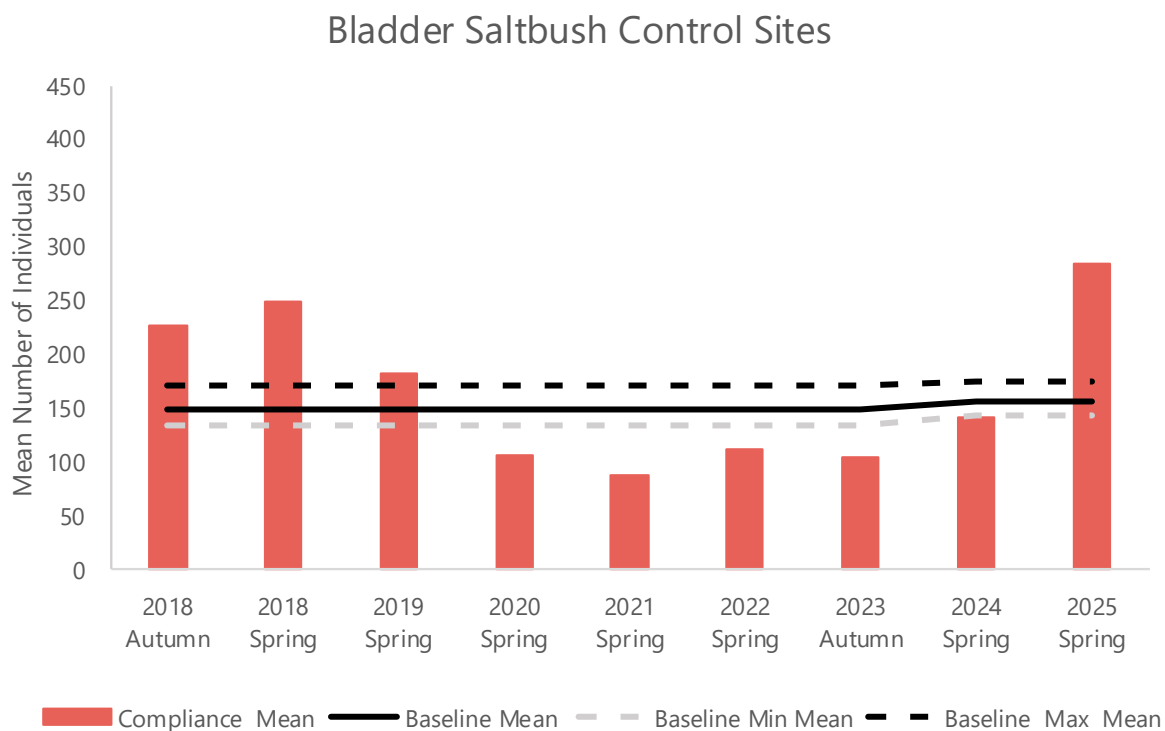


Figure 3.15: Mean abundance of Bladder Saltbush (adults and juveniles combined) at Jessup control sites, baseline versus compliance monitoring

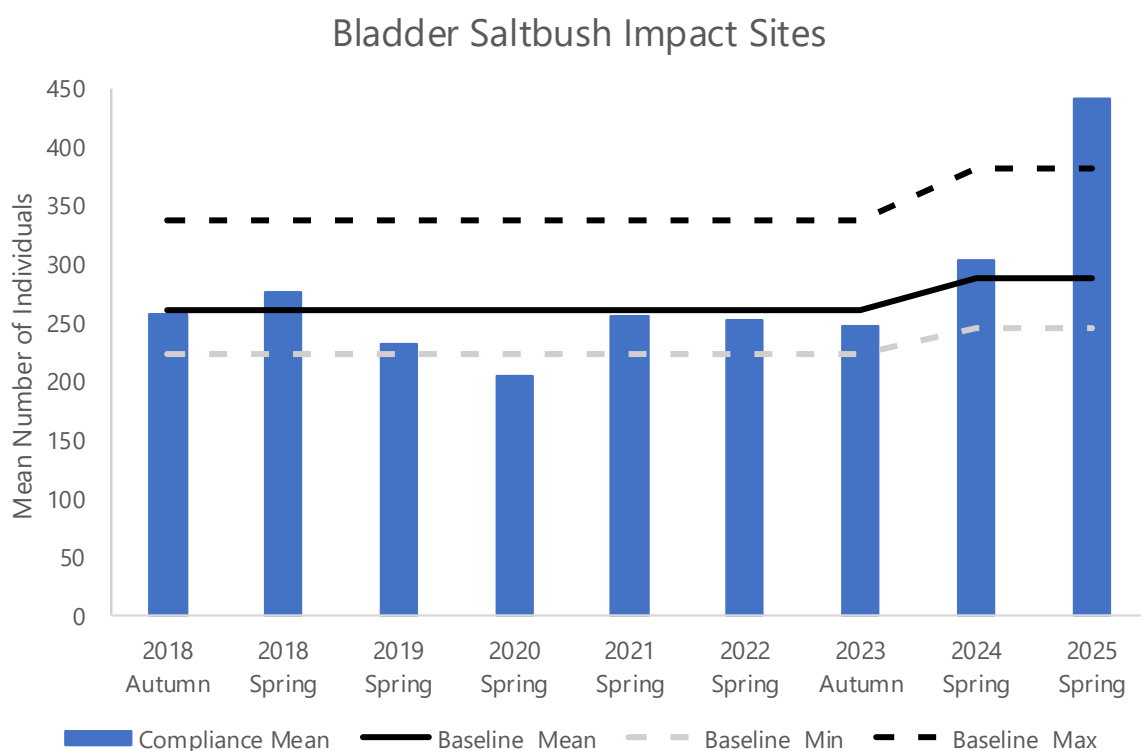


Figure 3.16: Mean abundance of Bladder Saltbush (adults and juveniles combined) at Jessup impact sites, baseline vs compliance monitoring



Samphire

All Samphire species were analysed collectively. The most widespread Samphire species at the Jessup sites is *Tecticornia medullosa*, with *T. pergranulata* and *T. tenuis* being associated with floodout areas of drainage lines. Samphire species were present at all 13 gibber Jessup sites.

The mean abundance at impact sites has been relatively stable between 2018 and 2024, but increased in 2025. The increase in 2025 was due largely to a 50% increase in *Tecticornia medullosa* at site 5, with the abundance at other impact sites little changed from 2024. At control sites, the mean abundance of Samphire during compliance surveys has been more variable, but with no distinct trends emerging between 2018 and 2025 (Figure 3.17).

Since 2018, the mean number of Samphire individuals at control sites has been within, or exceeded, the baseline range except in 2021 (Figure 3.18). The mean number of Samphire at impact sites was slightly below the baseline range in 2020, 2021 and 2022. However, in 2023 and 2024, the mean number of individuals at impact sites returned to within the baseline range, and in 2025 increased again to be at the baseline mean abundance (Figure 3.19). Samphire populations at impact sites have either been stable or increased during compliance, and were within the baseline range as of 2025, hence there is no evidence that Samphire populations are impacted by mining activities at Carrapateena.

Samphire Compliance Population Trends

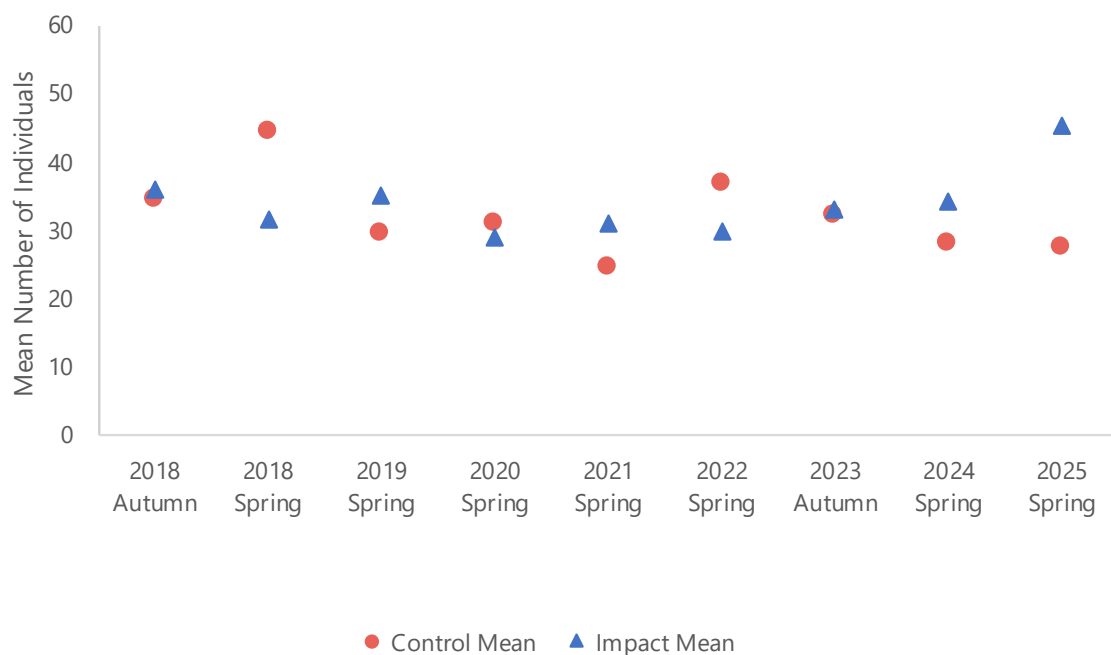


Figure 3.17: Samphire population trends during compliance period at control and impact sites

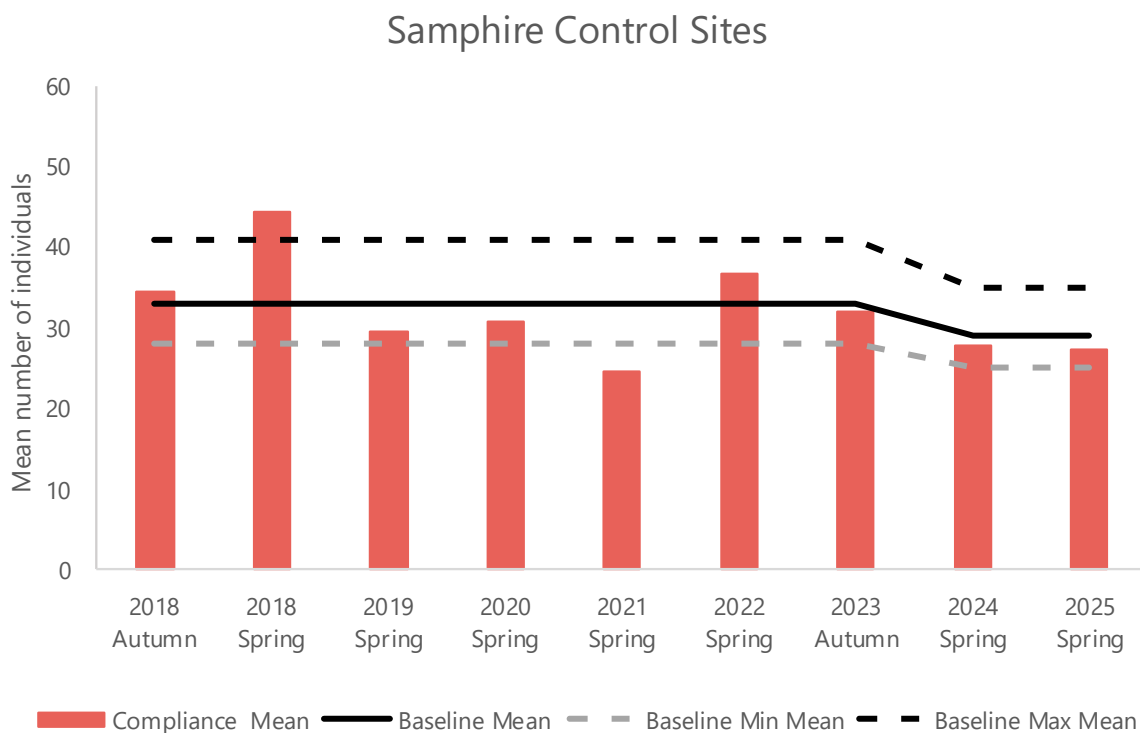


Figure 3.18: Mean abundance of Samphire at Jessup control sites, baseline vs compliance monitoring

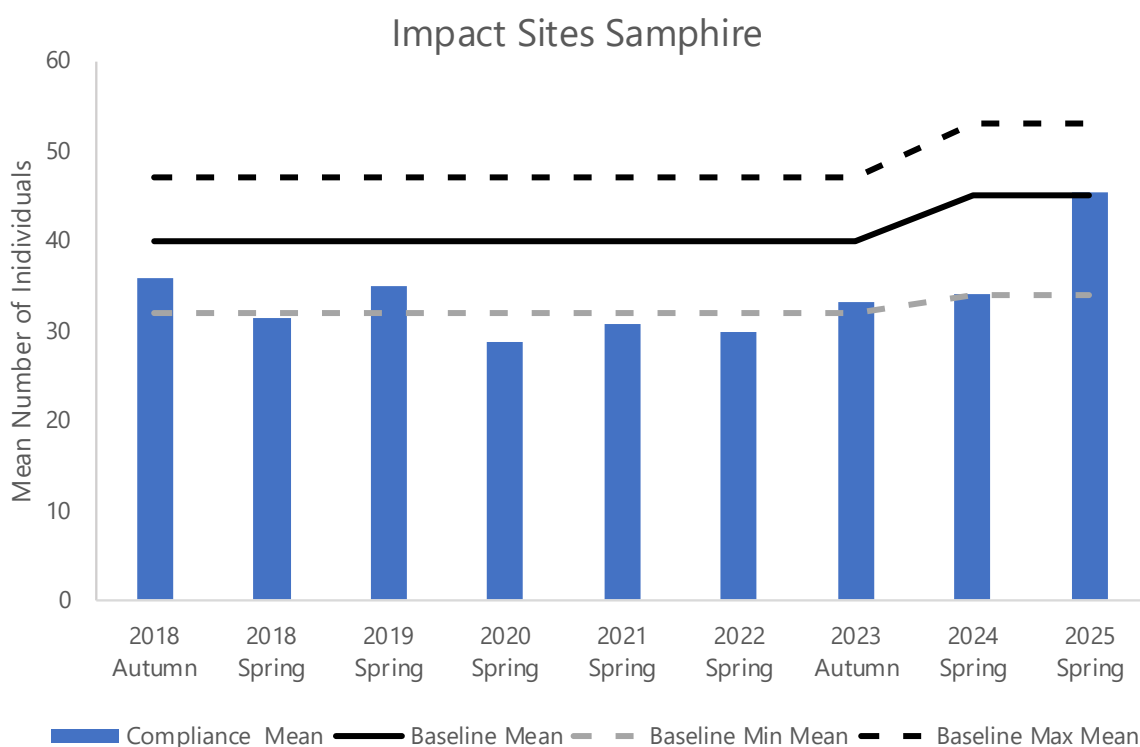


Figure 3.19: Mean abundance of Samphire at Jessup impact sites, baseline vs compliance monitoring

Thyme Sea-heath

At impact sites, the mean population of Thyme Sea-heath was stable between 2018 – 2023 before increasing in 2024 and 2025 (Figure 3.20). The increase in mean population in 2024 and 2025 reflects the re-assignment of sites 4 and 6 in 2024, from impact sites to control sites (due to infrastructure changes). At control sites, the population mean has fluctuated during compliance but with no distinct trend evident (Figure 3.20). At the individual site level, the population of Thyme Sea-heath has also remained relatively stable and or/shown no clear trends (Table 3.9). Thyme Sea-heath was most abundant at Impact Sites 3 and 5, which despite their proximity to infrastructure (Site 3 adjoining the processing plant, and Site 5 being near the WAR / Midway Quarry), the populations have shown no clear trends.

At control sites, the mean number of Thyme Sea-heath has been within, or exceeded, the baseline range for all survey periods except spring 2021 (Figure 3.21). At impact sites, the mean number of Thyme Sea-heath has remained within the baseline range during all compliance phase surveys (Figure 3.22). Hence, mining activities have not had an impact on Thyme Sea-heath populations.

Table 3.9: Abundance of Thyme Sea-heath at all sites, 2018 to 2025

Site ¹	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
1	1	1	2	0	0	4	1	0	0
2	0	5	1	1	0	0	0	1	1
3	45	33	36	13	27	18	28	28	30
4	1	1	3	0	0	0	0	3	5
5	116	111	67	59	67	106	74	65	82
6	2	0	2	3	1	1	5	5	5
7	21	17	14	10	6	8	7	9	2
9	2	16	13	9	9	10	13	12	16
11	0	1	3	4	3	3	3	2	3
12	0	0	1	2	1	2	2	1	4
13	29	58	30	11	4	24	30	14	14
15	4	7	8	5	5	5	6	8	6

¹Note Site 10 and 16 are absent, given there are no Thyme Sea-heath in the Jessup transect

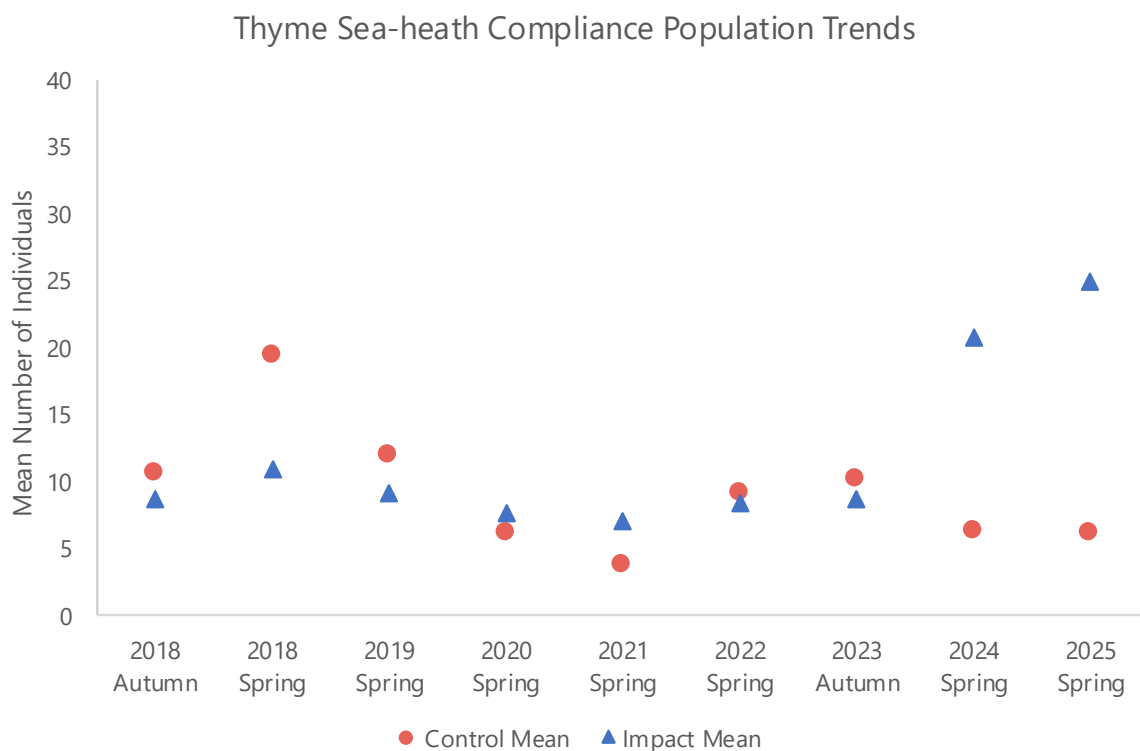


Figure 3.20: Population trends in Thyme Sea-heath during compliance period, control and impact sites

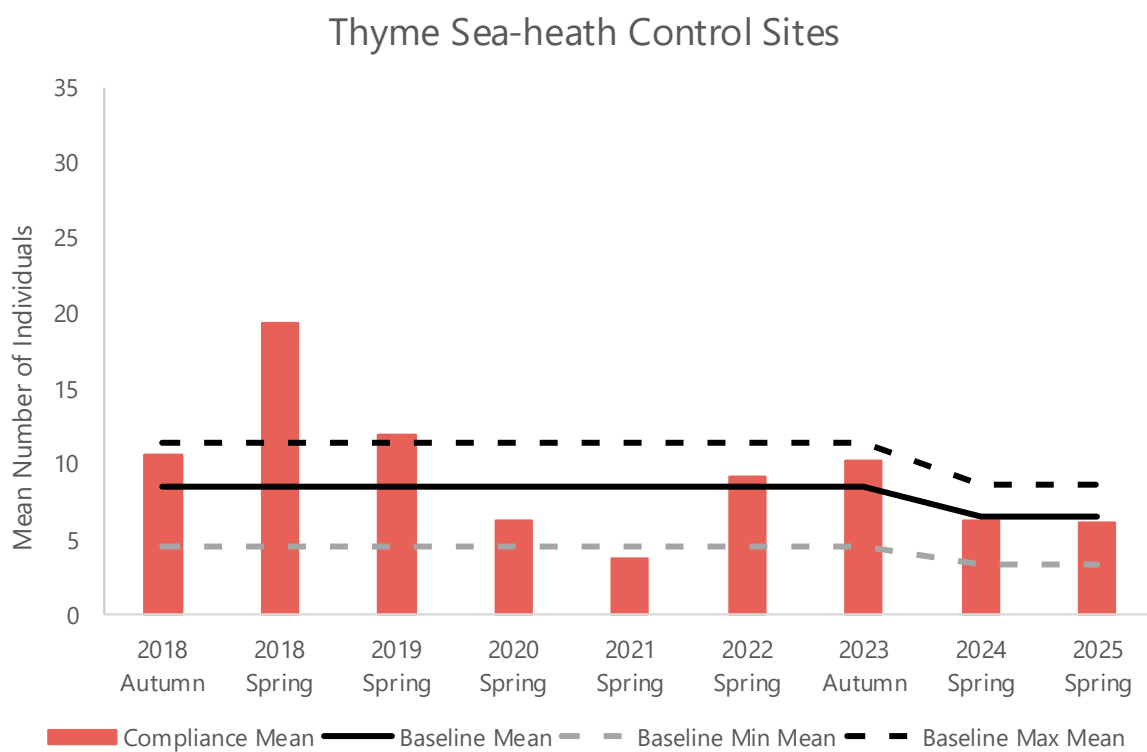


Figure 3.21: Mean abundance of Thyme Sea-heath at Jessup control sites, baseline vs compliance monitoring

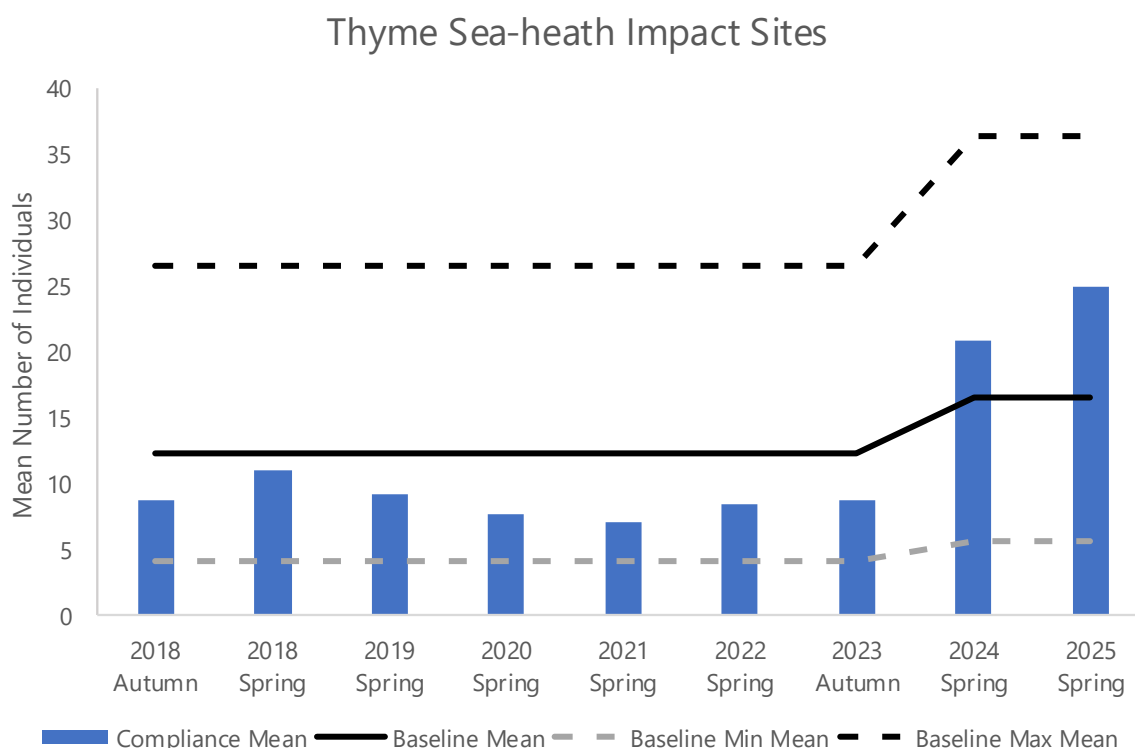


Figure 3.22: Mean abundance of Thyme Sea-heath at Jessup impact sites, baseline vs compliance monitoring

Bush Minuria

Bush Minuria is a relatively widespread and long-lived shrub at the gibber sites. Unlike Thyme Sea-heath, however, it is relatively palatable. Previous compliance reporting has shown that the abundance of Bush Minuria at Jessup sites has varied widely both between surveys and also within survey sites. This was attributed to both variation in yearly rainfall totals (defoliating during prolonged drought), and to grazing impact. During the exceptionally low rainfall years of 2018 and 2019 and continuing into 2020 – 2022, the mean abundance of Bush Minuria at both control and impact sites was below the baseline means. However, since 2022, the mean abundance at control sites has been above the baseline mean abundance, and since 2023 the mean abundance at impact sites has approached or exceeded the baseline mean (Table 3.10). In 2024 and 2025, regeneration was recorded at 3 of the 7 impact sites and at 1 of the 4 control sites (Table 3.10 and Table 3.11). Trends in abundance at impact and control sites have been similar, hence discounting mining impacts as a cause of variable abundance.



Table 3.10: Mean abundance of Bush Minuria, compliance and baseline

Treatment	2018	2018	2019	2020	2021	2022	2023	Pre-2024 ¹	2024	2025	2024-2025 ¹
	Autumn	Spring	Spring	Spring	Spring	Spring	Autumn	Baseline	Spring	Spring	Baseline
Control Means	3.7	3.3	3.3	2.3	0.7	6.5	15.0	4.3	12.5	11.8	5
Impact Mean	2.6	1.6	0.2	0.4	0.2	0.4	6.6	6.7	6.8	3.6	4

¹ Pre-2024 Sites 4 and 6 were Control Sites, but changed to Impact sites in 2024, given change in use of Southern Access Road

Table 3.11: Adult and juvenile abundance of Bush Minuria per site

Treatment	Site	2024		2025	
		Adults	Juveniles	Adults	Juveniles
Control	1	3		1	
	4	1		4	
	6	24		27	6
	7	1			
	13	3		1	
Control Totals		31	0	33	6
Impact	3	12	1	6	1
	5	5		5	1
	11	43		32	
	12	8		1	
	15		4		
	16	2	2		4
Impact Totals		71	7	44	6
Adults plus juveniles		78		50	

Plains Lantern Bush

In 2025, Plains Lantern Bush was the second most abundant long-lived shrub at gibber Jessup transects, following Bladder Saltbush. The mean abundance of Plains Lantern Bush has fluctuated between surveys (Table 3.12). However, at impact sites the mean abundance has been above the baseline mean for all compliance surveys except 2020 and 2021. Mean abundance at control sites has been above the baseline mean for all compliance surveys except 2020, 2021 and 2022, returning to be well above the baseline since 2023. The declines below the baseline mean at both impact and control sites are likely related to lag effects of the exceptionally low rainfall years of 2018 and 2019. Given it is unpalatable, grazing is not likely to be a major factor in declines. In 2024 and 2025, regeneration was also widespread in both control and impact sites (Table 3.13). Trends in abundance at impact and control sites have been similar, hence discounting mining impacts as a cause of variable abundance.

Table 3.12: Mean abundance of Plains Lantern Bush, compliance and baseline

Treatment	2018	2018	2019	2020	2021	2022	2023	Pre-2024 ¹	2024	2025	2024-2025 ¹
	Autumn	Spring	Spring	Spring	Spring	Spring	Autumn	Baseline	Spring	Spring	Baseline
Control Means	11.7	15	8.7	1.3	0	5	13	5.0	10.3	12.5	6.4
Impact Mean	37.2	44.5	43	34.8	30.5	42.2	53.3	41.4	58.8	57.5	34.7

¹ Pre-2024 Sites 4 and 6 were Control Sites, but changed to Impact sites in 2024, given change in use of SAR

Table 3.13: Abundance of Plains Lantern Bush adults and juveniles, 2024 and 2025

Treatment	Site	2024		2025	
		Adults	Juveniles	Adults	Juveniles
Control	1	19	2	17	5
	2	13	4	9	3
Control Totals		32	6	26	8
Impact	3	4		4	
	5	73	23	76	57
	11	176	23	115	12
	15	1		1	
	16	26	25	37	43
	Impact Totals	312	77	259	120
Adults + Juveniles		389		379	

3.2.2.2 Jessup transects Eliza Creek Sites

To assess potential impacts on vegetation downstream of the Tailings Storage Facility (TSF), 4 sites were established in autumn 2018 progressively downstream from the TSF embankment within Eliza Creek. In addition, Site 10 was established in 2012 during baseline surveys, and is located downstream from site 20 (furthest from the TSF). At each site, the survey methods included a Jessup transect, which is a count of all adult and juvenile woody long-lived perennial species. Since 2018, all sites have recorded a net increase in the total number of long-lived woody perennials (Figure 3.23). Sites 17 has recorded a net increase in plant abundance of 17%.

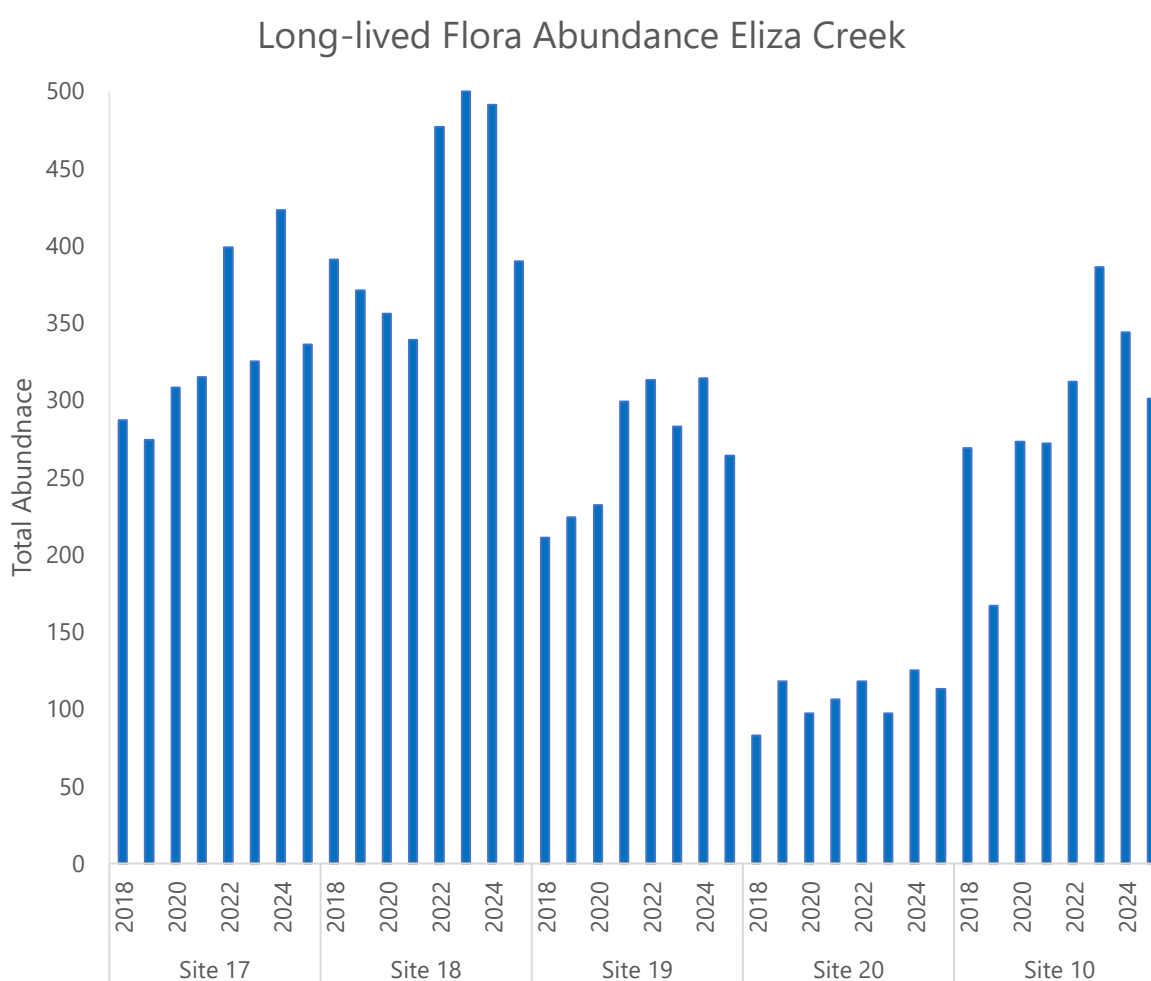


Figure 3.23: Combined abundance of all species recorded at Eliza Creek Jessup transects (adults and juveniles)

3.2.2.3 Abundance of select long-lived perennials at Eliza Creek

To further analyse population trends in long-lived species at the Eliza Creek transects, the population of trees and shrubs present at 3 or more sites, including Sites 17 and 18, were analysed and shown in Figure 3.24 to Figure 3.29. Appendix D2 presents the data in tabular form, in addition to data for the more abundant species present at Sites 19, 20 and/or 10 (further downstream). Site 10 is 270 m downstream from the TSF, site 18 is 930 m and site 19 is 3 km from the TSF. Sites 20 and 10 are approximately 4.7 km



and over 5 km respectively from the TSF. Hence potential impacts due to the TSF are expected to first become apparent at site 17, followed by sites 18, 19, 20 and 10 in that order.

Western Myall

At site 17, closest to the TSF, Western Myall numbers have shown a slight downward trend, but only because the 2023 tally was low (Figure 3.24). In 2024 and 2025 however, 27 individuals were recorded, similar to the 2018 tally. Western Myall abundance has fluctuated widely at Site 18, largely due to fluctuations in seedling abundance (with some seedlings germinating, but not surviving beyond a year). Regeneration of Western Myall has been extensive: in 2025, 23 juveniles were recorded at site 18 and 9 juveniles recorded at Site 17. At site 19, the population of Western Myall along the Jessup transect has been very stable. There has been no notable decline in abundance of Western Myall which could be attributed to the TSF operation.

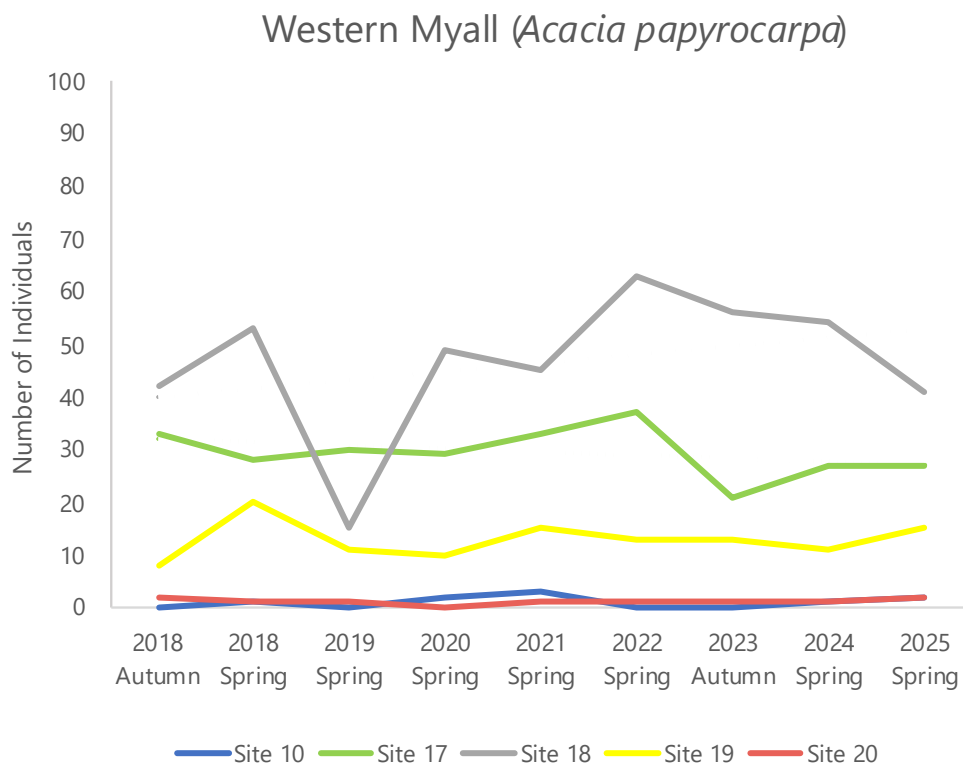


Figure 3.24: Abundance of Western Myall (adult and juveniles) recorded along Eliza Creek Jessup transects



Lobed-leaf Hop-bush

Lobed-leaf Hop-bush abundance has remained stable at Sites 10, 17, 18 and 20. At Site 19, population levels at the Jessup transect reached a peak in 2021, but have declined since 2021 with the 2025 tally being the lowest since compliance (Figure 3.35). The reason for the decline at Site 19 is not known. However, given the population at Sites 17 and 18 have been stable, it is unlikely that the cause for a decline at Site 19 are due to mining (Sites 17, 18 being within 930 m of the TSF and Site 19 being 3 km from the TSF). Hence, there is no notable decline in abundance of Lobed-leaf Hop-bush which could be attributed to the TSF operation.

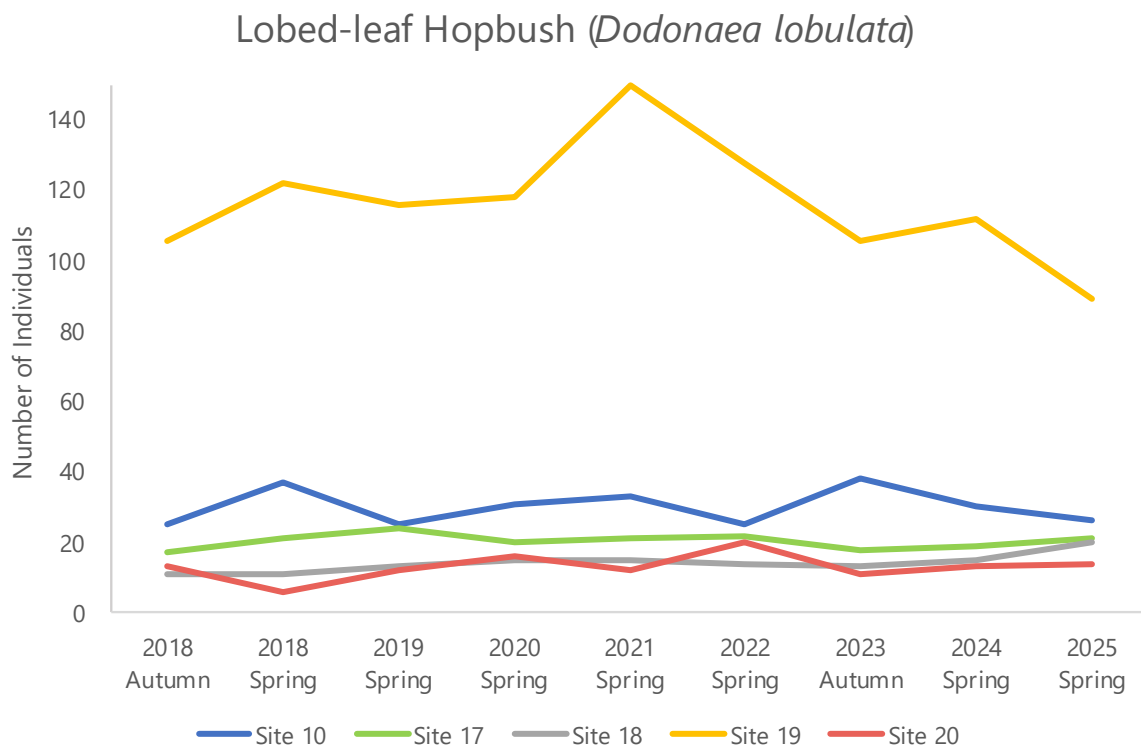


Figure 3.25: Abundance of Lobed-leaf Hop-bush (adult and juveniles) recorded along Eliza Creek Jessup transects



Spongy-fruit Bluebush

Spongy-fruit Bluebush is highly palatable but the populations at both Sites 17 and 18 have increased since 2018 (Figure 3.26). There is no notable decline in abundance of Spongy-fruit Bluebush which could be attributed to the TSF operation.

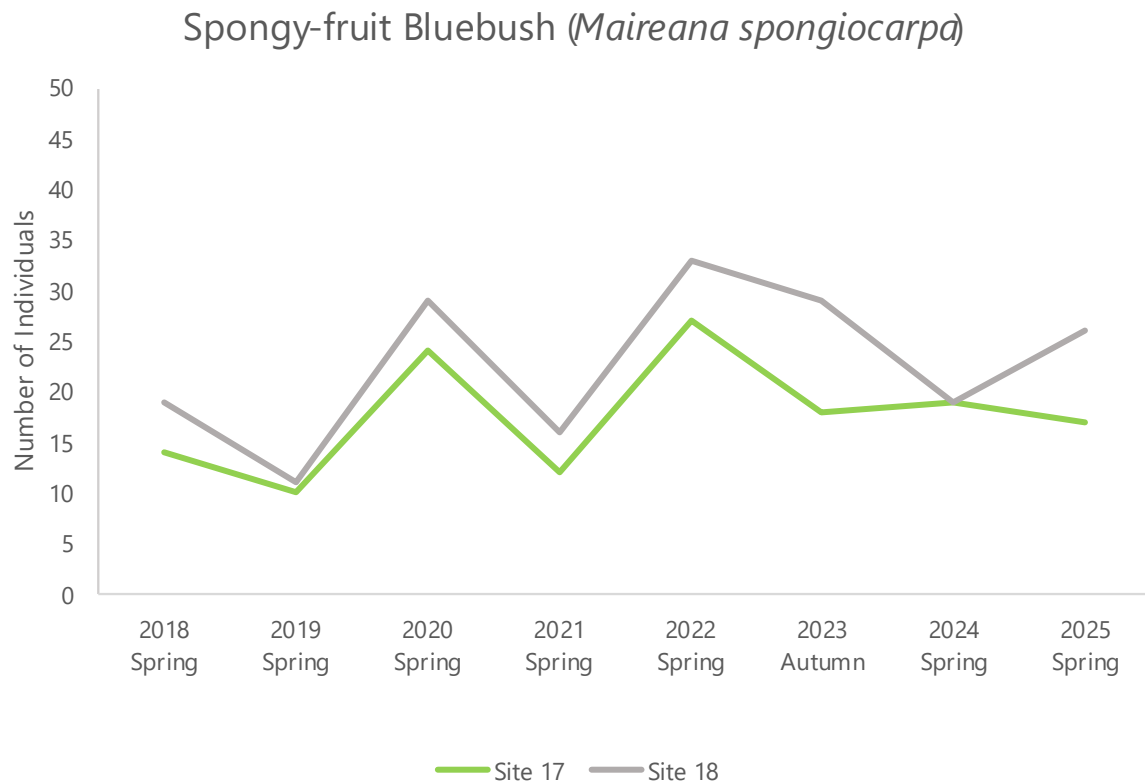


Figure 3.26: Abundance of Spongy-fruit Bluebush (adult and juveniles) recorded along Eliza Creek Jessup transects



Silver Mulla Mulla

In 2025, Silver Mulla Mulla decreased in abundance at sites 10, 17, 18, with smaller variations recorded at sites 19 and 20 (Figure 3.27). However, the populations at site 17 remains higher than totals recorded from 2018 to 2021. The site 18 population declined almost 65% in 2025, but was still higher than the 2021 population. The site 10 population has also fluctuated widely since 2018, but remains higher than tallies recorded 2018 to 2021. Hence the abundance of this species seems to be naturally more variable than other species that are woodier and longer-lived than Silver Mulla Mulla. Although the population has varied widely at sites 17, 18 and 10, there remains no obvious trends in abundance. Hence mining impacts are not apparent.

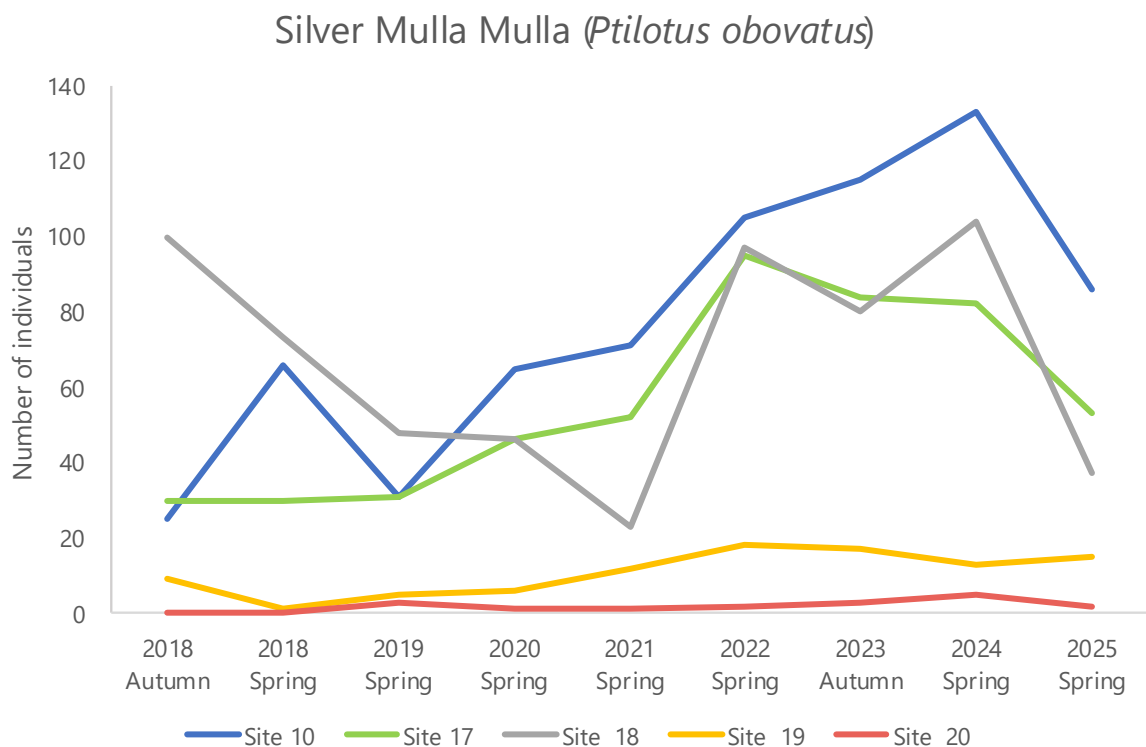


Figure 3.27: Abundance of Silver Mulla Mulla (adult and juveniles) recorded along Eliza Creek Jessup transects



Spiny Fanflower

The Spiny Fanflower population has recorded an upward trend at Sites 10 and 19, while no distinct trends are evident at Sites 17, 18 and 20 (Figure 3.28). Hence, there is no notable decline in abundance of Spiny Fanflower which could be attributed to the TSF operation.

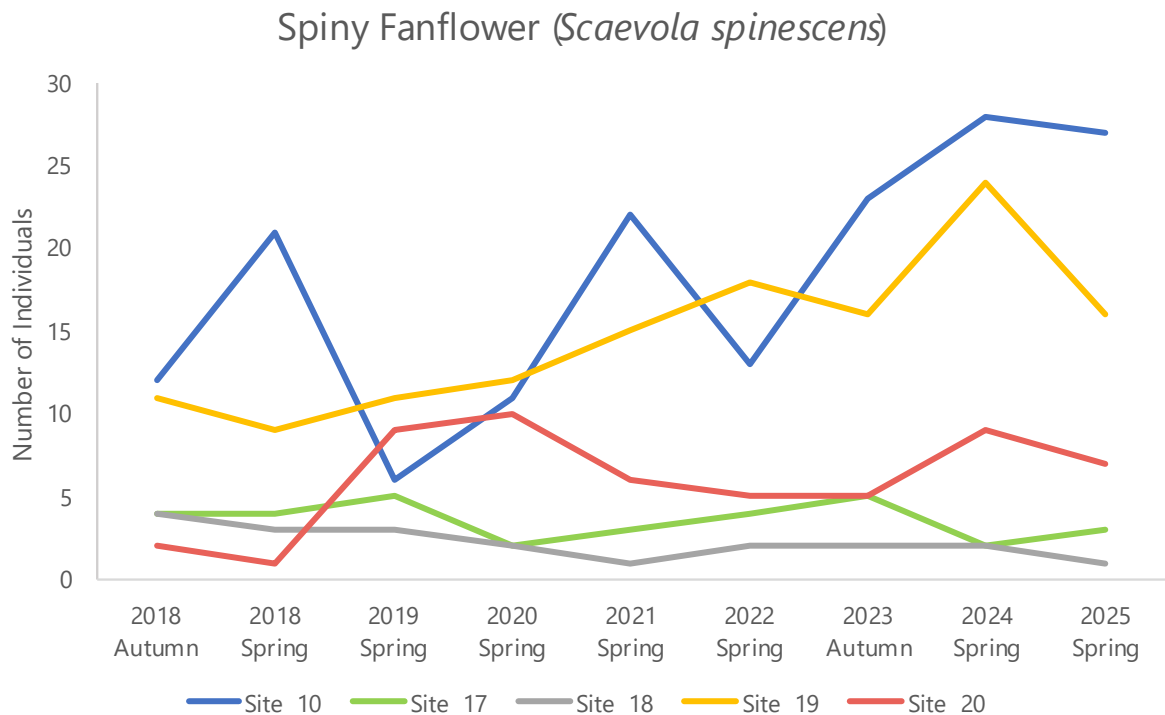


Figure 3.28: Abundance of Spiny Fanflower (adult and juveniles) recorded at Eliza Creek Jessup transects



Senna sp.

The *Senna* Jessup population at each site is ≤ 7 individuals, but, there have been no obvious increasing or decreasing trends at any site (Figure 3.29). There is no noticeable decline in *Senna*, which could be attributed to the TSF.

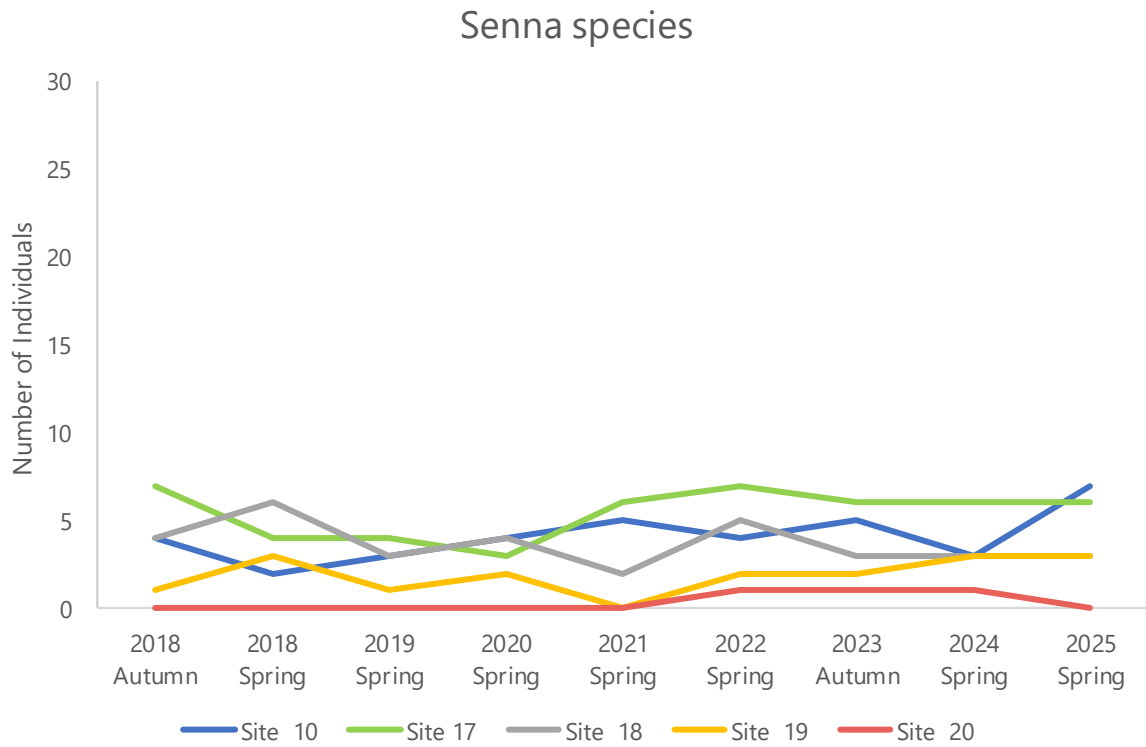


Figure 3.29: Abundance of *Senna* species (adult and juveniles) recorded along Eliza Creek Jessup transects



3.2.3 Canopy cover tree health, Eliza Creek

Tree canopy cover was also assessed at transects in Eliza Creek to assess potential impacts on tree health due to seepage from the TSF or reduced water flows down the catchment as a result of the TSF. Site 17 and Site 18 are Western Myall sites and Site 19 and Site 20 are River Red Gum dominant (refer Table 3.14 for approximate distance from TSF). No canopy cover sites were installed in Eliza Creek Site 10 because it was part of the original RAM / Jessup program and is furthest downstream, therefore least likely to demonstrate impacts from the TSF.

3.2.3.1 Canopy cover change

Table 3.14 summarises changes in canopy cover along each transect, since 2018, using 2 techniques: the densitometer, and visual estimates of individual canopy extent.

There has been a net increase in the number of Western Myall trees intercepted along the transects; a net increase in the number of Myall foliage intercepts, but net declines in visual estimates of Western Myall canopy extent (the latter only recorded in 2025). For Red Gums, there has been no change in the number of trees intercepted along the transects, no distinct trends in the number of foliage intercepts at each site, but net declines in Red Gum canopy extent as estimated visually without the aid of a densitometer.

Table 3.14: Summary of canopy changes between 2018 to 2025

Transect, landscape position, trees in 2025 ^{1,3}	New Trees and Tree Death	Number of Foliage Intercepts	Net % Change in # of Foliage Intercepts	Tree Mean Canopy Extent ²	Net % Change in Mean Canopy Extent
17A, channel (270 m from TSF), WM: 12 live	New trees: 5 Deaths: 0	2018: 25 2025: 35	+40%	2019: 86% 2025: 79%	-8%
17B, bank (270 m from TSF), WM: 8 live	New trees: 1 Deaths: 0	2018: 17 2025: 21	+17%	2019: 90% 2025: 69%	-23%
18A, bank (930 m from TSF), WM: 23 live, 1 dead	New trees: 9 Deaths: 1	2018: 13 2025: 39	+200%	2019: 81% 2025: 73%	-10%
18B, channel (930 m from TSF), WM: 5 live, 2 dead	New trees: 2 Deaths: 2	2018: 7 2025: 8	+14%	2019: 42% 2025: 39%	-5%
19A, channel (3 km from TSF), RG: 6 live, 1 dead WM: 8 live, 1 dead	RG New trees: 0 Deaths: 0 WM New trees: 6 Deaths: 0	RG 2018: 26 2024: 30	+15%	RG 2019: 70% 2025: 52%	-26%
19B, channel edge (3 km from TSF), RG:	RG New trees: 1 Deaths: 1	RG 2018: 16 2025: 10	-38%	RG 2019: 54% 2025: 30%	-44%



Transect, landscape position, trees in 2025 ^{1,3}	New Trees and Tree Death	Number of Foliage Intercepts	Net % Change in # of Foliage Intercepts	Tree Mean Canopy Extent ²	Net % Change in Mean Canopy Extent
6 live, 2 dead WM: 6 live	WM New trees: 4 Deaths: 0				
20A, channel edge (4.65 km from TSF), RG: 9 live WM: 1 live	RG New trees: 0 Deaths: 0 WM New trees: 0 Deaths: 0	RG 2018: 21 2025: 28	+33%	RG 2019: 49% 2025: 39%	-20%
20B, channel (4.65 km from TSF), RG: 4 live WM: nil	RG New trees: 0 Deaths: 0	RG 2018: 24 2024: 17	-29%	RG 2019: 63% 2024: 56%	-11%

¹WM = Western Myall (*Acacia papyrocarpa*/*Acacia sp. Blyth Range*), RG = Northern River Red Gum (*Eucalyptus camaldulensis subsp. arida*); ²Canopy Extent first recorded in 2019. ³Note error in 2024 reporting 18B should have been 1 dead WM.

3.2.3.2 Live foliage estimates (densitometer data)

Comparing the total number of densitometer foliage records along a transect over time provides an indication of changes in total canopy cover along the transect. Potential changes in total canopy cover may be a combination of canopy expansion of individual trees (natural growth, improved canopy health), dieback; and/or recruitment of new trees.

*Western Myall*²

At the Western Myall dominant transects (Site 17 and Site 18), the total number of Western Myall foliage records has trending strongly upwards since 2018 (Figure 3.30). The increase in foliage records at each site is largely due to additional trees being recorded along each transect (discussed further below). At Site 19, where both Red Gums and Western Myall occur, there has also been an upward trend in the total number of Western Myall foliage records since 2018, although totals stabilising since 2022. At Site 20, there has been only 1 Western Myall tree intercepted at all recording periods, and the foliage records have been relatively constant. Figure 3.30 shows the sum of Western Myall foliage records for both transects combined at each site. Figure 3.31 and Figure 3.32 show foliage records for individual transects at Site 17 and Site 18, respectively.

² Note that the Western Myall trees in the Carrapateena operational area may be *Acacia papyrocarpa* and/or the very similar *Acacia sp. Blyth* (formerly *Acacia affinity papyrocarpa*). Distinction requires fruiting pods which were absent during surveys

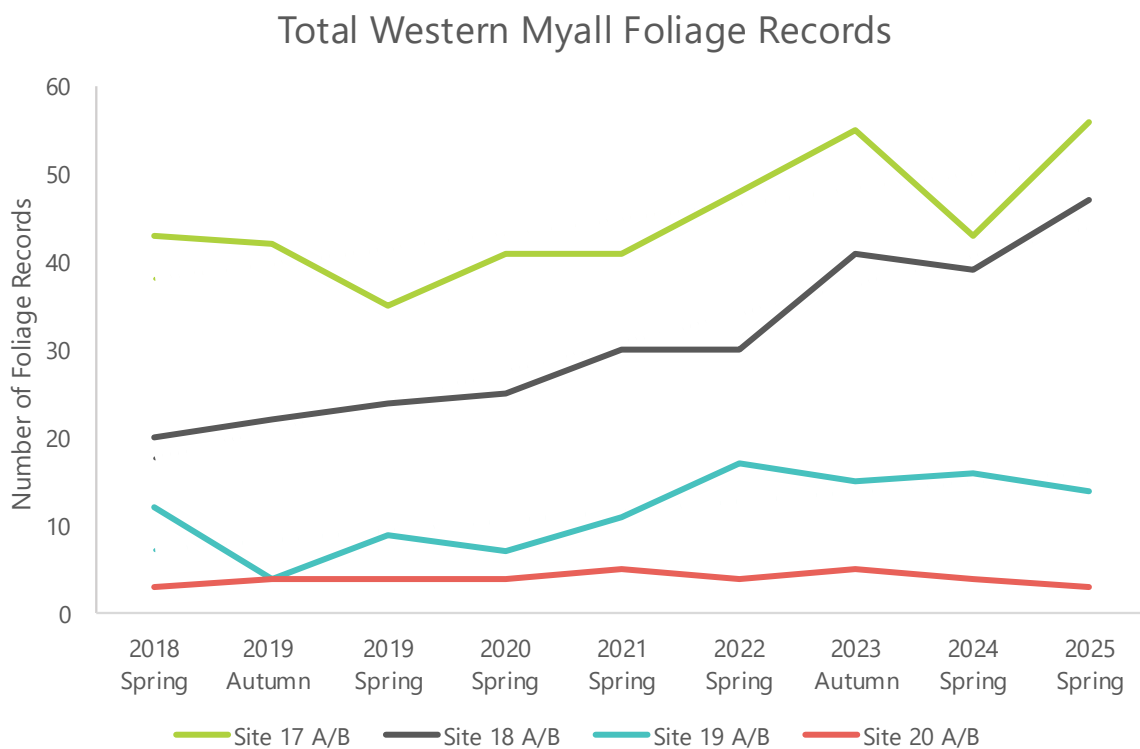


Figure 3.30: Total number of Western Myall foliage records at each site (2018-2025)

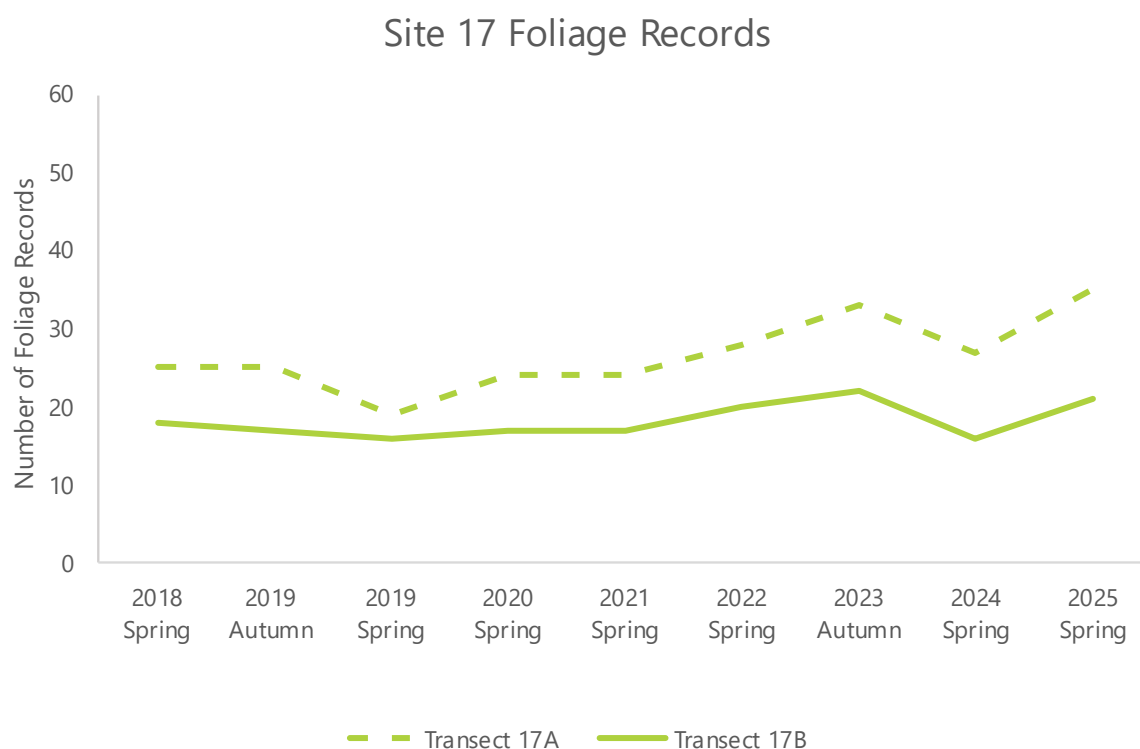


Figure 3.31: Number of Western Myall foliage records along Site 17 transects (2018 to 2025)

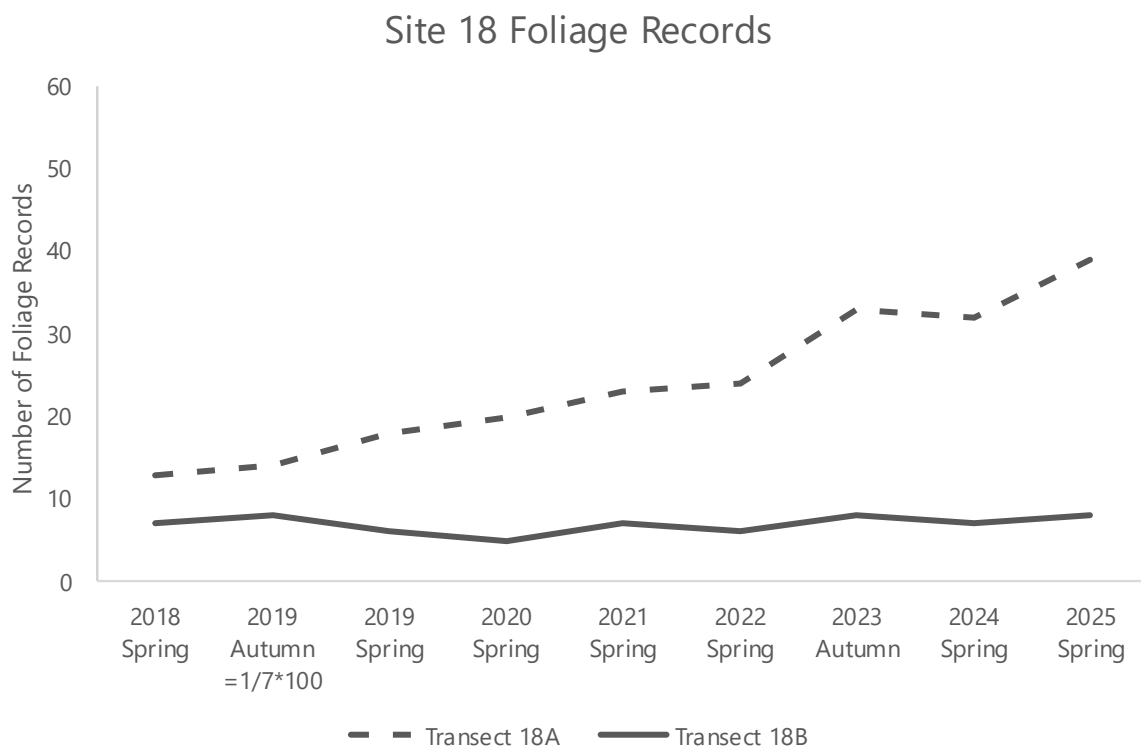


Figure 3.32: Number of Western Myall foliage records along Site 18 transects (2018 to 2025)



River Red Gum

The number of River Red Gum (*Eucalyptus camaldulensis ssp. arida*) foliage records for Sites 19 and 20 has fluctuated, often quite markedly, between survey periods. However, there has been no distinct trend apparent at Site 19, and a slight upward trend in total River Red Gum foliage records at Site 20. At both Site 19 and 20, the number of River Red Gum foliage records for both transects combined was similar in 2018 and 2025 (Figure 3.33). Figure 3.34 and Figure 3.35 show River Red Gum foliage records for individual transects at Sites 19 and 20, respectively. There have been slight upward trends in foliage records for both transect 19A and 20A, but no apparent trend at transect 20A. There has been a very slight decline in total foliage records at transect 20B, corresponding to a decline in canopy extent, as estimated visually (no densitometer). However, there are only 4 River Red Gum trees along this transect and results for the whole site should be considered.

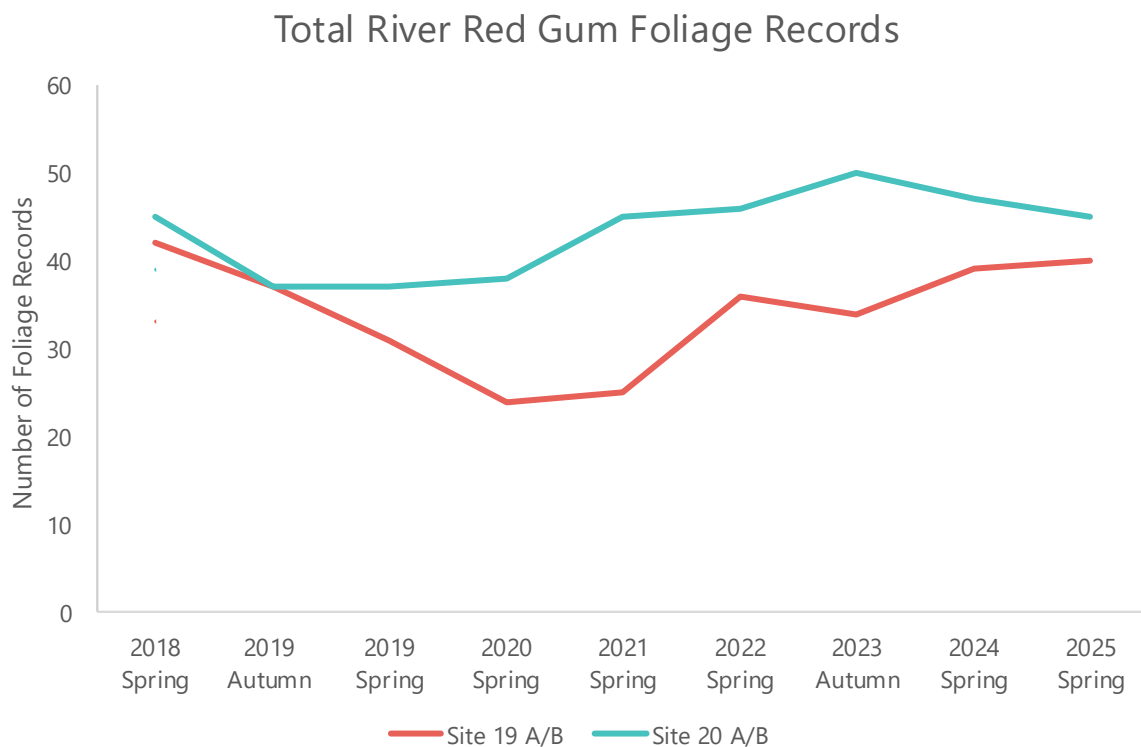


Figure 3.33: Total number of River Red Gum foliage records for each site (2018 to 2025)

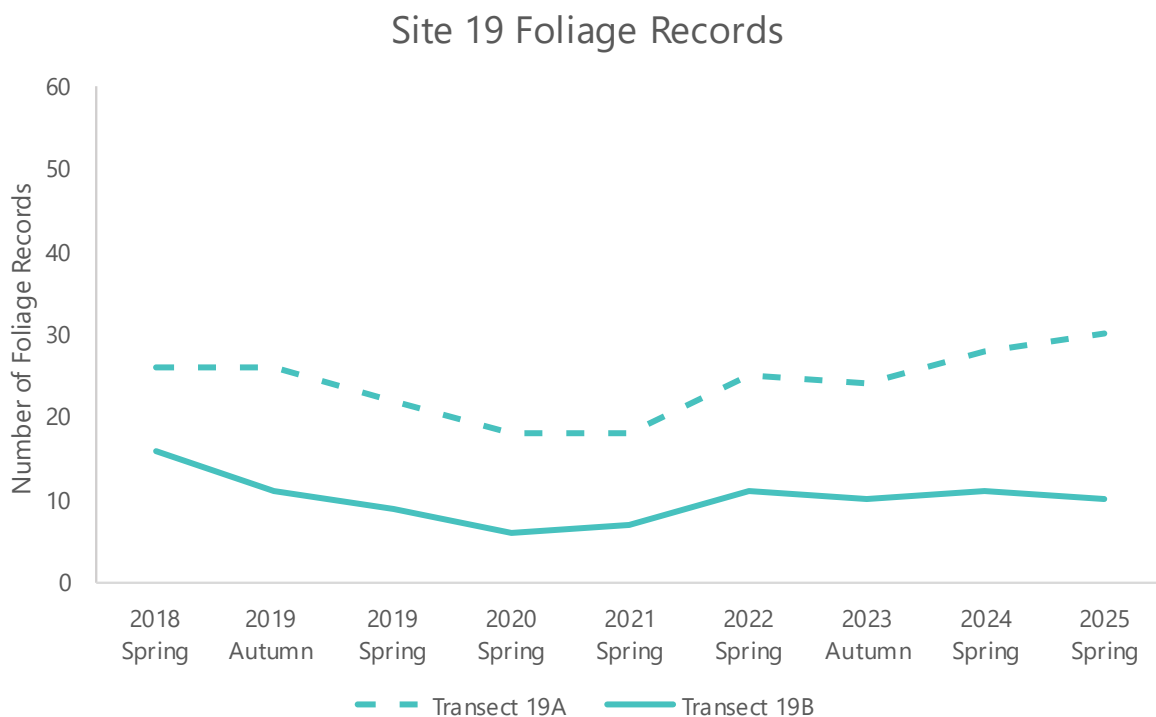


Figure 3.34: Number of River Red Gum foliage records along Site 19 transects (2018 to 2025)

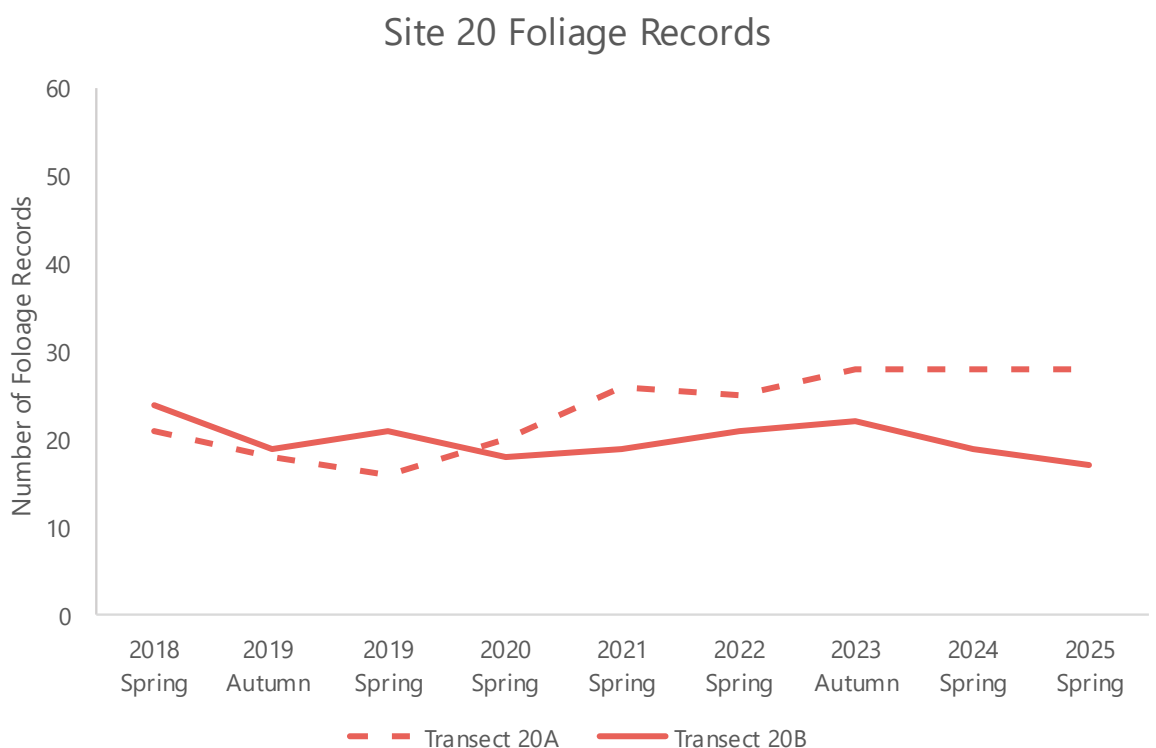


Figure 3.35: Number of River Red Gum foliage hits along Site 20 transects (2018 to 2025)

3.2.3.3 Tree death and new trees

Surveyed trees are individually numbered along each transect, which facilitates records of individual tree death, canopy loss resulting in trees no longer being recorded along the alignment, and tree canopies that are intercepted along the alignment for the first time. New trees are recorded as a result of expansion of mature tree canopies onto the transect alignment and/or younger trees that newly meet the survey criteria for densitometer recordings (i.e. minimum plant height of 1 m and intercepting the transect).

Western Myall

The number of existing, new and dead Western Myall trees recorded at each site (transects combined) is shown in Figure 3.36 (where Site 17 is the closest to the TSF, Site 20 is not shown, given only 1 Western Myall present at all survey periods). In 2025, 3 new Western Myall trees were recorded, all on Transect 18A. One tree died on Transect 18B (Figure 3.36). Since 2018, there have been 3 Western Myall tree deaths and 26 new Western Myall trees recorded along the combined transects. The 3 deaths occurred at Site 18. Two of these trees were estimated to have retained less than 10% of their canopy foliage prior to the operation of the TSF. The most recent tree to die had an estimated canopy loss of >90% since 2021 (Appendix E). There have been no Western Myall deaths at Sites 17, 19 or 20. The majority of new trees intercepted along transects have been juveniles that have increased in size, meeting the survey criteria (as mentioned above).

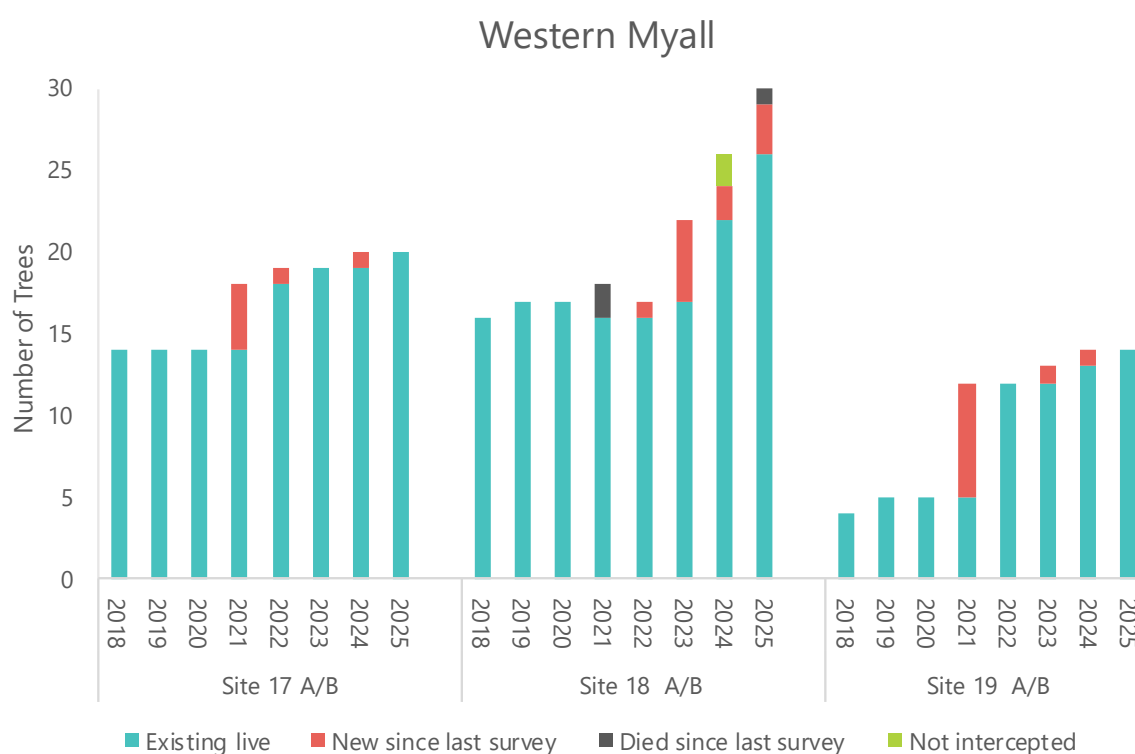


Figure 3.36: Change in Western Myall abundance (new = meets criteria, not intercepted = tree present but not intersecting transect)

River Red Gum

Since 2018, there has been 1 new Red Gum intercepted (Site 19, in 2024) and 1 Red Gum has died (Site 19 in 2021). The dead tree had a visually estimated canopy extent of approximately 50% in 2019 and 3% in 2020. Transect 19 is 3 km downstream of the TSF. Figure 3.37 shows the number of live Red Gum trees, deaths and new trees for each survey period since 2018.

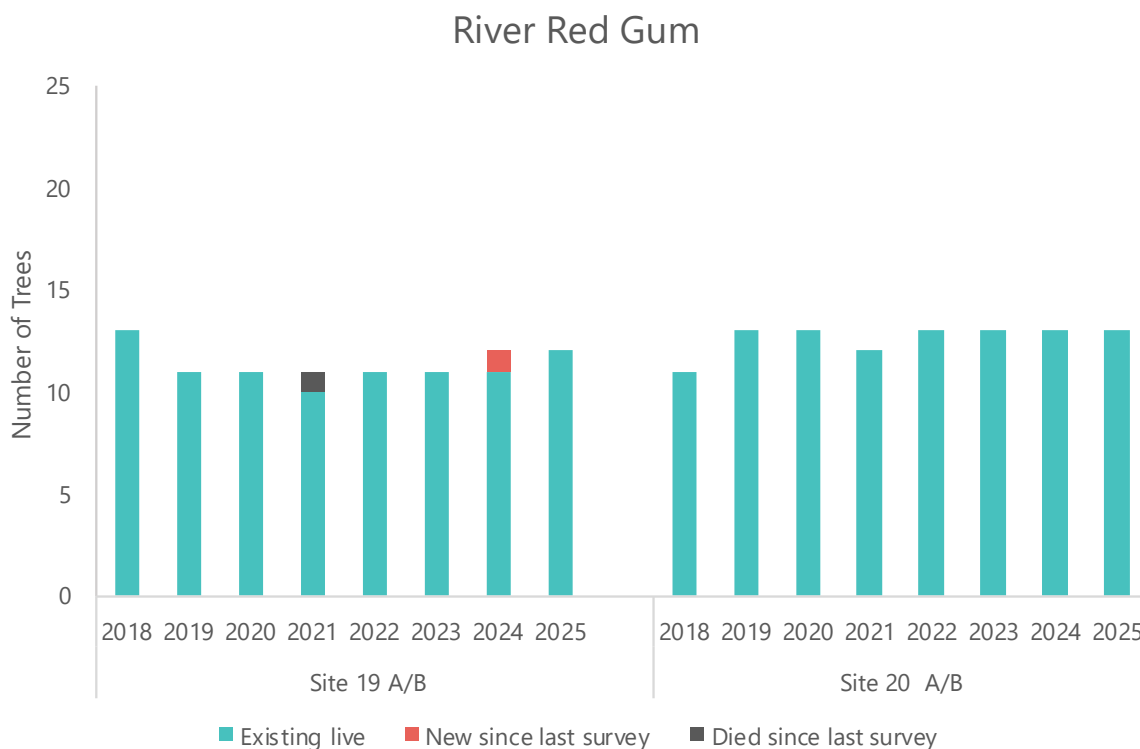


Figure 3.37: Change in River Red Gum abundance (new = met criteria)

3.2.3.4 Visual estimates of canopy intactness

Visual estimates of canopy intactness for individual trees commenced in 2019 as an additional alternate means of estimating overall tree health.

Western Myall

Visual estimates of canopy intactness for Western Myall trees are shown in Table 3.15 and Figure 3.38. Up until 2024, visual estimates indicated relatively similar levels of canopy intactness for each transect. However, for the 2025 survey, a mean decline in Western Myall canopy intactness of between 6 – 21% was recorded for Transects 17A/B, 18A and 19A/B. Mean canopy intactness at Transect 17B declined from means of 90 – 97% (between 2019 and 2024) to just 69% in 2025. The discrepancy between visual estimates and densitometer records is elaborated further in the Discussion (Section 4.1.5 and Section 4.3.4).



Table 3.15: Visual estimates of canopy intactness for Western Myall trees

Transect (# of live trees in 2025) ²	Mean % Canopy Intact ¹ Western Myall Trees						
	2019 Spring	2020 Spring ³	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
17A (12)	86	87	94	90	92	86	79
17B (8)	90	92	93	91	97	90	69
18A (23)	81	-	72	80	89	80	73
18B (5)	42	-	18	28	35	33	39
19A (8)	100	100	96	99	100	97	79
19B (6)	69	68	75	77	86	79	72
20A (1)	100	90	77	100	100	70	70

¹Visual estimate of canopy extent compared with expected canopy extent for tree in optimum health. ²No Western Myall on transect 20B. ³Canopy intactness was not recorded in 2020 for Transects 18A and 18B.

Western Myall Canopy Intactness

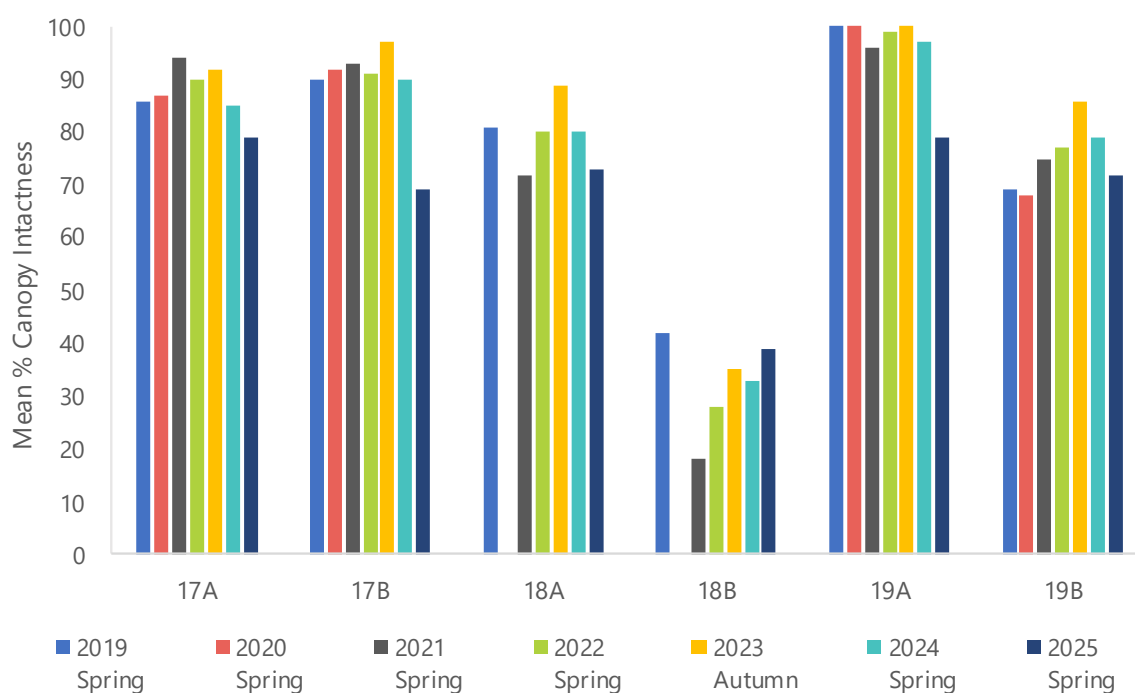


Figure 3.38: Visual estimates of mean canopy intactness for Western Myall trees (2019-2025)

River Red Gum

Visual estimates of Red Gum canopy intactness declined for all transects in 2025, following even larger declines in 2024 (Table 3.16 and Figure 3.39). These declines followed a general pattern of canopy decline 2019 to 2021, followed by large increase in canopy extent in 2022 and 2023. The variation in visual estimates of canopy intactness for River Red Gums has been greater than the variation recorded via densitometer foliage records.

Table 3.16: Visual estimates of canopy intactness for River Red Gum trees

Transect (# of live trees in 2025)	Mean % Canopy Intact ¹ River Red Gum Trees						
	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
19A (6)	70	63	60	72	87	61	52
19B (6)	54	47	43	42	67	47	26
20A (9)	49	40	47	80	91	61	39
20B (4)	63	46	46	75	85	78	56

¹Visual estimate of canopy extent compared with expected canopy extent for tree in optimum health

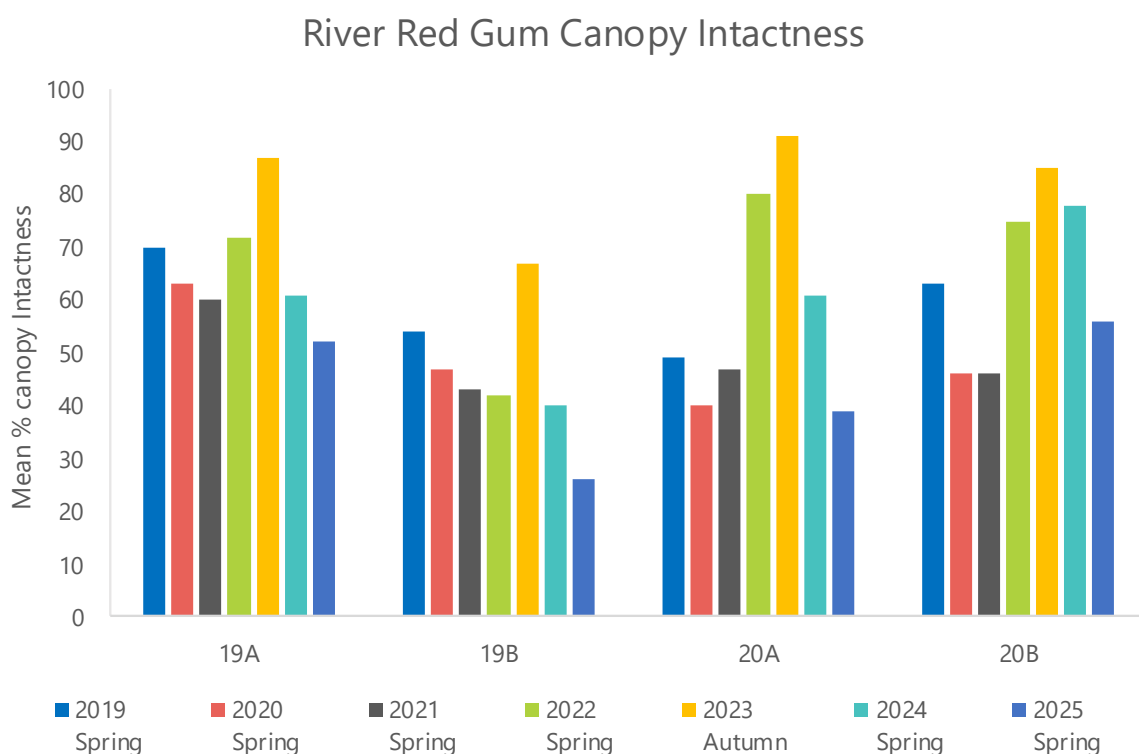


Figure 3.39: Visual estimates of canopy intactness for River Red Gum trees (2019-2025)



3.2.4 Weed diversity and abundance

Weeds were surveyed at standard flora sites, designated weed transects, targeted sites (including dams, villages and Yeltacowie homestead), and opportunistically. All weed species recorded during baseline surveys (2012 to 2016) and compliance monitoring (2018 to 2025) are summarised in Table 3.17 and Appendix G. Although Dawson Dam, South Eliza Dam, North Eliza Dam and Anzac Dam are outside of existing mineral leases, weed species at these locations were documented in detail during annual surveys 2018 – 2024 to identify potential sources of new weed infestations into the mineral leases and/or document potential spread of weeds from the mineral leases into dams. These surveys provided a comprehensive list of weeds occurring at the 4 dams. Given no new weed species, nor obvious changes in abundance, were recorded in 2024 at the dam locations, only a subset of dams were surveyed in 2025. The need for future weed surveys at dams outside of the mineral lease will be influenced largely by whether new weed species are recorded within the mineral lease, and the source thereof being determined.

3.2.4.1 New weed species

No new weed species were recorded during the 2025 spring survey (Table 3.17), namely all weed species recorded in 2025 had been previously recorded during baseline and/or monitoring surveys.

Table 3.17: Weed species recorded during baseline surveys (2012-2016); compliance monitoring (2018 – 2024) and the current compliance survey (2025)

Scientific Name	Common Name	Recorded During Baseline Surveys (EBS 2012-2016) ²	Recorded 2018-2024 ²	Recorded Spring 2025 ^{1,2}	Weed Status ³
<i>Brassica tournefortii</i>	Mustard	Y	N	N	
<i>Carrichtera annua</i>	Wards Weed	N	Y	N	
<i>Carthamus lanatus</i>	Saffron Thistle	Y	Y	N	
<i>Centaurea calcitrapa</i>	Star Thistle	Y	N	N	
<i>Centaurea melitensis</i>	Malta Thistle	Y	Y	N	
<i>Centaureum erythraea / tenuiflorum</i>	Centaury	Y	Y	Y	
<i>Chenopodium album/murale</i>	Goosefoot	NS	Y	Y	
<i>Citrullus species, including C. colocynthis</i>	Bitter Melon	N	Y	N	
<i>Cucumis myriocarpus</i>	Paddy Melon	N	Y	N	
<i>Erodium sp. including Erodium cicutarium</i>	Cut-leaf Heron's-bill	N	Y	Y	
<i>Heliotropium curassavicum</i>	Smooth Heliotrope	N	Y	N	
<i>Heliotropium supinum</i>	Spreading Heliotrope	N	Y	Y	
<i>Lepidium africanum</i>	Peppercress	Y	N	N	



Scientific Name	Common Name	Recorded During Baseline Surveys (EBS 2012-2016) ²	Recorded 2018-2024 ²	Recorded Spring 2025 ^{1,2}	Weed Status ³
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	N	Y	Y	
<i>Malva parviflora</i>	Mallow	N	Y	Y	
<i>Medicago</i> sp. (including <i>M. minima</i>)	Medic	N	Y	Y	
<i>Mesembryanthemum crystallinum</i>	Iceplant	N	Y	N	
<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant	Y	N	N	
<i>Nicotiana glauca</i>	Tree Tobacco	Y	Y	N	
<i>Opuntia</i> sp.	Prickly Pear	NS	Y	Y	WoNS
<i>Rostraria pumila</i>	Tiny Bristle Grass	Y	Y	N	
<i>Rumex vesicarius</i>	Rosy Dock	Y	Y	N	
<i>Schismus barbatus</i>	Arabian Grass	Y	N	N	
<i>Sisymbrium erysimoides</i>	Smooth Mustard	Y	Y	Y	
<i>Solanum nigrum</i>	Black Nightshade	Y	Y	Y	
<i>Sonchus oleraceus</i>	Sow Thistle	Y	Y	Y	
<i>Tamarix aphylla</i>	Athel Pine	NS	Y	Y	WoNS, D
<i>Tribulus terrestris</i>	Caltrop	Y	Y	N	
<i>Urtica urens</i>	Stinging Nettle	NS	Y	N	
<i>Xanthium spinosum</i>	Bathurst Burr	N	Y	Y	D

¹ Excludes dams and Whittata Creek (non-mineral lease areas); ²(Y = Yes Recorded N = Not Recorded; NS = Not surveyed); ³ Weed status where WoNS = Weed of National Significance, D = Declared under the Landscape South Australia Act 2019, blank = common.

3.2.4.2 Increase in abundance

Appendix G1 details all weed species recorded during baseline surveys and compliance, along with the location recorded and their abundance. Excluding the dam locations (non-mineral lease sites), 3 weed species recorded an increased abundance in 2025, compared with previous compliance surveys (2018 – 2024); Sow Thistle (*Sonchus oleraceus*), Cut-leaf Heron's-bill (*Erodium cicutarium*) and Bathurst Burr (*Xanthium occidentale*).

Sow Thistle

In 2025, Sow Thistle was recorded at 18 locations, more than previous years. For example, Sow Thistle was recorded at 5 locations in 2024. Of the 18 locations where Sow Thistle was recorded in 2025, Sow Thistle had previously been recorded at 10 of these locations. However, prior to 2025, Sow Thistle had been recorded from a cumulative total of 12 locations (including weed transects, Rangeland sites and other regularly targeted sites).

***Bathurst Burr***

Previous compliance surveys have recorded Bathurst Burr only at dams (namely on non-mineral lease land), and on drainage lines intercepting weed transects CWM01 (Whittata Creek) and CWM02 (Yeltacowie Creek/South Eliza Dam) both along the Southern Access Road. CWM01 and CWM02 Bathurst Burr populations have not increased during compliance monitoring, including when surveyed in 2025.

However, in 2025, Bathurst Burr was recorded along weed transect CWM05 for the first time. This transect occurs along the Western Access Road, approximately 5 km from the Stuart Highway. A total of 10 plants were recorded at the western end of the weed transect. The plants were recorded within an area of cracking clay soil (9 m wide x 50 m long), south of the made road, between the road shoulder and the dune. Nine plants were in a cluster of 6 m² and a further isolated plant occurred at the eastern end of the cracking clay soil. The plants were 0.3 to 0.5 m tall and appeared dead. No fruit were observed. It is possible that seeds were spread to this location from vehicle tyres and/or animals.

Cut-leaf Heron's-bill

One plant was recorded at each of Rangeland Sites 4, 5 and 9, previously unrecorded from these sites and an increase from previous surveys.

All other weed species were recorded at the same or non-discernible changes in abundance compared with previous compliance surveys.

3.2.4.3 Species recorded at previously unreported locations

Two weed species were recorded in 2025 at previously unreported locations.

Spreading Heliotrope

Spreading Heliotrope (*Heliotropium supinum*) was recorded as an isolated clump along weed transect CWM02. Spreading Heliotrope has not been recorded along this transect during baseline or compliance monitoring. Along weed transect CWM02, the species was recorded near the road culvert next to South Eliza Dam outlet. Spreading Heliotrope occurs on wet clay soils and its presence is connected to the wet soils rather than mining activities. Conversely, in 2025, Spreading Heliotrope was not recorded along weed transect CWM01, where it has been previously reported during both baseline and compliance monitoring. The net population of Spreading Heliotrope, therefore has not increased between 2024 and 2025.

Scarlet Pimpernel

Scarlet Pimpernel (*Lysimachia arvensis*) was recorded at Eliza Creek Flora Site 18 for the first time (1 seedling). Conversely, in 2025 it was not recorded along weed transects CWM01 and CWM06, where it has been previously recorded during compliance monitoring. The net population of Scarlet Pimpernel, therefore, has not increased between 2024 and 2025.

Table 3.17, Appendix G1 and Appendix G2 contain further details on weed records during baseline and compliance monitoring.



3.2.4.4 Weeds recorded at RAM sites (Control and Impact)

During the 2025 survey, 4 species of weeds were recorded at Rangeland flora sites:

- Smooth Mustard (*Sisymbrium erysimoides*) was recorded at Eliza Creek site 18 (1 plant), and at both dune sites (21 and 22). Smooth Mustard was widespread and locally common at Site 21 (control) and widespread and abundant at Site 22 (impact being 150 m from the WAR). Smooth Mustard has been recorded every year at sites 21 and 22 during compliance monitoring. At each site, it has been recorded at similar levels of abundance, namely a relatively high cover at Site 22 and a moderate cover at Site 21. The construction of the WAR does not appear to have increased Smooth Mustard density at Site 22.
- Sow Thistle was again widespread at both control and impact sites, but always sparsely occurring. Of the 18 locations where it was recorded in 2025, 12 were Rangeland sites (4 control gibber habitats, 3 impact gibber habitats, 3 Eliza Creek (impact), and both dune sites).
- Cut-leaf Heron's Bill, 1 plant recorded at Impact Site 4 and 1 plant recorded at Control Site 5.
- Scarlet Pimpernel, 1 seedling recorded at Eliza Creek Site 18.

It is noted that Maltese Thistle (*Centaurea melitensis*), previously recorded as small isolated clusters at Eliza Creek Site 20, was not recorded at Rangeland flora sites in 2025.

3.2.4.5 Northern Wellfields lease area

The Northern Wellfield Lease area includes weed monitoring transects (NWM01, NWM02, NWM03) and Rangeland Flora Sites 1, 2 and 7. No weeds were recorded at these sites during annual surveys from 2020 to 2024, nor during baseline surveys at the Rangeland flora sites. However, in 2025 a few Sow Thistle plants were recorded at weed transect NWM01, at the bottom of a drainage line.

3.2.4.6 Weeds of National Significance

Prickly Pear (*Opuntia species*)

The isolated population of Prickly Pear near the Yeltacowie homestead has been actively managed since 2021 (and including 2025) by poisoning with cochineal (Plate 3.2). The cluster of *Opuntia* was first detected during operational monitoring in 2018, occurring within an area of approximately 10 m², (Easting 724000 Northing 6530688, Zone 53), just off lease (east of Site 21). At the time of the 2025 survey, the *Opuntia* cluster appeared to be reduced in area by approximately 90% since 2018. An additional two small patches have also been treated for the last couple of years, both patches are outside the operations area (near SED and Emmie's Buff near the WAR).



Plate 3.2: Cochineal treatment on Prickly Pear

Athel Pine (*Tamarix aphylla*)

Athel Pine has been recorded as clustered trees around Yeltacowie Homestead and the nearby dam. These trees are being actively controlled with numerous dead trees and/or cut trees evident. In 2025, the population comprised up to 10 previously cut trees that are now suckering and/or supporting regrowth shoots, and two large old trees, up to 10 m tall.

3.2.4.7 Declared Weeds

In addition to being WoNS, Prickly Pear and Athel Pine are also Declared species under the *Landscape South Australian Act 2019*. Athel Pine is declared for control within 100 m of a watercourse.

Bathurst Burr

As noted above, in addition to previously recorded populations (e.g. Dawson Dam, South Eliza Dam, CWM01 and Whittata Creek, CWM02), in 2025 Bathurst Burr was also recorded along weed transect CWM05 (10 plants) (Plate 3.3). The CWM01 and CWM02 populations adjoin the SAR. In 2025, 7 plants were detected along CWM01 in association with Whittata Creek (reduced from 30 seedlings in 2024), and 3 plants were detected along CWM02 near Yeltacowie Creek/South Eliza Dam (reduced from 12 plants in 2024). Fruit were present on the plants and on the ground at both locations.

Outside of the mineral lease at South Eliza Dam, the population of Bathurst Burr observed during the 2025 survey comprised only isolated small clusters. The population of Bathurst Burr at Dawson Dam was not surveyed in 2025. It is noted that Dawson Dam is excluded from ML6471, hence managed by the landholder and management and control of Bathurst Burr is ongoing.



Plate 3.3: Bathurst Burr detected at CWM05

3.2.4.8 Other weeds of high environmental threat

Wards Weed (Carrichtera annua)

Within the Carrapateena operational area, Wards Weed has been previously recorded at 2 locations; in 2021, an isolated patch was recorded along weed transect CWM01 (along the SAR) and in 2024, a few plants along weed transect CWM05. Wards Weed was searched for in 2025 but not recorded.

Tobacco Bush (Nicotiana glauca)

An extensive population of Tobacco Bush persists at South Eliza Dam (in the drainage channels behind the dam). Due to its high rate of fruit and seed set, high viability of seeds and successful survival of seedlings, it forms dense stands (CABI 2022). Hence the species has the potential to increase still further in this location.

3.2.5 Landscape Function Analysis

The following provides a summary of changes in key parameters: Landscape Organisation Index (LOI) (reflecting plant cover), plant species diversity and soil attributes, for the Landscape Function Analysis (LFA) transects. Each LFA site comprised 2 transects, each 50 m long. Photos taken at the start and end of each transect are contained in Appendix A.

3.2.5.1 Site 1: Aerodrome (LFAAL1)

Aerodrome Transects 1A and 1B: LFA established method

Each transect (1A and 1B) comprised two zones, namely one patch type 'vegetation' and one interpatch type 'rocky/ soil'.

In 2025, short-lived perennials (primarily *Sclerolaena* (Bindyi) species) were still the dominant plant cover, but an increasing number of long-lived species were also re-establishing. Both transects supported areas of dense vegetation (Plate 3.4), but also large areas where vegetation was absent. Approximately one third of each transect comprised a continuous length that was devoid of vegetation: along Transect 1A no vegetation was intercepted between 0 – 14 m, and Transect 1B lacked vegetation from 37 – 50 m (Plate 3.5 and Plate 3.6). During the 2025 survey, however, it was noted that vegetation had colonised to within 5 m of the transect adjoining these zones.

From 2020 to 2024, both transects recorded increases in the LOI. The LOI being the proportion of the total transect that is intercepted by vegetation patches. However, in 2025, both transects recorded a decline in the total amount of vegetation intercepted - 24% of the transects in 2024 versus 11% in 2025 (Figure 3.40). The total patch area also declined from a mean of 23.2 m² in 2024 to 5.6 m² in 2025 (due to a decline in length and width of patches). Species recorded along the Aerodrome LFA linear transects are shown in Table 3.18.

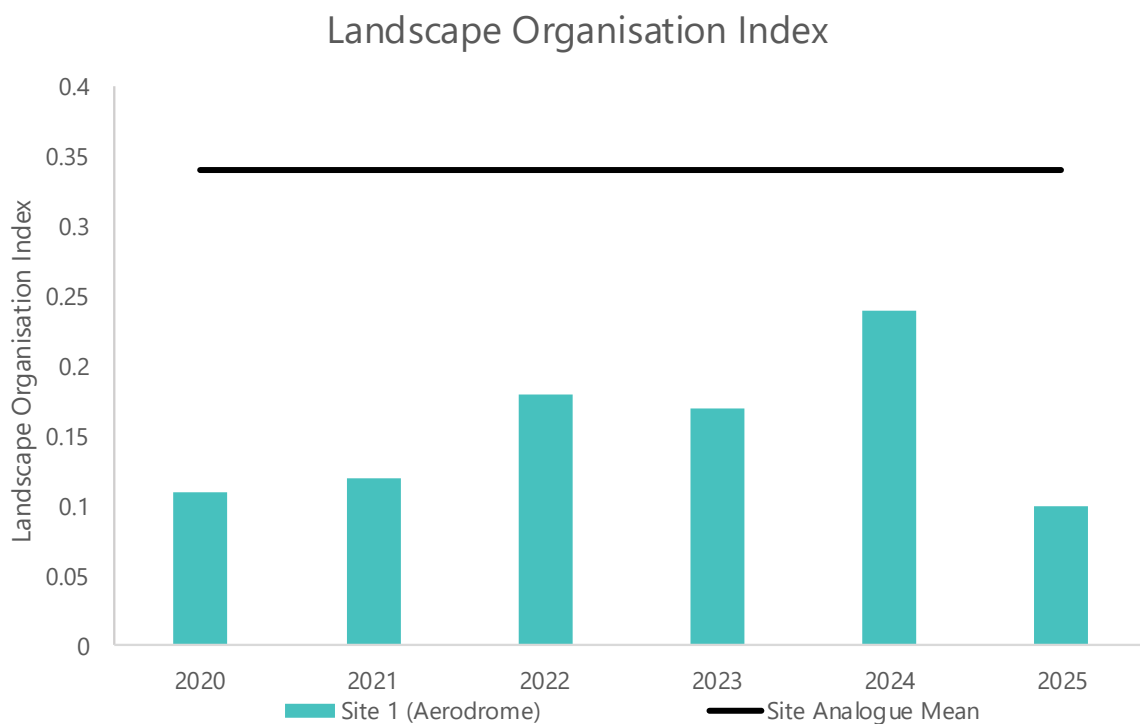


Figure 3.40: Landscape Organisation Index (LOI) at LFA Airport Laydown (mean of transects A and B)



Plate 3.4: Dense patch of re-established vegetation adjoining Transect 1A, including long-lived perennial Bladder Saltbush (dominant shrub of adjoining reference community)



Plate 3.5: Aerodrome Transect 1A showing little change between 2024 (above) and 2025 (below); re-establishment of vegetation largely concentrated in the second half of the transect



Plate 3.6: Aerodrome Transect 1B showing little change from 2024 (above) to 2025 below); moderately dense vegetation covers much of the first half of the transect



Aerodrome Transects 1A and 1B: PCQ method

Due to the high number of vegetation patches recorded along the transect, and notable changes being detected by the LFA method, the PCQ was no longer considered a necessary supplementary method to show yearly changes.

Table 3.18: Species recorded along and within 5 m of the Aerodrome LFA transects 2024 and 2025

Species	Common Name	Number of patches species was recorded in along LFA transects				Recorded within 5 m of transects (2025)
		2024 1A	2025 1A	2024 1B	2025 1B	
Short-lived Perennials						
<i>Atriplex holocarpa</i>	Pop saltbush	1	5	1	2	
<i>Cullen cinereum</i>	Annual Scurf-pea			1	0	1 (1A)
<i>Dissocarpus biflorus</i>	Twin-horned Copper-burr	0	1	6	0	1 (1B)
<i>Dissocarpus paradoxus</i>	Ball bindyi	1	0	1	1	
<i>Enneapogon avenaceus</i>	Bottlewahsers			1	0	
<i>Panicum decompositum</i>	Native Millet			1	0	2 (1A), 2 (1B)
<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	0	1	2	0	
<i>Sclerolaena divaricata</i>	Tangled Bindyi	2	2	3	0	
<i>Sclerolaena ventricosa</i>	Salt Bindyi	19	10	16	6	
<i>Sclerolanea intricata</i>	Tangled Bindyi			0	1	
<i>Sida fibulifera</i>	Pin Sida	0	1			
Long-lived Perennials						
<i>Abutilon halophilum</i>	Plains Lantern Bush	1	2			2 (1A)
<i>Astrebla pectinata</i>	Mitchell Grass					2 (1A), 2 (1B)
<i>Atriplex vesicaria</i>	Bladder Saltbush	3	3	3	4	5 (1A), 10 (1B)
<i>Minuria cunninghamii</i>	Bush Minuria					1 (1A)
<i>Tecticornia medullosa</i>	Samphire	3	3	2	2	3 (1A), 10 (1B)

3.2.5.2 Site 3: Midway Quarry (LFAQUA3)

Midway Quarry Transects 3A and 3B: LFA established method

Transects 3A and 3B are parallel to each other, and on relatively flat ground. In 2022, the sites were prepared for re-establishment by ripping to a moderate depth (< 40 cm). By 2023, however, the troughs had eroded and were no longer deep enough to be considered effective “patches” (nutrient collectors). Hence since 2023, both transects have been assessed using the established LFA method. Each transect comprised two zones; 1 patch type ‘vegetation’ and 1 interpatch ‘rocky/ soil’.

To date, re-establishment of vegetation has been very sparse, and confined to 2 short-lived species, Salt Bindyi (*Sclerolaena ventricosa*) and Pop Saltbush (*Atriplex holocarpa*) (Plate 3.7, Plate 3.8). The LOI increased slightly in 2024, but declined in 2025, and remained much below the analogue mean (Figure 3.41). In 2025, the mean LOI for both transects was 0.02 (namely 2% of the transects intercepted by vegetation) compared with the LOI analogue mean of 0.34 (34% of the transect).

Transect 3A intercepted just 1 patch of vegetation in 2025 (namely, 1 patch of Pop Saltbush), a decline from 3 patches in 2024. Transect 3B intercepted 7 patches in 2025 (all Pop Saltbush), compared with 8 patches in 2024 (all Pop Saltbush).

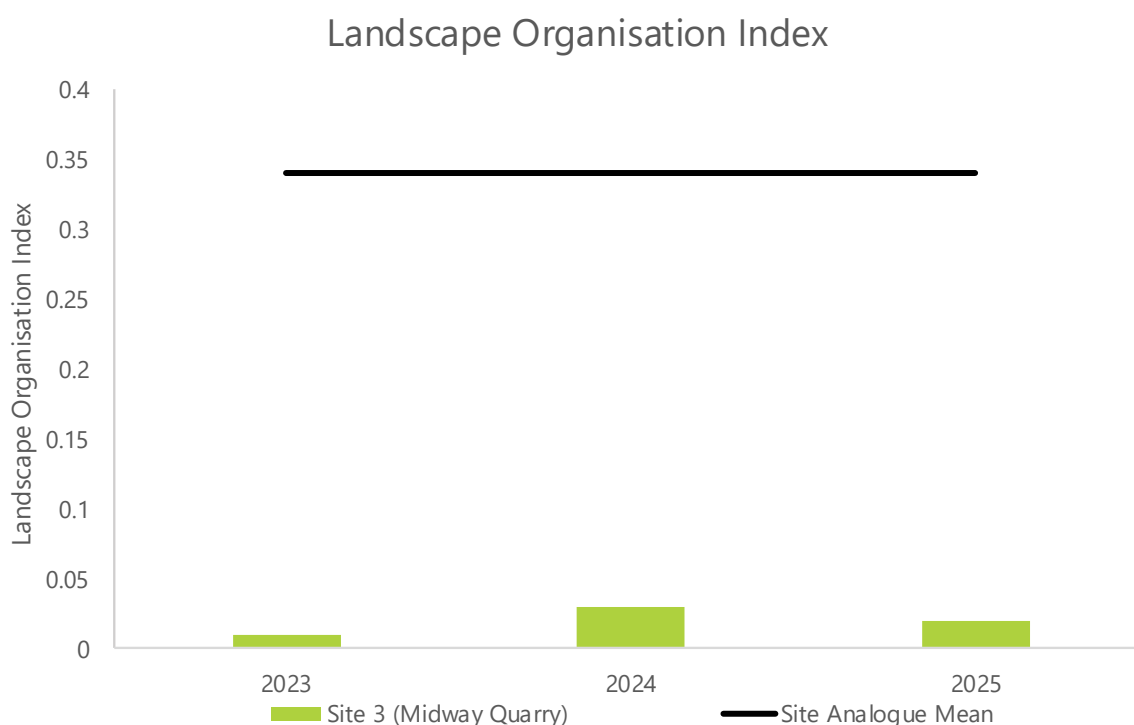


Figure 3.41: Landscape Organisation Index (LOI) at Midway Quarry (mean of transects A and B)



Plate 3.7: Midway Quarry Transect 3A from start facing end, re-establishment of vegetation has been very sparse, and confined to short-lived perennials, with minimal change between 2024 (above) and 2025 (below)



Plate 3.8: Midway quarry Transect 3B, contours have levelled out (< 10 cm deep) and plant regeneration is sparse; minor change between 2024 (above) and 2025 (below)



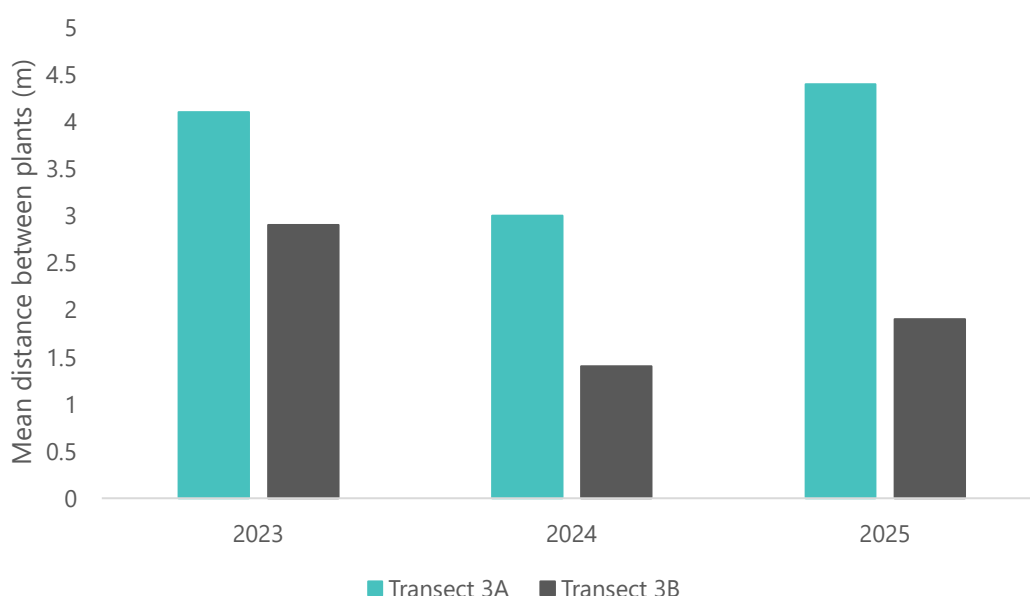
Table 3.19: Species recorded along LFA transects 2024

Species	Common Name	Number of patches that individual species were recorded in along transects			
		2024 3A	2025 3A	2024 3B	2025 3B
Short-lived Perennials					
<i>Atriplex holocarpa</i>	Pop saltbush	1	5	1	2
<i>Sclerolaena ventricosa</i>	Salt Bindyi	19	10	16	6
Additional species recorded within 5 m of transects in 2025 (all are short-lived species)					
<i>Osteocarpum sp.</i>	Bonefruit				
<i>Sclerolaena divaricata</i>	Tangled Bindyi		1		
<i>Senecio glossanthus</i>	Annual Groundsel		1		1
<i>Sida fibulifera</i>	Pin Sida		1		1

Midway Quarry Transects 3A and 3B: PCQ method

The PCQ method was first conducted in May 2023, when plants became apparent at the site. The PCQ method was also conducted in 2024 and 2025. Plant density (as measured by the mean distance between plants and also by the mean number of plants per m²) has remained very low since 2023. Plant density increased between 2023 and 2024 but declined again in 2025 (Figure 3.42 and Figure 3.43). In 2025, the mean number of plants per square meter along Transect 3A was approximately 1 plant per 20 m², and approximately 1 plant per 3 m² along Transect 3B.

Only 3 species were recorded by the PCQ method in 2025; Pop Saltbush (73% of records), Salt Bindyi (24% of records) and Tangled Bindyi (3% of records).

PCQ: Mean Distance Between Plants**Figure 3.42: Midway Quarry mean distance between plants (PCQ)**

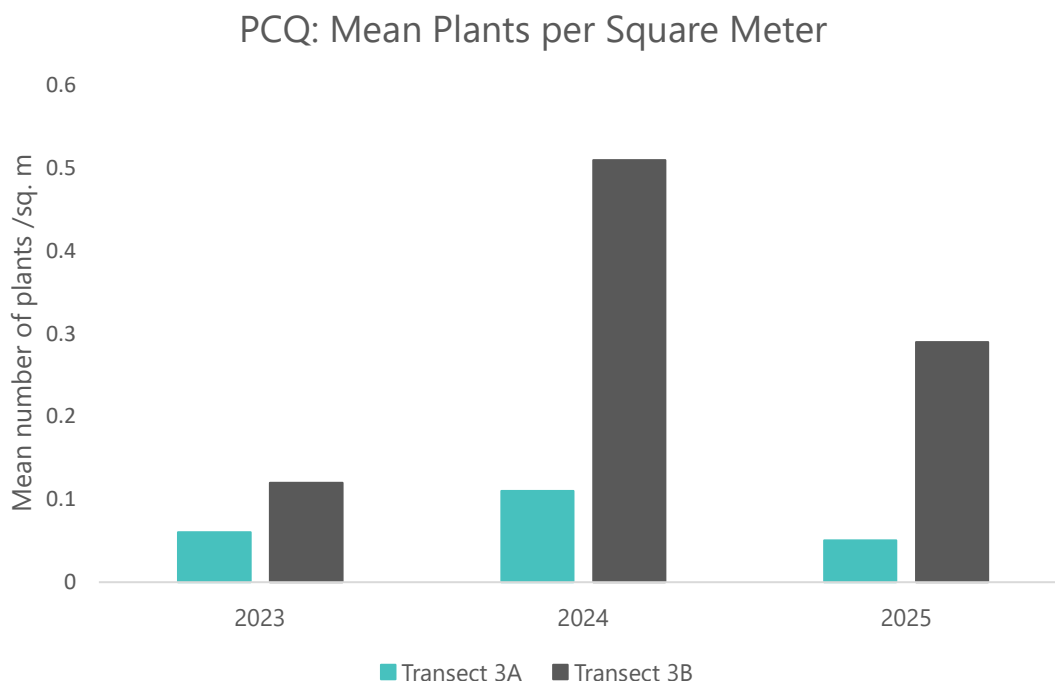


Figure 3.43: Midway Quarry mean number of plants per square meter (PCQ)

3.2.5.3 Soil Parameters

The LFA Surface Soil Assessment includes record of 11 soil parameters for each patch and inter patch. From the Surface Soil Assessment, 3 indices are derived; soil stability, soil infiltration and nutrient cycling. The following results compare data at the rehabilitation sites with 'analogue' (reference) sites. Six analogue sites were surveyed prior to the compliance/operational period (by EBS Ecology).

Soil stability

The soil stability index is derived from the following parameters scored in the field: soil cover, litter cover, cryptogam cover, crust broken-ness, erosion, deposited materials, surface resistance to disturbance and slake test.

For both the Aerodrome and Midway Quarry sites, soil stability scores have remained relatively consistent, and slightly below the analogue mean (Figure 3.44 and Table 3.20). This is because for most sites, a cryptogam cover has not yet developed and materials are not entering the sites from adjoining areas. Leaf litter is still largely confined to beneath the canopy of each plant.

Soil infiltration

The soil infiltration index is derived from the following parameters scored in the field: vegetation cover, litter cover, surface roughness, surface resistance to disturbance, slake test and soil texture.

For the Aerodrome Site LFAAL1 the soil infiltration value has remained very similar since 2021, and very close to the analogue mean value (Table 3.20 and Figure 3.45). At the Midway Quarry site, the soil infiltration value has been more variable but in 2025 was close to the analogue mean.

Nutrient cycling

The nutrient cycling index is derived from the following parameters scored in the field: vegetation cover, litter cover, cryptogram cover and surface roughness. The results show that the Aerodrome Site nutrient cycling index has scored close to the analogue mean since 2021, although declining in 2024 and 2025 (Table 3.22 and Figure 3.46). At the Midway Quarry site, the nutrient cycling index has increased since 2023 and in 2025 was close to the analogue mean, perhaps reflecting the moderate litter cover and surface roughness that is developing.

Table 3.20: LFA Surface Soil Indices¹

Soil Parameter	Year	Aerodrome		Midway Quarry		Analogue		
		1A	1B	3A	3B	Mean	Std Dev Upper	Std Dev Lower
Soil Stability	2020	38	45			46	67	26
	2021	46	43					
	2022	45	45	40	41			
	2023	42	39	47	47			
	2024	41	38	38	37			
	2025	39	39	40	42			
Soil Infiltration	2020	19	18			29	43	15
	2021	23	34					
	2022	24	31	32	29			
	2023	33	27	20	20			
	2024	30	29	16	17			
	2025	30	23	26	32			
Nutrient Cycling	2020	14	14			19	27	10
	2021	18	19					
	2022	20	26	14	14			
	2023	26	16	9	9			
	2024	20	17	12	12			
	2025							

¹Higher indices (percentages), reflect better landscape function

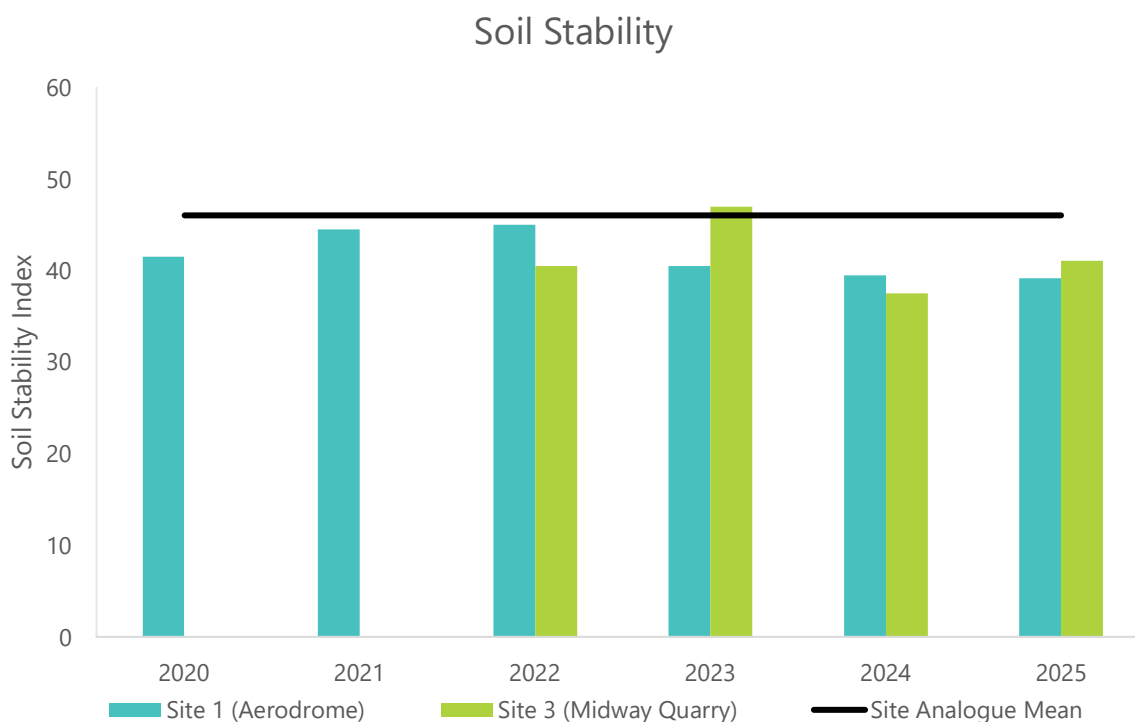


Figure 3.44: Mean soil stability index of transect based on combined patch and interpatch at LFA sites (2020 to 2025)

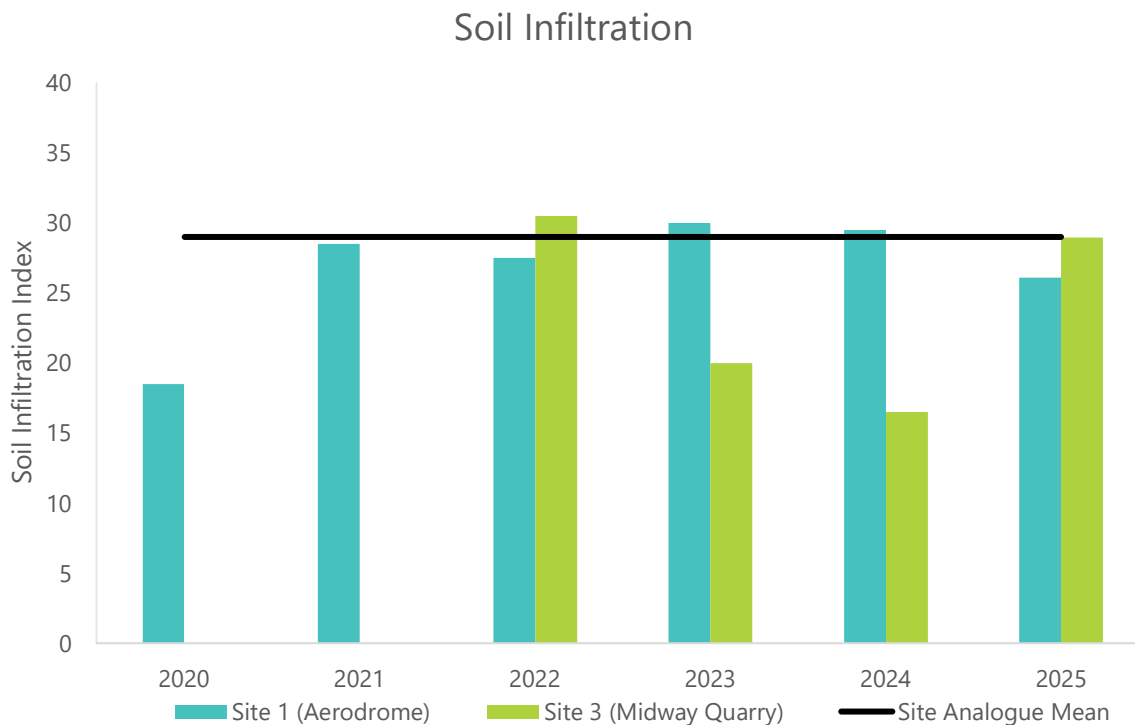


Figure 3.45: Mean soil infiltration index of transect based on SSA (combined patch and interpatch) at LFA sites (2020 to 2025)

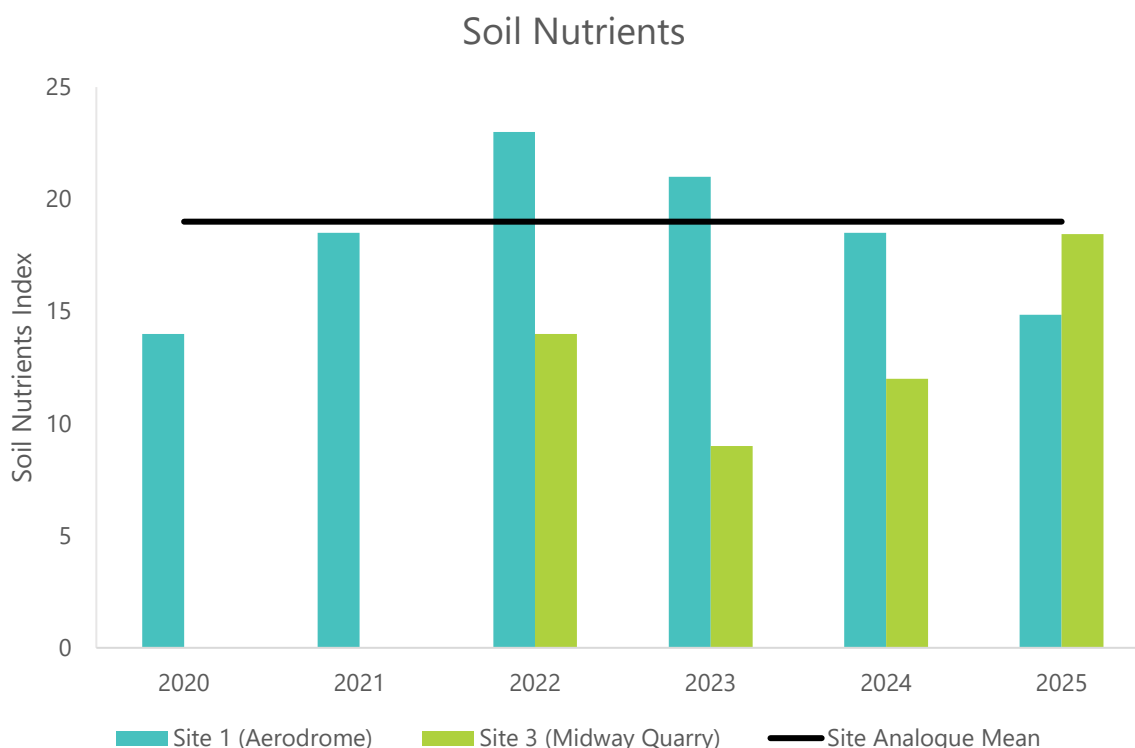


Figure 3.46: Mean nutrient cycling index of transect based on SSA (combined patch and interpatch) at LFA sites (2020 to 2025)

3.2.6 Threatened Flora

No EPBC listed flora species were detected during the spring 2025 survey.

Further detail about 1 NPW listed flora species was recorded. Rounded Sea-heath (*Frankenia subtrees*) listed as rare in South Australia is known to occur at Carrapateena near Flora Site 9, adjacent a narrow drainage channel and Boree (*Melaleuca xerophila*) low woodland (Plate 3.9, Plate 3.10). The area would require further mapping to accurately record the entire extent, given there are some dense areas and other areas where the species is sparsely present. An initial estimation suggests over 2,000 plants (adults and juveniles) occur at this location.



Plate 3.9: Rounded Sea-heath (SA Rare), north-east of Site 9



Plate 3.10: Rounded Sea-heath (SA Rare), close up

3.3 Fauna

3.3.1 Survey effort and capture rates

As per Section 2.6, fauna survey methods during compliance monitoring broadly followed the SA Vertebrate Survey guidelines (Owens 2000), with modifications aligning with the objectives of this survey, and based on recommendations from earlier surveys. The broadly accepted guidelines recommend a minimum of 4 trapping nights to ensure sufficient trapping effort for the purposes of documenting key faunal assemblages across a study area. A trapping line set up is shown in Plate 3.11.

Table 3.21 provides a summary of total trapping effort across the spring 2025 survey. Survey effort has been calculated by number of trapping nights (number of traps multiplied by the number of nights the traps were set for) and the total number of active surveys and searches. Opportunistic observations and bird surveys were also undertaken at all 8 fauna sites; the 4 sites in Eliza creek, the dune Flora sites (21 and 22) and at opportunistic sites. No spotlighting was undertaken, but opportunities for capturing nocturnal activity occurred via camera trapping and Song Meter deployment at fauna trapping sites (birds only), Site 7 (birds and bats over 4 nights) and Site 10 (birds and bats over 3 nights).



Plate 3.11: Fauna trapping set up (site 4)



Table 3.21: Fauna survey effort, spring 2025

Location	# of Trap Nights		Total Trap Effort Per Site
	Funnel trap	Pit Trap	
Fauna Site 1	16	24	40
Fauna Site 2	16	24	40
Fauna Site 3	16	24	40
Fauna Site 4	16	24	40
Fauna Site 5	16	24	40
Fauna Site 6	16	24	40
Fauna Site 15	16	24	40
Fauna Site 16	16	24	40
Total	128	192	320

3.3.1.1 Capture rates

The spring survey returned a total of 443 observations, captures or evidence of fauna (excludes exact numbers for sheep, kangaroos, goats, rabbits and birds which were not counted). This included 265 detections / observations of birds, 69 of mammals and 109 of reptiles (includes 43 Song Meter / camera duplicate bird detections). Of the observations, 110 were pit or funnel trap captures. The highest capture rates were made in pitfall traps (92) and there were 18 captures in funnel traps. Capture rates for the number of pits and funnels deployed at each site are summarised in Table 3.22.

Total spring 2025 trapping capture rate for funnel and pit traps was calculated by dividing total captures by total trap effort ($110/320 = 0.34$) ($141/320 = 0.44$). The total trapping capture rate was above the 2018-2022 spring capture rates (~ 0.23) and the autumn 2023 capture rate (0.11), but below the 2024 rate of 0.44. The 2025 total capture rate is well within the range reported during baseline surveys (0.14 to 0.97), where the lowest rates were recorded in autumn 2013 (0.14) and 2014 (0.13), and the highest rate was recorded in spring 2016 (0.97) (EBS 2017b). Capture rate numbers during the current survey are considered to be positive, particularly given the drier conditions preceding the survey.

As per above, both funnel and pit captures (110 in total) increased from the 2022 spring and 2023 autumn surveys but decreased from the 2024 spring survey (142 in total), and there were only 5 recaptures (3 reptiles, 2 dunnarts) recorded. When reviewing trends for total fauna species detections across the control and impact site, including captures and observations of additional species (opportunistic, Song Meter, bird surveys) there are no clear differences emerging between control and impact sites. It is noted that Control Site 1, Impact Site 15 and Impact Site 16 had the highest overall fauna detection (37, 28 and 28) and Control Site 2 had the lowest total species detection (12). Impact sites had variable numbers of bird species, varying levels of mammal / reptile captures and there are no clear trends when compared with spring 2022 and spring 2025 results (Figure 3.47). All sites show a trend of total mammal decline from 2022, but small mammal detection was above 2023 and 2024 in 2025. Noting this comparison primarily relates to point of time comparison across the sites.



Table 3.22: Fauna (trapping only) capture rates per site, spring 2025

Site	Treatment	Funnel Trap		Pit		Total Captures	Total Capture Rate	Total Capture Rate Comparison to spring 2024
		Captures	Capture Rates	Captures	Capture Rates			
Fauna Site 1	Control	0	0	11	0.46	11	0.28	decrease
Fauna Site 2	Control	1	0.06	6	0.25	7	0.18	decrease
Fauna Site 4	Control	1	0.06	15	0.63	16	0.40	decrease
Fauna Site 6	Control	2	0.13	13	0.54	15	0.38	decrease
Fauna Site 3	Impact	0	0	5	0.21	5	0.13	decrease
Fauna Site 5	Impact	3	0.19	14	0.58	17	0.43	increase
Fauna Site 15	Impact	5	0.31	17	0.71	22	0.55	increase
Fauna Site 16	Impact	6	0.38	11	0.46	17	0.43	increase

As per Section 2.3.2, Site 4 and Site 6 were changed from Impact to Control sites in 2024.

Carrapateena Total Fauna Detections

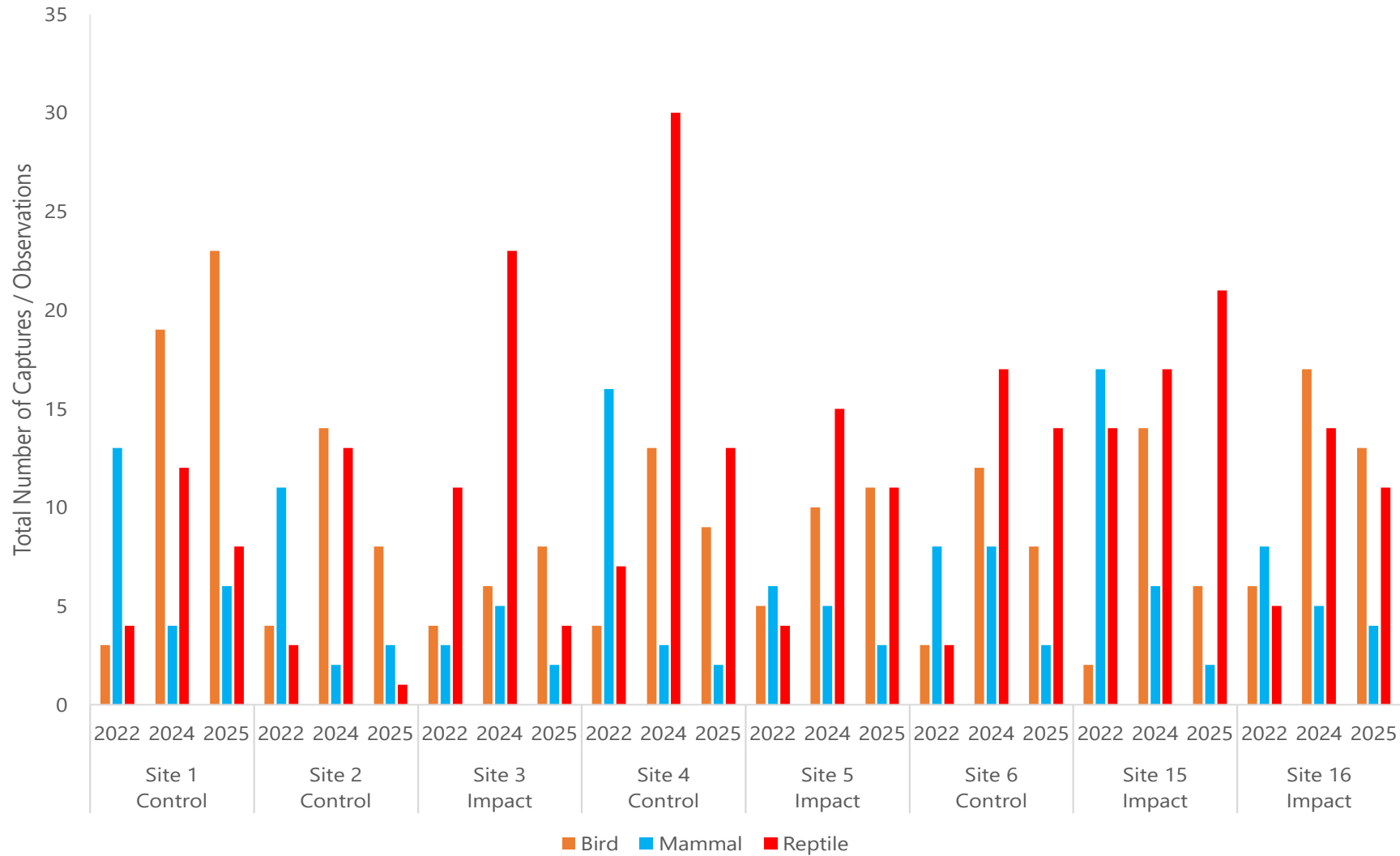


Figure 3.47: Total fauna detections (bird species present only), spring 2022, 2024 and 2025



3.3.2 Fauna diversity summary

During the 2025 spring fauna survey a total of 87 vertebrate species were detected from the 8 fauna survey sites, 20 bird survey sites and opportunistically within the study area. Of these 87 species, 3 species had not been observed / detected before or since the baseline surveys (2012-2017); Broad-banded Swimmer (*Eremiascincus richardsonii*), Brown Goshawk (*Accipiter fasciatus fasciatus*) and Rufous Whistler (*Pachycephala rufiventris rufiventris*). The site occurs within the known range for these species (Menkhorst et al. 2023; Davies et al. 2022; Hutchinson and Williams (2024c). The numbers of vertebrate species detected in the study area are summarised below:

- 57 bird species (53 at fauna sites and bird sites, 49 at opportunistic locations, includes 10 waterbirds / shorebirds)
- 17 reptile species (6 via fauna trapping, 11 via camera trap / opportunistic observation)
- 13 mammal species (4 fauna trapping captures; 9 opportunistic including 3 exotic species, 4 microbat species) (excludes sheep).

No NPW Act-listed as threatened species were detected, 1 EPBC listed species was detected; Southern Whiteface (*Aphelocephala leucopsis leucopsis*) listed as Threatened (Vulnerable). The species was detected along the WAR near CWM05, individuals have previously been detected near Site 21 (in 2019, Jacobs 2020a), and near WAT17 creek site (in 2021, Jacobs 2023a) and were detected in a similar location as part of other regional surveys (e.g. for the Northern Water Project, Z. Bull pers. comm.).

Introduced birds or mammals detected at the site included House Sparrows (in similar numbers with previous years), European Rabbits and Feral Cats (has decreased since the previous survey). Evidence of Feral Cats and European Rabbits only included scats and tracks in 2025, no live animals detected. Rock Doves (Feral Pigeon) and House Mice were not captured or detected via camera trap in 2025.

The following sections provide detail on each faunal group identified, including summary tables of species.

Given the nature of fauna data from individual surveys, movement of species, the variations in weather conditions between surveys, variations in trapping effort (to baseline) and capture rates across surveys and sites, fauna data is reflective of high-level trends over time only. Broadly, Figure 3.48 shows the total species diversity for mammals, birds, reptiles / frogs that were captured, recorded during dedicated bird surveys and recorded opportunistically across the Carrapateena location during spring baseline (2012 - 2017) surveys compared with data from the construction/operation period (2018 - 2025). Results for 2025 total diversity falling within the spring range reported from previous years, and snap shot autumn surveys from early baseline (2012), late baseline (2017) and early compliance monitoring (2017) (Figure 3.48). Similar to spring 2022 and autumn 2023, dams held water, including South Eliza Dam (SED) which has Class A wastewater, where waterbirds were present. Fewer waterbird species and families were detected in 2025 potentially as a result of survey effort at these wetted areas, windy conditions during the survey and no Song Meter being deployed at SED during the spring 2025 survey.



Similar to previous years, there was evidence of breeding activity across the site. Given the arid environment, the breeding of many species is stimulated by climate conditions, hence breeding can occur throughout the year. The small mammals showed some evidence of breeding, however sample sizes were small for some species (e.g. Fat-tailed Dunnart, Forrest's Mouse). Stripe-faced Dunnarts (Plate 3.12) were captured in higher numbers than Fat-tailed Dunnarts, as per previous surveys. Over 10 bird and reptile species were observed in breeding pairs / groups or had young present, which is a sign that species are persisting within the Operations area environment; e.g. pairs of Mulga Parrot, Australian Ringneck, Blue Bonnet, multiple family groups of two fairywren species, juveniles of Eyrean Earless Dragon, Bynoes gecko, Four-toed Slider).

No evidence of a significant reduction in species diversity was observed in spring 2025, with total species numbers on par with baseline and spring time compliance monitoring results, with detection numbers of small rodents and bird species reflective of the dry climate conditions preceding the survey (refer Section 3.1).

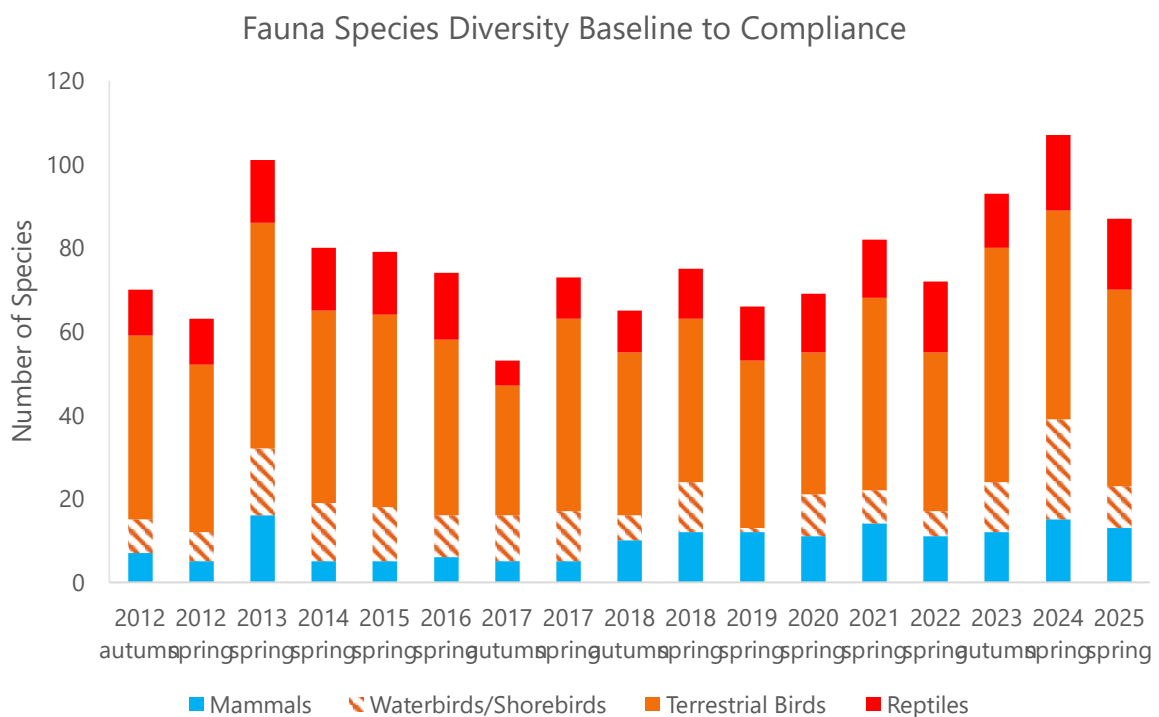


Figure 3.48: Vertebrate total species diversity, during baseline (2012 – 2017), and compliance monitoring (2018 – spring 2025, control and impact totals)



Plate 3.12: Stripe-faced Dunnart (Site 1)

3.3.2.1 Bird diversity

A total of 57 bird species were detected during the spring 2025 survey across the Carrapateena site (see Appendix F). Of these species, 53 were recorded during dedicated bird surveys across 20 sites and the additional species were recorded opportunistically when driving along tracks, around camp, effluent irrigation areas, during weed surveys and at dams (Plate 3.13). All dams that were surveyed had water including coffer dams, and waterbirds and resident shorebirds were present, similar to previous years when dams held water. One EPBC listed threatened species was detected opportunistically; Southern Whiteface (*Aphelocephala leucopsis leucopsis*), which was detected at a weed monitoring site (CWM05) along the WAR. No EPBC listed Migratory shorebird species were detected. No State listed species were recorded.

There were no new records for the Carrapateena location, but records for two bird species that had not been detected since baseline or prior; Rufous Whistler (*Pachycephala rufiventris rufiventris*), not recorded since 2006 (before baseline), was detected at both sand dunes sites (Site 21 and 22) and Brown Goshawk (*Accipiter fasciatus fasciatus*), not recorded since 2017, was detected opportunistically at weed site CWM01 (Plate 3.13).

Bird families were well represented, with birds from 32 different families detected (increased from 22 in spring 2022, but lower than 37 recorded in 2024 and 34 in 2023 (autumn)). Many families were only represented by 1 species (17 families) or by 2 species (9 families). Meliphagidae (honeyeaters and chats)



were the most represented (5 species), with Artamidae (woodswallows, butcherbirds and currawongs) and Psittacidae (parrots) represented by 4 species.

The species detected at the most fauna sites during site targeted bird surveys was the Australian Raven (13 sites), followed by Singing Honeyeater (*Gavicalis virescens*) (12 sites), White-winged Fairywren (*Malurus leucopterus leuconotus*) (10 sites) and Australian Pipit (*Anthus australis australis*), Nankeen Kestrel (*Falco cenchroides cenchroides*), Black-faced Woodswallow (*Artamus cinereus*), Welcome Swallow (*Hirundo neoxena neoxena*) and Zebra Finch (*Taeniopygia guttata castanotis*) (all at 9 sites).

Family groups of 2 different types of Fairywren (White-winged and Purple-backed (was Variegated, *Malurus assimilis assimilis*) were recorded at a number of sites (10 and 8, respectively). White-winged Fairywren groups were commonly observed across the Carrapateena Operation area in Chenopod habitats close to Western Myall Creeklines (e.g. Impact Site 3 adjacent the admin). Other species also showed breeding plumage, had juveniles present, were in breeding groups or nesting. The South Eliza Dams provided temporary nesting site for several waterbird species, but fewer species were detected than in 2024 when there were larger extents of Class A Wastewater.

The House Sparrow (*Passer domesticus*) was again observed around both site camps in 2025, as per previous years. Both males and females were present, in similar numbers than previously, numbers are not declining or increasing. No Rock Dove (feral pigeon) (*Columba livia*) were detected.



Plate 3.13: Brown Goshawk (opportunistic detection at CWM01)



Plate 3.14: Purple-backed Fairywren (Eliza Creek)

Comparison with baseline data – birds

Mean bird species diversity per bird site in spring 2025 was 8.85 (a decrease from 13.17 in spring 2024 and 9.65 in autumn 2023, and an increase from 5.6 in spring 2022), with total diversity per site ranging from 1 to 23 species detected. The mean diversity was within the range observed between 2018-2023 (5-9.65) and above the range recorded for baseline surveys (e.g. ranging from 4.1 in 2016, to 7.9 in 2013). More species were generally detected at sites within or near drainage lines (e.g. Site 7, Site 10 Plate 3.14, Plate 3.15), or sites with Western Myall Woodland nearby (i.e. sites with a tree canopy in addition to shrubland understorey, such as Site 1, Site 16). Song Meters are considered suitable to complement bird surveys, given conditions at the Carrapateena location are not always suitable to detect birds. Sites with the lowest numbers, generally received less effort as Song Meters were only deployed at fauna trapping sites and Flora Site 7 and 10 (e.g. the lowest number of species were detected was at Site 13, where a Song Meter was not deployed as conditions were less suitable on the day this site was visited (warm and windy)). Bird records per site and how they were detected are summarised in Appendix F.

Total spring bird species diversity (57) across the site was within the range of total diversity reported during baseline surveys (e.g. species diversity ranged from 42 in autumn 2017 to 70 in spring 2013; EBS 2017a, 2017b), and within compliance monitoring numbers observed to date (e.g. from 37 in 2022 to 74 in 2024). Total number of bird families (32) represented across the site was within the range recorded during baseline survey results (e.g. families recorded ranged from 29 in spring 2012 to 38 in spring 2014 (EBS 2017)) and was also within the range from previous compliance monitoring to date (e.g. 21 in 2019 to 37 in 2024). Given the presence of water in the dams, the temporary Class A wastewater at SED, small rainfall event in winter, and use of Song Meters to enhance survey effort, it is not unexpected that diversity



of species and families was within and the range of previous diversity recorded. It is noted that diversity numbers had decreased from 2024, likely associated with less sustained rainfall in 2025, and only 8 species were detected via Song Meter, but not observed during bird survey or opportunistically (e.g. Port Lincoln Parrot (*Barnardius zonarius zonarius*) Little Corella (*Cacatua sanguinea gymnopsis*), Silver Gull (*Chroicocephalus novaehollandiae novaehollandiae*), Black-faced Cuckoo-shrike (*Coracina novaehollandiae*), Orange Chat (*Epthianura aurifrons*), Spotted Nightjar (*Eurostopodus argus*), Budgerigar (*Melopsittacus undulatus*) and Rainbow Bee-eater (*Merops ornatus*). The variety of species and families of different types detected in 2025 and the ongoing evidence of numerous species breeding reflects stable conditions for an arid environment. In addition, the detection of species not detected since baseline monitoring or prior is also a good indicator of stable conditions. The data collected provides no evidence to suggest mining activities are impacting bird species presence across the site.



Plate 3.15: Chestnut-rumped Thornbill (Eliza Creek)



3.3.2.2 Reptile diversity

Seventeen reptile species from 110 detections were recorded across the sites during the spring 2025 survey (Table 3.23). During 2025, 69% of the records (76 out of 110) were through physical trapping, with the remainder detected opportunistically, including via camera trap. No spotlighting was undertaken. In terms of diversity, 82% of species were detected opportunistically, and 35% of species were detected via pit / funnel captures (noting some species were detected through both pathways). As per previous surveys, the main species recorded in traps was the Saltbush Ctenotus (*Ctenotus olympicus*) with the greatest numbers being detected at Impact Site 15 (16), Control Site 4 (7) and Impact Site 5 (6). The reptile trap captures were considered commensurate with the temperatures observed during the spring survey (refer Table 3.23).

Five common reptile families were well represented during the survey; with the skinks represented by 9 species, dragons by 4 species and geckos by 2 species and 1 species each for snakes and goannas. Juveniles of several species were detected during the survey (e.g. Earless Dragons (*Tympanocryptus* sp.), Bynoe's Gecko (*Heteronotia binoei*, Plate 3.16), Saltbush Ctenotus and Southern Four-toed Slider (*Lerista dorsalis*)) indicating ongoing successful breeding activity across the site. Notable opportunistic species detected in lower numbers included Cane-grass Dragon (*Diporiphora winneckeii*) at the dune sites (Plate 3.17), Eyre Peninsula Dragon (*Ctenophorus fionni*) (Plate 3.18) detected in the creek areas and Central Bearded Dragon (*Pogona vitticeps*) detected at several sites (Plate 3.19).

The Southern Four-toed Slider has not been detected since baseline surveys (in 2016) but was detected in 2024, was again detected at Site 6 in 2025 through capture of a single juvenile individual. This species was detected during baseline surveys at Site 2, 3, 6, 15 and 16 (between 2012–2016), and detection of another juvenile individual during the 2025 survey is a positive indication that the species persists in the area.

Only 1 snake species (Curl Snake (*Suta suta*)) was detected during the survey (along the fauna trapping fence at Site 4). Low detections of snakes may be related to conditions during the survey (ranging between 19 and 31°C), they are usually detected in low numbers (e.g. 23 detected during baseline period, 1–6 per survey; 13 detected during compliance monitoring period 1–5 per survey). Similarly, there were no snake relocations in the operations areas during spring 2025 (BHP site fauna interaction register).

One species was detected that has not been recorded at Carrapateena since baseline surveys (last record 2016); the Broad-banded Sand Swimmer (*Eremiascincus richardsonii*). The species has previously been detected at Site 1, 4 and 16, during baseline surveys (2013 to 2016). The species was an opportunistic observation provided (via photo) from BHP staff.



Plate 3.16: Juvenile Bynoe's Gecko (opportunistic detection at Yeltacowie Homestead)



Plate 3.17: Cane-grass Dragon (opportunistic detection at dune Site 21/22)

Table 3.23: Reptiles detected at Carrapateena in spring 2025

Family Name	Scientific Name	Common Name	Fauna Site								OP/CT Total ¹	All Total
			1 Control	2 Control	3 Impact	4 Control	5 Impact	6 Control	15 Impact	16 Impact		
Agamidae	<i>Tympanocryptis tetraporophora</i>	Eyrean Earless Dragon	3 [P]		3[P]	2[P]	5[P]	3[P]	2[P]	2[P], 1[F]	OP CF01 [1]	22
Agamidae	<i>Pogona vitticeps</i>	Central Bearded Dragon								1[OP]	OP S13 [1], S21[1], Wat17 [1]	4
Agamidae	<i>Ctenophorus fionni</i>	Eyre Peninsula Dragon									OP S9 [2 males], S19 [1 female]	3
Agamidae	<i>Diporiphora winneckeii</i>	Cane-grass Dragon									OP S22 [4]	4
Elapidae	<i>Suta suta</i>	Curl Snake				[1 OP]					OP [1 along trap fence]	1
Gekkonidae	<i>Diplodactylus tessellatus</i>	Tessellated Gecko				2[P]		1[CT]		1[F]	1	4
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko									OP Yeltacowie Homestead [5]	5
Scincidae	<i>Ctenotus olympicus</i>	Saltbush Ctenotus	1[P]	1[F]	1[P]	6[P], 1[F]	3[P], 3[F]	3[P], 1[F]	12[P], 4[F]	1[P], 3[F]		40
Scincidae	<i>Ctenotus robustus</i> (C. inornatus) ²	Eastern Striped Skink									S10[1], S20 [1]	2
Scincidae	<i>Ctenotus regius</i>	Eastern Desert Ctenotus									OP Yeltacowie Homestead [2]	2
Scincidae	<i>Lerista dorsalis</i>	Southern Four-toed Slider						1[P]			juvenile	1
Scincidae	<i>Menetia greyii</i>	Common Dwarf Skink	3[P]					2[P],1[F]	1[F], 2[P]	1[F]		10
Scincidae	<i>Morethia adelaidensis</i>	Adelaide Snake-eye						1[P, male]				1
Scincidae	<i>Morethia boulengeri</i>	Common Snake-eye									OP S19[2], Yeltacowie Homestead [1]	3
Scincidae	<i>Tiliqua rugosa</i>	Sleepy Lizard	1[OP]			1[OP]		1[OP]		1[OP]	OP S21[tracks], S22[1], SED [1], Yeltacowie Homestead [1]	8
Scincidae	<i>Eremiascincus richardsonii</i>	Broad-banded Swimmer									OP TJU Village [1]	1
Varanidae	<i>Varanus gouldii</i>	Sand Goanna									Tracks at S10, S21, S22 [3]	3
	Totals detected	110	8	1	4	13	11	14	21	11	33	
	Total species ¹	17	4	1	2	5	2	7	3	6	13	

¹ OP/CT = opportunistic (OP) / camera trap (CT), [X] = totals; all others captured in pit [P] or Funnel [F]; includes 3 recaptures (1 x Saltbush Ctenotus, 2 x Eyrean Earless Dragon); Opportune sites = Site(#), YH = Yeltacowie Homestead, Wat 17, TJU = Tjungu, CF01 (spill site).

² Ongoing taxonomic revision with this species.



Comparison with baseline data – reptiles

Total reptile captures / observations for spring 2025 (110) was below spring 2024 (160), well above autumn 2023 (39) and spring 2022 (88), and within the range for baseline spring surveys (49 in 2016, 184 in 2014 and 117 in spring 2017 (EBS 2017b, site fauna database), and within previous spring compliance monitoring totals (ranging from 39 to 160).

Results in 2025 for total species diversity (17) were above the baseline monitoring range (10 to 16 species, between 2012 – 2017, EBS 2017a, 2017b), and within the compliance monitoring range (12-17, between 2018 and 2024). These results continue the trend that indicates there is no notable impact from the reduction in trapping effort and the number of trap lines deployed since 2017 (i.e. only 1 trap line per site), and that there is no evidence of impacts to reptile diversity across the fauna sites as a result of mining activity.

All families previously detected in baseline and compliance monitoring were represented, with the ongoing exception of the Pygopodidae (only one individual has previously been recorded across the Carrapateena location during the 2013 baseline survey (EBS 2013a) whilst spotlighting (Black-headed Scalyfoot, *Pygopus nigriceps*). The Pernatty Knob-tailed Gecko (Carphodactylidae family) and Centralian Blind Snake (Typhlopidae family) remain undetected since 2014, but these species were only previously reported during spotlighting opportunistically (presumably in dune habitats), which are not part of the compliance trapping program).

Detection of species that have not been detected since baseline is always a positive for the monitoring program. In 2024 a species not detected since baseline was the Southern Four-toed Slider and in 2025 another juvenile of this species was detected at Site 6, which was re-classified as a control site in 2024.

Mean reptile species diversity per fauna site was 3.75 in spring 2025, ranging from 2 to 7 species (Table 3.23). This has decreased from 4.8 in spring 2024 but is above the spring of 2022 (3.13) and 2021 (2.13) and is slightly below the baseline range (4.8 in 2012 to 6.6 in 2014). It is noted that mean diversity was not calculated in 2023 due to low reptile captures and was not reported in the baseline report in 2017. Despite a drier season, local climatic effects appear to be favouring certain species. Warmer daytime temperatures and humidity during the survey also influenced opportunistic detections, contributing to the total reptile diversity across the location during the survey period (Plate 3.18).



Plate 3.18: Female Eyre Peninsula Dragon (opportunistic detection in Eliza Creek)



Plate 3.19: Central Bearded Dragon (opportunistic detection at Site 13)



3.3.2.3 Mammal diversity

Thirteen mammal species (excluding sheep) were detected across the Carrapateena site during the spring 2025 survey (refer Table 3.24). Four small mammal species were captured via trapping; Stripe-faced Dunnart (*Sminthopsis macroura*), Fat-tailed Dunnart (*Sminthopsis crassicaudata*), Central Short-tailed Mouse (Forrest's Mouse) (*Leggadina forresti*) and Giles' Planigale (Paucident Planigale) (*Planigale gilesi*) (32 captures in total). Stripe-faced Dunnarts were captured in good numbers (24) relative to other surveys. Native rodents were recorded in lower numbers than dunnarts (3 captures, 2 via camera trap). No House Mouse (*Mus musculus*) were detected during the current survey. Other animals detected include pest or exotic fauna, 2 Kangaroo species and 4 species of microbats.

Similar to results from the 2021 to 2024 surveys, the Stripe-faced Dunnart was the most abundant small mammal captured at all sites (24 in total), above 2024 (19), 2023 (16) and 2021 (18), but still lower than 2022 when conditions were more optimal (46) (Jacobs 2019a, 2023b, 2023h). Both males and females were captured, and a range of age classes were present with some evidence of pouch activity. Only 4 Fat-tailed Dunnarts were captured. There were also low numbers of 2 less common species captured; 2 Giles' Planigale and 3 Central Short-tailed Mouse.

The White-striped Free-tail Bat is the only bat in South Australia that is audible to the human ear. Whilst spotlighting was not undertaken in Eliza Creek (Site 10), the species was detected via Song Meter at Site 10 (1 night) and Site 7 (2 nights). Three other microbat species were also detected via Song Meter; Gould's Wattled Bat, Lesser Long-eared Bat, Inland Forest Bat. The Inland Free-tailed Bat (*Ozimops (Mormopterus) petersi*) that was detected at Site 7 and SED was not detected. There were a total of 16 detections of microbat species at the 2 surveyed locations (Site 7 and Site 10) across 4 nights. All 4 species were detected at both sites (Specialised Zoological 2025).

There was minimal evidence of pest fauna species detected at the fauna trapping sites and as mentioned in Section 3.2 evidence of grazing was limited at flora sites. Goats were not observed during this survey, but a small group is known to occur across the broader Carrapateena site. Rabbit scats and diggings were detected opportunistically, but primarily at dune sites and creek sites with sandy areas (e.g. Site 10). Rabbits were not detected when driving past the warren on the track to Site 15. Foxes have been recorded on the site previously (2012, 2013, 2015, den in Eliza Creek 2019, dead fox at Anzac Dam in 2019). Similar to 2023 and 2024, foxes were not detected during 2025. Cats are known to occur at the site and have increased slightly in recent times, particularly around administration areas, and management of the species is ongoing. No cats were detected at the fauna sites, but tracks and scats were detected at Flora Site 21, 22 (dune sites) and Yeltacowie Homestead.

Grazing management has changed across the site, with less areas under grazing and more fencing delineating grazed areas; flocks of sheep were observed / detected (via camera trap or song meter) at 3 sites during the survey (Site 6, 12 and 16). As a result, kangaroos are also being managed more effectively across the site and there is likely less competition for resources. Red Kangaroos and Euros were observed across the study area and were noted to be in excellent health. Euros were observed in slightly larger numbers than previous years and numbers of Red Kangaroos appeared in greater numbers, as is known for the region in general for 2025.



Plate 3.20: Giles' Planigale (captured at Site 1)



Plate 3.21: Native Mouse, likely Sandy Inland Mouse (camera trap, Site 6)



Plate 3.22: Central Short-tailed Mouse (Forrest's Mouse) (captured at Site 1)

Table 3.24: Mammals recorded at Carrapateena during spring 2025 survey

Family Name	Scientific Name	Common Name	Fauna Site								OP [Total]1	Total2
			1 Control	2 Control	3 Impact	4 Control	5 Impact	6 Control	15 Impact	16 Control		
Bovidae	<i>Ovis aries</i>	Sheep (Feral Sheep)						4[CT]			Flock3	NA
Dasyuridae	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	1[P]			1[P]	1[P]			1[P]		4
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	1[P]	4[P]	1[P]	4[P]	5[P]	3[P]	1[P]	5[P]		24
	<i>Planigale gilesi</i>	Giles' Planigale	2[P]									2
Felidae	<i>Felis catus</i>	Cat (Feral Cat)									S21, S22, YH [3]3	3
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit (European Rabbit)									S10, S1, S22 [3]2	NA3
Macropodidae	<i>Macropus (Osphranter) robustus</i>	Euro								[3]	S7 [1], S18 [2]	NA3
	<i>Macropus (Osphranter) rufus</i>	Red Kangaroo2	[1]	[1]	[1]		[1]		[1]	[1]	S18 [1]	NA3
Muridae4	<i>Leggadina forresti</i>	Central Short-tailed Mouse (Forrest's Mouse)	1[CT]	2[P]							CT [1]	3
	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	1[CT]					1[CT]			CT [1]	1
Vespertilionidae5	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat									2 x S7, 2 x S10 [4]	4
	<i>Vespadelus baverstocki</i>	Inland Forest Bat									2 x S7, 1 x S10 [3]	3
	<i>Chalinolobus gouldii</i>	Gould's Wattle Bat									3 x S7, 3 x S10 [6]	6
Molossidae	<i>Austronomus australis</i>	White-stripe Free-tailed Bat									2 x S7, 1 X S10 [3]	3
	Total Trap Captures	32	4	6	1	5	6	3	1	6		
	Total Species Detected	14	6	3	2	2	3	3	2	4		

1OP = Opportunistic, YH = Yeltacowie Homestead; S21 = Site CAR021, S22 = Site CAR022, S11 = CAR011 etc.; 2Not Accurate given red kangaroos / sheep, present not always counted; CT –recorded on Camera Trap. 3fresh tracks and / scats. 4 Mice and dunnarts caught in pitfall trap unless otherwise mentioned as CT, excludes 2 recapture dunnarts at Site 16. 5All microbats recorded on Song Meter, number relates to nights of species detection only.

*Comparison with baseline data – mammals*

No Plains Mouse were detected, continuing the trend of no detections since the commencement of the compliance monitoring. Only 2 rodent species were detected, the Central Short-tailed Mouse (3 captured) and 2 Sandy Inland Mouse (2 via camera), both in very low numbers, similar to baseline and compliance surveys (Table 3.25). Low numbers of rodents in general is likely reflective of drier conditions in the preceding months before the survey, given rodents require sustained rainfall for more than 6 months and associated resources to breed in larger numbers. i.e. the rainfall events spread out between November 2024, March and July 2025, but still resulting in below average yearly totals, unlikely to sustain large rodent numbers. In addition, there are also species-specific influences, as highlighted in the results of a long-term study of the predator proof Arid Recovery Reserve. Moseby (et al. 2025) showed that smaller native rodents occur in low numbers within and outside the reserve, whereas the Plains Mouse population boom was linked to predator pressure and the population conditions prior to rainfall response. Interestingly they found limited effects of rainfall on Stripe-faced Dunnarts. Whilst results for Fat-tailed Dunnarts did not show influence of predator exclusion, it was considered Stripe-faced Dunnarts may have out competed Fat-Tailed Dunnarts limiting them from population increase within the reserve (Moseby et al. 2025). Desert dasyurids are insectivorous and many smaller dasyurids are not as responsive to rainfall, possibly due to their opportunistic foraging strategy and flexible habitat requirements Haythornthwaite et al (2006).

At Carrapateena small mammal species diversity from trapping effort alone during spring 2025 (4 small mammal species) was within the compliance monitoring range (3 – 5) and within the baseline range (4 – 6). No House Mice were caught in traps in 2025. There were more Stripe-faced Dunnart captures (24) than Fat-tailed Dunnarts (4), and they were detected at both control and impact sites. This follows the trend observed during baseline and compliance monitoring (Figure 3.47, Figure 3.48, Table 3.25, Table 3.28). Male and female dunnarts were recorded, some females with evidence of brood patch, suggesting that at least one round of breeding may have occurred prior to the survey. Planigales have been recorded in previous surveys in low numbers, and they are elusive species that are generally more active during warmer temperatures. Whilst neither of the 2 species known from the site were detected in 2024, one of the species was detected in 2025; Giles' Planigale was detected at Site 2 (two captures) (Plate 3.20). The Central Short-tailed Mouse has also previously been detected in small numbers and these were again detected in small numbers (3 captures) in 2025. Four of the 5 microbat species detected in 2024 opportunistically via acoustic methods were detected in 2025 at 2 sites with roosting habitat (e.g. Site 7 (men's site) and Site 10 (Eliza Creek, dry at time of survey) (Figure 3.49).

Mean small mammal diversity per fauna trapping site was 2.13, up from spring 2024 (1.9), and slightly below previous years, i.e. 2.4 (autumn 2023) and 2.75 (spring 2022), but still ranging from 1 to 5 species per site, which is on par with previous compliance monitoring surveys (small mammal captures only) and within the baseline surveys results presented in EBS (2017b). There was very little difference between small mammal species diversity and captures across sites, with the highest small mammal diversity recorded at control Site 1 (5 species). The next highest diversity was 2 species recorded at Control Sites 2, 4, and 6 and Impact Sites 5 and 16. Capture numbers ranged from 1-6 individuals, with 5 of the sites recording 4-6 captures (Site 1, 2, 4, 5, 16). The sites with the lowest number of small mammal captures and the lowest small mammal diversity were Site 3 and 15, both of which are impact sites in very close proximity (within

650 m) to active mining / construction. Further consideration of small mammal detection at control and impact sites is considered in Section 3.3.3.

In general, mammal species diversity did not differ notably from previous surveys. Total diversity of mammals (13) detected throughout the survey was within the range of mammal diversity reported during baseline and compliance Figure 3.48). Noting that, baseline surveys did not always report on presence of microbats, kangaroos, fox, cow, Euro, bat, sheep, and only occasionally recorded pests (e.g. spring 2014), hence it is difficult to compare data. Red Kangaroos were present across the site, and similar to 2022/2023 remain in good health compared to earlier years and were observed in moderate to high numbers (not counted). Feral Goats were not detected but are known to occur on the site in low numbers and other feral animals are still present in low numbers on par with baseline numbers. There were ongoing signs / evidence of rabbits, but detection was generally lower than in 2024 (no live individuals detected).

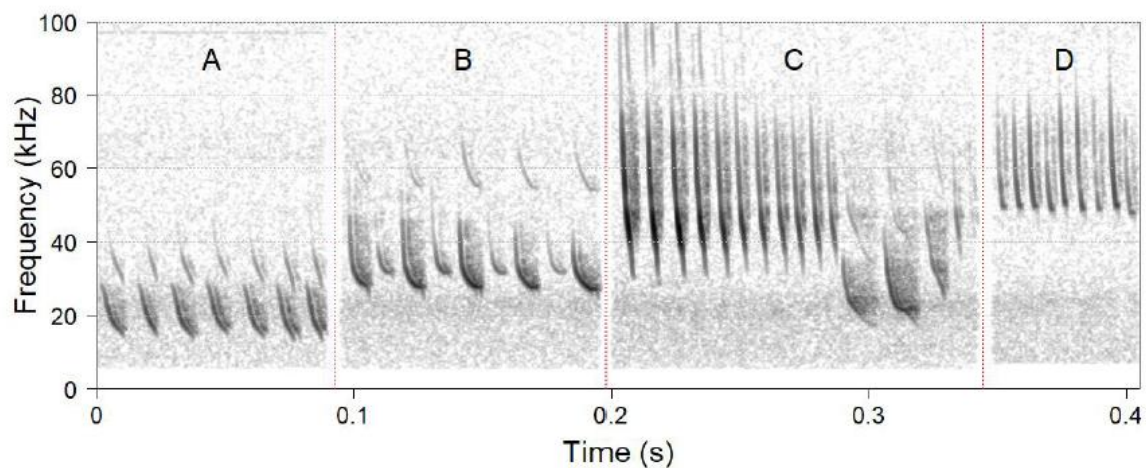


Figure 3.49: Representative echolocation call sequence portions of the species identified; (A) White-stripe Free-tailed Bat, (B) Gould's Wattled Bat, (C) Lesser Long-eared Bat (D) Inland Forest Bat, (time between pulses has been compressed)



Table 3.25: Summary of total small mammal captures, baseline (2012-2017) versus compliance monitoring (2018–2025)

Family Name	Scientific Name	Common Name	Baseline (2012-2017)			Compliance (2018-2025)		
			Total ¹	Range per survey	Mean per survey	Total ¹	Range	Mean
Dasyuridae	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	217	4-31	18	75	1-20	8
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	617	8-98	51	150	3-47	17
	<i>Planigale gilesi</i>	Giles Planigale	56	0-10	<3	25	0-10	>1
	<i>Planigale tenuirostris</i>	Narrow-nosed Planigale						
Muridae	<i>Leggadina forresti</i>	Central Short-tailed Mouse	79	0-19	<7	29	0-8	>3
	<i>Pseudomys sp.</i>	Native Mouse ⁵	14	0-4	<1	6	0-2	<1
	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse						
	<i>Pseudomys bolami</i>	Bolam's Mouse						
	<i>Pseudomys australis</i>	Plains Mouse	39	0-20	3	0	0	0
	<i>Mus musculus</i>	House Mouse	11	0-10	<1	5	0-2	<1

Note: Numbers are rounded and do not account for recaptures as limited information is available for baseline data. ¹Number reflect totals, acknowledging that baseline totals include two surveys per year running 2 to 4 traplines per site and compliance surveys were reduced to one trapline per site and one survey per year from 2019 (two in 2018).

3.3.3 Control versus impact

Results from spring 2025 indicate that when combining total diversity of bird species detected, mammal species captured / detected and reptile species captured / detected at fauna trapping sites, the mean species diversity is slightly higher at control sites than impact sites regardless of whether the original treatments are compared (Table 3.26 and Table 3.26) or the treatments as revised in 2024 are compared (Table 3.28). A comparison of the mean total fauna diversity between control and impact sites for the original treatment using un-paired t-tests indicated no statistically significant difference (Control Mean +/- Standard Error (SE) = 21.50 +/- 10.50, Impact Mean +/- SE = 14.67 +/- 1.43, P = 0.2678). Similarly, comparison of means for total species diversity using the revised treatments, was also not statistically significant between control and impact sites (Control Mean +/- Standard Error (SE) = 19 +/- 4.53, Impact Mean +/- SE = 13.75 +/- 2.06, P = 0.3317). Whilst the results indicate there are no significant differences, the trends are higher for control sites and standard errors are high, particularly for diversity.

As per Section 3.3.2.3, whilst small mammal total diversity appears to be relatively stable and commensurate with the difference in survey trapping effort between baseline and compliance monitoring (e.g. more trap lines deployed during baseline than compliance), capture rates for some small mammal species were low. Further interrogation of data was undertaken for each small mammal species (Table 3.28) to determine whether there were any trends between control and impact sites. The two most common small mammal species (Stripe-faced Dunnart and Fat-tailed Dunnart) have been consistently



detected throughout baseline and compliance surveys at both control and impact sites, with the latter detected in lower numbers. The Central Short-tailed Mouse was consistently detected at both control and impact sites during baseline surveys, and continues to be regularly detected at control sites during compliance monitoring. However, this species has been detected during fewer surveys at impact sites during the compliance monitoring period. This could be related to lower numbers of detections in general during compliance monitoring with fewer trap lines deployed (i.e. variance from a smaller sample size), but is a trend that is worth watching. Results for smaller native rodents are difficult to interpret as the overall detections are low and there are difficulties in identification of the two species that are known for the site (Bolam's Mouse and Sandy Inland Mouse). However, there have been detections at both control and impact sites during the compliance period. Similarly, Planigales are detected in lower numbers, and rates of detection at control and impact sites remain relatively stable for the compliance period. The Plains Mouse has not been detected at either control or impact sites since compliance surveys commenced, but this is consistent with regional findings, and there were also extended periods of no captures during baseline surveys.

The mean number of total captures is higher at control sites than impact sites under both treatment scenarios (Table 3.26 and Table 3.27). A comparison of mean total fauna captures (reptiles and mammals only) between control and impact sites using un-paired t-tests indicated no statistically significant difference for the original treatment, Control Mean $\pm$ SE = 6.0 $\pm$ 3.0, Impact Mean $\pm$ SE = 5.29 $\pm$ 0.81, $P = 0.7368$; and for the updated treatment, Control Mean $\pm$ SE = 7 $\pm$ 1.41, Impact Mean $\pm$ SE = 4.25 $\pm$ 0.63, $P = 0.1260$.

These results indicate higher total fauna diversity and captures at control sites than impact sites, but there are no statistically significant differences between control and impact sites with either of the treatment arrangements used (original or revised). This suggests there is no evidence that mining activity is impacting fauna diversity or trap capture rates. In the future there may be a need to reallocate control Site 1 and 2 to impact sites, depending on the influence of increased Khamsin Road traffic / Northern Wellfield activities. The results for small mammals in particular show that the two common species (Stripe-faced Dunnart and Fat-tailed Dunnart) are still being detected at both control and impact sites, and that native rodent detection should be monitored. Regardless, overall diversity (birds, mammals and reptiles) and capture rates across the Carrapateena location are within baseline and compliance ranges, and are not currently indicating significant impacts to fauna as a result of mining activity at Carrapateena.

Table 3.26: Comparison of fauna diversity and captures at control and impact sites (original treatment), 2025 data

Site	Treatment	Diversity number of bird, reptile, small mammal captures / detected ^{1,2}	Mean diversity at fauna sites by treatment type	Captures number of reptile, small mammal captures/ detected ¹	Mean detection at fauna sites by treatment type
1	control	32	21.50	9	6
2	control	11		3	
3	impact	11	14.67	3	5.5
4	impact	16		7	
5	impact	15		4	
6	impact	17		9	
15	impact	10		4	
16	impact	19		6	

(¹Excludes kangaroos, goat, rabbit, ²bird species only counted once as present)

Table 3.27: Comparison of fauna diversity and captures at control and impact sites (revised treatment), 2025 data

Site	Treatment	Diversity number of bird, reptile, small mammal captures / observed ^{1,2}	Mean diversity at fauna sites by treatment type	Captures number of reptile, small mammal captures/ observed ¹	Mean captures at fauna sites by treatment type
1	control	32	19.00	9	7
2	control	11		3	
4	control	16		7	
6	control	17		9	
3	impact	11	13.75	3	4.25
5	impact	15		4	
15	impact	10		4	
16	impact	19		6	

(¹Excludes kangaroos, goat, rabbit, ²bird species only counted once)

Table 3.28: Summary of small mammal detections at control and impact sites during baseline and compliance surveys

		Baseline												Compliance										Total Captures
		2012		2013		2014		2015		2016		2017		2018		2019	2020	2021	2022	2023	2024	2025		
		Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Spring	Spring	Spring	Spring	Autumn	Spring	Spring		
Stripe-faced Dunnart	Impact	23	17	29	59	29	40	27	31	4	4	45	45	4	4	0	3	12	13	8	9	14	767	
	Control	32	26	33	39	26	50	18	32	4	4			2	4	3	2	8	34	8	10	12		
Fat-tailed Dunnart	Impact	1	5	14	17	14	10	4	17	3	2	17	28	2	4	2	11	9	15	1	4	2	292	
	Control	3	11	9	14	16	10	5	11	2	4			1	3	3	4	3	5	2	2	2		
Central Short-tailed Mouse	Impact	12	0	1	2	2	9	1	1	3	3	13	3	0	0	0	1	0	3	2	0	0	108	
	Control	6	0	1	2	4	10	1	1	3	1			2	1	1	2	4	4	6	0	3		
Bolams Mouse	Impact	2	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	14	
	Control	2	4	0	0	0	0	1	1	0	1			0	0	0	0	0	0	0	0	0		
Sandy Inland Mouse	Impact	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	
	Control	0	0	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bolam or Sandy Inland Mouse (camera trap)	Impact	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	
	Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Plains Mouse	Impact	7	2	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	39	
	Control	13	6	1	4	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0		
Giles Planigale	Impact	0	0	0	0	0	3	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	16	
	Control	3	0	0	0	1	1	0	0	0	1			0	1	1	0	0	0	0	0	2		
Narrow Nosed Planigale	Impact	2	0	0	2	0	4	0	2	2	0	3	7	0	0	1	0	0	3	3	0	0	68	
	Control	1	5	2	4	0	6	2	2	3	1			0	0	2	0	4	7	0	0	0		
House Mouse	Impact	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	16	
	Control	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	2	1	0		
Total small mammal species per survey		7	5	6	5	4	6	5	6	5	6	6	6	3	4	5	5	5	5	5	4	5		

Note: Baseline survey deployed 2-4 trap lines per site, compliance surveys deployed 1 trap line per site. Data for 2017 is not available split between impact and control sites. Green cells indicate detections in that survey. Grey cells indicate detection of the EPBC listed Plains Mouse.



3.3.4 EPBC Act Protected Matters

The conditions of the PEPR require that records of 3 EPBC listed threatened species are reported if they are recorded during ecological surveys at site, namely Thick-bill Grasswren, Plains Mouse and Night Parrot. In addition, observations of the Migratory / Critically Endangered Curlew Sandpiper are to be noted as per EPBC referral commitments (BHP 2025a).

3.3.4.1 EPBC1 – Thick-billed Grasswren (Vulnerable)

No evidence of the Thick-billed Grasswren (TBGW) (*Amytornis modestus indulkanna*) (calls, direct observations) were observed during the 2025 survey, including bird surveys at 20 sites, or during opportunistic observations at dams and other likely habitat during the survey. As per 2023 and 2024, Song Meters were deployed at all dedicated fauna sites, a pastoral dam (South Eliza Dam), Eliza Creek (Site 10) and a small patch of potentially suitable Thick-bill Grasswren habitat within the Carrapateena Wellfield Expansion area (Site 7). There was no evidence of the distinctive high pitch calls on the Sonogram outputs, only calls of White-winged Fairywrens and Purple-backed Fairywrens.

A total of 57 bird species were observed throughout the survey including other similar sized species, such as 2 species of Fairy-wren (White-winged, Purple-backed) and the Rufous Fieldwren.

3.3.4.2 EPBC2 – Plains Mouse (Vulnerable)

No evidence of Plains Mouse was recorded during pitfall and unbaited camera trapping at 8 fauna sites during the spring 2025 survey, despite trapping effort within proximity to isolated patches of cracking clay habitat. However, it is noted that many gilgais did not show a large amount of activity, cracks and fauna runs into cracks. Native rodents were only captured on nocturnal cameras and in a pitfall trap at one site during the survey (Site 2). These results align with other regional surveys for 2025. No Plains Mice were detected at either of the South Gap offset areas, or inside / outside the arid recovery area adjacent Olympic Dam, and there was one detection via baited camera at Oak Dam in autumn 2025 (Nature Conservation 2026, Lathwida 2025b, 2025c, 2025d, BHP 2025b). At South Gap it is considered the population has been undergoing a low, since mid-2022, and other small mammals have also been detected in low yet stable rates (Nature Conservation 2026). The lack of in detection at South Gap in 2025, particularly given the survey effort (13 permanent camera sites, that were operational throughout the year) continues to suggest the population is currently declining (Nature Foundation 2026). At Oak Dam a single Plains Mouse was detected at a Cane-grass Swamp site with large areas of suitable gilgais (via baited camera during autumn) but was not detected during autumn or spring trapping surveys (Lathwida 2025b, 2025c, 2025d). The species has not been captured at Carrapateena since 2017 (only 3 captured) prior to commencement of the compliance monitoring phase. Lack of recent detection at Carrapateena is also likely related to additional factors (e.g. impacts from grazing and predators compared with South Gap). The preceding climate conditions such and lack of sustained rainfall that rodents require, also likely contributed to results, similar to other regional surveys.



3.3.4.3 EPBC3 – Night Parrot Records (Endangered)

During the annual flora and fauna survey (spring 2025) at the Carrapateena Mine site, there was no evidence of Night Parrot (calls, direct observations or distinct feathers) at 8 flora and fauna monitoring sites, 20 bird survey sites and a number of opportunistic observations at dams, during spotlighting. There was also no detection via Song Meter at the fauna sites or other opportunistic locations deployed (e.g. South Eliza Dam, Eliza Creek (Site 10, Site 7). A total of 57 bird species were detected throughout the survey including 4 common parrot species: Budgerigar, Eastern Blue Bonnet, Mulga Parrot, Port Lincoln Parrot.

No EPBC listed Parrots were detected during the spring 2025 survey.

3.3.4.4 Curlew Sandpiper (Critically Endangered)

The EPBC listed Critically Endangered and Migratory Curlew Sandpiper (*Calidris ferruginea*) is not covered by the PEPR conditions for Carrapateena but is one of the 4 EPBC species that was considered in the Operation's EPBC referral. Whilst it was considered unlikely to occur at the site, there is potential the shorebird could visit water habitats at the site.

No evidence of Curlew Sandpiper (calls, direct observations) were detected during the 2025 spring survey, whilst undertaking bird surveys at 20 sites, or during opportunistic observations at dams or on Song Meter outputs. All dams contained water during the survey period with little areas of exposed mud. The South Eliza Dams had overflow and temporary wetland conditions. A total of 57 bird species was observed throughout the survey; with no EPBC listed as Migratory shorebirds detected. A number of waterbird species and resident or endemic shorebirds were recorded in water habitats; Banded Lapwing, Masked Lapwing, Black-fronted Dotterel, Silver Gull and several duck / grebe species.

3.3.5 Vouchers

For the spring 2025 survey no trap deaths occurred, hence no vouchers were provided as specimens to the SA Museum as required by the ethics and fauna permit.

3.3.6 Pitfall line integrity

As mentioned earlier, the trapping effort at the site has been reduced over the years from 4 pit lines to 1 pit line per site being opened during each survey. The reduction in number of lines was undertaken to align the survey effort undertaken with the requirements of the PEPR (i.e. focus on species diversity and not focus on measures of abundance or a need for high capture rates). There has been some flexibility in the pits and lines opened during compliance monitoring to date, using only 6 of the 7 pits in a line, and potentially using different pit lines at a site over different surveys. Previously some of the pit lines contained pits that required maintenance or permanent removal as the integrity of the pit bases did not meet ethics standards (likely related to historical Planigale presence and potentially extraction of small skinks that had managed to get under the base liner). Following the 2023 survey, the site environmental team began replacing damaged pit bases with custom-made stainless-steel bases with numerous holes (2-3 mm) drilled in, to reduce ongoing maintenance and improve pitfall trap integrity across the mine site.



The new bases are easy to install and can be removed with narrow-nosed pliers and a rubber mallet (e.g. to change the pit line that is surveyed).

During the site maintenance schedule the pit lids are checked to ensure that they are secure and there are no gaps where animals (particularly very small skinks, geckos, juvenile mammals) can squeeze into cracks can get in and become trapped outside of the survey period. This is required 6 monthly as per the Wildlife Ethics Permit. The process for securing the lid involves: digging around the top of the pit, below the lip of the pit lid (e.g. ~10 cm), then aligning pit lid, banging the lid down and inserting the tech screw through the lip of the UV stable lid and the UV stable pit liner. Prior to this process the pit is checked that it is free of any fauna, particularly if pits are left open for a short time for maintenance or pit bases. These steps align with the approved permit for the site that allows for the pits to be closed with a tech (hex) screw, rather than filling the traps with non-perishable material (e.g. rocks, sand or sandbags) at the end of the survey (Section 2.2). Rocks are also placed on top of closed pits to reduce UV exposure to the lid. Ethics require photos of the closed pits, and GPS coordinates of all pits, are provided in the annual Wildlife Ethics Report (due 1 February each year - Lathwida prepares on behalf of BHP), for the Permit requirements.



4 Discussion

4.1 Summary of spring 2025 results

4.1.1 Assessment of mining impacts

Potential impacts from mining activity on vegetation would be represented by a decline in the number of native flora and fauna species present; a decline in the abundance of individuals within a species; a decline in plant health (e.g. due to potential raised dust settling on plants, saline seepage from tailings dam and/or altered groundwater levels) and/or an increase in weed presence. The discussion below outlines why the 2025 survey results do not indicate impacts on vegetation from mining at Carrapateena.

4.1.2 Native flora species diversity (RAM sites)

Monitoring of perennial species diversity (number of species present) provides an indication of long-term trends in plant populations. Prior to operational monitoring, baseline monitoring was conducted between 2012 and 2017, with full data sets available for 2013 to 2016. This period included years of average, well above-average and well below-average rainfall, hence providing a wide range of data, against which compliance data can be compared.

At the Carrapateena operational area, long-lived species diversity is monitored at 1-ha sites, and analysed at the individual site scale, at a habitat scale (stoney tableland, dunes, drainage lines) and at a landscape scale (number of plant species present across the whole operational area). Long-lived plant diversity is relatively constant in undisturbed environments. In contrast, ephemeral diversity varies greatly in response to rainfall in arid rangelands. Long-term monitoring of short-lived plant diversity however is also important because short-lived plant species often comprise most plant species in arid rangelands (Davies et al. 2018) which can dominate during periods of high rainfall (Waudby and Petit (2015). Long-term changes (10+ years) in short-lived species diversity may indicate possible irreversible changes such as due to climate change, loss of soil seed bank, grazing impacts and/or altered soil properties.

4.1.2.1 Flora diversity across the whole Carrapateena operational area

In spring 2025, a cumulative total of 134 native flora taxa was recorded at the 20 RAM flora sites across the Carrapateena Operation area. This was the median diversity recorded during compliance monitoring surveys (2018 to 2025). A relatively high diversity of short-lived species was recorded (77 species), which compares with a maximum of 83 and a minimum of 52 species recorded since 2018, and indicates that mining activities have not impacted ephemeral species. Despite below-average rainfall received from January to June 2025, long-term mean rainfall recorded in the 3 months prior to the survey (June - August) was sufficient to stimulate widespread germination of annuals. Given the survey was conducted in mid-September, annuals were still present. During the 2025 survey, 57 long-lived perennial species were recorded. This tally was 1 less than the previous minimum of 58 species recorded in both 2018 and 2023, but only 5 fewer than the maximum tally recorded in 2021. The species not recorded in 2025 were those present as only isolated individuals at the dune sites or at sites including a drainage line. Due to



boundaries not being permanently marked at these sites, it is difficult to replicate precise survey search area each year. The tally of 57 species is considered to be within the range of variation caused by variable search area rather than by mining impact. Hence the diversity of long-lived species is not considered to have been impacted by mining activities.

4.1.2.2 Flora diversity for individual sites

Plant species diversity (long-lived and short-lived) at all individual sites in 2025 was within the baseline range for each site. For each individual site, although there has been variation in species diversity between survey periods there have been no obvious increasing or decreasing trends emerging. Further, impact and control sites have recorded similar variation in magnitude and direction of changes in diversity. Given post-construction monitoring results have not shown clear trends emerging in long-lived or short-lived species diversity, and no significant difference between control and impact site mean diversity, it is considered that there has been no impact on perennial or short-lived species diversity across the site, from mining

4.1.2.3 Flora diversity for individual habitats

Eliza Creek sites. Since 2020, long-lived species diversity has varied between surveys, for each flora site. Unlike the gibber transects, the survey area along Eliza Creek is defined as a 1-hectare area, under the influence of the creek environment, the precise boundaries therefore varying between observers each year. In 2025, long-lived species diversity at each site was similar to 2020 diversities. Long-lived species diversity however, for Sites 18, 20 and 10 were below the compliance monitoring means, but the same or greater than compliance monitoring means at Sites 17 and 19. At sites 10, 18 and 20, the reduced long-lived perennial diversity in 2025 was due largely to a decrease in long-lived grass species recorded. This was likely due to most perennial grasses being heavily grazed in 2025, making positive identification difficult.

In summary there was no clear pattern emerging in flora species diversity at Eliza Creek relating to the time since TSF establishment or the distance from the TSF (Sites 17 being the closest and Site 10 being the furthest away).

Dune habitats. Flora Sites 21 and 22 were initially established to determine potential impacts from mining on sand dune habitat, given dune habitats were excluded from baseline monitoring. Site 21 is considered a control site (located > 2 km from mining infrastructure) and Site 22 is a potential impact site as it adjoins the Western Access Road (< 2 km from mining infrastructure). In 2025, perennial species diversity was within the range recorded since 2018. Yearly variations are due to the difficulty in replicating the precise survey area each year and/or difficulty in detecting species represented by one or few individuals and that may be hidden beneath other shrubs – rather than actual loss or gain of species. At both sites, no clear species diversity trend has emerged. Hence species diversity in the dune habitat is considered not to have been impacted by mining activities.



Gibber (stony tableland habitat). The gibber stony tableland is the dominant habitat within the operational area; hence 9 gibber habitat flora sites have been monitored since 2018. As at spring 2025, there were no trends emerging in species diversity at either control or impact sites in gibber (stony tableland) habitats. This includes Flora Site 3 which adjoins the western edge of the processing plant and the site potentially most liable to dust impact. For all individual sites, long-lived species diversity in 2025 was within both the baseline range, and the compliance range.

Gibber (stony tableland habitat) that include a minor drainage line. During both baseline and post-construction/ operational monitoring, diversity has fluctuated at Control Sites 1 and 7, and to a lesser extent at Control Site 9 and Impact Site 11 but overall has shown no clear trends at these sites. Variations in long-lived species diversity at these sites is largely due to slight variations in area surveyed at each survey: the presence of multiple habitats decreasing the ability to replicate survey areas precisely.

Given that there have been no consistent trends in plant diversity for individual sites, it is considered that there has been no impact on mining at either the site level, habitat level or landscape level.

4.1.3 Long-lived woody perennial species diversity and abundance (Jessup transects)

Jessup transects have been surveyed during baseline and construction monitoring, to analyse potential mining impacts on population trends (abundance) of long-lived woody plants. The transect data provides a quantitative measure of abundance based on absolute counts of individuals within a precisely defined survey area.

4.1.3.1 Gibber habitats

Since 2018, the population of the 5 most abundant and widespread shrubs at Jessup transects in gibber habitats have been analysed; Bladder Saltbush, Thyme Sea-heath, Plains Lantern-Bush, Bush Minuria and Samphire. Following declines in the abundance of all 5 species between 2020 and 2022/2023, all species increased in 2023/ 2024 and 2025 and as at 2025 populations were within the baseline range. The widespread declines in 2020 – 2022 were likely associated with well below-average rainfall in 2017, 2018 and 2019, the low rainfall having a lag impact. Although all 5 species are relatively drought tolerant, during prolonged and severe drought, Bladder Saltbush, Thyme Sea-heath, Bush Minuria and Plains Lantern drops their leaves and become less obvious in the Jessup transects. Qualitative observations of Samphire also noted higher foliage dieback during and immediately following the drought years. The increases in population abundance of all species in 2023 to 2025 have been associated with average or near-average long term annual rainfall totals. In 2025, the populations of the 5 species either remained within the baseline range or had recovered to once again be within the baseline range.

Bladder Saltbush is the dominant shrub and plant cover at all gibber sites and is slightly to moderately palatable in this environment. The species has a lifespan of approximately 25 to 30 years and is recognised as important for ecosystem stability in rangelands of southern Australia (Walsh et. al. 2005). In South Australia, due to its longevity and drought tolerance, Bladder Saltbush is used extensively as an indicator of land condition in chenopod shrublands (Baulderstone and Baird 2012). Widespread regeneration of Bladder Saltbush was recorded at the Jessup sites, in 2023, 2024, and 2025 largely contributing to the recovery of Bladder Saltbush populations since 2022. Although many of the juveniles recorded in 2025



are unlikely to survive an extended hot dry period, the survival of even a small percentage is likely to assist in maintaining a sustainable population. The high number of juveniles recorded since 2023 suggests a healthy population. In a 10-year study of Bladder Saltbush recruitment and survival in western NSW, Eldridge and Westoby (1991) recorded substantial turnover of the saltbush population with plants less than 2 years old comprising an average of 60% of the individuals present. The widespread regeneration at Carrapateena since 2023 and 2024 correlates with average to near-average yearly rainfall totals in 2023 and 2024. Since 2018 the correlation of population size with rainfall, and abundance trends being of similar magnitude at impact and control sites, indicates that climate (particularly rainfall totals) rather than mining has influenced Bladder Saltbush populations.

Similar to Bladder Saltbush, the abundance of Samphire plants in Jessup sites declined in 2020/2021 following below average rainfall years. The Samphire population means for both impact and control sites returned to being within baseline ranges, in 2023, 2024 and 2025. As per Bladder Saltbush, the greater recovery at impact sites rather than control sites indicates that Samphire abundance has not been affected by mining related activities. During compliance monitoring, the population of Thyme Sea-heath recorded at Jessup transects also declined during the below average rainfall years of 2018 – 2020 but both control and impact site mean populations have increased since 2021 with increased yearly rainfall. In 2025, the mean populations of impact and control sites were within the baseline range. Samphire and Thyme Sea-heath are relatively unpalatable species not grazed by stock, kangaroos or feral animals (with the possible exception of young foliage). Hence changes in abundance are potentially due to mining activities or climate changes. Impact sites, however, have either shown similar population trends to control sites, or a greater increase in population. Changes in abundance for all 5 species analysed have shown a strong correlation with rainfall totals – decline during and immediately following the drought years, followed by recovery at both impact and control sites to be within the baseline range. At control sites, the declines were either similar or greater than at impact sites. Samphire and Thyme Sea-heath are non-palatable, removing grazing as a cause of the decline experienced in these species. Hence this suggests that changes in abundance in these species are related to climatic changes rather than impacts from mining. Plains Lantern Bush and Bladder Saltbush are moderately palatable, and their increased abundance may be due to both increased rainfall and widespread destocking across the lease area.

4.1.3.2 Eliza Creek

To provide data against which to assess potential impacts on vegetation downstream of the TSF, 4 flora sites, which included Jessup transects, were established in autumn 2018, located progressively downstream from the TSF embankment within Eliza Creek. A fifth site (established during baseline surveys) is located furthest from the TSF on Eliza Creek. At all sites, the total number of long-lived woody perennials present in the Jessup transect, has increased since 2018. To analyse potential impacts of the TSF on individual species, species of shrubs/trees were chosen that were common at site 17 (closest to TSF) and common at 2 or more other Eliza Creek sites; Western Myall, Lobed-leaf Hop-bush, Silver Mulla Mulla, Senna species, Spiny Fanflower and Spongy-fruit Bluebush. It is expected that if there were potential impacts due to the TSF they would appear first at Site 17. However, whilst all 6 species have shown yearly fluctuations, they have either recorded no long-term change in abundance, or an increasing abundance trend, which does not suggest the any impacts associated with the TSF.



Western Myall is the dominant tree at Jessup Sites 17 and 18. Since 2018 Western Myall abundance has fluctuated yearly at these sites, but without displaying a downward trend. The population fluctuations are largely due to fluctuations in seedling abundance (including some seedlings likely not surviving beyond a year) and/or slight changes in Jessup alignment. Nine juveniles and 18 adults were recorded at Site 17 in both 2024 and 2025. This is notable as Site 17 is just 270 m from the TSF and the adult and juvenile Western Myall trees remain healthy with regular recruitment and/or growth of trees.

The Eliza Creek Jessup transects have shown an increase in the abundance of perennial individuals during compliance monitoring, as well as no decline in individual species abundance. Hence, no impact from mining activities is considered evident at the Eliza Creek flora sites.

4.1.4 Plant health

During the spring 2025 survey, no dust layer was noted on plants at any flora site, including Site 3 which adjoins the processing plant and nearby spoil heap. No signs of saline impact on plant health were noted (e.g. no salt crust on the ground or on leaves). This aligns with findings of the Dust Impact study (Jacobs 2020b) which recorded no significant decline in plant health or vigour at distances greater than 10 m from roads.

In both 2024 and 2025, qualitative observations of Bladder Saltbush noted that dieback/ leaf loss was much reduced compared to 2020 levels, and that almost all shrubs were heavily in fruit, perhaps the most since compliance monitoring began (pers obs. S Croft who has conducted all surveys since 2018). In 2025, mean dieback of Bladder Saltbush across the survey sites was an estimated 10 – 20%, considered to be within the range of dieback when plants are not under undue stress. Bladder Saltbush has good salt tolerance and high drought tolerance but will shed leaves to conserve moisture (State Government of Victoria 2024).

Mean dieback of Samphire across the survey sites in 2025 was an estimated 10 – 30%, considered to be within the range of dieback when Samphire plants are not under undue stress.

In 2025 qualitative observations of high leaf loss on mature plants was noted at the flora sites, but the majority of mature plants were also recovering with new growth and fruiting, and a smaller proportion of plants were flowering. There was also widespread regeneration with juveniles healthy and comprising one third of the 2025 Jessup Lantern Bush population (including at impact sites).

Thyme Sea-heath is not impacted by grazing, and no dust has been recorded on any plant at flora sites, hence potential causes of notable changes in abundance are largely confined to climate and mining impacts. Qualitative observations during the 2025 survey noted that the Thyme Sea-heath plants were healthy, with abundance at impact sites increasing, and abundance remaining stable at control sites. Hence mining is not considered to be impacting Thyme Sea-heath abundance or plant health.

Bush Minuria is one of the more palatable species within the survey area, and usually only recorded growing in the protection of Bladder Saltbush. With prolonged drought, bushes will defoliate and become less obvious. However, the population at Jessup transects has increased during compliance monitoring at both control and impact sites by similar percentages. In 2025, juveniles were recorded at 3 of the 7 impact sites and at one of the 4 control sites. Hence, mining is not considered to be impacting Bush Minuria populations.



In general vegetation within gilgais exhibited dieback, with the majority of plants being short-lived plants. At some sites, the long-lived Cotton-Bush (*Maireana aphylla*) was sparsely present and largely confined to gilgais, where it appeared droughted. The friable soils would be more susceptible to summer/autumn drought (as experienced in 2025) with these soils having a more limited water holding capacity compared to surrounding non-gibber soils. The 2025 gilgai dieback is considered short-term, with recovery likely as gilgai soils re-hydrate.

Sclerolaena species (Bindyi sp.) are short-lived sub-shrubs and are a prominent plant cover at all the gibber sites. In 2025, at flora sites where there was high dieback of these short-lived sub-shrubs, it was always accompanied by a similar amount of new growth.

At the Eliza Creek flora sites, qualitative observations noted that the only species with reduced vigour included Dead Finish (*Acacia tetragonophylla*) and Lobed-leaf Hop-bush (*Dodonaea lobulata*), where approximately 5% of bushes appeared droughted and/or > 90% dieback. Similar observations have been made on these species in previous years at the Eliza Creek sites and this relatively minor percentage of shrubs recording dieback is likely due to low rainfall and/or heat stress rather than mining impacts. At sites 19 and 20 (3 km and 4.7 km downstream from the TSF) the Lignum bushes appeared droughted, but no dead lignum was recorded and Jessup transects recorded no obvious decline in abundance (Lignum was not present at sites 17 and 18). In 2024, it was noted that Green Emubush (*Eremophila serrulata*) and Crimson Emubush (*Eremophila latrobei*) displayed leaf yellowing in approximately 25% of the population. However, this was not evident in 2025 and there was no decline noted in the Jessup populations.

At all Eliza Creek sites, the creek bed appeared very dry with higher water-requiring plants such as Darling Lily (*Crinum flaccidum*) and sedges (*Cyperus* species) absent or much reduced in density compared with higher rainfall years of 2023 and 2024.

At gibber flora sites, grazing impacts were evident on the long-lived perennial grasses, particularly Neverfail (*Eragrostis setifolia*) and on the palatable shrubs, Bush Minuria and Spongy-fruit Bluebush (*Maireana spongiocarpa*). However, juveniles of both Bush Minuria and Spongy-fruit Bluebush were also present. Sheep grazing at the time of the spring 2025 survey was evident at several sites (e.g. control Sites 6 and 12 and impact Site 16) but no decline in abundance of species was noted. Cattle dung was present at the dune sites during each compliance survey, but no species was noted to be severely modified by grazing. At the Eliza Creek sites, grazing impact was most notable on the perennial grasses, Neverfail and Cotton Grass (*Digitaria brownii*), and on the palatable shrubs Spongy-fruit Bluebush, Spiny Fanflower (*Scaevola spinescens*) and Opposite-leaf Emubush (*Eremophila oppositifolia*). However, CSR abundance estimates and/or Jessup abundance counts indicate no obvious decline in abundance in these species.

In summary, 2025 survey results indicate that there are no current detectable impacts from mining on flora health, diversity or abundance, i.e. no long-term decline in the number of native species present; no long-term decline in abundance of any species, no differential decline between control and impact sites in the abundance of individuals within a species; and no decline in plant health (e.g. due to potential raised dust settling, saline seepage).



4.1.5 Tree health (canopy cover)

The canopy health of the dominant tree species at Eliza Creek sites (17, 18, 19 and 20) has been assessed since 2018 using both a hand-held GRS densitometer and visual estimates of canopy intactness. This was to assess possible impacts on tree health due to potential seepage from the TSF or reduced water flows down the catchment. Comparing the total number of densitometer foliage records along a transect over time provides an indication of changes in total canopy cover. Potential changes in total canopy cover may be a combination of canopy expansion of existing trees; recruitment of trees and/or canopy decline of existing trees. At each Eliza Creek site, there are 2 parallel transects. Along each 100 m transect, readings were taken every metre, hence the number of readings showing canopy cover equates to the percent canopy cover along the transect. Additionally, visual estimates were made (with no tool) of the entire canopy of individual trees, to assess the extent of foliage compared to the potential extent of foliage expected of a tree in good health.

4.1.5.1 Western Myall trees

At the Western Myall dominant transects (Sites 17 and 18), the total number of Western Myall foliage records has trended strongly upwards since 2018. The increase in foliage records at each site is due to both additional trees and expansion of existing tree canopies along each transect. Since 2018, there have been 2 Western Myall tree deaths and 26 new Western Myall trees recorded along the combined transects. Visual estimates of Western Myall canopy intactness were relatively consistent from 2018 to 2024, but visual estimates recorded a decline in canopy intactness in 2025. These visual estimates of decline in 2025 did not align with the increase in foliage records using the densitometer. Some variation in visual estimates between survey periods is likely due to observer variation rather than actual declines/increases. Different observers are likely to differ slightly in their estimates of canopy extent and/or there may be variation in estimates by the same observer at different survey periods. The mean decline in visual estimates of canopy extent at transect 17A was 6%, possibly within the range of observer variation. Site 17 is closest to the TSF (approximately 250 to 350 m downstream). Conversely, mean estimates of canopy extent at Transect 19B increased.

The continued increase in the number of canopy (live foliage) recordings along the Western Myall transects, the net increase in trees and visual estimates that align with densitometer readings (within the margin of estimating error) indicate that as at 2025, mining related activities (impacts from TSF) have not impacted Western Myall abundance or health along the Eliza Creek canopy cover transects.

4.1.5.2 River Red Gums

Since 2018, the number of River Red Gum foliage densitometer records for Sites 19 and 20 (Eliza Creek) has fluctuated, often quite markedly, between survey periods. However, there has been no distinct trend apparent at Site 19, and a slight upward trend in total foliage records at Site 20. Site 19 is 3 km from the TSF, and the first occurrence of River Red Gums downstream from the TSF. Site 20 is 4.6 km from the TSF. Visual estimates have also indicated that Red Gum canopy extent has varied notably between surveys. Visual estimates recorded declines in canopy extent for all transects at Sites 19 and 20 in 2024 and 2025, following large increases in canopy extent in 2022 and 2023. River Red Gums shed leaves during periods



of low rainfall (NSW government undated) and changes in canopy extent of River Red Gum seem to be more responsive to yearly rainfall totals than the Western Myall canopies that are present in Eliza Creek. The canopy of Western Myall trees, however, is relatively dense and less prone to defoliation as a drought strategy. Acacia species in general tend to retain their “leaves” (phyllodes) during drought, with the ability to extract water from dry soils (Tunstall 2005). At the Eliza Creek canopy cover transects, the Western Myall canopies appear to be less affected by changing yearly rainfall totals than do the River Red Gum trees. Changes in the cover of River Red Gum canopies during operation monitoring is likely to reflect seasonal conditions, which in turn, will have varying impacts depending on unquantified variables such as age and size of tree (which will determine root depth and access to water). Compliance monitoring at the Eliza Creek sites indicates that the impact of well above-average or well below-average rainfall on the River Red Gums seems to be apparent within 12 months, with foliage shedding recorded in 2019 (low rainfall year) and increased foliage being recorded in 2021. Foliage records for transects at Site 19 and 20 in both 2023 and 2024 showed that River Red Gums had regained canopy losses in 2018-2020. Rainfall totals in 2025, however, were slightly below long-term means, and the reduced canopy extent may be a response. Since 2018, there has been 1 new Red Gum intercepted (Site 19, in 2024) and one River Red Gum has died.

As with Myall trees, the variation in visual estimates of canopy intactness for Red Gums has been greater than the variation recorded in densitometer foliage records. However, for both species, despite yearly variations in canopy extent, there is no obvious long-term decline in canopy health and no potential impacts resulting from the construction and operation of the TSF to the dominant trees within Eliza Creek are evident.

4.1.6 Weed diversity and abundance

4.1.6.1 Diversity

There were no new weed species recorded in 2025.

4.1.6.2 Increase in abundance/ extent

Excluding the dam locations (namely, excluding non-mineral lease sites), 3 weed species were recorded with increased abundance in 2025, compared with previous compliance surveys (2018 – 2024); common Sow Thistle (*Sonchus oleraceus*), Cut-leaf Heron’s-bill (*Erodium cicutarium*) and Bathurst Burr (*Xanthium occidentale*).

Cut-leaf Heron’s-bill and Sow Thistle are annual species and not Declared under legislation. Their occurrence in any 1 year is likely to be random. Sow Thistle has been previously recorded at 12 locations during baseline and compliance monitoring but was recorded at 18 locations in 2025. Sow thistle reproduces by seed, which is spread primarily by wind, but also by animals and machinery tyres. Each plant can produce up to 8000 seeds and seeds remain viable for up to 8 years (Coleman et. al. 2021). Seeds germinate following rainfall with an ideal maximum/minimum temperature range of 25°C/10°C being observed (Coleman et. al. 2021). At the Carrapateena operational area, optimal germination conditions were present immediately preceding the survey, with mean winter rainfall totals and diurnal temperature ranges being within the optimum range. Hence the widespread occurrence of Sow thistle



during the spring 2025 survey (albeit at low densities) was likely due to weather conditions rather than mining related activities. Cut-leaf Heron's-bill was recorded for the first time at 3 Rangeland flora sites in 2025, (2 control sites and 1 impact site). Like Sow Thistle, Cut-leaf Heron's-bill also produces a large number of seeds (up to 9900 per plant) which can remain viable in the soil for several years. Seeds can spread in the wool or fur of animals. Germination is optimal in moist soils at soil temperatures of 5-200°C and optimal growth occurs at 15-200°C (Neudorf 2024). Such conditions occurred during the 2025 survey. Hence the species' increased abundance at the Carrapateena Operation in 2025 likely reflects optimal germination and growth conditions being met, rather than mining impacts.

Bathurst Burr (listed as Declared under the *Landscape South Australia Act 2019*) was detected at a new location in 2025, albeit a small population. It was recorded along the Western Access Road at weed transect CWM05, approximately 5 km from the Stuart Highway. A total of 10 plants were recorded at the western end of the weed transect. The plants appeared dead and no fruit were observed either on the plants or on the ground. It is possible that seeds were spread to this location from vehicle tyres and/or animals. It is recommended that this population be monitored and if found to be viable plants, implement control measures.

4.1.6.3 Weed species Declared or listed under legislation (*Landscape South Australia Act 2019*)

Declared weed species recorded during compliance/operational surveys include Bathurst Burr, Athel Pine (*Tamarix aphylla*) and Prickly Pear (*Opuntia* species). These species have been recorded during all operational surveys, primarily in off lease areas adjacent the operational area. Athel Pine and Prickly Pear species are also considered to be Weeds of National Significance (WoNS).

During baseline and compliance surveys to date, Bathurst Burr has only been recorded at the dam sites (which are outside of the mineral lease), in the vicinity of dam sites, and along weed transects CWM01 and CWM02, associated with drainage lines intersecting the Southern Access Road. These populations have not increased during compliance monitoring. However, as noted above, in 2025, a new population was recorded along Weed Transect CWM05. In the SA Arid Lands, control is not enforced, but landholders are encouraged to manage infestations (Government of South Australia (2022)). Weed transect CWM02 occurs within Mineral Lease 6172 and CWM01 falls within the Southern Access Road and Radial Wellfield MPL 154. It is recommended that BHP continue to work with the station owner to manage infestations at Dawson Dam and South Eliza Dam.

Athel Pine has been recorded as clustered trees around Yeltacowie Homestead and the nearby dam. These trees are being actively controlled with numerous dead trees and/or cut trees present. In 2025, the population had not increased and comprised up to 10 previously cut trees that were now suckering and/or supporting regrowth shoots, and two large old trees, up to 10 m tall. Ongoing control of these trees is recommended.

The isolated population of Prickly Pear near the Yeltacowie homestead (outside of the operational area) has been actively managed since 2021 (and including 2025) by poisoning with cochineal. In 2025 this population had been reduced to approximately 10 m². In 2024, however, BHP environmental staff reported two additional occurrences of Prickly Pear (not sighted during the 2025 survey). These two small



occurrences have been treated for the last couple of years and are also reducing (both are outside the operations area (SED and Emmie's Buff)).

4.1.7 Landscape Function Analysis

The spring 2025 survey included the seventh assessment of Landscape Function at the Aerodrome site prepared for rehabilitation in 2019 and the fourth assessment at the Midway Quarry site prepared for rehabilitation in 2022. Both sites were devoid of plants when initially prepared for rehabilitation and are sites that formerly supported Bladder Saltbush +/- Samphire low shrubland on stony tableland.

The Ventia site was prepared for rehabilitation in 2019 but was decommissioned in 2024 due to lack of plant re-establishment and the site being encroached upon by road work activities. Areas nearby have been re-ripped and hand-seeded, hence a new LFA site will be established, once seedlings emerge. A fourth rehabilitation (Tjungu on the WAR) was prepared for rehabilitation in 2022. The site was assessed using the LFA method from 2022 to 2024. By 2024, plant cover and soil parameters recorded with the LFA method were equal to those measured in reference (analogue) habitats. The rehabilitation success of this site correlated with the deep ripping and seeding that occurred, not only providing deep trenches to capture water and seed, but also to create high volume surface rock cover that assisted in trapping nutrients.

For the 2 surveyed sites in 2025 (Aerodrome and Midway Quarry), the Point-Centred Quarter (PCQ) method has been used to complement the LFA survey; namely, to additionally record plant density and diversity in the early stages of rehabilitation when plant density along the LFA transect line is sparse. PCQ monitoring began in 2020 for the Aerodrome site but was discontinued in 2024 by which time plant density and diversity was sufficient to show yearly changes using the LFA method alone. The PCQ was first used in 2023 for the Midway Quarry site and was continued in 2024 and 2025, because plant re-establishment had been insufficient to show changes using the LFA method alone.

At the Aerodrome site, both LFA transects a steady increase in the vegetation cover along the transect was recorded between 2020 and 2024. However, in 2025, the percentage of vegetation intercepted along the transect was only 11% compared with 25% in 2024. Since 2024, Lathwida ecologists have collected species composition data, in addition to the LFA method requirements. The additional data has enabled a comparison of the floristic composition with adjoining reference vegetation. Despite a decline in vegetation cover along the Aerodrome transects in 2025, the diversity of species has continued to increase. In 2025, 8 species were intercepted (6 short-lived and 2 long-lived) with 23% of the vegetation patches intercepted along the transects contained long-lived species. Soil parameter indices at the Aerodrome site have remained relatively consistent since 2021, and slightly below or close to the analogue mean. This reflects that the soil surface is stable but still developing a cryptogam and litter cover. Although re-establishment has been successful over approximately two thirds of the transects, one third of each LFA transect remains devoid of vegetation. These areas are likely to slowly recolonise, the process prolonged due to lack of deep troughs.

At the Midway Quarry site, re-establishment of vegetation has been very sparse and confined to a few individuals of the 2 short-lived species. Salt Bindyi (*Sclerolaena ventricosa* and Pop Saltbush (*Atriplex holocarpa*). In 2025, only 2% of the transects were intercepted by vegetation, a decline since 2024, and well below the analogue mean of 34% of the transect. Despite the very limited re-establishment of

vegetation cover, the LFA soil indices were only slightly below the analogue means, perhaps reflecting the moderate litter cover developing and the relatively stable clay soils. At the Midway Quarry site, the troughs that were initially ripped have largely levelled out.

LFA summary and recommendations

At the Aerodrome site given there is an unevenness of plant cover, rehabilitation is not yet complete and further monitoring is recommended for at least one more year. The re-establishment of vegetation would be facilitated by deep ripping and / or hand seeding the larger areas currently lacking vegetation.

At the Midway Quarry site, vegetation cover is sparse and ongoing monitoring is recommended for several more years. It is recommended that the site be re-ripped to a greater depth and supplemented with hand direct-seeding of Bladder Saltbush seeds.

A new LFA site should be established along the WAR near the Ventia LFA site and at Flora Site 3 in areas that were deep ripped and hand seeded in September 2025 (Plate 4.1).



Plate 4.1: Deep ripped and hand direct-seeded section of WAR for proposed LFA

It is noted that 2024 LFA reporting included patch density as an LFA index. The patch density in 2024 was close to analogue means, but the use of this parameter is considered misleading and not reported upon in 2025. A patch density increase may be due to fragmentation of existing larger patches, rather than an increase in the number of new patches.



Analogue sites could be established at the nearest Flora site to LFA sites, using the established 100 m Jessup transects, allowing for 2 x 50 m duplicates along that existing transect.

OMC LUP4 is considered to be in-progress / compliant at, Aerodrome and Midway Quarry sites.

4.1.8 Fauna

4.1.8.1 Diversity and abundance

A total of 87 vertebrate species were detected during the 2025 spring fauna survey from the 8 trapping sites and opportunistically within the broader study area. Total species diversity (birds, mammals and reptiles) was generally within the range of baseline and previous compliance survey results. The capture rate for small mammals and reptiles combined (0.34) was below the previous spring compliance monitoring rates (0.44 in spring 2024), but within the compliance range (~0.23 to 0.44 between 2018 and 2024) and within the range reported during baseline surveys (0.17 to 0.97 between 2012 and 2017). The rate in 2025 was largely influenced by the number of reptile captures and warmer temperatures during some days of the survey. There is also likely an influence for some fauna species from presence of slightly above average short-lived flora species, sustained by rainfall events in March and July.

Whilst the site has experienced ongoing drought conditions and below average rainfall, above average rainfall events in the late spring of 2024 and autumn/winter 2025, interspersed with periods of well below average rainfall likely influenced these results. Presence of water in the dams would have contributed to maintaining stable bird diversity, a winter rainfall event and presence of short-lived flora would have provided resources to the resident dunnart and reptiles species. For small mammals, small native rodent numbers were low, likely reflective of fluctuating but not excessive rainfall throughout the preceding years, and they also only detected at control sites in 2025. Both dunnart species remain consistently detected at both control and impact sites. There was evidence of all fauna breeding, in family groups or pairs, some small mammals had evidence of brood patches. In addition, a few species (bird and reptile) were detected that had not been detected since baseline or prior and only in low numbers. The presence of species that have not been recorded since the baseline monitoring and moderate bird and high reptile diversity is also a positive sign for the overall condition of the Carrapateena site.

Mammals

In terms of small mammal diversity, several species were not detected in 2025 or detected in very low numbers (e.g. Central Short-tailed Mouse, Planigales), or only via camera trap (e.g. Sandy Inland Mouse), however these species have historically been recorded in lower numbers and have not been recorded during all previous surveys. The Central Short-tailed Mouse being the exception that has been recorded from 90% of surveys. No Plains Mouse were detected in 2025, consistent with previous compliance monitoring surveys, extended periods of the baseline monitoring, and with regional findings in 2025. Small rodents (as a group) were not detected at impact sites in 2025, although in 2024 they were detected at impact sites, but not control sites. Whilst this is worth watching, it is more likely related to climatic conditions preceding the survey and lower numbers of detections (sample size). It is well known that a characteristic of desert or arid dwelling small mammals is dramatic abundance fluctuations in response to periods of high rainfall and drought, which are further influenced by resource competition and



predation (Read 1988, Letnic et al. 2011). For example, *Pseudomys* species have been shown to respond to significant weather events 3-10 months after the event, with the variability in response dependent on both pre-existing population abundance and resource availability (Dickman et al. 1999). In addition, long-term monitoring of native mammals within and outside the Arid Recovery Reserve (where predators and pest are excluded) north of the Olympic Dam mine also suggest differences in succession responses to impacts from pest and predators, similar to that expected following disturbance such as vegetation clearance, fire, mining and agriculture (Moseby et al. 2025). Moseby (et al. 2025) recently found that smaller rodent communities (e.g. Sandy Inland Mouse, Bolam's Mouse, House Mouse) responded to high rainfall events within approximately 12-18 months, but the degree of the response was likely linked to predator pressure and the population conditions prior to rainfall response. These findings could also suggest that rodent numbers at Carrapateena are currently low as a combined result of competition from native and pest grazers, predators and low rainfall. Interestingly, Moseby et al. 2025 found that Dunnart responses were comparably delayed and muted in comparison to rodent response, suggesting less influence from predators, non-native competition and rainfall.

Of the small mammal captures from the 2025 spring survey, Stripe-faced Dunnarts were again represented in greater numbers than Fat-tailed Dunnarts, aligning with trends observed during baseline and compliance monitoring prior to 2025 where they have consistently been detected at both control and impact sites. Stripe-faced Dunnarts are known to prefer habitats with greater plant diversity and healthier (denser) understorey (Animalia 2018, OEH 2020). Stripe-faced Dunnarts were present in several age classes and larger numbers, suggesting conditions were suitable for that species, whereas Fat-tailed Dunnarts were present in much lower numbers and may not have commenced breeding. Fat-tailed Dunnarts are known to continue to breed for up to 6 months without breaks once the breeding season commences, hence smaller numbers may suggest drier conditions earlier in the season may have limited the opportunity for a continuous breeding cycle. Similarly, dunnarts are known to use daily torpor to thrive in adverse environmental conditions and exploit resource poor environments and they are known to adjust the breeding period depending on climatic conditions. Whilst results showed lower numbers for native rodents, small mammal detections in total were towards the highest recorded during the compliance monitoring period (2022 being the highest), with no significant differences between control versus impact. There is no evidence to suggest mining is impacting small mammal presence across the site.

While the survey effort used for detection of microbats has not been consistent across compliance monitoring, when compared with baseline monitoring, a number of species were previously detected and it is considered good practice to occasionally monitor for these species to confirm ongoing existence at the location. During the 2024 survey 5 microbat species were detected at sites with suitable roosting or feeding habitat, and 4 of these species were also detected in 2025. Two of these species have been regularly detected at site (White-stripe Free-tailed Bat, audible to the human ear, and the Lesser Long-eared Bat), 2 other less common species were also detected in 2025 (Gould's Wattled Bat, Inland Forest Bat) and 1 species was not detected (Inland Free-tailed Bat). Prior to 2024, there were only 4 records for the Inland Free-tailed Bat (1 from autumn 2013, 3 from spring 2007).

Comparisons of mean total species diversity and capture rates between control and impact sites showed slightly higher species diversity at control sites compared with impact sites. Trends were similar for the older treatment and the new revised treatment (e.g. Site 4 and 6 as Control sites). Regardless, differences



between control and impact means of mean diversity and captures were not statistically significant. The updated treatment continues to provide more statistical rigour having an equal number of control sites (4) compared with impacts sites (4) and aligns more with delineation of control and impacts sites (e.g. previously related to dust contour monitoring, distance to infrastructure) in relation to the operations phase, now that the WAR has been completed, and traffic along the SAR is greatly reduced. The findings for fauna also align with the flora results. Regardless, significant mining related impacts to common fauna are not evident from the 2025 data or from comparisons of previous baseline and compliance data.

Birds

A total of 57 bird species were detected during the spring 2025 survey across the Carrapateena site. Similar to recent years (except for autumn 2023), Splendid Fairywrens were not detected in the sand dune habitats. Whilst resident White-winged Fairywrens and Purple-backed (Variegated) Fairywrens have been generally detected every year during baseline and compliance monitoring, Splendid Fairywrens are not recorded every year, suggesting transient presence, or population fluctuations that may be dependent of more sustained rainfall. Similarly, Rufous Fieldwren are not detected every year (e.g. absent in 2020, limited detection in 2021). However, this species was detected at most fauna sites in 2024 and 2025 and regularly recorded on Song Meters.

Similar to spring 2022-2024 there was water present in all the dams in 2025. Water in the South Eliza temporary water source (less extensive than the spring 2024 survey) also attracted some waterbirds species to the location. One EPBC listed threatened species was detected opportunistically; Southern Whiteface was detected at a weed monitoring site along the WAR (CWM05). No EPBC listed Migratory shorebird species were detected. No State listed species were recorded.

There were no new records for the site, but for 2 bird species that had not been detected since before baseline surveys; Rufous Whistler (not since 2006), was detected at both sand dunes sites (Site 21 and 22) and Brown Goshawk (not since 2017) was detected opportunistically at weed site CWM01. The total number of bird species was below 2023 (68) and 2024 (74) but within the baseline range (42-70) and compliance range (46-74) and is likely reflective of the preceding below average rainfall and associated impacts on short-lived vegetation and Song Meter detection (increased windy periods) at some sites. Noting only 8 additional species were detected via Song Meter, that were not detected via bird survey and Song Meters were also deployed in 2023/2024.

Reptiles

A total of 17 reptile species were detected during the spring 2025 survey across the Carrapateena site, the majority were detected via physical trapping (76 of 110 records). As per previous surveys, the main species recorded in traps was the Saltbush Ctenotus (*Ctenotus olympicus*) with the greatest numbers being detected at Impact Site 15 (16), Control Site 4 (7) and Impact Site 5 (6). The reptile trap captures were considered commensurate with the temperatures observed during the spring survey.

Five common reptile families were well represented during the survey; with the skinks represented by 9 species, dragons by 4 species, geckos by 2 species, and snakes and goannas by one species. Juveniles of several species were detected during the survey (e.g. Southern Four-toed Slider (*Lerista dorsalis*) (Plate 4.2) indicating ongoing successful breeding activity across the site.



Detection of species that have not been detected since baseline is always a positive for the monitoring program. In 2025 the Southern Four-toed Slider that was detected during baseline and then not until spring 2024 was captured at Site 6 (another juvenile of this species). In addition, a Broad-banded Swimmer was detected opportunistically by BHP staff in the accommodation area. The species has not been detected since baseline surveys (2016). There are no clear patterns emerging for reptile diversity or captures between control and impact sites.



Plate 4.2: Juvenile Southern Four-toed Slider captured again at Site 6

***EPBC listed species***

Only 1 EPBC listed threatened fauna was detected throughout the spring 2025 survey; Southern Whiteface (Vulnerable), detected opportunistically at a weed monitoring transect. This species has been recorded at the site previously, most recently in 2021 at opportunistic site WAT17. No other EPBC threatened or Migratory bird species were detected. EPBC listed Plains Mouse were not detected (via trapping or camera), and there was limited evidence of surface activity around gilgais. This species has not been detected since baseline surveys in 2017 (via standard fauna trapping) and is detected typically following a prolonged period of good rainfall. Similarly, the species was detected in very low numbers (only one detection) at South Gap in 2024, but there were no records in 2025. Baited camera trapping was deployed at two South Gap offsets areas in 2025 (cameras deployed at 20 sites ongoing, although results were only obtained from 13 cameras in 2025). Detection rates for other small mammals (e.g. dunnarts and smaller rodents) remained low and stable at the South Gap areas in 2025 (Nature Foundation 2026). The offset areas, located southeast of Carrapateena on the banks of Lake Torrens, received below average rainfall of 110 mm in 2025, with most falling in November of 2024. This follows an ongoing decrease in numbers of Plains Mouse detection. Plains Mice were also not detected by trapping during autumn and spring surveys near Olympic Dam (outside of Arid Recovery Reserve) and Oak Dam in 2025 (Lathwida 2026a,b,c). There was 1 detection via non-baited camera trapping at Oak Dam in autumn 2025 (Lathwida 2026c). Whilst Plains Mice were originally detected at Carrapateena via annual pitfall trapping, future consideration could be given to establishing a baited camera trap program, similar to South Gap to increase detection. In addition, review of rainfall conditions preceding the next annual survey should be considered, prior to deciding whether the annual 2025 survey should be in autumn or spring. One option may be to deploy cameras in autumn through to the physical trapping survey in spring. Autumn deployment of cameras would need to follow suitable sustained rainfall and could coincide with other monitoring that is not season dependent in arid locations (e.g. LFA, weed monitoring).

Pest species

Whilst evidence of pest species was noted (House Sparrows at camps, Rabbits at several locations), there was no major increase in presence of pest fauna species was observed as part of the survey, i.e. observations of rabbits, sparrow numbers and cats was maintained / less than previous and House Mice were not detected. The rabbit warren along the track to Site 15 was not notably active. No Feral Pigeons or foxes were detected. All of these species have been recorded previously, in low numbers and hence does not constitute an increase in pest species present, therefore the site is considered compliant against OMC criteria related to pests.

4.2 Compliance against obligations

As indicated in Section 1.1.1 above, the approved PEPR for ML 6471 outlines a number of monitoring commitments required to demonstrate compliance against the mine lease 6471 conditions (Table 1.1) and the approved environmental outcomes (Table 1.2) for the Operation. Table 4.1 below provides a summary of compliance against the conditions and outcomes based on the results of the spring 2025 survey.

All mine lease conditions and outcomes are currently being met.

Table 4.1: PEPR ML 6471 Compliance Reporting, spring 2025

Date	Monitoring Requirement/s	Achievement Value	Locations	Compliant / Non-Compliant	Evidence	Actions / Recommendations
September 2025 (spring)	ML 6471 Schedule 6, Condition 6, Condition 28.1 MPL 149 Schedule 6, Condition 10, MLP 152 to 154 Schedule 6 Condition 6 MLP 156 Schedule 6 Condition 3 OMC WP1 / WP2 Annual (spring) survey	No introduction of - new species of weeds declared or listed under relevant legislation - plant pathogens - pests (including feral animals) when compared to previously recorded weed species and introduced fauna. No sustained increase in the abundance of existing weed or pest species in the land compared to previous survey records.	Weed monitoring transects (CWM01-CWM07, NWM01-NWM03) Flora Sites 1- 7; 9 – 13; 15 - 22 Opportunistic and targeted observations across Operation area	Compliant	No new species of weeds declared or listed under relevant legislation were recorded at flora sites, weed transects, or elsewhere within the Operational area in September 2025. No new species of weeds declared or listed under relevant legislation were recorded at flora sites, weed transects, or elsewhere within the Operational area in September2025. Existing known Declared weeds are Bathurst Burr, Athel Pine and Prickly Pear (although Prickly Pear is outside the operations area, and Athel Pine is on the edge). One new small population of Bathurst Burr recorded in spring 2025, totalling 10 plants along Western Access Road. No increase in known populations. No increase in size of the known small populations of Athel Pine, which is being actively controlled. No increase in the size of the existing documented small population of Prickly Pear, which is being actively controlled. Two additional small patches are also being treated, but these are outside of the operations area. In 2025, new locations of existing weeds were recorded for 2 annual herbaceous species Cut-leaf Heron's-bill (<i>Erodium cicutarium</i>) and Sow Thistle (<i>Sonchus oleraceus</i>). The increased occurrence of these species was related to optimum germination conditions prior to and during the survey, namely winter rainfall, cool to mild soil temperatures and diurnal temperatures These species produce 8000 or more seeds per plant which remain viable for several years. Seed spread for Sow Thistle is primarily by wind. Hence their occurrence can be widespread, random and temporary. New locations for both species were represented by both control and impact sites. Hence their increased occurrence is expected to be temporary and was likely due to climatic conditions rather than mining activities. In summary, in 2025 a new but small population of Bathurst Burr was recorded along the WAR. This population should be removed and monitored to ensure no new propagules occur. Apart from this population, there has been no net or sustained increases in the population of any other weed species recorded. House Sparrow (previously during baseline) numbers were slightly reduced at the exploration camp, where worker occupancy was reduced at the time of survey. Rabbit presence observed at less sites, presence is maintained or less. Cats only detected at one location (sand dunes).	Ongoing weed monitoring at flora sites 1-22 and weed transects CWM01 - CWM07, and opportunistic and targeted observations (villages, spill areas, dams). Ongoing opportunistic observations, including revisiting sites where weeds have been identified in spring 2025. Weed management by BHP in response to data reported here, in particular control of Bathurst Burr population along the WAR, and continued ongoing management of Bathurst Burr at existing known locations. Any new individuals to be controlled by environmentally sensitive methods, including manual grubbing and disposal of vegetative matter or spraying where appropriate and will not impact drainage lines / water habitats. Continue control and monitoring of Athel Pine and Prickly Pear (supporting the station owner) at the homestead and other locations that are off lease. Ongoing monitoring of birds, including House Sparrows. Monitoring of rabbit / cat population and control as required (e.g. warren at Site 15).

Date	Monitoring Requirement/s	Achievement Value	Locations	Compliant / Non-Compliant	Evidence	Actions / Recommendations
September 2025 (spring)	ML 6741 Schedule 6 Condition 14 OMC AQ2 Annual (spring) survey	No adverse impacts on the diversity and abundance of native vegetation at monitoring sites directly attributed to dust deposition from mining operations or mine related activities when compared to baseline native vegetation conditions unless an SEB has been approved in accordance with the relevant legislation	Flora Sites 1-22 See Figure 9.3 of the PEPR. Figure 2.1	Compliant	Specific dust transects established and surveyed in 2020 covering a range of habitats including sites downwind from spoil heap. The 2020 results indicated that no dust was detected at transects and no death of vegetation was noted. In 2025, no dust was noted on vegetation at existing survey locations, or elsewhere across the Operations area. Existing flora survey sites (1-16, excluding 8 and 14, plus 17- 22) were monitored for native plant species diversity (RAM flora sites) and abundance (Jessup transects) in spring 2025 and data collected was compared with baseline data. Total plant species diversity at all individual sites in 2025 was within the baseline range for each site. Mean long-lived species diversity at control sites and at impact sites has also been within the baseline range, during all compliance surveys. The diversity of long-lived drought-resistant species has remained relatively stable since 2018, and in line with baseline data. Short-lived species diversity has varied widely during compliance monitoring has correlated with seasonal rainfall but has remained within the baseline range during compliance monitoring, including in 2025. There is no clear difference in species diversity between control and impact sites, either in long-term species diversity or in total species diversity. Control and impact sites have recorded similar directional changes in long-lived species diversity during compliance monitoring. No adverse impacts on the diversity and abundance of native vegetation at monitoring sites due to mining activities have been detected.	Nine years of compliance monitoring has established that flora species diversity has remained within the baseline range, and that trends in flora diversity at control sites have been similar to those at impact sites. To streamline reporting, it is recommended that there be ongoing vegetation monitoring at all existing RAM and Jessup flora sites, but that trends in diversity need only be compared between control and impact sites, rather than with baseline means. As the time from baseline data increases, it becomes less valid to compare diversity in a changing climate with diversity from a set time (2013 to 2016).

Date	Monitoring Requirement/s	Achievement Value	Locations	Compliant / Non-Compliant	Evidence	Actions / Recommendations
September 2025 (spring)	ML 6471 Schedule 6 Condition 17 OMC TSF6 / SWRF1 Annual survey	No adverse impact on the diversity and abundance of native vegetation and water dependent ecosystems attributed to tailings seepage or reduced surface flows caused by mining operations when compared to baseline conditions (unless an SEB has been approved). Linked to Native Vegetation Outcome (Schedule 6 Condition 11)	Eliza Creek monitoring (Flora Sites 10, and 17-20 (which include Canopy Cover transects). See Figure 9.3 of the PEPR (BHP 2025a).	Compliant	<u>Decant Dam seepage event</u> In late 2022 / early 2023 saline seepage from the TSF extended beyond the approved impact zone. The area impacted by the saline seepage was surveyed in May 2023, and April 2024, and damage to native vegetation (death and dieback) was recorded over an area of approximately 0.4 ha beyond the approved impact zone. Repeat surveys in October 2024 and September 2025 noted no further impact on vegetation, and it was considered that no increased area of impact from the saline seepage was likely. A Significant Environmental Benefit (SEB) offset under the Native Vegetation Act 1991) has been paid as per the NVMP associated with the PEPR (Appendix C BHP 2025a). <u>Regular monitoring sites</u> Eliza Creek monitoring results indicate no adverse impact on the diversity and abundance of native vegetation due to mining activities. Vegetation is monitored at Flora Sites 17-20 at increasing distance from the proposed TSF dam wall, covering both Western Myall and Red Gum habitat. RAM, Jessup transects and Canopy Cover data is collected at all 4 sites. Data collected in 2018 and 2019 represents baseline condition, species diversity, abundance and tree health prior to TSF construction. Monitoring at Flora Site 10 (furthest distance from TSF), also includes Jessup and RAM surveyed 2012 – 2017, and during compliance surveys (2018 to present). RAM flora sites show no obvious trends in long-lived species diversity during compliance monitoring. In 2025, long-lived species diversity was below baseline means at 3 sites, but the same or greater than baseline means at 2 sites, including Site 17 closest to the TSF. RAM site results also indicated no obvious trends in total flora species diversity. Jessup transect results indicate no obvious trends in abundance of long-lived perennial species at all sites, including gibber sites and the Eliza Creek sites. Canopy Cover transect results indicate increasing canopy cover for Western Myall at sites closest to the TSF, and no obvious trends in canopy cover for Western Myall at sites furthest from the TSF. At the Red Gum dominated sites, Red Gum canopy cover records using the hand-held densitometer show no obvious trends. Visual estimates of canopy extent declined in 2025 but data from future surveys is needed to indicate whether this is a longer-term trend. Tailings dam storage facility Stage 1 construction completed just prior to spring 2019 survey, and now operational. Eliza Creek has not flowed since pre TSF construction, there was however a controlled release from the decant dam in June 2019, with flow only recorded to 600 m downstream of the TSF and no adverse impact on flora at the downstream monitoring sites has resulted from this controlled release.	Ongoing vegetation monitoring at Flora Sites 17-20 for RAM, Jessup transects and Canopy Cover (reflects a leading indicator of tree health) to enable monitoring of potential impacts, and trends in diversity and abundance of native vegetation. Adaptive management of monitoring program as required if leading indicators indicate potential impacts (e.g. canopy cover measures in close proximity to tailings dam wall). Consideration of repeat of remote sensing vegetation cover estimates on a periodic basis, as a cost-effective way to track changes in vegetation cover downstream of the TSF embankment. No further formal monitoring of Decant Dam seepage is considered necessary as no further extent of damage is considered likely. If permission is provided, install star droppers at dune flora sites and more at Eliza Creek flora sites to assist with more precisely replicating area surveyed each year.
September 2025 (spring)	ML 6471 Schedule 2 Condition 28.2 MPL 152 Schedule 2 Condition 13.2 OMC EPBC1 Annual survey or opportunistic sighting	Any records of sightings and recordings of the Thick-billed Grasswren are provided to the BDBSA to enable effective monitoring and record keeping, as per the Recovery Plan Actions.	Bird monitoring Sites 1-22 (which overlap with Flora Sites 1-22, and include Fauna sites 1-6, 15, 16). See Figure 9.2, 9.3 of the PEPR (BHP 2025a). Opportunistic observations across project area.	Compliant	EPBC1: No records of the Thick-billed Grasswren were reported during the spring 2025 survey at any of the 20 bird survey locations or opportunistically, including sites where Song Meters were deployed, so no records were provided to the BDBSA to facilitate effective population monitoring and record keeping. Song meters were deployed at 8 fauna sites, Eliza Creek (Site 10) and Site 7 in Bosworth creek. One EPBC listed species (Southern Whiteface) was detected and results will be provided to the BDBSA during annual reporting as per fauna permit requirements.	Ongoing bird surveys across all flora sites 1-22 and opportunistically to establish trends with baseline and compliance data. Report any future records of Thick-billed Grasswren to the BDBSA.

Date	Monitoring Requirement/s	Achievement Value	Locations	Compliant / Non-Compliant	Evidence	Actions / Recommendations
September 2025 (spring)	ML 6471 Schedule 2 Condition 28.2 MPL 152 Schedule 2 Condition 13.3 OMC EPBC 2 Annual survey or opportunistic sighting	Any records of sightings or captures of the Plains Mouse are provided to the BDBSA to enable effective monitoring and record keeping, as per the Recovery Plan Actions.	Fauna sites 1-6, 15, 16 for fauna trapping. See 9.2 of the PEPR (BHP 2025a).	Compliant	EPBC2: No records of the Plains Mouse were reported during the spring 2025 survey at any of the 8 established fauna trapping sites, so no records were provided to the BDBSA to facilitate effective monitoring and record keeping.	Ongoing pitfall trapping at 8 established fauna trapping sites to demonstrate species ongoing presence at site during periods of irruptive population growth and that refuge habitat continues to be effective despite mine operation. Report any future records of Plains Mouse to the BDBSA.
September 2025 (spring)	ML 6471 Schedule 2 Condition 28.2 MPL 152 Schedule 2 Condition 13.4 OMC EPBC 3 Annual survey or opportunistic sighting	Any records of sightings or recordings of the Night Parrot are provided to the Night Parrot Recovery Team to enable effective monitoring and record keeping.	Bird monitoring sites 1-22 (which overlap with Flora Sites 1-22, and include Fauna sites 1-6, 15, 16). See Figure 9.2 of the PEPR (BHP 2025a). Opportunistic observations across project area.	Compliant	EPBC3: No records of the Night Parrot were reported during the spring 2025 survey at any of the 20 bird survey locations or opportunistically or via Song Meter, so no records were provided to the Night Parrot Recovery Team to facilitate effective monitoring and record keeping. One EPBC listed species (Southern Whiteface) was detected and results will be provided to the BDBSA during annual reporting as per fauna permit requirements.	Ongoing bird surveys across all flora sites 1-22 and opportunistically to establish trends with construction now underway. Report any future records of Night Parrot to the BDBSA.
September 2025 (spring)	ML 6471 Schedule 6 Condition 1, 5, 8, 9 OMC LUP4 Annual LFA monitoring	Rehabilitation has achieved, or is likely to achieve, a landscape function equivalent to that of adjacent analogue LFA sites.	Baseline (analogue) LFA data from sites CEF1-CEF7 (shown in Figure 9.3 of the Carrapateena PEPR BHP 2025a). Rehabilitation monitoring at 4 locations to date (Airport Laydown and Ventia Laydown, Midway Quarry, Tjungu).	Compliant	Baseline LFA data established from analogue sites. Rehabilitation monitoring established at 2 sites in 2020 and 2 sites in 2023. But in 2025, monitoring discontinued from Ventia Laydown (established 2020) due to absence of rehabilitation and site being used for roadwork activities, and discontinued at Tjungu (established 2023) due to successful and complete rehabilitation. In spring 2025 site rehabilitation monitoring continued at 2 locations (LFAAL1 (Airport Laydown) and LFQUA3 (Midway Quarry), LFATJU4) with 2 transects at each site. LFA results at the Airport Laydown showed continued increases in vegetation cover until 2024 but a decline in vegetation cover along transects in 2025. LFA results at the Midway Quarry showed sparse rehabilitation in 2024 but a decline in 2025 with plants very sparse to largely absent. Data showed increasing long-lived species establishing at the Airport Laydown but only short-lived species present at the Midway Quarry. Ripping depth during site preparation at both sites was less deep than the more successful Tjungu site.	Midway Quarry site unlikely to re-establish in the short to medium term. Recommend that this site be ripped to a greater depth, combined with direct seeding of Bladder Saltbush. Consider re-ripping areas of Airport Laydown site where re-establishment has not occurred (up to 15 m lengths along transect). Continue LFA monitoring at Airport Laydown and Midway Quarry rehabilitation sites. Establish new LFA sites along WAR where deep ripping and hand seeding occurred in 2025. Establish new analogue sites adjacent to any new sites that are established.



4.3 Suitability of data for Informing compliance

4.3.1 Overview

The data collected during the spring 2025 survey is considered to provide meaningful data to determine compliance against the mine conditions and approved outcomes. The survey methods employed enabled comparison between impact and control sites, as well as comparison with baseline data. Construction / operational compliance monitoring data has now been collected since 2018. Results have been presented as text, tables and graphs, enabling demonstration of compliance against the established outcomes and measurement criteria, and representation of initial construction/operational compliance data trends.

4.3.2 RAM quadrats

The RAM data has provided quantitative data on species diversity present within each of the Flora Sites assessed. Further classification of species into woody long-lived perennial species vs short-lived species enables a more thorough examination of the difference between climate and/or grazing impacts against potential impacts from mining operations. Comparison with the baseline species diversity range has facilitated determination of the status of current site diversity. The RAM quadrats have enabled species diversity trends to be analysed in 4 ways; cumulative totals for all monitoring sites, comparisons of impact vs control sites, at the habitat level (gibber, dune, creek) and at the individual site level. Comparing species diversity for sites of similar habitat will help determine potential trends in species diversity regardless of distance to mining infrastructure. Comparing diversity trends for each site has been done to identify potential site-specific causes of impacts to flora (which may or may not include mining impacts).

All sites other than dune sites and Eliza Creek sites have been well defined, which has meant that the survey area has been accurately repeatable, providing consistent results. Long-lived perennial diversity has been relatively stable, while short-lived species diversity has shown a very strong correlation with yearly rainfall totals, indicating the survey method provides accurate and meaningful data. However, the dune sites are not defined on the ground (relying on surveying a 55 m radius from a known coordinate) and the Eliza Creek sites are loosely defined – beginning at the Jessup transect and surveying an estimated 1-hectare area that comes under the influence of the creek system.

It is recommended that permission be sought to install 4 star droppers at each dune site, and an additional 4 star droppers at each Eliza Creek site to assist with RAM boundary determination during surveys.

4.3.3 Jessup transects

The Jessup transects provide quantitative data on the number of adults and juveniles present for long-lived shrubs. This provides information on the health and vitality of individuals within a population, for example, it indicates if recruitment is occurring, or whether the population is declining, increasing, or staying the same. Combined with qualitative observations made on plant health (including defoliation and/or presence of dust on foliage) this will help inform if there has been an adverse impact on the diversity and abundance of long-lived woody native vegetation directly attributed to dust deposition from mining operations or mining related activities. To date, species abundance has been compared between baseline and compliance monitoring and also control site trends have been compared with impact site



trends for the compliance period. Results from these surveys enables reporting against compliance conditions.

Since 2020, the number of species analysed for the Stoney Tableland sites, has increased from 2 (Bladder Saltbush and Plains Lantern Bush) to 5 species (additionally, Samphire, Plains Lantern Bush and Thyme Sea-heath), in response to widespread foliage loss of the 2 dominant species (Bladder Saltbush and Samphire) at the Stony Tableland sites. These 5 species are the most abundant species and widespread long-lived shrubs at the Stony Tableland sites. Analysing their abundance trends provides insightful data on trends in population abundance in both palatable and non-palatable species. For all 5 species, the Jessup data has been very effective in reflecting population changes due to varying yearly rainfall totals. Species abundance at both control and impact sites have shown similar trends, that align with rainfall. Where there have been small differences between control and impact site trends, impact site abundance has increased more than at control sites. The Jessup data has shown that mining has had no impact on the long-lived shrubs at Jessup sites.

Prior to the 2021 survey, at the Eliza Creek sites, analysis was confined to comparison of net perennial species abundance between recording periods. In 2021, the analysis was expanded to compare trends in the abundance of individual perennial species. In 2025 the analysis focussed on 6 species that were common at Site 17 and 18, and also common at least one other site. Site 17 is closest to the TSF (270 m downstream), hence potential impacts related to the TSF would become evident first at that site and progressively downstream. The species analysis includes Western Myall, the dominant overstorey species at Site 17 and 18. To date the Jessup tallies have shown no distinct trend in abundance of the prominent shrubs and trees. This has proven a valuable tool for determining potential trends in populations of individual species, rather than simply comparing total species diversity.

4.3.4 Canopy cover transects

The Canopy Cover transects are used to record the presence of canopy foliage along a fixed 100 m transect at 1 m intervals. Within individual canopies, there may be from 1 to 5 or more recordings, depending on the width of the canopy. The technique is objective and does not rely on observer estimations of individual tree canopy intactness. By repeating the survey along a fixed transect, it is estimated that the technique can detect changes in canopy cover for the whole tree stand, and less accurately for larger individual canopies. It is estimated that the method has the ability to detect foliage cover changes at the stand level where there has been a real change in foliage extent of as little as 20%. Tree stress or death is expected to show up in densitometer results.

The technique is considered suitable for informing whether there has been a change in the health of the dominant trees on Eliza Creek and is seen as a leading indicator of tree stress. The technique proved very informative for determining the extent of impact from the TSF seepage in December 2022. Surveying the canopy cover transects at Site 17 (aligning with the downstream extent of seepage impact) in 2023, 2024 and 2025 showed that the seepage had no impact on Western Myall health at Site 17. These surveys will therefore contribute to the reporting against compliance conditions related to impacts in Eliza Creek.

Since 2019 visual estimates of canopy cover are also undertaken to complement the densitometer canopy cover assessments. Visual estimates of individual tree canopies enable record of individual tree canopy health and provide a time frame for potential canopy loss and in some cases, tree death. Results to 2024



show that the densitometer results are broadly in alignment with visual estimates, but in 2025 the visual estimates indicated declines in canopy health, which were not detected by the densitometer. It may be that the visual estimates have detected declines in canopy health slightly ahead of time lines for densitometer detection. Both methods should continue to be used.

Since 2021 additional trees have been recorded along the transects. These were new trees that meet the survey requirements along the transects as they mature. The transition in age classes and maturation of new recruits has been effectively demonstrated by the results of Canopy Cover transects.

The canopy cover data is considered to provide an objective method of determining trends in canopy health across the whole of the transect, including documenting tree deaths and recruitment. The visual estimate (no tool) is considered a more accurate assessment of tree health for individual trees, but the densitometer assessment is considered a more repeatable and objective assessment of the tree population, namely at the stand level. The trial in 2019 of using remote sensing of aerial imagery to estimate vegetative cover in increments downstream from the TSF embankment is considered a useful additional tool to monitor vegetation health within Eliza Creek.

4.3.5 Weed transects

Weed transects represent a repeatable, temporal examination of weed diversity and abundance at the site and are not time consuming to conduct. They are aligned along roads and intersect drainage lines and dam outlets, which are considered to be the key sources and/or vectors of seed spread. The weed transects have detected new occurrences of higher threat weeds such as Bathurst Burr and Wards Weed. As such, the weed transects represent a key method (when coupled with weed data from Rangelands assessments and opportunistic observations) to directly address a number of mine conditions and outcomes.

4.3.6 LFA transects

LFA at 2 rehabilitation sites at the mine site commenced in 2019, and 2 more were introduced in 2022. In 2023, all sites were surveyed using the established LFA method (as opposed to the Bank and Trough method applicable only for the very early stages of assessment). Introduction of the PCQ Method (an optional extension of the Established Method) has proven very useful for reporting on the density of vegetation in the early stages of rehabilitation, especially when vegetation along the LFA transect has been absent or very sparse.

Since 2024, Lathwida ecologists have also reported on the species composition of re-establishing vegetation. This has been very important in determining whether the re-establishing community matches the analogue community floristic composition and/or success of direct seeding. The LFA method does not provide this information, because the method does not identify species (Spain et al. 2025).

The current methods (LFA, PCQ and reporting on species floristic composition) are considered suitable to demonstrate change at the rehabilitation sites over time, as vegetation trends towards the 'baseline' / analogue condition. Current methods have already been successful in detecting notable differences in the success of the 4 sites, reflective of the different rehabilitation methods applied on the ground. For example, the deep cross ripped / handed seeded Tjunga site no longer requires monitoring, and the deep



ripped Aerodrome site now only requires the LFA established method. This data is useful for future rehabilitation around the broader mining lease area and meeting OMC requirements.

4.3.7 Fauna surveys

Fauna trapping undertaken during spring 2025 was comparable to the effort undertaken in spring 2018-2024, on the basis that the most important data is species diversity rather than species abundance. Despite moderate conditions and a drier preseason, overall fauna diversity was comparable with previous baseline survey periods and with the spring/autumn 2018-2024 survey numbers. Whilst there was water present in farm dams, bird diversity detection across Carrapateena was moderate. The overall capture rate was above within the compliance capture rate to date and well within the baseline range. For mammals, diversity rates were moderate, and captures were low for rodents, planigales and Fat-tailed Dunnarts, which is consistent with previous surveys during drier times and baseline and compliance monitoring results. Stripe-faced Dunnarts and Fat-tailed Dunnarts were again consistently detected at both control and impact sites (Plate 4.3). Small rodents were only detected at control sites in 2025, a new trend to watch, however they were only detected at impact sites in 2024 and lower numbers in general align with results of other regional surveys. For reptiles, captures were moderate and the diversity was on par with compliance and baseline; 17 species detected. Fauna trapping represents the greatest opportunity to definitively record the EPBC listed Plains Mouse, and to demonstrate persistence of this species at the site throughout mining operations, which is an important outcome for BHP. As such, fauna trapping is still considered a requirement for informing impacts of the mining operation on conservation significant fauna. As suggested previously, baited camera trapping at the designated fauna sites (outside of the fauna trapping program) may provide improved results, however this would need to align with preceding rainfall conditions. During the annual compliance surveys non-baited camera trapping has been used in 2021 - 2025 concurrently with open pitfall sites and a range of species detected (e.g. during 2025 species include Fat-tailed Dunnart, Stripe-faced Dunnart, Tessellated Gecko, Central Short-tailed Mouse and small *Pseudomys* sp. likely *P. hermannsburgensis*). Baited camera trapping without opening pits similar to the South Gap EPBC offset program may detect Plains Mouse, along with other small rodents, particularly following suitable rainfall events. However, it is noted that Plains Mouse were not detected via baited camera traps at the South Gap in 2025, and only one Plains Mouse was detected via baited camera trapping at Oak Dam in 2025. These results continue to suggest that the population is currently declining as occurs naturally in response to climatic factors (e.g. lower rainfall).

Bird surveys continue to provide good indications of overall site species diversity, with numbers increasing from 2020-2023 and reflective of baseline conditions. Most of the historic sites are relatively homogeneous from a habitat perspective, but greater diversity observed at some sites appears to align with creek line sites, drainage lines and dune sites with taller and diverse vegetation. There are no historic records of any EPBC listed threatened birds at the site (apart from newly listed Blue-winged Parrot, Southern Whiteface and Sharp-tailed Sandpiper), but regardless, the mine conditions require reporting of future records of EPBC listed species. This would not be possible without some level of bird survey. In some years State-listed species are also detected, however no State-listed species were detected in 2025. Southern Whiteface were opportunistically detected at one of the weed monitoring sites along the WAR. A number of common waterbirds and shorebirds were detected at dams and the South Eliza temporary wetland during the survey, but none are EPBC listed as threatened or Migratory. Many resident birds were



breeding, and different types of bird families were well represented. Resident White-wing Fairy Wrens, Purple-backed Fairywrens and Rufous Fieldwrens were present across the site at multiple locations, and the nomadic Splendid Fairywrens were not detected. Two bird species had not been detected at the site since baseline surveys; Brown Goshawk and Rufous Whistler. The bird survey results are in compliance with the OMC and provide a positive story at Carrapateena for balancing mining and the environment in arid conditions.

Opportunistic reptile observations provide a good return on investment and are considered an important part of the overall fauna survey program to inform diversity data. As per active fauna trapping, opportunistic reptile observations are considered suitable for informing overall impacts of the mining operation on fauna diversity. Both reptile and mammal diversity was in the range of baseline surveys, with reptile diversity in upper levels. In 2025, the bulk of the reptile diversity was from trap captures, given the warmer day time temperatures, this data contributes to the 'capture rate' as a snapshot measure of abundance. Of the reptiles that were detected, several species had juveniles present (e.g. Earless Dragons, Bynoe's Gecko, Southern Four-toed Slider). The Four-toed Slider (a juvenile) had only been previously detected during baseline and then during compliance monitoring in 2024 and now 2025. The Broad Banded Swimmer had not been detected since baseline and this was detected opportunistically in the accommodation area by BHP staff.

Feral mice were not detected, no cats were physically detected, aside from tracks at dune sites. Evidence of rabbits were detected at several locations. Hence ongoing feral animal control is required.



Plate 4.3: Dunnarts snuggled in stubbie holder at base of pitfall trap



4.4 Recommendations for future surveys and data analysis

Construction / operational compliance monitoring has been conducted since autumn 2018, involving 2 surveys in 2018, and annual surveys thereafter. Hence there have been 9 complete fauna and flora surveys, and additionally, a separate dust impact survey and separate Eliza Creek flora and canopy cover survey. There have been 2 autumn and 7 spring surveys. The period 2018 to 2025 has covered extreme low rainfall years (2018 and 2019 when yearly rainfall totals for the year were in the 10% decile), average rainfall years and well above average seasonal rainfall events. This compares well with the baseline survey duration and climate patterns, namely 2012 to 2017 when rainfall totals varied from below average to well above average. During the compliance monitoring period to date, there has been no evidence of impact from mining activity on any of the PEPR Leading Indicators that relate to fauna and flora outcome measurement criteria. Fauna and flora species diversity has been within the baseline range and compliance range, with the exception of a minor indication that small rodents are not being detected at impact sites. There have been no new declared weeds or increase in abundance of declared or listed weeds, with the exception of a small location of Bathurst Burr along the WAR. The health of Eliza Creek vegetation has remained stable. All short-term changes to date in flora and fauna diversity, perennial plant population abundances, and canopy health at Eliza Creek transects have been attributed to variation in seasonal and/or yearly rainfall.

The compliance OMC require annual monitoring to occur at the sites. Plains Mouse have not been detected and there is a minor new trend that small rodents are not being detected at impact sites. Formal fauna trapping surveys should continue and be supplemented annually with other techniques such as camera trapping, Song Meter deployment and bird surveys. Baited camera trapping, which require less survey effort, could also be deployed outside of formal trapping / following larger rainfall events, to facilitate detection of rodents at control and impact sites.

It is recommended that all sites surveyed in 2025 be re-surveyed in either autumn or spring 2026, using the same survey techniques. It is recommended that the seasonal timing of the survey remain flexible. In the arid zone, flora diversity, and often fauna diversity, reflects rainfall events, rather than a specific season. Mean monthly rainfall for the nearest long-term weather station, Woomera indicates highest rainfall means occur between November and March rather than winter; but can be extremely variable year to year. Hence for compliance monitoring, comparison of data across the operation for sites undergoing the same climatic conditions, as well as comparison of baseline and previous compliance monitoring ranges for a range a climatic and grazing conditions is good practice, rather than a focus on comparisons to baseline data alone.

The spring 2025 survey was conducted in September 2025, when conditions were mild to warm and there windy days. Reptile diversity and abundance was high, bird diversity was moderate and mammal diversity and abundance was low but within the baseline range. For the small mammals, rodents were in low numbers, but this is reflective of the climate in the months preceding the survey (i.e. fluctuating rainfall, below average). Rodents have also historically been detected in lower numbers in the baseline and compliance surveys, with the exception of higher rainfall years (e.g. 2012, 2014, 2017 and 2022). Flora diversity was moderate to high due to the diversity of short-lived species. It is recommended that surveys be conducted in either September/October or late March to April, when daily temperatures are not extreme and compliant with animal ethics requirements. The preference for an autumn or spring survey should be determined by seasonal conditions in the preceding 6 months, namely consideration should be given to conducting the survey in response to particular climatic conditions (i.e., good rainfall) in order



to maximise the chance of demonstrating compliance against some conditions (in particular, the presence of Plains Mouse).

Baseline survey in Eliza Creek commenced in 2018 and includes survey of 8 canopy cover transects, as well as RAM and Jessup transects. This has provided an indication of the inherent variability in the data, and the dynamic response of River Red Gum and Western Myall canopies to seasonal conditions. At Eliza Creek medium to longer term trends in plant health are of major concern, rather than seasonal changes. Given that monitoring has been established since 2018, and additional reporting of individual tree health has been established, yearly surveys of Eliza Creek are considered sufficient. It is recommended that additional remote sensing reporting be continued, to supplement on-ground data.

Further details regarding future recommendations are provided below.

4.4.1 RAM quadrats

RAM sites represent a key measure of flora species diversity, abundance (as per CSR categories) and grazing impact and should continue across the site, annually, as per the outcome measurement criteria for the mine lease (OMC SWRF1, TSF6, AQ2). To date, the construction / operational phase monitoring data results have indicated species diversity has remained within the baseline range. This survey technique used during compliance monitoring reports upon both long-lived and short-lived species diversity, the latter largely influenced by weather events.

Flora Sites 21 and 22, were established on dunes in autumn 2018 to monitor this previously un-surveyed dune habitat within the operation area. This monitoring should continue annually to address potential impacts from the WAR on dune habitat to address the agreed outcomes for OMCs WP1 and WP2. Jessup sites are not undertaken due to insufficient density of long-lived shrubs and trees, and the absence of on-ground markers to delineate the transect. Given these factors, Jessup transects are not considered necessary on the dunes. RAM sites on the dunes assess species diversity and abundance.

The Jessup transects monitor populations only of long-lived perennial shrubs and trees. Despite the longevity of the species monitored, compliance monitoring has shown relatively large fluctuations in populations that correlate with large variations in yearly rainfall totals. Some species monitored have relatively small populations. Annual monitoring is considered necessary for early detection of changes in populations that may result in the potential loss of the more abundant and widespread species at a site.

For all sites excluding Site 21 and 22, Jessup monitoring should continue annually to address the agreed outcomes for the operation (OMC SWRF1, TSF6, AQ2).

4.4.2 Data analysis of RAM quadrats and Jessup transects

To date compliance monitoring has categorised sites as either control or potential impact sites, defined as sites either greater than 2 km or less than 2 km, respectively from mining infrastructure. The 2 km criteria was based on a literature review of the likely potential distance of dust and/or noise impact upon vegetation and dust impact modelling. All sites along Eliza Creek, however, were deemed to be potential impact sites, regardless of distance downstream from the TSF. During compliance monitoring, however, the WAR has been developed, the Northern Wellfield Supply Road (Khamsin Road) receives greater usage, and the SAR is no longer widely used. The 2023 reporting (Jacobs 2023) recommended a review of the



classification of sites as impact or control. In particular, recommended that impact Sites 4 and 6 be changed from impact to control. This recommendation was implemented in the 2024 report and continued in the current report. Currently Flora Sites 1 and 2 adjoin the Northern Wellfield Road, but due to the low traffic volume on this road, have remained designated as control sites. Should traffic volume substantially increase on this road, the control status of these sites should be reviewed.

In addition to analysing results collectively for control sites and collectively for impact sites, past and current reporting analysis has included plant species abundance and diversity trends at a site level, by habitat, and at a landscape level for the whole Operational Area. To date there are no emerging trends related to mining, with only climate related variation for some species recorded, particularly annuals and short-lived perennials. Analysis at these different levels should continue.

For the RAM and Jessup sites, complete baseline data sets are available for the years 2013 to 2016 (sites 15 and 16 not surveyed in 2012 and survey data from 2017 is not available). Compliance monitoring analysis to date (2018 to 2025) has compared compliance data with baseline data, and also examined trends during compliance monitoring. Consideration should be given to streamlining reporting and adjusting for climate change, given the time since baseline data was collected and availability of complete data sets. Further, as the time since baseline data increases, with climate change occurring in the region (Enviro Data SA 2025), the validity for comparing compliance data with data from a fixed point in time diminishes. To streamline reporting and to negate the effects of climate change, it is recommended that future data analysis need only compare trends in control sites vs trends in impact sites during the operational period, and not with baseline data. This already occurs for the 2 flora sites established on the dunes in 2018. In addition to comparing trends in control data with impact data, continued examination of trends in population abundance, species diversity and plant health at an individual site level is also recommended. Further revisions of the PEPR would need to consider the above.

4.4.3 Canopy cover transects

Canopy cover assessment should continue, given transects have been assessed in Eliza Creek on 10 occasions since 2018. This has provided an indication of variability in the data, both actual variation in tree canopy health (due to long term change and/or seasonal variability) and inherent variability or “noise” in the assessment method. The numbering of individual trees and installation of permanent posts along each transects has increased the precision of the transect alignment each survey. This has reduced the inherent “noise” in the data. The continued use of the densitometer rather than relying purely on visual estimates of crown intactness, is strongly recommended. The canopy cover transects are 100 m long, providing a sufficient number of densitometer canopy readings to provide precision and accuracy in quantifying canopy cover for the transect as a whole. The method is relatively objective as it does not rely on “eyeball” estimates of whole canopy intactness where there is often variation between observers’ estimates. For assessment of individual tree canopy intactness, “eyeball” assessments (no tools) of canopy intactness provide data on population trends – detecting loss of trees or tree gain along the transect and perhaps more accurate estimates of individual canopy intactness than provided by a densitometer which provides only a few foliage recordings per canopy.

The densitometer method, and visual estimates of individual canopy intactness therefore, are complementary, and both methods should be used to assess tree health at each survey. It is recommended that annual surveys are sufficient. Continuation of the Eliza Creek canopy cover data is



expected to detect potential tree stress and death overtime, if it occurs, and will contribute to addressing the agreed outcomes for the Operation (OMC SWRF1, TSF6, AQ2).

4.4.4 Weed transects

The monitoring program includes 10 weed transects, that include the Northern Wellfield, SAR, WAR and station tracks near Anzac Dam. These transects are considered to provide good representation across the mineral leases that capture locations for potential spread of weeds due to mining related activities. There are 3 weed transects along the WAR (near the Gatehouse, near the administration and spoil heap area, and near the Stuart Highway), 2 sites along the SAR, 3 sites along the Northern Wellfield Road and along minor access roads. Targeted locations, where weed populations are considered most likely on site (including dams and the villages) were also re-surveyed recording the general location and densities of all weeds present. Weed transects CWM01 and CWM02 are located along the SAR, which now receives very little mining-related vehicle traffic. However, the transects are still within current mineral leases, and include populations of the declared weed, Bathurst Burr, plus several non-declared weeds that favour high moisture habitats. For this reason, it is recommended that these 2 transects continue.

The weed transects and targeted survey locations are considered a very efficient way of detecting new weeds or an increase (or decline) in existing weed populations, as evidenced by the post-construction data. Collection of weed data should continue as per the spring 2025 survey at assigned transects and opportunistically around the site to address the agreed outcomes for the Operation (Outcome measurement criteria WP1, WP2) and Mineral Lease condition 6 (sixth schedule) and MPL 156 conditions. Populations of Bathurst Burr should be revisited and monitored to determine success of control efforts.

4.4.5 LFA

The LFA data collected presents a simple means to graphically show changes in indices, and to also compare the indices with previously collected data from analogue sites considered broadly representative of natural conditions across the mine lease. The establishment of the Midway Quarry and Tjungu sites in 2023 provided a greater opportunity to monitor rehabilitation success as well as variation in techniques (e.g. deep cross ripping, plus hand seeding). Continued data collection will enable opportunities for ongoing data analysis, and a determination of when recorded indices approach or reach the range of the analogue data.

The LFA data collected (and PCQ data) indicates that the Tjungu site has successfully rehabilitated to a level comparable with, or even exceeding reference habitat. Likewise, plant and soil parameter data at aerodrome site shows that this site is approaching reference site means. The LFA Established method and PCQ data at the Midway Quarry shows the site is still at the very early stages of landscape restoration in terms of vegetation cover. Collection of species identification data since 2023 (which is additional to the LFA method) has shown that only short-lived species are present at the Midway Quarry site. The sparsity of short-lived species and absence of long-lived species suggests that the depth of ripping was insufficient for the successful rehabilitation of the analogue (reference) community.

To date, the LFA soil parameters have shown that the sites are approaching the analogue soil parameter means, even when the vegetation cover has been much below the analogue. The soil parameter data collection requires 3 replicates per zone per transect and is time intensive. The soil parameter data tends



to quickly get close to the analogue mean in the Stoney Tableland habitat, where leaf litter, erosivity and soil surface unevenness is natural low. The primary aim of the rehabilitation monitoring is to determine whether the re-established community achieves a stable self-sustaining community that resembles adjoining analogue communities. LFA indices tend to plateau once soil structure has stabilised and vegetation cover has maximised (Spain et al. 2025). Once a plateau has been reached, the LFA indices are less indicative of ecosystem function, e.g. they do not record floristic composition or recruitment of dominant species. Future monitoring should consider streamlining the soil parameter attributes recorded, or simply only reporting on vegetation cover and composition. As per Section 4.1.7 new LFA sites should be established at Ventia in the nearby newly deep-ripped and seeded section of the WAR. There is also opportunity to establish new analogue sites within the existing Jessup transects.

4.4.6 Fauna surveys

Single pitfall trapping lines continued to allow for suitable capture of small mammals and reptiles during the 2025 survey. The most common mammal species that have been captured across all baseline surveys were still detected at both control and impact sites, with all small mammal captures via pitfall traps and camera trap. It is recommended that pitfall trapping is retained in order to detect presence or absence of Plains Mouse as per PEPR condition EPBC2, in addition to continuing to monitor habitat condition (flora monitoring). As suggested following the spring 2022 survey, increased rainfall in the region (spring and summer) resulted in an autumn survey in 2023 instead of spring survey, however Plains Mouse were not detected. Sustained rainfall did not occur in 2025, where similar to 2024, the survey occurred in spring. Regardless, Plains Mouse remain undetected in 2025. As per 4.3.7 above, Plains Mouse has been detected via baited camera trap at the South Gap offset area, but in low numbers since mid- 2022, and not in 2025, but was detected at Oak Dam via baited camera in autumn 2025, so detection at Carrapateena may still occur in the future, but more likely following periods of above average rainfall.

To increase the chance of detection of Plains Mouse at Carrapateena, particularly at control sites 1, 2, 4 and 6 options may include:

- increasing the number of lines and pits open at fauna sites during the next survey
- setting up targeted baited Elliot traps at good quality gilgais, at the established fauna sites. E.g. 5 baited Elliot traps at 10 sites, 100m apart, for a standard 4 night survey
- setting up baited camera traps similar to South Gap (noting there would be greater success at sites where predators (e.g. cats) are under control. Flora site 12 is noted to have good areas of gilgais. These could be set up away from fauna trap lines, if trapping occurs concurrently.

As 3.3.6 above, replacement metal bases have been installed in the pitfall traps for the majority of the lines. These bases have been successful; easy to install/remove, drain well and do not get too hot (remain at least 2-5 degrees lower than ambient temperature) and also facilitate visual id of the trapped fauna (given pits are 60 cm deep). As per previous surveys, the lids of the semi-permanent pits need to be pushed down correctly before tech screws are applied to ensure there are no gaps that enable small mammals or reptiles to get through and be trapped outside of a survey period. It is also a requirement of the ethics permit that the status of the lids are checked every 6 months and an email forwarded to the Wildlife Ethics Committee.



Results for single pit line trapping continues to be comparable to baseline results and in general, mid-late spring appears suitable time to undertake the annual survey. For 2026, spring is probably ideal given the dry preceding summer of 2025/2026, an autumn survey would only be an option if there was heavy steady rainfall in later summer and early autumn, to maximise the chance of demonstrating compliance with the PEPR conditions. Fauna trapping should continue at the mine site until such time as it can be clearly demonstrated that conservation significant species (in particular) persist alongside the operational mine, or until a downward trend in mammal diversity / abundance at impact sites is confirmed real or otherwise. This should be considered and discussed following the next PEPR update. It is noted that 1 EPBC listed species was detected in spring 2025 opportunistically, rather than via formal trapping. Camera trapping outside the survey period, given the success at South Gap offset area, using alternate, less labour-intensive methods (without baits) or more labour intensive (with baits) may also be an option, i.e. aligning cameras with short lengths of fauna fence line to direct fauna into view. However, given the presence of cats at the site, regular checks would be required to avoid increasing predation of small mammals at trapping sites.

Whilst reptile diversity is interesting and provides a good indicator for overall site conditions, it relates more broadly to PEPR OMC about fauna diversity and abundance, therefore use of funnel traps could be ceased in the future and reptile diversity could be collected opportunistically and via pitfall captures alone, particularly during the spring surveys when reptiles are more active (Plate 4.4). However, setting and checking funnel traps requires minimal additional effort compared with additional pitfall lines and provides opportunity to trap snakes, where present, therefore it is suggested that funnel trapping be retained at the current time.

The bird surveys at fauna sites, flora sites and water points currently provide valuable data regarding overall avifauna diversity at the sites, and birds are expected to respond to mine impacts such as noise and traffic if levels are unacceptable to them. In addition, pest bird species are also monitored e.g. House Sparrows still present (low numbers). For this reason, bird surveys should be continued during operational compliance monitoring until data patterns are clear, and to meet PEPR conditions related to Thick-billed Grasswren and Night Parrot records (EPBC1 and EPBC 3) as well as conditions related to pests (WP1, WP2). Survey at water points (particularly pre-dawn and post-dusk) as well as spotlighting / night call detection is also an important survey technique to detect whether the Night Parrot is present at the site. Song Meters (only deployed from 2023) are a valuable tool to detect nocturnal, dawn and dusk species at both chenopod shrubland sites and representative creekline sites (e.g. Eliza Creek Site 10, Bosworth Creek Site 7). In 2025 Song Meter results included detection of 8 species not detected via bird surveys or opportunistic sightings, of these 1 was a common pre-dawn and post-dusk species; Spotted Nightjar. This species was last detected in 2022 via bird survey at North Eliza Dam (dead remains). No other nocturnal / dusk bird species were detected. Four diurnal microbat species were also detected on Song Meters that can be deployed to capture both bird and bat call data. Detection via acoustic methods is far more efficient than trapping or spotlighting for microbat fauna and useful to regularly compare against baseline data.



Plate 4.4: Female Eyre Peninsula Dragon (opportunistic detection in Eliza Creek)

5 References

Animalia (2018) Fat-tailed Dunnart. Cited online at: <http://animalia.bio/fat-tailed-dunnart>.

Atlas of Living Australia (ALA) (2025) Cited online at <https://spatial.ala.org.au/>.

Centre for Invasive Species (2025) Weeds of National Significance. Accessed online January 2025 at <https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html>. Australian Government Department of Agriculture, Fisheries and Forestry.

BHP (2025a) Carrapateena Operation Program for Environment Protection and Rehabilitation, ML 6471 Mineral Lease, MPL 149 Airstrip, Workers' Accommodation Village, Access Road and Ancillary Infrastructure, MPL 152 Western Infrastructure Corridor, MPL 153 Eastern Radial Wellfield, MPL 154 Southern Access Road and Radial Wellfield, MPL 156 Northern Wellfield. June 2025. Adelaide, South Australia. Last updated June 2025.

BHP (2025b, unpub.) Arid Recovery Annual Pitfall Trapping Swale Sites 2025. BHP Unpublished Report.

Bureau of Meteorology (BoM) (2025a) Woomera Aerodrome SA Weather Station Number 016001. www.bom.gov.au/climate/data, Commonwealth of Australia. Accessed Nov 2025.

Bureau of Meteorology (BoM) (2025b) Rainfall deficiencies and water availability, Accessed online at <http://www.bom.gov.au/climate>. Accessed Nov 2025.

Boulderstone C and Baird G (2012). Drought induced death of bladder saltbush (*Atriplex vesicaria*) in the north east pastoral district of South Australia. Conference Paper. 17th Australian Rangeland Society Biennial Conference. Australian Rangeland Society. Viewed 15/12/2025, <https://www.nintione.com.au/?p=3681>.

CABI (2022) Invasive Species Compendium. *Nicotiana glauca* (tree tobacco). Cited online at: <https://www.cabi.org/publishing-products/invasive-species-compendium/>.

Churchill S (2008) Australian Bats. 2nd Edition. Allen and Unwin Publishing, Crows Nest, NSW.

Cogger HG (2014) Reptiles and Amphibians of Australia, Seventh Edition. CSIRO Publishing, Australia.

Coleman M, Kristiansen P, Sindel B and Fyfe C (2021) Common Sow Thistle (*Sonchus oleraceus*): Weed management guide for Australian vegetable production. School of Environmental and Rural Science, University of New England, Armidale.

Cunningham GM, Mulham WE, Milthorpe PL, Leigh JH (1992) Plants of Western New South Wales. Melbourne Inkata Press.

Davies J, Menkhorst P, Rogers D, Clarke R, Marsack P and Franklin K (2022) The Compact Australian Bird Guide. CSIRO Publishing.

Davies R J-P, Mackay DA, Whalen MA, Smyth AK (2018) Vegetation and seed banks of arid ephemeral gilgai wetlands subject to contrasting grazing regimes, *Journal of Arid Environments*, Volume 154, Pages 51-60.



Department for Environment and Natural Resources (DENR) (2011) Pastoral lease assessment. Technical Training Manual. Pastoral Land Management Group. Department for Environment and Natural Resources.

Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE) (2013) Field guide for landscape function analysis for environmental monitoring and assessment, Minerals Regulatory Guidelines MG21, Mineral Resources Division. Department for Manufacturing, Innovation, Trade, Resources and Energy, South Australia, Adelaide.

Dickman CR, Mahon PS, Masters P, Gibson DF (1999) Long-term dynamics of rodent populations in arid Australia: the influence of rainfall, Wildlife Research, 26: 389-403 (<http://dx.doi.org/10.1071/WR97057>).

EBS (EBS Ecology) (2013a) Carrapateena Biannual Flora and Fauna Monitoring Baseline Survey 2012. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2015a) Carrapateena Retention Lease Compliance Monitoring Report Flora and Fauna 2014 Final. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2015b) Carrapateena Spring Flora and Fauna Report 2015. Final. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2016) Carrapateena Flora and Fauna Monitoring. Autumn 2016. Final. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2017a) Carrapateena Flora and Fauna Monitoring. Autumn 2017. Final. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2017b) Carrapateena Flora and Fauna Monitoring. Spring 2017. Final. Prepared by EBS Ecology for OZ Minerals.

EBS (EBS Ecology) (2017c) Carrapateena Operation Ecological Baseline Assessment. Report to OZ Minerals. EBS Ecology, Adelaide. MLP Appendix B6.

Eldridge D and Westoby M (1991) Recruitment and survival in *Atriplex vesicaria* populations in semi-arid western New South Wales, 1977-1987. Aust. Journal of Ecology. 16(3), 309-314.
<https://doi.org/10.1111/j.1442-9993.1991.tb01059.x>.

Enviro Data SA (2025) SA Climate Ready. Accessed 18/12/2025. SA Climate Ready - Home

Government of South Australia (2022) Declared Plant Policy, Bathurst Burr (*Xanthium spinosum*)
https://pir.sa.gov.au/_data/assets/pdf_file/0016/220480/bathurst_burr_policy.pdf.

GRS (2018) Densitometer. Geographic Resource Solutions. <http://www.grsgis.com/densitometer.html>. Accessed 4/6/18.

Haythornthwaite AS, Dickman CR (2006) Distribution, abundance, and individual strategies: a multi-scale analysis of dasyurid marsupials in arid central Australia. Ecography 29: 285–300.

Heard L and Channon B (1997) Guide to a native vegetation survey using the Biological Survey of South Australia methodology. Department of Housing and Urban Development. South Australian Government.

Horton P, Blaylock B and Black A (2020) Annotated List of the Birds of South Australia. Fifth edition, Version 5.1. Cited online at: <https://docs.samuseum.sa.gov.au/pkg7lrix8>.



Hutchinson M and Williams I (2024a) Key to the Geckos of South Australia. South Australian Museum, Government of South Australia. Obtained online from <http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Hutchinson M and Williams I (2024b) Key to the Skinks of South Australia. South Australian Museum, Government of South Australia. Obtained online from <http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Hutchinson M and Williams I (2024c) Key to the Snakes of South Australia. South Australian Museum, Government of South Australia. Obtained online from <http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Hutchinson M and Williams I (2024d) Key to the Dragons of South Australia. South Australian Museum, Government of South Australia. Obtained online from <http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Hutchinson M and Williams I (2024e) Key to the Goannas of South Australia.
<http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Hutchinson M and Williams I (2022f) Checklist of the Reptile and Frogs of South Australia (Hutchinson 2022f). <http://www.samuseum.sa.gov.au/research/biological-sciences/reptiles-andamphibians/south-australian-reptile-keys>.

Jacobs (2018a) Carrapateena Ecology, Autumn Survey 2018. Prepared by Jacobs for OZ Minerals.

Jacobs (2019a) Carrapateena Ecology, Spring Survey 2018. Prepared by Jacobs for OZ Minerals.

Jacobs (2019b) Autumn 2019 Eliza Creek Canopy Monitoring and Weed Transects. Memo to OZ Minerals from Sonia Croft.

Jacobs (2020a) Carrapateena Ecology, Spring Survey 2019. Prepared by Jacobs for OZ Minerals.

Jacobs (2020b) Carrapateena Dust Impact Study. Assessment of Dust Impacts on Vegetation. Prepared by Jacobs for Coffey Services Australia for OZ Minerals. October 2020.

Jacobs (2021b) Carrapateena Ecology, Spring Survey 2020. Prepared by Jacobs for OZ Minerals.

Jacobs (2022a) Carrapateena Ecology, Spring Survey 2021. Prepared by Jacobs for OZ Minerals.

Jacobs (2023a) WAT17 Vegetation Assessment. Final memo prepared by Jacobs for OZ Minerals.

Jacobs (2023b) Carrapateena Ecology Survey, Spring 2022. Prepared by Jacobs for OZ Minerals. IS346900_500_RPT-001. IS346900-500-NE-RPT-001 Carrapateena Ecology Spring 2022_REV2. Jacobs (2023h) Carrapateena Ecology Survey, Autumn 2023. Prepared by Jacobs for OZ Minerals / BHP.

Kellermann J (ed) (2025) Flora SA. Board of Botanic Gardens and State Herbarium: Adelaide. <https://flora.sa.gov.au/resources/census-of-sa>. Accessed September 2025.

- Kemper C and Stokes P (2021) Key to species of Dasyuridae (Carnivorous Marsupials) of South Australia.
- Kemper C and Stokes P (2023) Key to species of Muridae (Rodents) of South Australia. SA Museum. February 2021.
- Kutsche F, Lay, B, Croft T and Kellermann J (2023) Field guide to the plants of outback South Australia (second revised edition). State Herbarium of South Australia: Adelaide.
- Lathwida (Lathwida Environmental) (2025a) Carrapateena Operations Flora and Fauna Survey (spring) 2024. Final Report prepared for BHP. Revision 0. Project number LE24009. March 2025.
- Lathwida (Lathwida Environmental) (2025b) Oak Dam Mining Project Targeted Threatened Species Survey. Final Report prepared for BHP. Revision 1. Project number LE24023. August 2025.
- Lathwida (Lathwida Environmental) (2025c) Oak Dam Mining Project Ecological Baseline Survey Autumn 2025. Final Report prepared for BHP. Revision 0. Project number LE25006. July 2025..
- Lathwida (Lathwida Environmental) (2025e) Mine Concentrator Growth Project Ecological Baseline Survey Autumn 2025. Final Report prepared for BHP. Revision 0. Project number LE25012. September 2025.
- Lathwida (Lathwida Environmental) (2026a) Olympic Dam Mine Concentrator Growth Project Ecological Baseline Survey, Spring 2025. Final Report prepared for BHP. Revision 0. Project number LE25025. January 2026.
- Lathwida (Lathwida Environmental) (2026b) Oak Dam Mining Project Ecological Baseline Survey Spring 2025. Draft Report prepared for BHP. Revision B. Project number LE25027. March 2026.
- Letnic M, Story P, Story G, Field J, Brown O, Dickman CR (2011) Resource pulses, switching trophic control, and the dynamics of small mammal assemblages in arid Australia. J. Mammal. 92:1210-1222 (<http://dx.doi.org/10.1644/10-mamm-s-229.1>).
- Menkhorst P and Knight F (2011) A Field Guide to Mammals of Australia (2nd Edition). Oxford University Press, Melbourne Victoria (revised edition, first published in 2001).
- Menkhorst P, Rogers D, Clarke R, Davies J, Marsack P and Franklin K (2023) The Australian Bird Guide. CSIRO Publishing Australia (revised edition, first published 2019).
- Moseby KE, Read J, Tuft K, Hayes G, Crisp H, Lynch C, Van der Weyde L (2025) Exclusion of invasive predators triggers succession, competition and habitat diversification in a small mammal community. Proc. R. Soc. B 292: 20250325.
- Morcombe M (2019) eGuide to Birds of Australia, application (Morcombe 2011-2019, Version 1.5-1.62).
- Native Vegetation Council (2024) Rangelands Assessment Manual. Government of South Australia. Department for Environment and Water, SA Government, Adelaide.
- Nature Foundation (2026) South Gap – EPBC Offset 2025 Annual Report. Final. 23 February 2026.
- Neudorf J (2024) *Erodium cicutarium* (L.) L'Her. Canadian Food Inspection Agency, Canada.
- NSW government (undated) River red gum factsheet. Environment and Heritage Group. Department of Planning and Environment. New South Wales Government.

- Office of Environment and Heritage (OEH) (2020) Stripe-faced Dunnart – profile. NSW Threatened Species Profiles, cited online at:
<https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10759#habitatandecology>.
- Owens HM (2000) 'Guidelines for Vertebrate Surveys in South Australia: using the Biological Survey of South Australia'. Adelaide, South Australia: National Parks and Wildlife.
http://www.environment.sa.gov.au/Knowledge_Bank/Information_and_data/Biological_Survey_of_South_Australia/Vertebrate_Survey_Manual.pdf.
- Pizzey G, Knight F, & Pizzey S (2012) The Field Guide to the Birds of Australia. 9th Edition. HarperCollins Publishers, Sydney South, Australia.
- PlantNET (The NSW Plant Information Network System) (2025) Royal Botanic Gardens and Domain Trust, Sydney. <https://plantnet.rbgsyd.nsw.gov.au>, accessed November 2025.
- Read DG (1988) Weather and Trap Response of the Dasyurid Marsupials *Sminthopsis crassicaudata*, *Planigale gilesi* and *Planigale tenuirostris*. Australian Wildlife Research 15(2) 139 – 148. CSIRO Publishing.
- Read JL and Moseby KE (2001) Factors affecting pitfall capture rates of small ground vertebrates in arid South Australia. The influence of weather and moon phase on capture rates of reptiles. Wildlife Research 28: 53-60.
- Read JL, Ward MJ, Moseby KE (2015) Factors that influence trap success of sandhill dunnarts (*Sminthopsis psammophila*) and other small mammals in Triodia dunefields of South Australia. Australian Mammalogy 37, 212-218.
- Simpson K and Day N (2010). Field Guide to the Birds of Australia. 8th edition, revised and updated.
- Simpson K and Day N (2010) Field Guide to the Birds of Australia. 8th edition, revised and updated.
- South Australian Seed Conservation Centre (2025) Seeds of South Australia database, accessed online at: <https://spapps.environment.sa.gov.au/seedsofsa/>.
- Spain CS, Nuske S and Gagen EJ (2025) Evaluating methods for assessing native ecosystem mine rehabilitation success: Technical Paper, Office of the Queensland Mine Rehabilitation Commissioner, Queensland Government, Brisbane.
- Specialised Zoological (2025) Acoustic analysis and bat call identification from Carrapateena, South Australia. Unpublished report by Specialised Zoological for Lathwida Environmental Pty Ltd, version 2025-12-08, project reference SZ784.
- Strahan R (1995) Mammals of Australia / edited by Ronald Strahan. Smithsonian Institution Press Washington, DC.
- The Australasian Virtual Herbarium (AVH) (2025) Powered by the Atlas of Living Australia. Search for records | The Australasian Virtual Herbarium, accessed November 2024 at:
https://avh.ala.org.au/#tab_simpleSearch.
- Tongway DJ (2004) Landscape Function Analysis: Procedures for Monitoring and Assessing Landscapes – with Special Reference to Minesites and Rangelands. In: Canberra: CSIRO Sustainable Ecosystems; 2004.



Tongway DJ and Hindley NL (2005) Landscape Function Analysis: Procedures for monitoring and assessing landscapes. With special reference to Mine sites and Rangelands. CSIRO Sustainable Ecosystems, Canberra, original 2004, updated 2005.

Triggs B (2004) Tracks, scats and other traces: A field guide to Australian mammals. Melbourne: Oxford University Press (revised edition, first published 1996).

Tunstan B (2005) Acacia – Eucalypt Strategies for Water & Nutrients. Microsoft Word - Acacia Eucalypt Strategy.doc. Accessed 19/12/2025.

Walsh D, Sinclair R, Andrew MH and Coleman D (2005) The role of the male flower spike as a cue for selective grazing in bladder saltbush. The Rangeland Journal. 27: 97- 103.

Waudby HP, Petit S (2015) Ephemeral plant indicators of livestock grazing in arid rangelands during wet conditions. The Rangeland Journal 37, 323–330. <https://doi.org/10.1071/RJ14118>.

Wilson S and Swan G (2023) A Complete Guide to Reptiles of Australia. 6th Edition. New Holland Publishers, Chatswood, NSW, Australia (revised edition, first published 2003).

Appendices

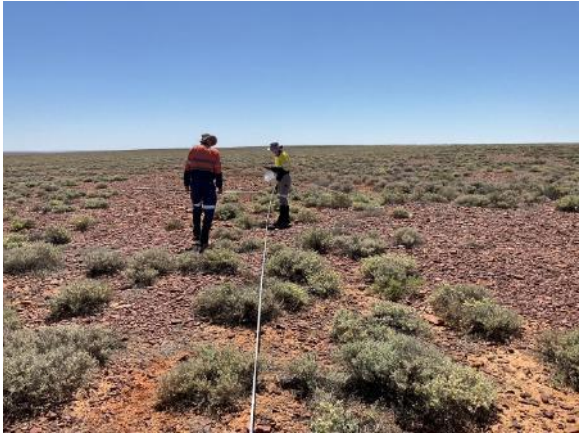
Appendix A. Photologs spring 2025

Appendix A1. Photolog, Rangeland Flora Sites

CAR001	
	
Appendix Plate A1.1: Facing north	Appendix Plate A1.2: Facing east
	
Appendix Plate A1.3: Facing west	Appendix Plate A1.4: Facing south

CAR002	
	
Appendix Plate A1.5: Facing north	Appendix Plate A1.6: Facing east
	
Appendix Plate A1.7: Facing west	Appendix Plate A1.8: Facing south

CAR003	
	
Appendix Plate A1.9: Facing north	Appendix Plate A1.10: Facing east
	
Appendix Plate A1.11: Facing west	Appendix Plate A1.12: Facing south

CAR004	
	
Appendix Plate A1.13: Facing north	Appendix Plate A1.14: Facing east
	
Appendix Plate A1.15: Facing west	Appendix Plate A1.16: Facing south

CAR005	
	
Appendix Plate A1.17: Facing north	Appendix Plate A1.18: Facing east
	
Appendix Plate A1.19: Facing west	Appendix Plate A1.20: Facing south

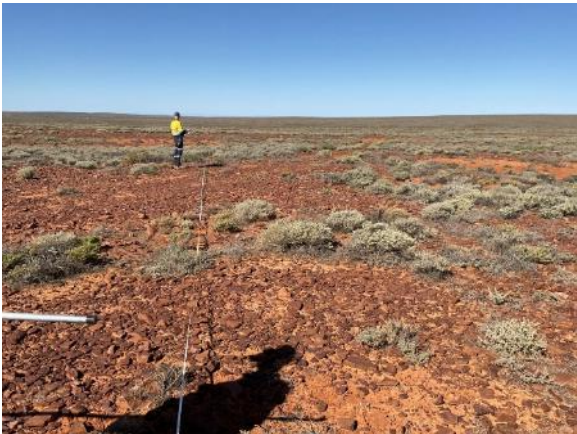
CAR006	
	
Appendix Plate A1.21: Facing north	Appendix Plate A1.22: Facing east
	
Appendix Plate A1.23: Facing west	Appendix Plate A1.24: Facing south

CAR007	
	
Appendix Plate A1.25: Facing north	Appendix Plate A1.26: Facing east
	
Appendix Plate A1.27: Facing west	Appendix Plate A1.28: Facing south

CAR009	
	
Appendix Plate A1.29: Facing north	Appendix Plate A1.30: Facing east
	
Appendix Plate A1.31: Facing west	Appendix Plate A1.32: Facing south

CAR010	
	
Appendix Plate A1.33: Facing north	Appendix Plate A1.34: Facing east
	
Appendix Plate A1.35: Facing west	Appendix Plate A1.36: Facing south

CAR011	
	
Appendix Plate A1.37: Facing north	Appendix Plate A1.38: Facing east
	
Appendix Plate A1.39: Facing west	Appendix Plate A1.40: Facing south

CAR012	
	
Appendix Plate A1.41: Facing north	Appendix Plate A1.42: Facing east
	
Appendix Plate A1.43: Facing west	Appendix Plate A1.44: Facing south

CAR013	
	
Appendix Plate A1.45: Facing north	Appendix Plate A1.46: Facing east
	
Appendix Plate A1.47: Facing west	Appendix Plate A1.48: Facing south

CAR015	
	
Appendix Plate A1.49: Facing north	Appendix Plate A1.50: Facing east
	
Appendix Plate A1.51: Facing west	Appendix Plate A1.52: Facing south

CAR016	
	
Appendix Plate A1.53: Facing north	Appendix Plate A1.54: Facing east
	
Appendix Plate A1.55: Facing west	Appendix Plate A1.56: Facing south

CAR017	
	
Appendix Plate A1.57: Facing north	Appendix Plate A1.58: Facing east
	
Appendix Plate A1.59: Facing west	Appendix Plate A1.60: Facing south

CAR018	
	
Appendix Plate A1.61: Facing north	Appendix Plate A1.62: Facing east
	
Appendix Plate A1.63: Facing west	Appendix Plate A1.64: Facing south

CAR019	
	
Appendix Plate A1.65: Facing north	Appendix Plate A1.66: Facing east
	
Appendix Plate A1.67: Facing west	Appendix Plate A1.68: Facing south

CAR020	
	
Appendix PlateA1.69: Facing north	Appendix Plate A1.70: Facing east
	
Appendix Plate A1.71: Facing west	Appendix Plate A1.72: Facing south

CAR021	
	
Appendix Plate A1.73: Facing north	Appendix Plate A1.74: Facing east
	
Appendix Plate A1.75: Facing west	Appendix Plate A1.76: Facing south

CAR022	
	
Appendix Plate A1.77: Facing north	Appendix Plate A1.78: Facing east
	
Appendix Plate A1.79: Facing west	Appendix Plate A1.80: Facing south



Appendix A2. Photolog, Jessup Transects



Appendix Plate A2.1: CAR001, start facing end



Appendix Plate A2.2: CAR002, start facing end



Appendix Plate A2.3: CAR003, start facing end



Appendix Plate A2.4: CAR004, start facing end



Appendix Plate A2.5: CAR005, start facing end



Appendix Plate A2.6: CAR006, start facing end



Appendix Plate A2.7: CAR007, start facing end



Appendix Plate A2.8: CAR009, start facing end



Appendix Plate A2.9: CAR010, start facing end



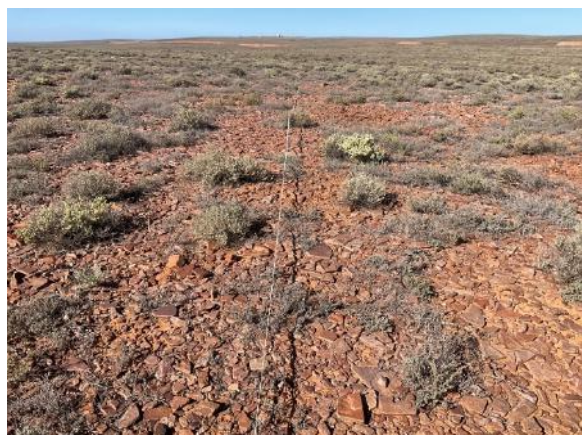
Appendix Plate A2.10: CAR011, start facing end



Appendix Plate A2.11: CAR012, start facing end



Appendix Plate A2.12: CAR013, start facing end



Appendix Plate A2.13: CAR015



Appendix Plate A2.14: CAR016



Appendix Plate A2.15: CAR017



Appendix Plate A2.16: CAR018



Appendix Plate A2.17: CAR019



Appendix Plate A2.18: CAR020



Appendix A3. Photolog, Canopy Cover Transects Eliza Creek

CAR017	
	
Appendix Plate A3.1: Transect A	Appendix Plate A3.2: Transect B

CAR018	
	
Appendix Plate A3.3: Transect A	Appendix Plate A3.4: Transect B

CAR019	
	
Appendix Plate A3.5: Transect A	Appendix Plate A3.6: Transect B

CAR020	
	
Appendix Plate A3.7: Transect A	Appendix Plate A3.8: Transect B



Appendix A4. Photolog, Weed Survey

CWM01 0m	
	
Appendix Plate A4.1: Left road side, facing away from start	Appendix Plate A4.2: Right road side, facing away from start
	
Appendix Plate A4.3: Left road side, facing end	Appendix Plate A4.4: Right road side, facing end

CWM01 250m	
	
Appendix Plate A4.5: Left road side, facing start	Appendix Plate A4.6: Right road side, facing start
	
Appendix Plate A4.7: Left road side, facing end	Appendix Plate A4.8: Right road side, facing end

CWM01 500m	
	
Appendix Plate A4.9: Left road side, facing start	Appendix Plate A4.10: Right road side, facing start
	
Appendix Plate A4.11: Left road side, facing end	Appendix Plate A4.12: Right road side, facing end

CWM01 750m	
	
Appendix Plate A4.13: Left road side, facing start	Appendix Plate A4.14: Right road side, facing start
	
Appendix Plate A4.15: Left road side, facing end	Appendix Plate A4.16: Right road side, facing end

CWM01 1000m	
	
Appendix Plate A4.17: Left road side, facing start	Appendix Plate A4.18: Right road side, facing start
	
Appendix Plate A4.19: Left road side, facing away from end	Appendix Plate A4.20: Right road side, facing away from end

CWM02 0m	
	
Appendix Plate A4.21: Left road side, facing away from start	Appendix Plate A4.22: Right road side, facing away from start
	
Appendix Plate A4.23: Left road side, facing end	Appendix Plate A4.24: Right road side, facing end

CWM02 250m	
	
Appendix Plate A4.25: Left road side, facing start	Appendix Plate A4.26: Right road side, facing start
	
Appendix Plate A4.27: Left road side, facing end	Appendix Plate A4.28: Right road side, facing end

CWM02 500m	
	
Appendix Plate A4.29: Left side of road, facing start	Appendix Plate A4.30: Right side of road, facing start
	
Appendix Plate A4.31: Left side of road, facing end	Appendix Plate A4.32: Right side of road, facing end

CWM02 750m	
	
Appendix Plate A4.33: Left side of road, facing start	Appendix Plate A4.34: Right side of road, facing start
	
Appendix Plate A4.35: Left side of road, facing end	Appendix Plate A4.36: Right side of road, facing end

CWM02 1000m	
	
Appendix Plate A4.37: Left side of road, facing start	Appendix Plate A4.38: Right side of road, facing start
	
Appendix Plate A4.39: Left side of road, facing away from end	Appendix Plate A4.40: Right side of road, facing away from end

CWM03 0m	
	
Appendix Plate A4.41: Left side of road, facing end	Appendix Plate A4.42: Right side of road, facing end
	
Left side of road, facing away from start	Appendix Plate A4.43: Right side of road, facing away from start

CWM03 250m	
	
Appendix Plate A4.44: Left side of road, facing end	Appendix Plate A4.45: Right side of road, facing end
	
Appendix Plate A4.46: Left side of road, facing start	Appendix Plate A4.47: Right side of road, facing start

CWM03 500m	
	
Appendix Plate A4.48: Left side of road, facing end	Appendix Plate A4.49: Right side of road, facing end
	
Appendix Plate A4.50: Left side of road, facing start	Appendix Plate A4.51: Right side of road, facing start

CWM03 750m	
	
Appendix Plate A4.52: Left side of road, facing end	Appendix Plate A4.53: Right side of road, facing end
	
Appendix Plate A4.54: Left side of road, facing start	Appendix Plate A4.55: Right side of road, facing start

CWM03 1000m	
	
Appendix Plate A4.56: Left side of road, facing away from end	Appendix Plate A4.57: Right side of road, facing away from end
	
Appendix Plate A4.58: Left side of road, facing start	Appendix Plate A4.59: Right side of road, facing start

CWM04 0m	
	
Appendix Plate A4.60: Left side of road, facing away from start	Appendix Plate A4.61: Right side of road, facing away from start (note newly ripped / seeded area of WAR for future LFA)
	
Appendix Plate A4.62: Left side of road, facing end	Appendix Plate A4.63: Right side of road, facing end (note newly ripped / seeded area of WAR for future LFA)

CWM04 250m	
	
Appendix Plate A4.64: Left side of road, facing end	Appendix Plate A4.65: Right side of road, facing end
	
Appendix Plate A4.66: Left side of road, facing start	Appendix Plate A4.67: Right side of road, facing start

CWM04 500m	
	
Appendix Plate A4.68: Left side of road, facing end	Appendix Plate A4.69: Right side of road, facing end
	
Appendix Plate A4.70: Left side of road, facing start	Appendix Plate A4.71: Right side of road, facing start

CWM04 750m	
	
Appendix Plate A4.72: Left side of road, facing end	Appendix Plate A4.73: Right side of road, facing end
	
Appendix Plate A4.74: Left side of road, facing start	Appendix Plate A4.75: Right side of road, facing start

CWM04 1000m	
	
Appendix Plate A4.76: Left side of road, facing start	Appendix Plate A4.77: Right side of road, facing start
	
Appendix Plate A4.78: Left side of road, facing away from end	Appendix Plate A4.79: Right side of road, facing away from end

CWM05 0m	
	
Appendix Plate A4.80: Left side of road, facing away from start	Appendix Plate A4.81: Right side of road, facing away from start
	
Appendix Plate A4.82: Left side of road, facing end	Appendix Plate A4.83: Right side of road, facing end

CWM05 250m	
	
Appendix Plate A4.84: Left side of road, facing start	Appendix Plate A4.85: Right side of road, facing end
	
Appendix Plate A4.86: Left side of road, facing start	Appendix Plate A4.87: Right side of road, facing end

CWM05 500m	
	
Appendix Plate A4.88: Left side of road, facing start	Appendix Plate A4.89: CWM05 500m Right side of road, facing start
	
Appendix Plate A4.90: Left side of road, facing end	Appendix Plate A4.91: Right side of road, facing end

CWM05 750m	
	
Appendix Plate A4.92: Left side of road, facing start	Appendix Plate A4.93: Right side of road, facing start
	
Appendix Plate A4.94: Left side of road, facing end	Appendix Plate A4.95: Right side of road, facing end

CWM05 1000m	
	
Appendix Plate A4.96: Left side of road, facing start	Appendix Plate A4.97: Right side of road, facing start
	
Appendix Plate A4.98: Left side of road, facing away from end	Appendix Plate A4.99: Right side of road, facing away from end

CWM06 0m	
	
Appendix Plate A4.100: Left side of road, facing away from start	Appendix Plate A4.101: Right side of road, facing away from start
	
Appendix Plate A4.102: Left side of road, facing end	Appendix Plate A4.103: Right side of road, facing end

CWM06 250m	
	
Appendix Plate A4.104: Left side of road, facing start	Appendix Plate A4.105: Right side of road, facing start
	
Appendix Plate A4.106: Left side of road, facing end	Appendix Plate A4.107: Right side of road, facing end

CWM06 500m	
	
Appendix Plate A4.108: Left side of road, facing start	Appendix Plate A4.109: Right side of road, facing start
	
Appendix Plate A4.110: Left side of road, facing end	Appendix Plate A4.111: Right side of road, facing end

CWM06 750m	
	
Appendix Plate A4.112: Left side of road, facing start	Appendix Plate A4.113: Right side of road, facing start
	
Appendix Plate A4.114: Left side of road, facing end	Appendix Plate A4.115: Right side of road, facing end

CWM06 1000m	
	
Appendix Plate A4.116: Left side of road, facing start	Appendix Plate A4.117: Right side of road, facing start
	
Appendix Plate A4.118: Left side of road, facing away from end	Appendix Plate A4.119: Right side of road, facing away from end

CWM07 0m	
	
Appendix Plate A4.120: Facing away from start	Appendix Plate A4.121: Facing end

CWM07 250m	
	
Appendix Plate A4.122: Facing start	Appendix Plate A4.123: Facing end

CWM07 500m	
	
Appendix Plate A4.124: Facing start	Appendix Plate A4.125: Facing end

CWM07 750m	
	
Appendix Plate A4.126: Facing start	Appendix Plate A4.127: Facing end

CWM07 1000m	
	
Appendix Plate A4.128: Facing start	Appendix Plate A4.129: Facing away from end

NWM01 0m	
	
Appendix Plate A4.130: Facing away from start	Appendix Plate A4.131: Facing end

NWM01 250m	
	
Appendix Plate A4.132: Facing start	Appendix Plate A4.133: Facing end

NWM01 500m	
	
Appendix Plate A4.134: Facing start	Appendix Plate A4.135: Facing end

NWM01 750m	
	
Appendix Plate A4.136: Facing start	Appendix Plate A4.137: Facing end

NWM01 1000m	
	
Appendix Plate A4.138: Facing start	Appendix Plate A4.139: Facing away from end

NWM02 0m	
	
Appendix Plate A4.140: Facing away from start	Appendix Plate A4.141: Facing end

NWM02 250m	
	
Appendix Plate A4.142: Facing start	Appendix Plate A4.143: Facing end

NWM02 500m	
	
Appendix Plate A4.144: Facing start	Appendix Plate A4.145: Facing end

NWM02 750m	
	
Appendix Plate A4.146: Facing start	Appendix Plate A4.147: Facing end

NWM02 1000m	
	
Appendix Plate A4.148: Facing start	Appendix Plate A4.149: Facing away from end

NWM03 0m	
	
Appendix Plate A4.150: Facing away from start	Appendix Plate A4.151: Facing end

NWM03 250m	
	
Appendix Plate A4.152: Facing start	Appendix Plate A4.153: Facing end

NWM03 500m	
	
Appendix Plate A4.154: Facing start	Appendix Plate A4.155: Facing end

NWM03 750m	
	
Appendix Plate A4.156: Facing start	Appendix Plate A4.157: Facing end

NWM03 1000m	
	
Appendix Plate A4.158: Facing start	Appendix Plate A4.159: Facing away from end



Appendix A5. Photolog, LFA Sites



Appendix Plate A5.1: LFA Site 1 Aerodrome, transect 1A, start facing north



Appendix Plate A5.2: LFA Site 1 Aerodrome, transect 1A, end facing south



Appendix Plate A5.3: LFA Site 1 Aerodrome, transect 1A, vegetation patch off transect



Appendix Plate A5.4: LFA Site 1 Aerodrome, transect 1B, start facing north-west



Appendix Plate A5.5: LFA Site 1 Aerodrome, transect 1B, end facing south-east



Appendix Plate A5.6: LFA Site 2 Ventia, transect 2A, start facing north, transect decommissioned. No regeneration has occurred along the transect.



Appendix Plate A5.7: LFA Site 2 Ventia, transect 2B, start facing north; no regeneration has occurred



Appendix Plate A5.8: LFA Site 2 Ventia, transect 2B, end facing south



Appendix Plate A5.9: LFA Site Midway Quarry, transect 3A, start facing end



Appendix Plate A5.10: LFA Site 3 Midway Quarry, transect 3A, end facing start



Appendix Plate A5.11: LFA Site 3 Midway Quarry, transect 3B, start facing end

Appendix B. Rangeland (RAM) Data

Appendix B1. Cumulative species list

The following is a cumulative list of flora species recorded at RAM sites (Flora Sites 1 – 22), spring 2024, including life span status, and the number of sites at which they were recorded.

Table B1.1: Cumulative flora list (RAM sites) for Carrapateena, spring 2025

Family	Scientific Name	Common Name	Status ¹	Number of Records	
				Long-lived	Short-lived
MALVACEAE	<i>Abutilon halophilum</i>	Plains Lantern-bush		11	
MALVACEAE	<i>Abutilon otocarpum</i>	Desert Lantern-bush		4	
FABACEAE	<i>Acacia aneura complex</i>	Mulga		1	
FABACEAE	<i>Acacia aptaneura</i>	Slender Mulga		1	
FABACEAE	<i>Acacia ligulata</i>	Umbrella Bush		2	
FABACEAE	<i>Acacia oswaldii</i>	Umbrella Wattle		1	
FABACEAE	<i>Acacia papyrocarpa</i> ²	Western Myall		7	
FABACEAE	<i>Acacia ramulosa</i> var. <i>ramulosa</i>	Horse Mulga		1	
FABACEAE	<i>Acacia tetragonophylla</i>	Dead Finish		6	
SAPINDACEAE	<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	Bullock Bush		1	
AMARANTHACEAE	<i>Alternanthera</i> sp.	Joyweed			1
ANACAMPSEROTACEAE	<i>Anacampseros australiana</i>	Australian Anacampseros			5
BRASSICACEAE	<i>Arabidella nasturtium</i>	Yellow Cress			5
POACEAE	<i>Aristida contorta</i>	Curly Wire-grass			2
POACEAE	<i>Aristida holathera</i> var. <i>holathera</i>	Tall Kerosene Grass			2
POACEAE	<i>Astrebla pectinata</i>	Barley Mitchell-grass		7	
AMARANTHACEAE	<i>Atriplex fissivalvis</i>	Gibber Saltbush			5
AMARANTHACEAE	<i>Atriplex holocarpa</i>	Pop Saltbush			11
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp.	Baldoo			5
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp. <i>conduplicata</i>	Baldoo			2
AMARANTHACEAE	<i>Atriplex velutinella</i>	Sandhill Saltbush			1
AMARANTHACEAE	<i>Atriplex vesicaria</i>	Bladder Saltbush		17	
POACEAE	<i>Austrostipa</i> sp.	Spear-grass			2
NYCTAGINACEAE	<i>Boerhavia dominii</i>	Tar-vine			5
ASTERACEAE	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>	Variable Daisy			1
ASPHODELACEAE	<i>Bulbine semibarbata</i> (may also include <i>Bulbine alata</i>)	Small Leek-lily			9
MONTIACEAE	<i>Calandrinia eremaea</i>	Dryland Purslane			1
ASTERACEAE	<i>Calotis hispidula</i>	Hairy Burr-daisy			7
ASTERACEAE	<i>Centipeda crateriformis</i> ssp.	Sneezeweed			2
PTERIDACEAE	<i>Cheilanthes lasiophylla</i>	Woolly Cloak-fern			1
AMARANTHACEAE	<i>Chenopodium curvispicatum</i>	Cottony Goosefoot		1	
AMARANTHACEAE	<i>Chenopodium desertorum</i> ssp.	Desert Goosefoot		1	
CONVOLVULACEAE	<i>Convolvulus remotus</i>	Grassy Bindweed			1
CRASSULACEAE	<i>Crassula colorata</i> var.	Dense Crassula			1
AMARYLLIDACEAE	<i>Crinum flaccidum</i>	Murray Lily			6
FABACEAE	<i>Crotalaria eremaea</i> ssp.	Loose-flowered Rattle-pod			1
FABACEAE	<i>Cullen cinereum</i>	Annual Scurf-pea			2
POACEAE	<i>Cymbopogon ambiguus</i>	Lemon-grass		3	
APIACEAE	<i>Daucus glochidiatus</i>	Native Carrot			8
POACEAE	<i>Digitaria brownii</i>	Cotton Panic-grass		4	
AMARANTHACEAE	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush			8
AMARANTHACEAE	<i>Dissocarpus paradoxus</i>	Ball Bindyi			7
SAPINDACEAE	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush		5	
SAPINDACEAE	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush		2	
POLYGONACEAE	<i>Duma florulenta</i>	Lignum		2	
AMARANTHACEAE	<i>Einadia nutans</i> ssp.	Climbing Saltbush		2	
AMARANTHACEAE	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush		7	
POACEAE	<i>Enteropogon acicularis</i>	Umbrella Grass			2
POACEAE	<i>Eragrostis australasica</i>	Cane-grass		1	

Family	Scientific Name	Common Name	Status ¹	Number of Records	
				Long-lived	Short-lived
POACEAE	<i>Eragrostis setifolia</i>	Bristly Love-grass		14	
SCROPHULARIACEAE	<i>Eremophila latrobei ssp.</i>	Crimson Emubush		2	
SCROPHULARIACEAE	<i>Eremophila oppositifolia ssp.</i>	Opposite-leaved Emubush		2	
SCROPHULARIACEAE	<i>Eremophila serrulata</i>	Green Emubush		4	
GERANIACEAE	<i>Erodium cicutarium</i>	Cut-leaf Heron's-bill	*		3
GERANIACEAE	<i>Erodium crinitum</i>	Blue Heron's-bill			5
MYRTACEAE	<i>Eucalyptus camaldulensis ssp. arida</i>	Northern River Red Gum		3	
POACEAE	<i>Eulalia aurea</i>	Silky Brown-top		2	
EUPHORBIACEAE	<i>Euphorbia drummondii group</i>	Spurge			1
EUPHORBIACEAE	<i>Euphorbia stevenii</i>	Bottletree Spurge			7
SANTALACEAE	<i>Exocarpos aphyllus</i>	Leafless Cherry		4	
FRANKENIACEAE	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath		12	
GOODENIACEAE	<i>Goodenia fascicularis</i>	Silky Goodenia			4
GOODENIACEAE	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia			3
MALVACEAE	<i>Hibiscus krichauffianus</i>	Velvet-leaf Hibiscus			2
BRASSICACEAE	<i>Lepidium phlebopetalum</i>	Veined Peppercross			5
FABACEAE	<i>Lotus cruentus</i>	Red-flower Lotus			9
PHYLLANTHACEAE	<i>Lysiandra fuernrohrii</i>	Sand Spurge		1	
PRIMULACEAE	<i>Lysimachia arvensis</i>	Pimpernel	*		1
AMARANTHACEAE	<i>Maireana aphylla</i>	Cotton-bush		7	
AMARANTHACEAE	<i>Maireana appressa</i>	Pale-fruit Bluebush		9	
AMARANTHACEAE	<i>Maireana astrotricha</i>	Low Bluebush		1	
AMARANTHACEAE	<i>Maireana eriantha</i>	Woolly Bluebush		6	
AMARANTHACEAE	<i>Maireana georgei</i>	Satiny Bluebush		1	
AMARANTHACEAE	<i>Maireana integra</i>	Entire-wing Bluebush		1	
AMARANTHACEAE	<i>Maireana pyramidata</i>	Black Bluebush		3	
AMARANTHACEAE	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush		7	
MALVACEAE	<i>Malvastrum americanum var. americanum</i>	Malvastrum			3
ASTERACEAE	<i>Minuria cunninghamii</i>	Bush Minuria		10	
SCROPHULARIACEAE	<i>Myoporum montanum</i>	Native Myrtle		6	
SOLANACEAE	<i>Nicotiana velutina</i>	Velvet Tobacco			2
AMARANTHACEAE	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit			4
AMARANTHACEAE	<i>Osteocarpum sp.</i>	Bonefruit			1
POACEAE	<i>Paractaenum novae-hollandiae ssp. reversum</i>	Barbed-wire Grass			2
THYMELAEACEAE	<i>Pimelea microcephala ssp.</i>	Shrubby Riceflower		2	
PLANTAGINACEAE	<i>Plantago drummondii</i>	Dark Plantain			5
ASTERACEAE	<i>Pluchea rubelliflora</i>				2
ASTERACEAE	<i>Podolepis davisiana</i>	Button Podolepis			2
ASTERACEAE	<i>Polycalymma stuartii</i>	Poached-egg Daisy			2
PORTULACACEAE	<i>Portulaca oleracea</i>	Common Purslane			10
ASTERACEAE	<i>Pterocaulon sphacelatum</i>	Apple-bush			2
AMARANTHACEAE	<i>Ptilotus obovatus</i>	Silver Mulla Mulla		6	
AMARANTHACEAE	<i>Rhagodia spinescens</i>	Spiny Saltbush		7	
ZYGOPHYLLACEAE	<i>Roepera eremaea</i>	Twinleaf			7
ZYGOPHYLLACEAE	<i>Roepera howittii</i>	Clasping Twinleaf			1
ZYGOPHYLLACEAE	<i>Roepera prismatotheca</i>	Square-fruit Twinleaf			1
ACANTHACEAE	<i>Rostellularia adscendens ssp.</i>	Pink Tongues			5
AMARANTHACEAE	<i>Salsola australis</i>	Buckbush			4
SANTALACEAE	<i>Santalum lanceolatum</i>	Plumbush		3	
GOODENIACEAE	<i>Scaevola spinescens</i>	Spiny Fanflower		4	
AMARANTHACEAE	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi			9
AMARANTHACEAE	<i>Sclerolaena diacantha</i>	Grey Bindyi			2
AMARANTHACEAE	<i>Sclerolaena divaricata</i>	Tangled Bindyi			11
AMARANTHACEAE	<i>Sclerolaena intricata</i>	Tangled Bindyi			12
AMARANTHACEAE	<i>Sclerolaena obliquicuspis</i>	Oblique-spined Bindyi			1
AMARANTHACEAE	<i>Sclerolaena sp. Pernatty3</i>				1
AMARANTHACEAE	<i>Sclerolaena ventricosa</i>	Salt Bindyi			11
ASTERACEAE	<i>Senecio glossanthus</i>	Annual Groundsel			6
FABACEAE	<i>Senna artemisioides ssp. helmsii</i>	Blunt-leaf Senna		5	
FABACEAE	<i>Senna artemisioides ssp. oligophylla</i>	Limestone Senna		1	

Family	Scientific Name	Common Name	Status ¹	Number of Records	
				Long-lived	Short-lived
FABACEAE	<i>Senna artemisioides ssp. X artemisioides</i>	Silver Senna		5	
FABACEAE	<i>Senna artemisioides ssp. X sturtii</i>	Grey Senna		1	
MALVACEAE	<i>Sida ammophila</i>	Sand Sida			2
MALVACEAE	<i>Sida corrugata var.</i>	Corrugated Sida			4
MALVACEAE	<i>Sida fibulifera</i>	Pin Sida			7
MALVACEAE	<i>Sida intricata</i>	Twiggy Sida		3	
MALVACEAE	<i>Sida petrophila (may include one record of Sida calyxhymenia)</i>	Rock Sida		6	
BRASSICACEAE	<i>Sisymbrium erysimoides</i>	Smooth Mustard	*		3
SOLANACEAE	<i>Solanum lithophilum</i>	Velvet Potato-bush			7
SOLANACEAE	<i>Solanum quadriloculatum</i>	Plains Nightshade			4
ASTERACEAE	<i>Sonchus oleraceus</i>	Common Sow-thistle			12
POACEAE	<i>Sporobolus actinocladius</i>	Ray Grass			11
ASTERACEAE	<i>Streptoglossa sp.</i>	Daisy			1
AMARANTHACEAE	<i>Tecticornia indica ssp.</i>	Brown-head Samphire		1	
AMARANTHACEAE	<i>Tecticornia medullosa</i>	Samphire		12	
AMARANTHACEAE	<i>Tecticornia pergranulata ssp.</i>	Black-seed Samphire		2	
AMARANTHACEAE	<i>Tecticornia tenuis</i>	Slender Samphire		2	
AIZOACEAE	<i>Tetragonia sp. (likely T. eremaea)</i>	Annual Spinach			8
LAMIACEAE	<i>Teucrium racemosum</i>	Grey Germander			4
AIZOACEAE	<i>Trianthema triquetrum</i>	Red Spinach			2
BORAGINACEAE	<i>Trichodesma zeylanicum var. zeylanicum</i>	Camel Bush			1
CAMPANULACEAE	<i>Wahlenbergia sp.</i>	Native Bluebell			1
COLCHICACEAE	<i>Wurmbea sp.</i>	Nancy			2
POACEAE	<i>Zygochloa paradoxa</i>	Sandhill Cane-grass		2	
		Totals		57	77

¹ Blank = Native * = Naturalised (introduced and reproducing itself without human assistance)

²*Acacia sp. Blyth Range* is a poorly known entity, formerly known as *Acacia affin. papyrocarpa*. It is most common in the vicinity of Lake Torrens, NW edge of Flinders Ranges and near Bltyh Range in WA. Factsheet - *Acacia sp. Blyth Range* (W.V.Fitzgerald s.n. 1898) [affin. *papyrocarpa*] “Further field and laboratory studies are needed to determine the status of this taxon. It is clearly related to *A. papyrocarpa*, but differs most obviously in having rather rigid, often subterete, ±pungent phyllodes and minutely appressed hairy pods.” In the Carrapateena operational area, the taxon of the trees is still under review.

³ *Sclerolaena sp.* Pernatty is not recognised as an official species. It has been recorded as *Sclerolaena sp. Pernatty* since baseline surveys and no further taxonomic work has been done.

Appendix B2. Site specific descriptive statistics, grazing impact

Table B2.1: Plant diversity, life span, grazing impact, life stages and cover/abundance per RAM Site

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
Flora Site 1 / CAR001	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	3	Mixed	0	>50	<50
	<i>Astrebala pectinata</i>	Barley Mitchell-grass	Y	3	Adult	0	>50	<50
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	3				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	<50	<50
	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>	Variable Daisy	N	1				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	2				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	2	Adult	>50	0	0
	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia	N	1				
	<i>Lotus cruentus</i>	Red-flower Lotus	N	2				
	<i>Maireana aphylla</i>	Cotton-bush	Y	1	Adult	>50	<50	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	3	Adult	>50	<50	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	2	Adult	<50	>50	0
	<i>Sclerolaena diacantha</i>	Grey Bindyi	N	3				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	4				
	<i>Senecio glossanthus</i>	Annual Groundsel	N	1				
	<i>Sida fibulifera</i>	Pin Sida	N	2				
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Sporobolus actinocladus</i>	Ray Grass	N	2				
	<i>Streptoglossa</i> sp.	Daisy	N	1				
	<i>Tecticornia medullosa</i>	Samphire	Y	3	Adult	>50	<50	0
	Site 1 Totals: 21 (long-lived = 13, short-lived = 8)							
Flora Site 2 / CAR002	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	2/4	Mixed	>50	<50	<50
	<i>Anacampseros australiana</i>	Australian Anacampseros	N	1				
	<i>Arabidella nasturtium</i>	Yellow Cress	N	1				
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex lindleyi</i> ssp.	Baldoo	N	3				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	<50	0
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	1				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	2/4				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Erodium crinitum</i>	Blue Heron's-bill	N	1				
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	1				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	1	Adult	>50	0	0
	<i>Lotus cruentus</i>	Red-flower Lotus	N	1				
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	1	Adult	>50	0	0
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Salsola australis</i>	Buckbush	N	2				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	4/5				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	2/4				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	2/4				
	<i>Tecticornia medullosa</i>	Samphire	Y	2	Adult	>50	0	0
	Site 2 Totals: 21 (long-lived = 6, short-lived = 15)							
Flora Site 3 / CAR003	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	3	Mixed	<50	>50	0
	<i>Anacampseros australiana</i>	Australian Anacampseros	N	3				
	<i>Arabidella nasturtium</i>	Yellow Cress	N	2				
	<i>Astrebala pectinata</i>	Barley Mitchell-grass	Y	3	Adult	0	>50	<50
	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N	2				
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex lindleyi</i> ssp.	Baldoo	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	4	Mixed	>50	<50	0
	<i>Bulbine semibarbata</i>	Small Leek-lily	N	1				
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	1				
	<i>Centipeda crateriformis</i> ssp.	Sneezeweed	N	1				
	<i>Daucus glochidiatus</i>	Native Carrot	N	3				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	3				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	2				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Adult	>50	<50	0
	<i>Lotus cruentus</i>	Red-flower Lotus	N	1				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	2	Mixed	>50	0	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	3	Mixed	>50	<50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	3	Mixed	0	<50	>50
	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit	N	1				
	<i>Plantago drummondii</i>	Dark Plantain	N	3				
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	3				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	3				
	<i>Senecio glossanthus</i>	Annual Groundsel	N	2				
	<i>Sida fibulifera</i>	Pin Sida	N	2				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Tecticornia medullosa</i>	Samphire	Y	5	Mixed	>50	<50	0
	Site 3 Totals: 30 (long-lived = 9, short-lived = 21)							
Flora Site 4 / CAR004	<i>Arabidella nasturtium</i>	Yellow Cress	N	1				
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	4	Mixed	>50	<50	0
	<i>Boerhavia dominii</i>	Tar-vine	N	3				
	<i>Bulbine</i> sp.	Bulbine-lily	N	3				
	<i>Daucus glochidiatus</i>	Native Carrot	N	1				
	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush	N	3				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	1				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	3	Adult	0	0	>50
	<i>Erodium cicutarium</i> *	Cut-leaf Heron's-bill	N	1				
	<i>Erodium crinitum</i>	Blue Heron's-bill	N	1				
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	1				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Adult	>50	0	0
	<i>Lotus cruentus</i>	Red-flower Lotus	N	3				
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	1	Mixed	0	>50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	1	Adult	0	<50	>50
	<i>Plantago drummondii</i>	Dark Plantain	N	3				
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Roepera prismatotheca</i>	Square-fruit Twinleaf	N	1				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	3				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	2/4				
	<i>Sida fibulifera</i>	Pin Sida	N	3				
	<i>Sida intricata</i>	Twiggy Sida	Y	1	Adult	0	0	>50
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	2				
	<i>Tecticornia medullosa</i>	Samphire	Y	2	Mixed	>50	0	0
	<i>Tetragonia</i> sp.	False Spinach	N	2				
	Site 4 Totals: 29 (long-lived = 7, short-lived = 22)							
Flora Site 5 / CAR005	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	4	Mixed	>50	<50	0
	<i>Anacampseros australiana</i>	Australian Anacampseros	N					
	<i>Astrebla pectinata</i>	Barley Mitchell-grass	Y	2	Adult	0	0	>50
	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N					
	<i>Atriplex holocarpa</i>	Pop Saltbush	N					
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	<50	0
	<i>Austrostipa</i> sp.	Spear-grass	N					
	<i>Bulbine</i> sp.	Bulbine-lily	N					
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N					
	<i>Crassula colorata</i> var.	Dense Crassula	N					
	<i>Cullen cinereum</i>	Annual Scurf-pea	N					
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2/4	Adult	0	0	>50
	<i>Erodium cicutarium</i> *	Cut-leaf Heron's-bill	N					
	<i>Erodium crinitum</i>	Blue Heron's-bill	N					
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	4	Mixed	>50	0	0
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	3	Adult	0	>50	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	2	Mixed	>50	<50	0
	<i>Maireana georgei</i>	Satiny Bluebush	Y	2	Mixed	<50	>50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	3	Mixed	<50	>50	0
	<i>Portulaca oleracea</i>	Common Purslane	N					
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N					

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N					
	<i>Sclerolaena</i> sp. <i>Pernatty</i>		N	2				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N					
	<i>Senecio glossanthus</i>	Annual Groundsel	N					
	<i>Sida intricata</i>	Twiggy Sida	Y	1	Adult	0	0	>50
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N					
	<i>Sporobolus actinocladius</i>	Ray Grass	N					
	<i>Tecticornia medullosa</i>	Samphire	Y	4	Mixed	>50	0	0
	Site 5 Totals: 29 (long-lived = 11, short-lived = 18)							
Flora Site 6 / CAR006	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	2	Adult	0	>50	<50
	<i>Arabidella nasturtium</i>	Yellow Cress	N	1				
	<i>Astrebla pectinata</i>	Barley Mitchell-grass	Y	1	Adult	0	0	>50
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	3				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	<50	>50	<50
	<i>Bulbine semibarbata</i>	Small Leek-lily	N	3				
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	1				
	<i>Centipeda crateriformis</i> ssp.	Sneezeweed	N	1				
	<i>Daucus glochidiatus</i>	Native Carrot	N	1				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	3	Adult	0	0	>50
	<i>Goodenia fascicularis</i>	Silky Goodenia	N	1				
	<i>Lotus cruentus</i>	Red-flower Lotus	N	2				
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	2	Adult	0	>50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	4	Mixed	0	0	>50
	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit	N	1				
	<i>Plantago drummondii</i>	Dark Plantain	N	2				
	<i>Podolepis davisiana</i>	Button Podolepis	N	1				
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Roepera eremaea</i>	Twinleaf	N	1				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	3				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	4				
	<i>Sida fibulifera</i>	Pin Sida	N	3				
	<i>Sida intricata</i>	Twiggy Sida	Y	1	Adult	0	0	>50
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Tecticornia medullosa</i>	Samphire	Y	3	Mixed	<50	>50	0
	<i>Wahlenbergia</i> sp.	Native Bluebell	N	1				
	Site 6 Totals: 28 (long-lived = 8, short-lived = 20)							
Flora Site 7 / CAR007	<i>Astrebla pectinata</i>	Barley Mitchell-grass	Y	4	Adult	0	<50	>50
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	<50	0
	<i>Enteropogon acicularis</i>	Umbrella Grass	N	1				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	2	Adult	>50	<50	0
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	3	Mixed	>50	<50	0
	<i>Maireana astrotricha</i>	Low Bluebush	Y	3	Adult	>50	<50	0
	<i>Maireana pyramidata</i>	Black Bluebush	Y	2	Adult	<50	>50	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	3	Mixed	<50	>50	<50
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	2	Adult	0	>50	<50
	<i>Myoporum montanum</i>	Native Myrtle	Y	1	Juveniles	>50	0	0
	<i>Osteocarpum</i> sp.	Bonefruit	N	3				
	<i>Plantago drummondii</i>	Dark Plantain	N	1				
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Sclerolaena diacantha</i>	Grey Bindyi	N	3				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	2				
	<i>Sclerolaena obliquicuspis</i>	Oblique-spined Bindyi	N	3				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	3				
	<i>Sida calyxhymenia</i>	Tall Sida	N	2				
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	2				
	<i>Tecticornia indica</i> ssp.	Brown-head Samphire	Y	3	Mixed	>50	0	0
	<i>Tecticornia pergranulata</i> ssp.	Black-seed Samphire	Y	3	Adult	>50	<50	<50
	<i>Tecticornia tenuis</i>	Slender Samphire	Y	2	Mixed	<50	>50	0
	<i>Tetragonia tetragonoides</i>	New Zealand Spinach	N	1				
	Site 7 Totals: 25 (long-lived = 12, short-lived = 13)							

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
Flora Site 9 / CAR009	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	2/4	Mixed	>50	<50	0
	<i>Acacia aneura complex</i>	Mulga	Y	2	Mixed	<50	>50	0
	<i>Acacia papyrocarpa</i>	Western Myall	Y	5	Mixed	>50	<50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	1	Adult	>50	<50	0
	<i>Anacampseros australiana</i>	Australian Anacampseros	N	1				
	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N	1				
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex lindleyi</i> ssp.	Baldoo	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	3	Mixed	>50	<50	<50
	<i>Cymbopogon ambiguus</i>	Lemon-grass	Y	3	Adult	0	0	>50
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	1				
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	2	Mixed	0	>50	0
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Eremophila oppositifolia</i> ssp.	Opposite-leaved Emubush	Y	1	Adult	0	0	>50
	<i>Erodium cicutarium</i> *	Cut-leaf Heron's-bill	N	1				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Adult	<50	>50	0
	<i>Maireana aphylla</i>	Cotton-bush	Y	3	Adult	0	>50	0
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	2/4	Mixed	0	>50	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	2/4	Adult	0	>50	<50
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	3	Mixed	0	<50	>50
	<i>Myoporum montanum</i>	Native Myrtle	Y	1	Juveniles	>50	0	0
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	2	Mixed	>50	0	0
	<i>Rostellularia adscendens</i> ssp.	Pink Tongues	N	1				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	3				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	3				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	3				
	<i>Sida fibulifera</i>	Pin Sida	N	1				
	<i>Solanum quadriloculatum</i>	Plains Nightshade	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Sporobolus actinocladus</i>	Ray Grass	N	2				
	<i>Tecticornia medullosa</i>	Samphire	Y	2/4	Mixed	<50	>50	<50
	<i>Tecticornia pergranulata</i> ssp.	Black-seed Samphire	Y	1/5	Mixed	<50	>50	<50
	<i>Tecticornia tenuis</i>	Slender Samphire	Y	4	Mixed	>50	0	0
	Site 9 Totals: 34 (long-lived = 19, short-lived = 15)							
Flora Site 10 / CAR010	<i>Abutilon otocarpum</i>	Desert Lantern-bush	Y	1	Adult	0	<50	>50
	<i>Acacia papyrocarpa</i>	Western Myall	Y	4	Mixed	>50	<50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	4	Mixed	<50	>50	<50
	<i>Aristida contorta</i>	Curly Wire-grass	N	3				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	3	Mixed	<50	>50	0
	<i>Austrostipa</i> sp.	Spear-grass	N	1				
	<i>Boerhavia dominii</i>	Tar-vine	N	1				
	<i>Crinum flaccidum</i>	Murray Lily	N	2				
	<i>Cymbopogon ambiguus</i>	Lemon-grass	Y	4	Adult	0	<50	>50
	<i>Daucus glochidiatus</i>	Native Carrot	N	1				
	<i>Digitaria brownii</i>	Cotton Panic-grass	Y	2/4	Adult	0	>50	0
	<i>Dodonea lobulata</i>	Lobed-leaf Hop-bush	Y	4	Mixed	0	>50	0
	<i>Duma florulenta</i>	Lignum	Y	2	Mixed	0	>50	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	3	Mixed	<50	>50	0
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	4	Adult	0	0	>50
	<i>Eucalyptus camaldulensis</i> ssp. <i>arida</i>	Northern River Red Gum	Y	4	Adult	>50	0	0
	<i>Eulalia aurea</i>	Silky Brown-top	Y	3	Adult	0	0	>50
	<i>Eulalia aurea</i>	Silky Brown-top	Y	1	Adult	0	0	>50
	<i>Exocarpos aphyllus</i>	Leafless Cherry	Y	1	Mixed	<50	>50	0
	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia	N	1				
	<i>Lepidium phlebopetalum</i>	Veined Peppercross	N	1				
	<i>Malvastrum americanum</i> var. <i>americanum</i>	Malvastrum	N	1				
	<i>Myoporum montanum</i>	Native Myrtle	Y	4	Mixed	>50	<50	0
	<i>Pterocaulon sphacelatum</i>	Apple-bush	N	1				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	4	Mixed	0	>50	<50
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	1	Adult	0	>50	0
	<i>Rostellularia adscendens</i> ssp.	Pink Tongues	N	3				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Scaevola spinescens</i>	Spiny Fanflower	Y	4	Mixed	0	>50	<50
	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y	3	Adult	>50	<50	0
	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y	4	Mixed	>50	<50	0
	<i>Sida corrugata</i> var.	Corrugated Sida	N	1				
	<i>Sida petrophila</i>	Rock Sida	Y	4				
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Solanum quadriloculatum</i>	Plains Nightshade	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	3				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	1				
	<i>Teucrium racemosum</i>	Grey Germander	N	1				
	Site 10 Totals: 37 (long-lived = 21, short-lived = 16)							
Flora Site 11 / CAR011	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	3	Mixed	>50	<50	0
	<i>Acacia papyrocarpa</i>	Western Myall	Y	1	Mixed	>50	<50	0
	<i>Anacampseros australiana</i>	Australian Anacampseros	N	2				
	<i>Astrebula pectinata</i>	Barley Mitchell-grass	Y	3/4	Adult	0	<50	>50
	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N	1				
	<i>Atriplex lindleyi</i> ssp.	Baldoo	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	4	Mixed	>50	>50	0
	<i>Bulbine</i> sp.	Bulbine-lily	N	2				
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	3				
	<i>Crinum flaccidum</i>	Murray Lily	N	1				
	<i>Daucus glochidiatus</i>	Native Carrot	N	3				
	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush	N	3				
	<i>Eragrostis australasica</i>	Cane-grass	Y	1	Adult	>50	0	0
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2/4	Adult	0	0	>50
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	1				
	<i>Exocarpos aphyllus</i>	Leafless Cherry	Y	1	Adult	0	>50	0
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Mixed	>50	0	0
	<i>Goodenia fascicularis</i>	Silky Goodenia	N	1				
	<i>Lotus cruentus</i>	Red-flower Lotus	N	3				
	<i>Maireana aphylla</i>	Cotton-bush	Y	1	Adult	<50	>50	0
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	3	Adult	<50	>50	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	1	Adult	<50	>50	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	2	Mixed	0	>50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	1	Mixed	0	>50	<50
	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit	N	2				
	<i>Plantago drummondii</i>	Dark Plantain	N	1				
	<i>Podolepis davisiana</i>	Button Podolepis	N	1				
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	1	Adult	>50	0	0
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	2				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	1				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	2/4				
	<i>Senecio glossanthus</i>	Annual Groundsel	N	2				
	<i>Sida fibulifera</i>	Pin Sida	N	3				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	3				
	<i>Tecticornia medullosa</i>	Samphire	Y	5	Mixed	>50	0	0
	<i>Tetragonia</i> sp.	False Spinach	N	2				
	Site 11 Totals: 37 (long-lived = 15, short-lived = 22)							
Flora Site 12 / CAR012	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	1	Mixed	0	<50	0
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex lindleyi</i> ssp. <i>conduplicata</i>	Baldoo	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	<50	0
	<i>Bulbine semibarbata</i>	Small Leek-lily	N	3				
	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush	N	3				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	2				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	4	Adult	0	0	>50
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	3				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	1	Adult	>50	0	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	2	Adult	0	0	>50
	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit	N	3				
	<i>Roepera eremaea</i>	Twinleaf	N	1				
	<i>Salsola australis</i>	Buckbush	N	1				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	2/4				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	2/4				
	<i>Sida fibulifera</i>	Pin Sida	N	2				
	<i>Sonchus oleraceus*</i>	Common Sow-thistle	N	1				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	3				
	<i>Tecticornia medullosa</i>	Samphire	Y	4	Adult	0	0	>50
	Site 12 Totals: 21 (long-lived = 6, short-lived = 15)							
Flora Site 13 / CAR013	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	2	Mixed	>50	0	0
	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N	2				
	<i>Atriplex lindleyi</i> ssp.	Baldoo	N	3				
	<i>Atriplex lindleyi</i> ssp. <i>conduplicata</i>	Baldoo	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	<50	>50	<50
	<i>Bulbine</i> sp.	Bulbine-lily	N	1				
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	2				
	<i>Daucus glochidiatus</i>	Native Carrot	N	1				
	<i>Dissocarpus biflorus</i> var.	Two-horn Saltbush	N	1				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	4	Adult	0	0	>50
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Adult	>50	0	0
	<i>Lotus cruentus</i>	Red-flower Lotus	N	2				
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	3	Adult	0	0	>50
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	1	Adult	0	0	>50
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Roepera eremaea</i>	Twinleaf	N	1				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	2/4				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	2/4				
	<i>Solanum quadriloculatum</i>	Plains Nightshade	N	1				
	<i>Sonchus oleraceus*</i>	Common Sow-thistle	N	1				
	<i>Tecticornia medullosa</i>	Samphire	Y	4	Mixed	>50	0	0
	<i>Tetragonia</i> sp.	False Spinach	N	1				
	Site 13 Totals: 23 (long-lived = 7, short-lived = 16)							
Flora Site 15 / CAR015	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	3	Adult	>50	<50	0
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	4	Mixed	>50	<50	0
	<i>Bulbine semibarbata</i>	Small Leek-lily	N	1				
	<i>Calotis hispidula</i>	Hairy Burr-daisy	N	1				
	<i>Dissocarpus biflorus</i> var.	Two-horn Saltbush	N	1				
	<i>Dissocarpus paradoxus</i>	Ball Bindyi	N	2				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	1	Adult	0	0	>50
	<i>Erodium crinitum</i>	Blue Heron's-bill	N	1				
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	1				
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	2	Mixed	>50	0	0
	<i>Lotus cruentus</i>	Red-flower Lotus	N	2				
	<i>Maireana aphylla</i>	Cotton-bush	Y	2	Adult	>50	<50	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	1	Mixed	0	>50	0
	<i>Roepera</i> sp.	Twinleaf	N	1				
	<i>Salsola australis</i>	Buckbush	N	3				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2/4				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	4/5				
	<i>Tecticornia medullosa</i>	Samphire	Y	3	Mixed	>50	0	0
	<i>Tetragonia</i> sp.	False Spinach	N	2				
	<i>Wurmbea</i> sp.	Nancy	N	1				
	Site 15 Totals: 22 (long-lived = 7, short-lived = 15)							
Flora Site 16 / CAR016	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y	2/4	Mixed	>50	<50	0
	<i>Arabidella nasturtium</i>	Yellow Cress	N	3				
	<i>Astrebla pectinata</i>	Barley Mitchell-grass	Y	1	Adult	0	0	>50
	<i>Atriplex holocarpa</i>	Pop Saltbush	N	2				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	5	Mixed	>50	0	0
	<i>Bulbine semibarbata</i>	Small Leek-lily	N	2				
	<i>Cullen cinereum</i>	Annual Scurf-pea	N	1				
	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush	N	2				
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Erodium crinitum</i>	Blue Heron's-bill	N	1				
	<i>Euphorbia stevenii</i>	Bottletree Spurge	N	1				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y	3	Mixed	>50	0	0
	<i>Goodenia fascicularis</i>	Silky Goodenia	N	1				
	<i>Lepidium phlebopetalum</i>	Veined Peppercross	N	2				
	<i>Lotus cruentus</i>	Red-flower Lotus	N	3				
	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y	1	Adult	>50	<50	0
	<i>Maireana eriantha</i>	Woolly Bluebush	Y	2	Adult	>50	<50	0
	<i>Minuria cunninghamii</i>	Bush Minuria	Y	1	Adult	>50	<50	0
	<i>Roepera</i> sp.	Twinleaf	N	1				
	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N	2/4				
	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N	2/4				
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	4				
	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N	4				
	<i>Senecio glossanthus</i>	Annual Groundsel	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	1				
	<i>Tecticornia medullosa</i>	Samphire	Y	4	Mixed	>50	0	0
	<i>Tetragonia tetragonoides</i>	New Zealand Spinach	N	2				
	<i>Trianthema triquetrum</i>	Red Spinach	N	1				
	Site 16 Totals: 29 (long-lived = 9, short-lived = 20)							
Flora Site 17 / CAR017	<i>Abutilon otocarpum</i>	Desert Lantern-bush	Y	1	Mixed	>50	0	0
	<i>Acacia papyrocarpa</i>	Western Myall	Y	5	Mixed	<50	>50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	2/4	Mixed	>50	0	0
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	2/4	Mixed	0	>50	0
	<i>Chenopodium desertorum</i> ssp.	Desert Goosefoot	Y	3	Mixed	<50	<50	>50
	<i>Crinum flaccidum</i>	Murray Lily	N	2				
	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	Y	4/5	Mixed	>50	<50	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	4	Mixed	>50	<50	0
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Eremophila latrobei</i> ssp.	Crimson Emubush	Y	3	Mixed	>50	0	0
	<i>Eremophila serrulata</i>	Green Emubush	Y	3	Mixed	>50	0	0
	<i>Exocarpos aphyllus</i>	Leafless Cherry	Y	1	Adult	0	>50	0
	<i>Goodenia</i> sp.	Goodenia	N	1				
	<i>Lepidium phlebopetalum</i>	Veined Peppercross	N	1				
	<i>Maireana aphylla</i>	Cotton-bush	Y	1	Adult	<50	>50	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	2/4	Adult	0	>50	<50
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	4	Mixed	>50	<50	0
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	2	Mixed	>50	<50	0
	<i>Rostellularia adscendens</i> ssp.	Pink Tongues	N	3				
	<i>Scaevola spinescens</i>	Spiny Fanflower	Y	3	Mixed	<50	<50	>50
	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y	2	Mixed	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>oligophylla</i>	Limestone Senna	Y	2/4	Mixed	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y	2	Adult	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>X sturtii</i>	Grey Senna	Y	1	Adult	>50	0	0
	<i>Sida petrophila</i>	Rock Sida	Y	2/4	Mixed	>50	0	0
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	2				
	Site 17 Totals: 28 (long-lived = 20, short-lived = 8)							
Flora Site 18 / CAR018	<i>Acacia papyrocarpa</i>	Western Myall	Y	5	Mixed	>50	<50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	4	Adult	>50	0	0
	<i>Alternanthera</i> sp.	Joyweed	N	1				
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	2/4	Mixed	>50	<50	0
	<i>Boerhavia dominii</i>	Tar-vine	N	1				
	<i>Cheilanthes lasiophylla</i>	Woolly Cloak-fern	N	1				
	<i>Chenopodium curvispicatum</i>	Cottony Goosefoot	Y	1	Adult	>50	0	0
	<i>Crinum flaccidum</i>	Murray Lily	N	3				
	<i>Digitaria brownii</i>	Cotton Panic-grass	Y	4	Adult	0	0	>50
	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	Y	4	Mixed	>50	0	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	4	Mixed	>50	<50	0
	<i>Enteropogon acicularis</i>	Umbrella Grass	N	2				
	<i>Eremophila serrulata</i>	Green Emubush	Y	1	Adult	>50	0	0
	<i>Goodenia</i> sp.	Goodenia	N	1				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Lysimachia arvensis</i> *	Pimpernel	N	1				
	<i>Maireana aphylla</i>	Cotton-bush	Y	1	Adult	>50	<50	0
	<i>Maireana integra</i>	Entire-wing Bluebush	Y	1	Adult	>50	0	0
	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y	4	Mixed	<50	>50	<50
	<i>Myoporum montanum</i>	Native Myrtle	Y	2	Mixed	>50	0	0
	<i>Portulaca oleracea</i>	Common Purslane	N	1				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	4	Mixed	>50	<50	0
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	2	Mixed	>50	<50	0
	<i>Rostellularia adscendens</i> ssp.	Pink Tongues	N	1				
	<i>Santalum lanceolatum</i>	Plumbush	Y	1	Adult	>50	0	0
	<i>Sclerolaena intricata</i>	Tangled Bindyi	N	1				
	<i>Senecio glossanthus</i>	Annual Groundsel	N	1				
	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y	3	Mixed	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y	3	Adult	>50	0	0
	<i>Sida corrugata</i> var.	Corrugated Sida	N	2				
	<i>Sida petrophila</i>	Rock Sida	Y	2/4	Adult	>50	0	0
	<i>Sisymbrium erysimoides</i> *	Smooth Mustard	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	2				
	<i>Sporobolus actinocladius</i>	Ray Grass	N	3				
	<i>Tetragonia</i> sp.	False Spinach	N	1				
	<i>Teucrium racemosum</i>	Grey Germander	N	1	Adult	>50	<50	0
	<i>Trianthema triquetrum</i>	Red Spinach	N	1				
	<i>Wurmbea</i> sp.	Nancy	N	1				
	Site 18 Totals: 37 (long-lived = 18, short-lived = 19)							
Flora Site 19 / CAR019	<i>Abutilon otocarpum</i>	Desert Lantern-bush	Y	3	Mixed	>50	0	0
	<i>Acacia papyrocarpa</i>	Western Myall	Y	2/4	Mixed	>50	<50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	4/5	Adult	>50	0	0
	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y	2	Mixed	>50	0	0
	<i>Boerhavia dominii</i>	Tar-vine	N	1				
	<i>Crinum flaccidum</i>	Murray Lily	N	3				
	<i>Daucus glochidiatus</i>	Native Carrot	N	3				
	<i>Digitaria brownii</i>	Cotton Panic-grass	Y	4	Adult	0	<50	>50
	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	Y	4/5	Mixed	>50	0	0
	<i>Duma florulenta</i>	Lignum	Y	2	Mixed	>50	0	0
	<i>Einadia nutans</i> ssp.	Climbing Saltbush	Y	2	Mixed	>50	0	0
	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y	2	Adult	0	0	>50
	<i>Eremophila latrobei</i> ssp.	Crimson Emubush	Y	2	Adult	>50	0	0
	<i>Eremophila oppositifolia</i> ssp.	Opposite-leaved Emubush	Y	1	Adult	0	0	>50
	<i>Eremophila serrulata</i>	Green Emubush	Y	1	Adult	>50	0	0
	<i>Eucalyptus camaldulensis</i> ssp. <i>arida</i>	Northern River Red Gum	Y	4	Mixed	>50	0	0
	<i>Exocarpos aphyllus</i>	Leafless Cherry	Y	1	Adult	>50	0	0
	<i>Lepidium phlebopetalum</i>	Veined Peppercress	N	3				
	<i>Maireana aphylla</i>	Cotton-bush	Y	1	Adult	>50	0	0
	<i>Malvastrum americanum</i> var. <i>americanum</i>	Malvastrum	N	1				
	<i>Myoporum montanum</i>	Native Myrtle	Y	4	Mixed	>50	0	0
	<i>Pluchea rubelliflora</i>		N	2				
	<i>Pterocaulon sphacelatum</i>	Apple-bush	N	3				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	4	Mixed	>50	<50	0
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	1	Adult	<50	>50	0
	<i>Rostellularia adscendens</i> ssp.	Pink Tongues	N	1				
	<i>Santalum lanceolatum</i>	Plumbush	Y	2/4	Mixed	>50	0	0
	<i>Scaevola spinescens</i>	Spiny Fanflower	Y	4	Mixed	>50	<50	0
	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y	2/4	Adult	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y	2	Adult	>50	0	0
	<i>Sida corrugata</i> var.	Corrugated Sida	N	1				
	<i>Sida petrophila</i>	Rock Sida	Y	4	Mixed	>50	0	0
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	2				
	<i>Tetragonia</i> sp.	False Spinach	N	2				
	<i>Teucrium racemosum</i>	Grey Germander	N	3	Adult	>50	0	0
	Site 19 Totals: 36 (long-lived =23, short-lived = 13)							
	<i>Abutilon otocarpum</i>	Desert Lantern-bush	Y	2	Mixed	>50	0	0

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
Flora Site 20 / CAR020	<i>Acacia aptaneura</i>	Slender Mulga	Y	1	Adult	>50	0	0
	<i>Acacia papyrocarpa</i>	Western Myall	Y	2	Adult	>50	<50	0
	<i>Acacia tetragonophylla</i>	Dead Finish	Y	4	Adult	>50	0	0
	<i>Boerhavia dominii</i>	Tar-vine	N	3				
	<i>Convolvulus remotus</i>	Grassy Bindweed	N	1				
	<i>Crinum flaccidum</i>	Murray Lily	N	1				
	<i>Cymbopogon ambiguus</i>	Lemon-grass	Y	2	Adult	0	>50	<50
	<i>Daucus glochidiatus</i>	Native Carrot	N	2				
	<i>Digitaria brownii</i>	Cotton Panic-grass	Y	4	Adult	0	<50	>50
	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	Y	4	Mixed	>50	0	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	2	Mixed	>50	<50	0
	<i>Eremophila serrulata</i>	Green Emubush	Y	1	Mixed	>50	0	0
	<i>Eucalyptus camaldulensis</i> ssp. <i>arida</i>	Northern River Red Gum	Y	4	Mixed	>50	0	0
	<i>Lepidium phlebopetalum</i>	Veined Peppercreess	N	3				
	<i>Malvastrum americanum</i> var. <i>americanum</i>	Malvastrum	N					
	<i>Myoporum montanum</i>	Native Myrtle	Y	4	Mixed	>50	0	0
	<i>Pluchea rubelliflora</i>	Winged Plais-bush	N	4				
	<i>Ptilotus obovatus</i>	Silver Mulla Mulla	Y	2/4	Mixed	>50	0	0
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	1	Adult	>50	<50	0
	<i>Santalum lanceolatum</i>	Plumbush	Y	2	Mixed	>50	0	0
	<i>Scaevola spinescens</i>	Spiny Fanflower	Y	2	Adult	0	<50	>50
	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y	2	Mixed	>50	0	0
	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y	2	Adult	>50	0	0
	<i>Sida corrugata</i> var.	Corrugated Sida	N	1				
	<i>Sida petrophila</i>	Rock Sida	Y	2	Mixed	>50	0	0
	<i>Solanum lithophilum</i>	Velvet Potato-bush	N	1				
	<i>Solanum quadriloculatum</i>	Plains Nightshade	N	1				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Teucrium racemosum</i>	Grey Germander	N	1				
	Site 20 Totals: 30 (long-lived = 18, short-lived = 12)							
Flora Site 21 / CAR021	<i>Acacia ligulata</i>	Umbrella Bush	Y	4	Mixed	>50	0	0
	<i>Acacia oswaldii</i>	Umbrella Wattle	Y	1	Adult	0	>50	0
	<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	Bullock Bush	Y	1	Adult	0	>50	0
	<i>Aristida contorta</i>	Curly Wire-grass	N	2				
	<i>Aristida holathera</i> var. <i>holathera</i>	Tall Kerosene Grass	N	2				
	<i>Atriplex velutinella</i>	Sandhill Saltbush	N	1				
	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush	Y	1	Mixed	>50	<50	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	2	Mixed	0	>50	0
	<i>Hibiscus krichauffianus</i>	Velvet-leaf Hibiscus	N	2/4				
	<i>Lysiandra fuernrohrii</i>	Sand Spurge	Y	3	Mixed	>50	0	0
	<i>Maireana pyramidata</i>	Black Bluebush	Y	1	Adult	0	>50	0
	<i>Nicotiana velutina</i>	Velvet Tobacco	N	3				
	<i>Paractaenum novae-hollandiae</i> ssp. <i>reversum</i>	Barbed-wire Grass	N	1				
	<i>Pimelea microcephala</i> ssp.	Shrubby Riceflower	Y	1	Adult	>50	0	0
	<i>Polycalymma stuartii</i>	Poached-egg Daisy	N	2				
	<i>Roepera eremaea</i>	Twinleaf	N	1				
	<i>Sida ammophila</i>	Sand Sida	N	2				
	<i>Sisymbrium erysimoides</i> *	Smooth Mustard	N	4				
	<i>Zygochloa paradoxa</i>	Sandhill Cane-grass	Y	4	Adult	>50	0	0
	Site 21 Totals: 19 (long-lived = 9, short-lived = 10)							
Flora Site 22 / CAR022	<i>Acacia ligulata</i>	Umbrella Bush	Y	4	Mixed	>50	<50	0
	<i>Acacia ramulosa</i> var. <i>ramulosa</i>	Horse Mulga	Y	1	Adult	0	>50	0
	<i>Aristida holathera</i> var. <i>holathera</i>	Tall Kerosene Grass	N	2				
	<i>Calandrinia eremaea</i>	Dryland Purslane	N	1				
	<i>Crotalaria eremaea</i> ssp.	Loose-flowered Rattle-pod	N	4				
	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush	Y	1	Adult	>50	<50	0
	<i>Einadia nutans</i> ssp.	Climbing Saltbush	Y	2	Mixed	>50	0	0
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush	Y	2	Adult	<50	>50	0
	<i>Euphorbia drummondii</i> group	Spurge	N	1				

RAM Site	Scientific Name	Common Name	Long-lived ¹	CSR ²	Age Class ³	Grazing Level % of Total Population		
						Intact	Modified	Over-utilised
	<i>Hibiscus krichauffianus</i>	Velvet-leaf Hibiscus	N	2				
	<i>Maireana pyramidata</i>	Black Bluebush	Y	1	Adult	0	>50	0
	<i>Nicotiana velutina</i>	Velvet Tobacco	N	2				
	<i>Paractaenum novae-hollandiae</i> ssp. <i>reversum</i>	Barbed-wire Grass	N	1				
	<i>Pimelea microcephala</i> ssp.	Shrubby Riceflower	Y	1	Adult	>50	0	0
	<i>Polycalymma stuartii</i>	Poached-egg Daisy	N	3				
	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y	1	Adult	0	>50	0
	<i>Roepera eremaea</i>	Twinleaf	N	1				
	<i>Roepera howittii</i>	Clasping Twinleaf	N	1				
	<i>Salsola australis</i>	Buckbush	N	1				
	<i>Sida ammophila</i>	Sand Sida	N	1				
	<i>Sisymbrium erysimoides</i> *	Smooth Mustard	N	5				
	<i>Sonchus oleraceus</i> *	Common Sow-thistle	N	1				
	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	Camel Bush	N	3				
	<i>Zygochloa paradoxa</i>	Sandhill Cane-grass	Y	2/4	Adult	>50	<50	0
	Site 22 Totals: 24 (long-lived = 9, short-lived = 15)							

* Non-native

¹ Long-lived woody perennials – refer Appendix C; ² CSR ratio (Source = DENR (2011)); ³ Age Classes: Recorded for Long-lived perennials only; M = Adults and Juveniles present; A = Adults only present; J = Juveniles only present

CSR Ratio, Pastoral Lease Assessment Manual (DENR 2011)

CLASS	TERM	CSR	FIELD CRITERIA
1	Present	< 12 plants	< 12 plants within 200 m radius
2	Isolated Clumps	>20 spaces	Isolated clumps of 2 to 5 woody plants 200 m further apart
3	Isolated Plants	>20 spaces	Isolated plants
4	Very Sparse	6-20 spaces	Well spaced plants, crowns well separated
5	Sparse	1-5 spaces	Clearly spaced, crowns clearly separated
6	Mid dense	0-0.9 spaces	Crowns touching to slight separation
7	Closed or dense	0	Crowns touching to overlapping

Appendix C. Flora life span classification

Table C1: Long-lived Woody Species Perennial Classification

Family	Scientific Name	Common Name	Long-lived woody? Yes (Y) No (N)
MALVACEAE	<i>Abutilon halophilum</i>	Plains Lantern-bush	Y
MALVACEAE	<i>Abutilon leucopetalum</i>	Desert Lantern-bush	Y
MALVACEAE	<i>Abutilon otocarpum</i>	Desert Lantern	Y
MALVACEAE	<i>Abutilon</i> sp.	Lantern-bush	Y
FABACEAE	<i>Acacia aneura</i> var.	Mulga	Y
FABACEAE	<i>Acacia papyrocarpa</i>	Western Myall	Y
FABACEAE	<i>Acacia tetragonophylla</i>	Dead Finish	Y
FABACEAE	<i>Acacia victoriae</i> ssp.	Elegant Wattle	Y
SAPINDACEAE	<i>Alectryon oleifolius</i> ssp. <i>canescens</i>	Bullock Bush	Y
AMARANTHACEAE	<i>Alternanthera denticulata</i>	Lesser Joyweed	N
AMARANTHACEAE	<i>Alternanthera nodiflora</i>	Common Joyweed	N
LORANTHACEAE	<i>Amyema maidenii</i> ssp. <i>maidenii</i>	Pale-leaf Mistletoe	Y
LORANTHACEAE	<i>Amyema quandang</i> var. <i>quandang</i>	Grey Mistletoe	Y
ANACAMPSEROTACEAE	<i>Anacampseros australiana</i>	Australian Anacampseros	N
ASTERACEAE	<i>Anemocarpa podolepidium</i>	Rock Everlasting	N
ASTERACEAE	<i>Angianthus</i> sp.	Cup-flower	N
BRASSICACEAE	<i>Arabidella glaucescens</i>	Bluish Cress	N
BRASSICACEAE	<i>Arabidella nasturtium</i>	Yellow Cress	N
BRASSICACEAE	<i>Arabidella</i> sp.	Native Cress	N
POACEAE	<i>Aristida anthoxanthoides</i>	Yellow Three-awn	N
POACEAE	<i>Aristida contorta</i>	Curly Wire-grass	N
POACEAE	<i>Aristida holathera</i> var. <i>holathera</i>	Tall Kerosene Grass	N
POACEAE	<i>Aristida nitidula</i>	Brush Three-awn	N
POACEAE	<i>Aristida</i> sp.	Three-awn/Wire-grass	N
POACEAE	<i>Astrebla pectinata</i>	Barley Mitchell-grass	Y
POACEAE	<i>Astrebla</i> sp.	Mitchell-grass	Y
AMARANTHACEAE	<i>Atriplex fissivalvis</i>	Gibber Saltbush	N
AMARANTHACEAE	<i>Atriplex holocarpa</i>	Pop Saltbush	N
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp.	Baldoo	N
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp. <i>conduplicata</i>	Baldoo	N
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp. <i>inflata</i>	Corky Saltbush	N
AMARANTHACEAE	<i>Atriplex lindleyi</i> ssp. <i>lindleyi</i>	Baldoo	N
AMARANTHACEAE	<i>Atriplex</i> sp.	Saltbush	N
AMARANTHACEAE	<i>Atriplex spongiosa</i>	Pop Saltbush	N
AMARANTHACEAE	<i>Atriplex turbinata</i>	A Saltbush	N
AMARANTHACEAE	<i>Atriplex velutinella</i>	Sandhill Saltbush	N
AMARANTHACEAE	<i>Atriplex vesicaria</i>	Bladder Saltbush	Y
POACEAE	<i>Austrostipa nitida</i>	Balcarra Spear-grass	N
POACEAE	<i>Austrostipa scabra</i> ssp.	Rough Spear-grass	N
POACEAE	<i>Austrostipa</i> sp.	Spear-grass	N
POACEAE	<i>Austrostipa trichophylla</i>	Spear-grass	N
ASTERACEAE	<i>Bidens pilosa</i>	Cobblers Pegs	N
ASTERACEAE	<i>Blennospora drummondii</i>	Dwarf Button-flower	N
NYCTAGINACEAE	<i>Boerhavia dominii</i>	Tar-vine	N
NYCTAGINACEAE	<i>Boerhavia</i> sp.	Tar-vine	N
ASTERACEAE	<i>Brachyscome ciliaris</i> var.	Variable Daisy	N
ASTERACEAE	<i>Brachyscome ciliaris</i> var. <i>lanuginosa</i>	Woolly Variable Daisy	N
ASTERACEAE	<i>Brachyscome</i> sp.	Native Daisy	N
ASPHODELACEAE	<i>Bulbine semibarbata</i>	Small Leek-lily	N
ASPHODELACEAE	<i>Bulbine</i> sp.	Bulbine-lily	N
MONTIACEAE	<i>Calandrinia</i> sp.	Purslane/Parakeelya	N
MONTIACEAE	<i>Calandrinia volubilis</i>	Twining Purslane	N
ASTERACEAE	<i>Calotis hispidula</i>	Hairy Burr-daisy	N
ASTERACEAE	<i>Calotis</i> sp.	Burr-daisy	N
AIZOACEAE	<i>Carpobrotus rossii</i>	Native Pigface	Y
ASTERACEAE	<i>Centipeda cunninghamii</i>	Common Sneezeweed	N
ASTERACEAE	<i>Centipeda thespidioides</i>	Desert Sneezeweed	N

Family	Scientific Name	Common Name	Long-lived woody? Yes (Y) No (N)
AMARANTHACEAE	<i>Chenopodium curvispicatum</i>	Cottony Goosefoot	Y
AMARANTHACEAE	<i>Chenopodium desertorum</i> ssp.	Desert Goosefoot	Y
AMARANTHACEAE	<i>Chenopodium</i> sp.	Goosefoot	N
POACEAE	<i>Chloris pectinata</i>	Comb Windmill Grass	N
POACEAE	<i>Chloris</i> sp.	Windmill Grass/Chloris	N
ASTERACEAE	<i>Chrysocephalum pterochaetum</i>	Shrub Everlasting	N
ASTERACEAE	<i>Chrysocephalum</i> sp.	Everlasting	N
COMPOSITAE	<i>Compositae</i> sp.	Daisy Family	N
CONVOLVULACEAE	<i>Convolvulaceae</i> sp.	Bindweed Family	N
CONVOLVULACEAE	<i>Convolvulus angustissimus</i> ssp.	Narrow-leaf Bindweed	N
CONVOLVULACEAE	<i>Convolvulus erubescens</i> complex	Bindweed	N
CONVOLVULACEAE	<i>Convolvulus remotus</i>	Grassy Bindweed	N
CONVOLVULACEAE	<i>Convolvulus</i> sp.	Bindweed	N
ASTERACEAE	<i>Craspedia</i> sp.	Buttons	N
CRASSULACEAE	<i>Crassula</i> sp.	Crassula/Stonecrop	N
AMARYLLIDACEAE	<i>Crinum flaccidum</i>	Murray Lily	N
FABACEAE	<i>Crotalaria eremaea</i> ssp.	Loose-flowered Rattle-pod	N
FABACEAE	<i>Cullen australasicum</i>	Tall Scurf-pea	N
FABACEAE	<i>Cullen cinereum</i>	Annual Scurf-pea	N
FABACEAE	<i>Cullen graveolens</i>	Native Lucerne	N
FABACEAE	<i>Cullen pallidum</i>	Woolly Scurf-pea	N
FABACEAE	<i>Cullen</i> sp.	Scurf-pea	N
CONVOLVULACEAE	<i>Cuscuta</i> sp.	Dodder	N
POACEAE	<i>Cymbopogon ambiguus</i>	Lemon-grass	Y
APOCYNACEAE	<i>Cynanchum viminale</i> ssp. <i>australe</i>	Caustic Bush	Y
CYPERACEAE	<i>Cyperus rigidellus</i>	Dwarf Flat-sedge	N
CYPERACEAE	<i>Cyperus</i> sp.	Flat-sedge	N
POACEAE	<i>Dactyloctenium radulans</i>	Button-grass	N
APIACEAE	<i>Daucus glochidiatus</i>	Native Carrot	N
POACEAE	<i>Dichanthium sericeum</i> ssp.	Silky Blue-grass	Y
POACEAE	<i>Digitaria brownii</i>	Cotton Panic-grass	Y
POACEAE	<i>Digitaria divaricatissima</i> var. <i>divaricatissima</i>	Finger Panic-grass	Y
POACEAE	<i>Digitaria</i> sp.	Summer-grass	Y
AMARANTHACEAE	<i>Dissocarpus biflorus</i> var.	Two-horn Saltbush	N
AMARANTHACEAE	<i>Dissocarpus paradoxus</i>	Ball Bindii	N
SAPINDACEAE	<i>Dodonaea lobulata</i>	Lobed-leaf Hop-bush	Y
SAPINDACEAE	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	Narrow-leaf Hop-bush	Y
POLYGONACEAE	<i>Duma florulenta</i>	Lignum	Y
AMARANTHACEAE	<i>Dysphania cristata</i>	Crested Goosefoot	N
AMARANTHACEAE	<i>Dysphania pumilio</i>	Clammy Goosefoot	N
POLYGONACEAE	<i>Duma florulenta</i>	Lignum	Y
AMARANTHACEAE	<i>Einadia nutans</i> ssp. <i>nutans</i>	Climbing Saltbush	Y
CYPERACEAE	<i>Eleocharis pallens</i>	Pale Spike-rush	N
AMARANTHACEAE	<i>Enchylaena tomentosa</i> var.	Ruby Saltbush	Y
POACEAE	<i>Enneapogon avenaceus</i>	Common Bottle-washers	N
POACEAE	<i>Enneapogon cylindricus</i>	Jointed Bottle-washers	N
POACEAE	<i>Enneapogon polyphyllus</i>	Leafy Bottle-washers	N
POACEAE	<i>Enneapogon</i> sp.	Bottle-washers / Nineawn	N
POACEAE	<i>Enteropogon acicularis</i>	Umbrella Grass	N
POACEAE	<i>Enteropogon ramosus</i>	Umbrella Grass	N
POACEAE	<i>Enteropogon</i> sp.	Umbrella Grass	N
POACEAE	<i>Eragrostis australasica</i>	Cane-grass	Y
POACEAE	<i>Eragrostis dielsii</i>	Mulka	N
POACEAE	<i>Eragrostis eriopoda</i>	Woollybutt	N
POACEAE	<i>Eragrostis parviflora</i>	Soft Love-grass	N
POACEAE	<i>Eragrostis setifolia</i>	Bristly Love-grass	Y
POACEAE	<i>Eragrostis</i> sp.	Love-grass	Y
POACEAE	<i>Eragrostis xerophila</i>	Knotty-butt Neverfail	Y
SCROPHULARIACEAE	<i>Eremophila duttonii</i>	Harlequin Emubush	Y
SCROPHULARIACEAE	<i>Eremophila glabra</i> ssp.	Tar Bush	Y
SCROPHULARIACEAE	<i>Eremophila latrobei</i> ssp.	Crimson Emubush	Y

Family	Scientific Name	Common Name	Long-lived woody? Yes (Y) No (N)
SCROPHULARIACEAE	<i>Eremophila maculata</i> ssp.	Spotted Emubush	Y
SCROPHULARIACEAE	<i>Eremophila oppositifolia</i> ssp.	Opposite-leaved Emubush	Y
SCROPHULARIACEAE	<i>Eremophila serrulata</i>	Green Emubush	Y
GERANIACEAE	<i>Erodium crinitum</i>	Blue Heron's-bill	N
GERANIACEAE	<i>Erodium</i> sp.	Heron's-bill/Crowfoot	N
MYRTACEAE	<i>Eucalyptus camaldulensis</i> ssp.	River Red Gum	Y
POACEAE	<i>Eulalia aurea</i>	Silky Brown-top	Y
EUPHORBIACEAE	<i>Euphorbia drummondii</i> group	Spurge	N
EUPHORBIACEAE	<i>Euphorbia</i> sp.	Spurge	N
EUPHORBIACEAE	<i>Euphorbia stevenii</i>	Bottletree Spurge	N
EUPHORBIACEAE	<i>Euphorbia tannensis</i> ssp. <i>eremophila</i>	Desert Spurge	N
SANTALACEAE	<i>Exocarpos aphyllus</i>	Leafless Cherry	Y
ASTERACEAE	<i>Flaveria trinervia</i>	Clustered Yellow-tops	N
FRANKENIACEAE	<i>Frankenia serpyllifolia</i>	Thyme Sea-heath	Y
FRANKENIACEAE	<i>Frankenia</i> sp.	Sea-heath	Y
FRANKENIACEAE	<i>Frankenia subteres</i>	Round Sea-heath	Y
MALVACEAE	<i>Gilesia biniflora</i>	Western Tar-vine	N
ASTERACEAE	<i>Glossocardia bidens</i>	Native Cobbler's-pegs	N
FABACEAE	<i>Glycine</i> sp.	Glycine	N
ASTERACEAE	<i>Gnephosis arachnoidea</i>	Spidery Button-flower	N
ASTERACEAE	<i>Gnephosis</i> sp.	Cup-flower	N
GOODENIACEAE	<i>Goodenia fascicularis</i>	Silky Goodenia	N
GOODENIACEAE	<i>Goodenia lunata</i>	Stiff Goodenia	N
GOODENIACEAE	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia	N
GOODENIACEAE	<i>Goodenia</i> sp.	Goodenia	N
GRAMINEAE	<i>Gramineae</i> sp.	Grass Family	N
AIZOACEAE	<i>Gunniopsis quadrifida</i>	Sturt's Pigface	Y
BORAGINACEAE	<i>Heliotropium</i> sp.	Heliotrope	N
MALVACEAE	<i>Hibiscus krichauffianus</i>	Velvet-leaf Hibiscus	N
POACEAE	<i>Iseilema membranaceum</i>	Small Flinders-grass	N
ASTERACEAE	<i>Ixiochlamys cuneifolia</i>	Silverton Daisy	N
ASTERACEAE	<i>Ixiochlamys nana</i>	Small Fuzzweed	N
ASTERACEAE	<i>Leiocarpa leptolepis</i>	Pale Plover-daisy	N
BRASSICACEAE	<i>Lepidium phlebopetalum</i>	Veined Peppercress	N
BRASSICACEAE	<i>Lepidium</i> sp.	Peppercress	N
LILIACEAE	<i>Liliaceae</i> sp.	Lily Family	N
ASPARAGACEAE	<i>Lomandra</i> sp.	Mat-rush	Y
FABACEAE	<i>Lotus cruentus</i>	Red-flower Lotus	N
SOLANACEAE	<i>Lycium australe</i>	Australian Boxthorn	Y
PHYLLANTHACEAE	<i>Lysiandra fuernrohrii</i>	Sand Spurge	Y
AMARANTHACEAE	<i>Maireana aphylla</i>	Cotton-bush	Y
AMARANTHACEAE	<i>Maireana appressa</i>	Pale-fruit Bluebush	Y
AMARANTHACEAE	<i>Maireana astrotricha</i>	Low Bluebush	Y
AMARANTHACEAE	<i>Maireana coronata</i>	Crown Fissure-plant	Y
AMARANTHACEAE	<i>Maireana eriantha</i>	Woolly Bluebush	Y
AMARANTHACEAE	<i>Maireana georgei</i>	Satiny Bluebush	Y
AMARANTHACEAE	<i>Maireana integra</i>	Entire-wing Bluebush	Y
AMARANTHACEAE	<i>Maireana pyramidata</i>	Black Bluebush	Y
AMARANTHACEAE	<i>Maireana sedifolia</i>	Bluebush	Y
AMARANTHACEAE	<i>Maireana</i> sp.	Bluebush/Fissure-plant	Y
AMARANTHACEAE	<i>Maireana spongiocarpa</i>	Spongy-fruit Bluebush	Y
AMARANTHACEAE	<i>Maireana turbinata</i>	Top-fruit Bluebush	Y
AMARANTHACEAE	<i>Malacocera tricornis</i>	Goat-head Soft-horns	N
MALVACEAE	<i>Malvastrum americanum</i> var.	Malvastrum	N
MARSILEACEAE	<i>Marsilea drummondii</i>	Common Nardoo	N
ASTERACEAE	<i>Minuria cunninghamii</i>	Bush Minuria	Y
ASTERACEAE	<i>Minuria denticulata</i>	Woolly Minuria	N
ASTERACEAE	<i>Minuria integerrima</i>	Smooth Minuria	N
ASTERACEAE	<i>Minuria leptophylla</i>	Minnie Daisy	N
LOGANIACEAE	<i>Mitrasacme</i> sp.	Mitrewort	N
SCROPHULARIACEAE	<i>Myoporum montanum</i>	Native Myrtle	Y

Family	Scientific Name	Common Name	Long-lived woody? Yes (Y) No (N)
AMARANTHACEAE	<i>Neobassia proceriflora</i>	Desert Glasswort	N
SOLANACEAE	<i>Nicotiana velutina</i>	Velvet Tobacco	N
AMARANTHACEAE	<i>Osteocarpum acropterum</i> var.	Bonefruit	N
AMARANTHACEAE	<i>Osteocarpum dipterocarpum</i>	Two-wing Bonefruit	N
AMARANTHACEAE	<i>Osteocarpum</i> sp.	Bonefruit	N
POACEAE	<i>Panicum decompositum</i> var.	Native Millet	N
POACEAE	<i>Panicum</i> sp.	Panic/Millet	N
POACEAE	<i>Paractaenum novae-hollandiae</i> ssp. <i>reversum</i>	Barbed-wire Grass	N
PHYLLANTHACEAE	<i>Lysiandra fuernrohrii</i>	Sand Spurge	N
THYMELAEACEAE	<i>Pimelea simplex</i> ssp. <i>simplex</i>	Desert Riceflower	N
PLANTAGINACEAE	<i>Plantago drummondii</i>	Dark Plantain	N
ASTERACEAE	<i>Pluchea rubelliflora</i>	Plains-bush	N
ASTERACEAE	<i>Podolepis capillaris</i>	Wiry Podolepis	N
ASTERACEAE	<i>Polycalymma stuartii</i>	Poached-egg Daisy	N
PORTULACACEAE	<i>Portulaca oleracea</i>	Common Purslane	N
PORTULACACEAE	<i>Portulaca</i> sp.	Purslane	N
ASTERACEAE	<i>Pterocaulon sphacelatum</i>	Apple-bush	N
AMARANTHACEAE	<i>Ptilotus incanus/obovatus</i>	Mulla	Y
AMARANTHACEAE	<i>Ptilotus nobilis</i> ssp.	Yellow-tails	N
AMARANTHACEAE	<i>Ptilotus obovatus</i>	Silver Mulla	Y
ASTERACEAE	<i>Pycnosorus pleiocephalus</i>	Soft Billy-buttons	N
ASTERACEAE	<i>Pycnosorus</i> sp.	Billy-buttons	N
AMARANTHACEAE	<i>Rhagodia</i> sp.	Saltbush	Y
AMARANTHACEAE	<i>Rhagodia spinescens</i>	Spiny Saltbush	Y
ASTERACEAE	<i>Rhodanthe corymbiflora</i>	Paper Everlasting	N
ASTERACEAE	<i>Rhodanthe floribunda</i>	White Everlasting	N
ASTERACEAE	<i>Rhodanthe microglossa</i>	Clustered Everlasting	N
ASTERACEAE	<i>Rhodanthe stricta</i>	Slender Everlasting	N
ASTERACEAE	<i>Rhodanthe uniflora</i>	Woolly Daisy	N
FABACEAE	<i>Rhynchosia australis</i>	Rhynchosia	N
ZYGOPHYLLACEAE	<i>Roepera ammophila</i>	Sand Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera aurantiaca</i> ssp. <i>aurantiaca</i>	Shrubby Twinleaf	Y
ZYGOPHYLLACEAE	<i>Roepera billardierei</i>	Coast Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera crenata</i>	Notched Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera eremaea</i>	Climbing Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera iodocarpa</i>	Violet Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera ovata</i>	Dwarf Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera prismatotheca</i>	Square-fruit Twinleaf	N
ZYGOPHYLLACEAE	<i>Roepera</i> sp.	Twinleaf	N
ACANTHACEAE	<i>Rostellularia adscendens</i> var. <i>pogonanthera</i>	Pink Tongues	N
POACEAE	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	Y
POACEAE	<i>Rytidosperma</i> sp.	Wallaby-grass	Y
AMARANTHACEAE	<i>Salsola australis</i>	Buckbush	N
SANTALACEAE	<i>Santalum lanceolatum</i>	Plumbush	Y
SANTALACEAE	<i>Santalum</i> sp.	Plumbush	Y
AIZOACEAE	<i>Sarcozona praecox</i>	Sarcozona	N
GOODENIACEAE	<i>Scaevola spinescens</i>	Spiny Fanflower	Y
AMARANTHACEAE	<i>Sclerolaena anisacanthoides</i>		N
AMARANTHACEAE	<i>Sclerolaena bicornis</i> var. <i>bicornis</i>	Goat-head Bindyi	N
AMARANTHACEAE	<i>Sclerolaena brachyptera</i>	Short-wing Bindyi	N
AMARANTHACEAE	<i>Sclerolaena cuneata</i>	Tangled Bindyi	N
AMARANTHACEAE	<i>Sclerolaena decurrens</i>	Green Bindyi	N
AMARANTHACEAE	<i>Sclerolaena diacantha</i>	Horned Bindyi	N
AMARANTHACEAE	<i>Sclerolaena divaricata</i>	Tangled Bindyi	N
AMARANTHACEAE	<i>Sclerolaena intricata</i>	Poverty Bush	N
AMARANTHACEAE	<i>Sclerolaena parallelicuspis</i>	Western Bindyi	N
AMARANTHACEAE	<i>Sclerolaena patenticuspis</i>	Spear-fruit Bindyi	N
AMARANTHACEAE	<i>Sclerolaena</i> sp.	Bindyi	N
#N/A	<i>Sclerolaena</i> sp. <i>Pernatty Station</i>		N
AMARANTHACEAE	<i>Sclerolaena tricuspis</i>	Three-spine Bindyi	N
AMARANTHACEAE	<i>Sclerolaena ventricosa</i>	Salt Bindyi	N

Family	Scientific Name	Common Name	Long-lived woody? Yes (Y) No (N)
ASTERACEAE	<i>Senecio magnificus</i>	Showy Groundsel	Y
FABACEAE	<i>Senna artemisioides</i> ssp.	Desert Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>alicia</i> x ssp. <i>coriacea</i>	Desert Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>artemisioides</i> x ssp. <i>coriacea</i>	Desert Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Blunt-leaf Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>oligophylla</i>	Limestone Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>X artemisioides</i>	Silver Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>X coriacea</i>	Broad-leaf Desert Senna	Y
FABACEAE	<i>Senna artemisioides</i> ssp. <i>X sturtii</i>	Grey Senna	Y
POACEAE	<i>Setaria constricta</i>	Knotty-butt Paspalidium	Y
POACEAE	<i>Setaria</i> sp.	Pigeon-grass	Y
MALVACEAE	<i>Sida ammophila</i>	Sand Sida	N
MALVACEAE	<i>Sida corrugata</i> var.	Variable Sida	N
MALVACEAE	<i>Sida fibulifera</i>	Pin Sida	N
MALVACEAE	<i>Sida intricata</i>	Twiggy Sida	Y
MALVACEAE	<i>Sida petrophila</i>	Rock Sida	Y
MALVACEAE	<i>Sida trichopoda</i>	Narrow-leaf Sida	N
SOLANACEAE	<i>Solanum esuriale</i>	Potato-bush	N
SOLANACEAE	<i>Solanum quadriloculatum</i>	Tomato Bush	N
SOLANACEAE	<i>Solanum sturtianum</i>	Sturt's Nightshade	Y
POACEAE	<i>Sporobolus actinocladus</i>	Ray Grass	N
POACEAE	<i>Sporobolus caroli</i>	Yakka Grass	N
CELASTRACEAE	<i>Stackhousia muricata</i> ssp. <i>Perennial</i> (W.R.Barker 3641)		N
BRASSICACEAE	<i>Stenopetalum lineare</i>	Narrow Thread-petal	N
FABACEAE	<i>Swainsona</i> sp.	Swainson-pea	N
ASTERACEAE	<i>Taraxacum cygnorum</i>	Dandelion	N
AMARANTHACEAE	<i>Tecticornia indica</i> ssp.	Samphire	Y
AMARANTHACEAE	<i>Tecticornia medullosa</i>	Samphire	Y
AMARANTHACEAE	<i>Tecticornia pergranulata</i> ssp.	Black-seed Samphire	Y
AMARANTHACEAE	<i>Tecticornia</i> sp.	Samphire	Y
AMARANTHACEAE	<i>Tecticornia tenuis</i>	Slender Samphire	Y
AIZOACEAE	<i>Tetragonia eremaea</i>	Annual Spinach	N
AIZOACEAE	<i>Tetragonia tetragonoides</i>	Warragul cabbage	N
LAMIACEAE	<i>Teucrium racemosum</i>	Grey Germander	N
POACEAE	<i>Themeda triandra</i>	Kangaroo Grass	Y
ASPARAGACEAE	<i>Thysanotus baueri</i>	Mallee Fringe-lily	N
ASPARAGACEAE	<i>Thysanotus patersonii</i>	Twining Fringe-lily	N
ASPARAGACEAE	<i>Thysanotus</i> sp.	Fringe-lily	N
ARALIACEAE	<i>Trachymene glaucifolia</i>	Blue Parsnip	N
POACEAE	<i>Tragus australianus</i>	Red Spinach	N
AIZOACEAE	<i>Trianthema triquetrum</i>	Small Hogweed	N
BORAGINACEAE	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	Camel Bush	N
POACEAE	<i>Tripogonella loliiformis</i>	Purple Plume Grass	N
POACEAE	<i>Triraphis mollis</i>	Purple Needle-grass	N
ASTERACEAE	<i>Vittadinia cuneata</i> var.	Fuzzy New Holland Daisy	N
ASTERACEAE	<i>Vittadinia</i> sp.	New Holland Daisy	N
CAMPANULACEAE	<i>Wahlenbergia communis</i>	Tufted Bluebell	N
CAMPANULACEAE	<i>Wahlenbergia luteola</i>	Yellow-wash Bluebell	N
CAMPANULACEAE	<i>Wahlenbergia</i> sp.	Native Bluebell	N
CAMPANULACEAE	<i>Wahlenbergia stricta</i> ssp. <i>stricta</i>	Tall Bluebell	N
COLCHICACEAE	<i>Wurmbea latifolia</i> ssp. <i>latifolia</i>	Early Nancy	N

Appendix D. Jessup Sites raw data

Appendix D1. Jessup raw data – total number of long-lived woody perennial adults and juveniles, spring 2025

Species	Life Stage	Flora Site																		
		1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	19	20	Total
<i>Abutilon halophilum</i>	Adult	17	9	4		76					115			1	37					259
	Juvenile	5	3			57					12				43					120
<i>Abutilon otocarpum</i>	Adult									5										5
	Juvenile									3										3
<i>Acacia papyrocarpa</i>	Adult								1	2						18	18	10	2	51
	Juvenile															9	23	5		37
<i>Acacia tetragonophylla</i>	Adult									24								31	12	67
	Juvenile									2										2
<i>Atriplex vesicaria</i>	Adult	81	116	160	210	514	194	65	118	4	528	231	219	117	202	126	189	7		3081
	Juvenile	61	60	69	279	236	102	22	207		194	156	252	42	202	8				1890
<i>Dodonaea lobulata</i>	Adult									22						21	20	86	12	161
	Juvenile									4								3	2	9
<i>Duma florulenta</i>	Adult									4								5	21	30
	Juvenile																		3	3
<i>Einadia nutans ssp.</i>	Adult																	1		1
	Juvenile																	1	3	4
<i>Enchylaena tomentosa</i>	Adult									23						42	51	40	8	164
	Juvenile															17	10	1	6	34
<i>Eremophila latrobei</i>	Adult									2						1	2			5
	Juvenile									0										0
<i>Eremophila oppositifolia</i>	Adult								1											1
<i>Eremophila serrulata</i>	Adult									2						1				3
<i>Eucalyptus camaldulensis ssp arida</i>	Adult									6								4	5	15
	Juvenile									1									2	3
<i>Exocarpus aphyllus</i>	Adult									2										2
<i>Frankenia serpyllifolia</i>	Adult		1	30	2	70	1	2	13		3	4	13	6						145
	Juvenile			0	3	12			3			0								18
<i>Maireana aphylla</i>	Adult										2			19			1			22
<i>Maireana appressa</i>	Adult			4		3	1	16	1				3		2					30
	Juvenile			1				2												3

<i>Maireana astrotricha</i>	Adult							1											1
<i>Maireana eriantha</i>	Adult					2													2
<i>Maireana georgeii/turbinata</i>	Adult					5													5
<i>Maireana spongiocarpa</i>	Adult							7			91					16	26		140
	Juvenile										9					1			10
<i>Minuria cunninghamii</i>	Adult			6	4	5	27	1			32	1	1						77
	Juvenile			1		1	6				0				4				12
<i>Myoporum montanum</i>	Adult									5								12	29
	Juvenile									4								15	29
<i>Ptilotus obovatus</i>	Adult									84						49	32	15	182
	Juvenile									2						4	5	0	11
<i>Rhagodia spinescens/ Chenopodium curvispicatum</i>	Adult									3						5	9		17
	Juvenile															7			7
<i>Santalum lanceolatum</i>	Adult									1								3	6
	Juvenile																	2	4
<i>Scaevola spinescens</i>	Adult									27						2	1	16	53
	Juvenile															1			1
<i>Senna artemisioides ssp. artemisioides</i>	Adult									4						1	3	1	9
<i>Senna artemisioides ssp. helmsii</i>	Adult									3									3
	Juvenile																	1	1
<i>Senna artemisioides ssp. sturtii</i>	Adult																	1	1
	Adult															5			5
<i>Sida calyxhymenia/petrophila</i>	Adult							10											10
	Juvenile							2											2
<i>Sida intricata</i>	Adult	7		1	8	2													18
	Juvenile						1												1
<i>Sida petrophila</i>	Adult									54						2		3	61
	Juvenile									7									7
<i>Tecticornia indica</i>	Adult							6											6
<i>Tecticornia medullosa</i>	Adult	2	1	62	5	171	18				2	11	72	2	14				360
	Juvenile			4	3	2							0		4				13
<i>Tecticornia pergranulata</i>	Adult							31	43										74
<i>Tecticornia tenuis</i>	Adult								6										6
	Juvenile								5										5
<i>Teucrium racemosum</i>	Adult									1								1	2

Appendix D2. Eliza Creek species abundance trends

<i>Acacia tetragonophylla</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	39	28	22	43	37	34	25	25	26
Site 17	0	0	0	0	0	0	0	0	0
Site 18	0	0	0	0	0	0	1	0	0
Site 19	31	27	26	19	26	32	26	27	31
Site 20	9	6	7	11	14	11	11	9	12
<i>A. tetragonophylla</i> Total	79	61	55	73	77	77	63	61	69
<i>Acacia papyrocarpa</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	0	1	0	2	3	0	0	1	2
Site 17	33	28	30	29	33	37	21	27	27
Site 18	42	53	15	49	45	63	56	54	41
Site 19	8	20	11	10	15	13	13	11	15
Site 20	2	1	1	0	1	1	1	1	2
<i>A. papyrocarpa</i> Total	85	103	57	90	97	114	91	94	87
<i>Dodonaea lobulata</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	25	37	25	31	33	25	38	30	26
Site 17	17	21	24	20	21	22	18	19	21
Site 18	11	11	13	15	15	14	13	15	20
Site 19	106	122	116	118	150	128	106	112	89
Site 20	13	6	12	16	12	20	11	13	14
<i>Dodonaea</i> Total	172	197	190	200	231	209	186	189	170
<i>Duma florulenta</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	6	6	8	7	5	8	7	7	4
Site 17	0	7	0	0	0	0	0	0	0
Site 18	0	7	0	0	0	0	0	0	0
Site 19	0	2	5	2	7	7	5	4	5
Site 20	27	31	24	26	26	24	24	27	24
<i>Duma florulenta</i> Total	33	53	37	35	38	39	36	38	33
<i>Eremophila latrobei</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	1	1	1	1	0	1	1	2	2
Site 17	0	0	1	1	1	2	0	1	1
Site 18	3	7	9	5	11	9	10	9	2
Site 20	0	0	1	0	1	1	1	1	0
<i>Eremophila latrobei</i> Total	4	8	12	7	13	13	12	13	5
<i>Eremophila serrulata</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	2	2	2	0	1	0	1	1	2
Site 17	1	1	0	1	1	3	2	2	1
Site 18	2	1	0	4	0	0	0	0	1
Site 19	1	2	1	2	0	1	0	0	0
Site 20	0	0	0	0	0	0	0	0	0
<i>Eremophila serrulata</i> Total	6	6	3	7	2	4	3	3	3
<i>Maireana spongiocarpa</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 17	nr	14	10	24	12	27	18	19	17
Site 18	nr	19	11	29	16	33	29	19	26
<i>Maireana</i> Total		33	21	53	28	60	47	38	43
<i>Myoporum montanum</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	23	7	19	23	10	27	5	14	9
Site 19	27	17	18	15	17	19	36	36	27
Site 20	16	14	19	16	16	27	20	24	22
<i>Myoporum</i> Total	66	38	56	54	43	73	61	75	56
<i>Ptilotus obovatus</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	25	66	31	65	71	105	115	133	86
Site 17	30	30	31	46	52	95	84	82	53
Site 18	100	73	48	46	23	97	80	104	37
Site 19	9	1	5	6	12	18	17	13	15
Site 20	0	0	3	1	1	2	3	5	2
<i>Ptilotus</i> Total	164	170	118	164	159	317	299	337	86

<i>Scaevola spinescens</i>	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	12	21	6	11	22	13	23	28	27
Site 17	4	4	5	2	3	4	5	2	3
Site 18	4	3	3	2	1	2	2	2	1
Site 19	11	9	11	12	15	18	16	24	16
Site 20	2	1	9	10	6	5	5	9	7
<i>Scaevola</i> Total	33	38	34	37	47	42	51	65	54
<i>Senna</i> (all species combined)	2018 Autumn	2018 Spring	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Site 10	4	2	3	4	5	4	5	3	7
Site 17	7	4	4	3	6	7	6	6	6
Site 18	4	6	3	4	2	5	3	3	3
Site 19	1	3	1	2	0	2	2	3	3
Site 20	0	0	0	0	0	1	1	1	0
<i>Senna</i> Total	16	15	11	13	13	19	17	16	7

Appendix E. Canopy cover visual estimates

Western Myall Transects

Species / Transect	Tree No.	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
Western Myall / 17A	1	98	100	100	100	100	90	80
	2	98	100	100	95	100	95	95
	2b				76	75	65	65
	2c						100	95
	3	100	100	100	100	100	100	95
	4	40	32	45	41	40	20	30
	5	95	90	98	95	100	80	80
	5b			95	90	100	90	75
	6	86	100	100	100	100	80	65
	7	86	86	100	98	100	100	80
	7b			100	100	100	100	95
	7c			100	100	100	100	90
	Mean	86	87	94	90	92	85	79
	SD	21	25	17	18	19	23	23
Western Myall / 17B	1	100	98	100	98	95	95	70
	2	95	95	95	90	100	80	60
	3	95	76	76	78	100	70	50
	4	76	95	90	86	90	90	70
	5	100	100	100	100	100	100	95
	5b			100	95	100	90	70
	6	72	86	86	77	90	70	65
	7	90	95	100	100	100	95	75
	Mean	90	92	93	91	97	86	69
	SD	11.3	8.4	8.8	9.4	4.6	11.6	13
Western Myall / 18A	1	86	nr	81	81	100	95	65
	1a*							70
	1b						95	80
	2	86	nr	81	90	90	80	70
	3	9	nr	1	5	5	5	5
	3b					100	100	95
	4	98	nr	81	100	100	90	85
	5	98	nr	85.5	100	100	80	70
	6	98	nr	98	100	100	80	85
	7	100	nr	85.5	86	100	90	80
	7a					100	90	60
	7b					100	90	70
	7c					100	90	80
	8	10	nr	0 (died)	0	0	0	0
	8a				90	100	90	90
	8c		nr	85.5	86	100	Not intercepted	90
	8d					100	Not intercepted	60
	9	95	nr	76.5	77	100	60	90
	10	95	nr	76.5	100	100	100	60
	11	100	nr	90.25	100	100	100	85
	11a							90
	11b							80
	12	100	nr	90.25	100	100	90	95
	Mean	81		72	80	89	80	73
	SD	34		32	34	31	19	24
Western Myall / 18B	1	57	nr	8	1	0	5	0
	1b						60	60
	2	56	nr	25	40	72	50	30
	3	29	nr	6	23	12	10	15
	3b							100
	4	67	nr	49	76	90	70	65
	5	2	nr	0 (died)	0	0	0	0

Species / Transect	Tree No.	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
	Mean	42	nr	22	28	35	33	39
	SD	27	nr	20	32	43	31	80
Western Myall / 19A	2	100	100	100	100	100	100	95
	4a						100	95
	4b			72	100	100	100	70
	4c			100	100	100	90	50
	6	100	100	100	100	100	90	70
	6b			100	100	100	90	90
	6c			100	90	100	90	70
	10b			100	100	100	100	90
	Mean	100	100	96	99	100	95	79 16
	SD	0	0	10	4	0	5	
Western Myall / 19B	6A	100	100	100	nr	nr	nr	nr
	7	8	5	3	5	15	5	10
	7A						90	90
	7B			81	86	100	95	90
	8	100	98	93	95	100	90	70
	5AA				100	100	100	90
	5B			100	100	100	100	80
	Mean	69	68	75	77	86	79	72
	SD	53	54	41	41	35	37	31
Western Myall / 20A (one tree only)	9	100	90	77	100	100	70	70

*Shaded cells represent trees recorded for first time in 2025

River Red Gum

Species / Transect	Tree No.	2019 Spring	2020 Spring	2021 Spring	2022 Spring	2023 Autumn	2024 Spring	2025 Spring
River Red gum / 19A	1	88	90	86	81	90	85	85
	5	27	27	27	29	29	30	50
	7	77	90	75	80	100	70	60
	8	72	56	57	63	100	50	40
	9	68	45	63	75	100	70	35
	10	90	72	54	76	100	60	40
	Mean	70	63	60	67	87	61	52
	SD	23	25	20	20	29	19	19
River Red Gum / 19B	1	5	9	5	5	4	5	5
	2	86	81	90	96	100	80	15
	3b						70	35
	4	15	3	0	0	0	0	0
	5	81	56	43	81	100	35	60
	5A				10	100	20	20
	6	90	86	77	60	100	70	45
	Mean	55	47	43	42	67	40	26
	SD	42	39	41	42	51	33	22
River Red Gum / 20A	1	80	46	68	90	100	80	60
	2	3	2	23	90	90	10	20
	3	11	30	Not recorded	96	100	90	20
	4	72	53	60	63	80	40	40
	5	45	35	18	67	90	60	45
	6	48	53	64	90	100	70	35
	7	88	56	81	98	100	80	50
	8	42	33	18	38	70	35	30
	10	49	49	46	90	90	80	50
	Mean	49	40	47	80	91	61	39
	SD	29	17	25	20	11	27	14
River Red Gum 20B	1	45	35	28	48	70	70	45
	2	86	68	77	98	100	95	70
	3	36	33	23	67	90	65	35
	4	86	49	56	86	80	80	75
	Mean	63	46	46	75	85	78	56
	SD	27	16	25	22	13	13	19

Appendix F. Fauna

Table F1: Bird species detected at formal bird survey sites and opportunistic sites at Carrapateena during the spring 2025 survey

Family	Species Name	Common Name	Site																				Opportunistic ¹
			1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	19	20	21	22	
Podicipedidae	<i>Tachybaptus novaehollandiae novaehollandiae</i>	Australasian Grebe																					SED
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie	SM				1 ²	SM			SM					SM							
Motacillidae	<i>Anthus australis australis</i>	Australian Pipit	1 ² ,CT	1 ²	1 ² ,CT	1 ²	1 ²	SM	SM						1 ²	1 ²							LFA01
Corvidae	<i>Corvus coronoides</i>	Australian Raven	1 ²	1 ²	1 ²	SM	SM	SM	1		1 ²			1		1 ²				1	1	1	SED
Charadriidae	<i>Vanellus tricolor</i>	Banded Lapwing																					SED
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike	SM																				
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow	SM		SM				SM	1						SM	1			1	1	1	
Charadriidae	<i>Elsyornis melanops</i>	Black-fronted Dotterel							SM														SED
Falconidae	<i>Falco berigora berigora</i>	Brown Falcon				1		SM															SED
Accipitridae	<i>Accipiter fasciatus fasciatus</i>	Brown Goshawk																					CWM01
Psittacidae	<i>Melopsittacus undulatus</i>	Budgerigar									SM				SM								
Acanthizidae	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	1,SM																	1			CWM05
Cinclosomatidae	<i>Cinclosoma cinnamomeum</i>	Cinnamon Quailthrush	SM	SM					SM												1		CWM02
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing																			1		
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird																		1			
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon	SM		SM				SM	1	SM									1	1		
Psittacidae	<i>Northiella haematogaster haematogaster</i>	Eastern Blue Bonnet																					CWM01
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu																					CWM02, YH
Rallidae	<i>Fulica atra australis</i>	Eurasian Coot																					SED
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah	SM				1 ²				SM					SM							YH
Artamidae	<i>Cracticus torquatus leucopterus</i>	Grey Butcherbird	SM				SM				SM								1				
Anatidae	<i>Anas gracilis gracilis</i>	Grey Teal																					SED

Family	Species Name	Common Name	Site																				Opportunistic ¹
			1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	19	20	21	22	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush																					CWM01
Anatidae	<i>Aythya australis</i>	Hardhead																					SED
Podicipedidae	<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe																					SED
Cuculidae	<i>Chalcites basalis</i>	Horsefield's Bronze Cuckoo																					S21
Passeridae	<i>Passer domesticus</i>	House Sparrow																					EV, Admin, TJU Village
Cacatuidae	<i>Cacatua sanguinea gymnopsis</i>	Little Corella	SM																				
Monarchidae	<i>Grallina cyanoleuca cyanoleuca</i>	Magpielark							1 ²														CWM01, SED
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing																					SED
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow							SM		SM					SM			1	1			SED
Psittacidae	<i>Psephotus varius</i>	Mulga Parrot	SM							1	1 ²						1	1	1	1			
Falconidae	<i>Falco cenchroides cenchroides</i>	Nankeen Kestrel		1 ²	SM	1	1		1		1 ²		1		1	1 ²							
Meliphagidae	<i>Epthianura aurifrons</i>	Orange Chat						SM															
Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck																					SED
Psittacidae	<i>Barnardius zonarius zonarius</i>	Port Lincoln Parrot	SM																				
Maluridae	<i>Malurus assimilis assimilis</i>	Purple-backed Fairywren	SM						1 ²		1 ²						1		1	1	1	1	
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater							SM														
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	SM				SM															1	
Acanthizidae	<i>Calamanthus campestris</i>	Rufous Fieldwren	1 ²	1 ²		SM		SM	SM				1		1 ² ,CT	SM							CF01
Pachycephalidae	<i>Pachycephala rufiventris rufiventris</i>	Rufous Whistler																			1	1	
Laridae	<i>Chroicocephalus novaehollandiae novaehollandiae</i>	Silver Gull			SM																		
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater	SM		SM	SM	SM		1 ²		1 ²	1			SM	1 ²		1			1	1	
Acanthizidae	<i>Aphelocephala leucopsis leucopsis</i>	Southern Whiteface																					CWM05
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar							SM														
Meliphagidae	<i>Acanthogenys rufogularis</i>	Spiny-cheeked Honeyeater	SM								1,SM						1		1				
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote																					WAT17
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin		1		1					1 ²								1	1			

Family	Species Name	Common Name	Site																				Opportunistic ¹
			1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	19	20	21	22	
Accipitridae	<i>Aquila audax audax</i>	Wedge-tailed Eagle									1												WAT17
Hirundinidae	<i>Hirundo neoxena neoxena</i>	Welcome Swallow	SM	1 ²		SM	1		SM		SM				SM	SM					1		EX, LFA01, SED, TJU, WAT17
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler							1							1	1		1	1	1	1	
Meliphagidae	<i>Ptilotula penicillata</i>	White-plumed honeyeater																					CWM01
Maluridae	<i>Malurus leucopterus leuconotus</i>	White-winged Fairywren	1 ²	1	1 ²		1 ²	1	1 ²	1	SM					1					1		
Campephagidae	<i>Lalage tricolor</i>	White-winged Triller																					SED
Rhipiduridae	<i>Rhipidura leucophrys leucophrys</i>	Willie Wagtail	SM				SM				1 ²						1		1				YH
Meliphagidae	<i>Manorina flavigula</i>	Yellow-throated Miner	SM						SM													1	
Estrildidae	<i>Taeniopygia guttata castanotis</i>	Zebra Finch	SM			SM		SM	1 ²		1 ²	1				SM				1	1		SWM05, SED
		Grand Total	23	8	8	9	11	8	19	4	18	2	2	1	6	13	6	2	8	11	12	8	

¹Opportunistic observation locations: South Eliza Dam (SED), Exploration Village (EV), Western Access Road (WAR), Exploration Village (EV), CWM02/5 (weed monitoring sites), WAT17 / YC (Yeltacowie Creek), CF01 is a saline spray site within 500 m of processing plant (1.2 km from Site 3 and Site 15), ²Observed plus Song Meter detection; Note ‘1’ denotes present, not counts of individuals, SM = detected via Song Meter only, CT = detected via Camera Trap; Grey cells = EPBC Status. Limited bird surveys were undertaken at Site 11, 12 and 13 due to unsuitable conditions and limited time available.



**Acoustic analysis and
bat call identification
from Carrapateena,
South Australia**

Prepared for **Lathwida Environmental Pty Ltd**

Version **8 December 2025**

SZ project reference **SZ784**

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Date	Note
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Summary

Bat identifications from bat detector sound files are provided from recordings made in the Carrapateena study area, c. 65 km east of Woomera, near the Carrapateena Arm of Lake Torrens, South Australia.

The dataset submitted for analysis included a total of 193 WAV format bat detector sound files from two recording sites made over a total of seven recording nights (nights of 19 – 23/09/2025).

Four species of bat were detected in the recordings (**Tables 1** and **2**; **Figure 1**). All species were identified unambiguously.

Methods

The ultrasonic recordings provided were recorded in WAV sound format from Wildlife Acoustics Song Meter Mini Bat bat detectors.

A multi-step acoustic analysis procedure developed to process large full spectrum echolocation recording datasets from insectivorous bats (Armstrong et al. 2021a,b) was applied to the passive site-based recordings made on the survey. Firstly, the WAV files were scanned for bat echolocation calls using several parameter sets in the software SCAN'R version 1.8.3 (Binary Acoustic Technology), which also provides measurements (SCAN'R parameters) from each putative bat pulse. The outputs were then used to determine if putative bat pulses measured in SCAN'R could be identified to species. This was done using a custom [R] language application that performed three tasks:

1. undertook a Discriminant Function Analysis on training data from representative calls from southern Australia;
2. from the measurements of each putative bat pulse from SCAN'R, calculated values for the first two Discriminant Functions that could separate the echolocation call types derived from the analysis of training data, and plotted these resulting coordinates over data ellipses representing one standard deviation of the variation for the defined call types; and
3. facilitated an inspection in a spectrogram of multiple examples of each call type for each recording night by opening the original WAV files containing pulses of interest in Adobe Audition version 25.0.

Species identifications were made based on measurements of characteristic frequency and observation of pulse shape, and with reference to information in Armstrong et al. (2021a). Nomenclature follows Jackson and Groves (2015). Distribution information for all bat species considered here was checked against the BatMap resource hosted by the Australasian Bat Society, Inc (<https://www.ausbats.org.au/batmap.html>) (Milne et al. 2023).

Limitations

The identifications presented in this report have been made within the following context:

1. The identifications made herein were based on the ultrasonic acoustic data recorded and provided by a 'third party' (the client named on the front of this report).
2. The scope of this report extended to providing information on the identification of bat species in bulk ultrasonic recordings. Further extended comment on these species and the possible impacts of a planned project on bat species were not part of the scope.
3. In the case of the present report, the recording equipment was not set up and supplied by Specialised Zoological. The equipment was operated by the third party during the survey.
4. Other than the general location of the study area, Specialised Zoological has not been provided with detailed information of the survey area, has not made a visit to observe the habitats available for bats, nor have we visited the specific project areas on a previous occasion.
5. Specialised Zoological has had no input into the overall design and timing of this bat survey, recording site placement, nor the degree of recording site replication.
6. While Specialised Zoological has made identifications to the best of our ability given the available materials, and reserves the right to re-examine the data and revise any identification following a query, it is the client's and / or proponent's responsibility to provide supporting evidence for any identification, which might require follow-up trapping effort or non-invasive methods such as video recordings. Specialised Zoological bears no liability for any follow-up work that may be required to support an identification based initially on the analysis of acoustic recordings undertaken and reported on here.
7. There are a variety of factors that affect the 'detectability' of each bat species, given the frequency, power and shape characteristics of their calls. Further information on the analysis and the various factors that can impinge on the reliability of identifications can be requested.
8. The analysis of ultrasonic recordings is one of several methods that can be used to survey for bats, and comprehensive surveys typically employ more than one method. If an identification in the present report is ambiguous or in question, a trapping programme would help to resolve the presence of the possibilities in the project area.
9. This version of the document supersedes any previous version. Previous drafts are not authorised by us for submission to the regulator or the public domain.

References

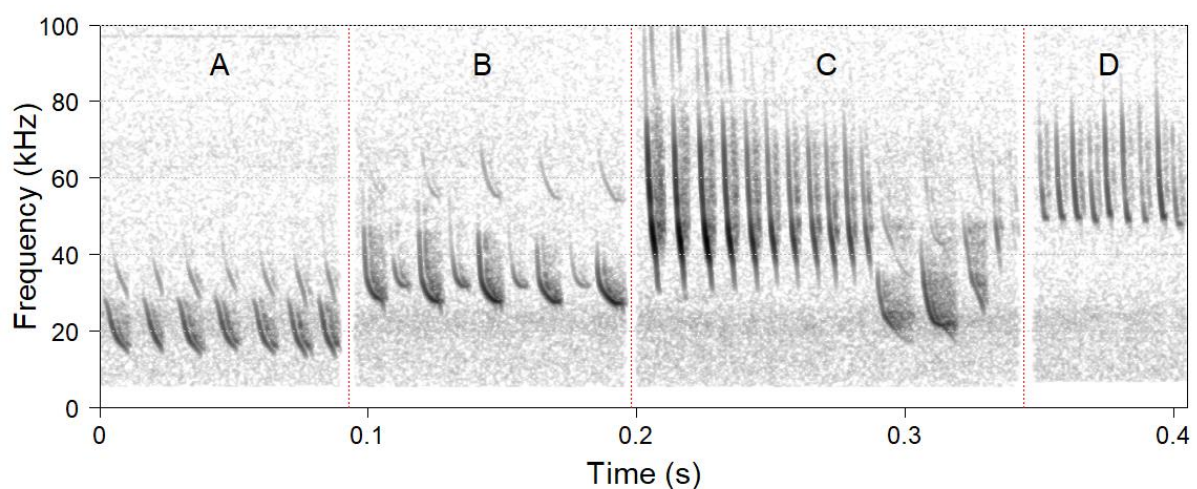
- Armstrong K.N., Clarke S., Linke A., Scanlon A., Roetman P., Hitch, A.T. and Donnellan S.C. (2021a). Citizen science implements the first intensive acoustics-based survey of insectivorous bat species across the Murray-Darling Basin of South Australia. *Australian Journal of Zoology* 68: 364–381. <https://doi.org/10.1071/ZO20051>
- Armstrong K.N., Broken-Brow J., Hoyer G., Ford G., Thomas M. and Corben C. (2021b). Effective detection and identification of sheath-tailed bats of Australian forests and woodlands. *Australian Journal of Zoology* 68:346–363. <https://doi.org/10.1071/ZO20044>
- Jackson, S.M. and Groves, C.P. (2015). *Taxonomy of Australian mammals*. CSIRO Publishing, Victoria.
- Milne D.J., Reardon T.B. and Ford G. (2023) BatMap – authoritative distribution maps for Australian bats. *Australian Mammalogy*. 45: 350–355. <https://doi.org/10.1071/AM23005>

Table 1. Species identified from all sites combined.

VESPERTILIONIDAE	
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>
Inland Forest Bat	<i>Vespadelus baverstocki</i>
MOLOSSIDAE	
White-striped Free-tailed Bat	<i>Austronomus australis</i>

Table 2. Species identifications summarised for all nights across each recording site (see *Table 1* for full species names).

			<i>A. australis</i>	<i>C. gouldii</i>	<i>N. geoffroyi</i>	<i>V. baverstocki</i>
Site	Night	Coordinates				
CAR007 SMU13599	19/09/2025	-31.173540, 137.442100	X	X	.	X
	20/09/2025	-31.173540, 137.442100	X	X	.	.
	21/09/2025	-31.173540, 137.442100	.	X	X	X
	22/09/2025	-31.173540, 137.442100	.	.	X	.
CAR010 SMU13725	21/09/2025	-31.231730, 137.525880	.	X	X	X
	22/09/2025	-31.231730, 137.525880	.	X	.	.
	23/09/2025	-31.231730, 137.525880	X	X	X	.

**Figure 1.** Representative echolocation call sequence portions of the species identified (**A:** *Austronomus australis*; **B:** *Chalinolobus gouldii*; **C:** *Nyctophilus geoffroyi*; **D:** *Vespadelus baverstocki*; time between pulses has been compressed).

Appendix G. Weeds

Appendix G1. Weed summary

Table G1: Weeds recorded at various locations across the Carrapateena Site during baseline (2012-2016) and compliance (autumn 2018 to spring 2024)

Scientific name	Common Name	Location	EBS 2012 – 2016	Years recorded between 2018 and 2024 and (CSR) ¹	Spring 2025 CSR*/ notes
<i>Asphodelus fistulosus</i>	Onion Weed	Dawson Dam	NR	2020 (2)	NR
<i>Brassica tournefortii</i>	Mustard	CWM01	Present	NR	NR
<i>Carrichtera annua</i>	Wards Weed	CWM01	NR	2021 (isolated CSR 4)	NR
		CWM05	NS	NR, 2024 (1)	NR
<i>Carthamus lanatus</i>	Saffron Thistle	CWM01	Present	2018, 2021, 2023 (1,2)	NR
		CAR007	Present	NR	NR
		South Eliza Dam	NS	2021 (2), 2024 (2)	NR
<i>Centaurea calcitrapa</i>	Star Thistle	CWM02	Present	NR	NR
<i>Centaurea melitensis</i>	Malta Thistle	CAR010	Present	2021 (1)	NR
		CAR018	NS	2021, 2023 (1)	NR
		CAR020	NS	2021, 2023 (2), 2024 (2/4)	NR
		CWM01	NS	2024 (1/5)	NR
		Dawson Dam	NS	2021, 2022 (2), 2024 (1/3)	NS
		South Eliza Dam	NS	NR	3 (localised)
<i>Centarium erythraea / tenuiflorum</i>	Centaury	CAR010	Present	NR	NR
		EV EIA	NS	2018 (1), 2023 (4)	1
		Dawson Dam	NS	2020 (4), 2023 (1)	NS
		Anzac Dam	NS	2022 (1)	NS
		South Eliza Dam	NS	2022 (2)	NR
		North Eliza Dam	NS	NR	NS
		Dawson	NS	2023 (2/4)	NS
<i>Chenopodium album/murale</i>	Goosefoot	Expo Village EIA	NS	2018, 2019, 2021, 2023 (2/4), 2024 (2/4)	2
		Anzac Dam	NS	2018, 2020 - 2023 (1/2/4)	NS
		Whittata Creek	NS	2021 (1)	NS
		Dawson Dam	NR	2020 - 2023 (2/3/4)	NS
<i>Citrullus species, inc. C. colocynthis</i>	Bitter Melon	Anzac Dam	NS	2019 – 2023 (2/3/4)	NS
		South Eliza Dam	NS	2019, 2020 (2/4)	NR
		Dawson Dam	NS	2018 – 2020, 2023 (1/2/4), 2024 (2)	NS
		CWM01	NR	2020, 2022 (1/3)	NR
		CWM02	NR	2022 (1)	NR
		CWM05	NS	2020, 2022, 2023, 2024 (2 or 3 or 4 or 5)	NR

Scientific name	Common Name	Location	EBS 2012 – 2016	Years recorded between 2018 and 2024 and (CSR) ¹	Spring 2025 CSR*/ notes
		CWM06	NR	2020, 2022, 2023 (1/2/3)	NR
		CWM021	NS	2020, 2022, 2023 (1/2)	NR
		CWM022	NS	2020, 2022, 2023 (1/2)	NR
		Tjungu EIA	NS	2023 (1/3)	NS
<i>Cucumis myriocarpus</i>	Paddy Melon	EV EIA	NS	2020, 2023 (3)	NS
		CWM01	NR	2020 (3)	NR
		Dawson Dam	NR	2020, 2023 (2/3/5)	NS
		South Eliza Dam	NR	2020, 2023 (2/3/5)	NR
<i>Cynodon dactylon</i>	Couch	Whittata Creek	NS	2021 (2), 2024 (2)	NS
<i>Erodium sp. including E. cicutarium</i>	Cut-leaf Heron's-bill	CAR004	NR	NR	1
		CAR005	NR	NR	1
		CAR009	NR	NR	1
		CWM02	NR	2020 (1)	NR
		Dawson Dam	NR	2020 (1)	NS
		Whittata Creek	NS	2021 (1)	NS
		Anzac Dam	NR	2020, 2021 (1/2)	NS
<i>Heliotropium curassavicum</i>	Smooth Heliotrope	North Eliza	NS	2018 – 2024 (2 or 3 or 4 or 5)	NS
		South Eliza	NS	2018 – 2024 (2 or 3 or 4 or 5)	4/5 (localised)
		Anzac Dam	NS	2018 – 2023 (2/4/5/6)	NS
		Dawson Dam	NS	2018 – 2024 (2/4/5/6)	NS
		CWM01	NR	2023 (1), 2024 (2)	2
		CWM02	Present	2019 – 2024 (1 or 2 or 3 or 4)	4 (near water)
		CWM06	NR	2023 (1)	2 (near water)
<i>Heliotropium europeum and/or supinum</i>	Spreading Heliotrope	CWM01	Present	2018, 2021 (1/2)	NR
		CWM02	NR	NR	2
		Anzac Dam	NS	2019 (1)	NS
		North Eliza Dam	NS	2019 – 2024 (2 or 3 or 4)	NS
		South Eliza Dam	NS	2021 – 2024 (1 or 2 or 4)	1
		Dawson Dam	NS	2018 – 2021 (2/3/4), 2024 (2)	NS
		Whittata Creek	NS	2021 (2)	NS
<i>Lepidium africanum</i>	Peppergrass	CWM02	Present	NR	NR
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	Expo Village EIA	NS	2018 – 2022 (2/4), 2024 (2/6)	Present
		CWM001	NR	2022 (1)	NR
		CWM006	NR	2020 (1)	NR
		CAR018	NS	NR	1
		North Eliza Dam	NS	2024 (1)	NS
<i>Malva parviflora</i>	Mallow	Anzac Dam	NS	2019 (1)	NS

Scientific name	Common Name	Location	EBS 2012 – 2016	Years recorded between 2018 and 2024 and (CSR) ¹	Spring 2025 CSR*/ notes
		North Eliza Dam	NS	2024 (1)	NS
		South Eliza Dam	NS	2023 (3)	2 (localised)
		CWM01	NR	2020, 2022 (1)	NR
		CWM02	NR	2020, 2023 (2/3)	3 (near water)
<i>Medicago sp (including M. minima)</i>	Medic	CWM01	NR	2022 (1)	1
		CWM02	NR	2022 (1), 2024 (3)	NR
		North Eliza Dam	NS	2024 (3)	NS
		South Eliza Dam	NS	2024 (3)	2
<i>Mesembryanthemum crystallinum</i>	Iceplant	CWM01	NR	2020 (3)	NR
		South Eliza Dam, EV	NR	2020 (1)	NR
<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant	CAR001, CAR008, CAR009, CAR010	Present	NR	NR
<i>Nicotiana glauca</i>	Tree Tobacco	CAR013	Present	2022 (1)	NR
		Dawson Dam	NS	2023 (1)	NS
		South Eliza Dam	NS	2018 – 2024 (2 to 5)	2 to 5
<i>Opuntia sp. ¹</i>	Prickly Pear	Yeltacowie homestead	NS	2018 – 2024 (1)	1 (c. 10 m ²)
<i>Polygonum aviculare</i>	Wire Weed	Anzac Dam	NS	2019 (1)	NS
<i>Rostraria pumila</i>	Tiny Bristle Grass	CAR003-CAR005, CAR007, CAR008, CAR012-CAR015, CAR022	CAR003- CAR005, CAR007, CAR008, CAR012-CAR015	CAR004, CAR012 (1) Recorded in 2019 and 2020	NR
		South Eliza Dam	NS	2019 (3)	NR
		Expo Village	NS	2019 – 2022 (1/2/4), 2024 (2)	NR
<i>Rumex vesicarius</i>	Rosy Dock	CAR004, CAR013	Present	NR	NR
		CAR007	Present	2020 (1)	NR
<i>Schinus molle</i>	Pepper Tree	Whittata Creek	NS	2021 (1) Not surveyed other years	NS
<i>Schismus barbatus</i>	Arabian Grass	CAR003, CAR006, CAR012, CAR014	Present	NR	NR
<i>Sisymbrium erysimoides</i>	Smooth Mustard	Anzac Dam	NS	2019 (1)	NS
		Dawson Dam	NS	2019 (1), 2024 (2/4)	NS
		CAR001, CAR009, CAR011, CAR013, CAR014, CAR016	Present	NR	NR
		CAR010	NS	2021 (1)	NR
		CAR012	NS	2019 (1)	NR
		CAR017	NS	2019 (1)	1
		CAR020	NS	2024 (1)	NR
		CAR021	NS	2020, 2022, 2023, 2024 (1 or 2 or 3 or 4)	4
		CAR022	NS	2019 – 2023 (1/2/3/4), 2024 (4/5)	5
		CWM01	NR	2019, 2020, 2022, 2023 (1/2/3/4), 2024 (3)	1

Scientific name	Common Name	Location	EBS 2012 – 2016	Years recorded between 2018 and 2024 and (CSR) ¹	Spring 2025 CSR*/ notes
		CWM03	Present	NR	NR
		CWM05	NS	2020, 2021 (1/3), 2024 (1/4)	1 and 3
		CWM06	NR	2019 – 2023 (1/3), 2024 (1/5)	1 to 5
		South Eliza Dam	NS	2019, 2020 (3), 2024 (3)	1
		North Eliza Dam	NS	2024 (1/3)	NS
		Expo Village	NS	2020 (2), 2024 (2/4)	2 and 4
<i>Solanum nigrum</i>	Black Nightshade	Anzac Dam	NS	2019 – 2023 (1)	NS
		Dawson Dam	NS	2019 – 2020, 2023 and 2024 (2)	NR
		South Eliza Dam	NS	2020, 2023 and 2024 (1)	1
		Expo Village	NS	2018 – 2021, 2023 and 2024 (1/2)	1
		Expo Village EIA	NS	2018 – 2021, 2023, 2024 (1 or 2 or 3 or 4)	1
		Whittata Creek	NS	2021 (1) Not surveyed other years	NS
		CWM01	Present	2021, 2022 (1), 2024 (1)	NR
		CWM02	Present	NR	NR
<i>Sonchus oleraceus</i>	Sow Thistle	Expo Village	NS	2018 (1), 2024 (2)	1
		Airport Laydown LFA (restoration)	NS	NR	1
		CWM01	NR	2021, 2022 (1), 2023 (1)	3 (largely near drainage)
		CWM02	NR	2024 (3)	NR
		CWM07	NR	NR	1
		NWM01	NS	NR	1
		Expo Village EIA	NS	2018, 2019, 2021, 2023 (1/3/4), 2024 (3/4)	3/4
		TV EIA	NS	2018 – 2023 (4)	NS
		CAR003		2019 (1)	1
		CAR004, CAR006	NR	NR	1
		CAR009	Present	NR	1
		CAR010	Present	NR	3
		CAR007, CAR014	Present	NR	NR
		CAR012	Present	2023 (1)	1
		CAR011, CAR015	Present	2019 (1)	NR
		CAR013	Present	2019, 2023 (1)	1
		CAR016	NR	2019 (1)	1
		CAR018	NR	2023 and 2024 (1)	2
		CAR019	NS	2020 (1), 2024 (1)	2
		CAR020, CAR022	NS	NR	1
<i>Tamarix aphylla</i> ^{1,2}	Athel Pine	Yeltacowie homestead	NS	2018, 2019, 2021 – 2023 (1), 2024 (1)	1 (c. 10 trees including suckers and regrowth of cut trees)
<i>Tribulus terrestris</i>	Caltrop	CAR002, CAR005, CAR008-CAR010, CAR013, CAR014	Present	NR	NR

Scientific name	Common Name	Location	EBS 2012 – 2016	Years recorded between 2018 and 2024 and (CSR) ¹	Spring 2025 CSR*/ notes
		CAR020	NS	2020 (1)	NR
<i>Urtica urens</i>	Stinging Nettle	Exploration Village EIA	NS	2023 (2)	NR
<i>Verbena supina</i>	Trailing Verbena	Anzac Dam	NS	2022 (2)	NS
		North Eliza Dam	NS	2024 (1)	NS
<i>Xanthium spinosum</i> ¹	Bathurst Burr	CWM01	NR	2018, 2019, 2021, 2023 (1/3), 2024 (2)	1 (7+ plants near culvert)
		CWM02	NR	2019, 2021, 2023 (2/3/4), 2024 (3)	1 (near water)
		CWM05	NS	NR	1 (c. 10) plants in localised area of cracking clay. No fruit observed
		Dawson Dam	NS	2019 – 2024 (4/5)	NS
		South Eliza Dam	NS	2019, 2021, 2023 (2/3/4/5), 2024 (3)	2 (localised)
		Whittata Creek	NS	2021 (2/5), 2024 (1) Not surveyed other years	NS

*CSR = Crown Separation Ratio: Abundance recorded using the CSR scale 1 = < 12 individuals; 2 = isolated clumps, 3 = isolated individuals, 4 = plants separated by 6-20 crown widths, 5 = plants separated by 1-5 crown widths

¹ Declared in SA under the Landscapes South Australia 2019 Act. Declared plant species are regulated as to their movement, sale, notification and/or control.

² WoNS - Weed of National Significance. Must be controlled within 100 m of a watercourse

³ EV = Exploration Village, EV EIA = Exploration Village Effluent Irrigation Area. TV EIA = Tjungu Village Effluent Irrigation Area, NR = Not Recorded, site was surveyed, but weed species was not observed; NA = Not applicable, site was discontinued in spring 2018, NS = Not surveyed.

Appendix G2. Weed transect species (baseline and compliance)

Table G2: Weed species recorded along weed transects, baseline and compliance/operational monitoring

Transect	Species	2012-2016 ¹	Years recorded between 2018 and 2024 and (CSR) ²	Spring 2025 notes and/or CSR ²
CWM01	<i>Brassica tournefortii</i> (Mustard)	Present	NR#	NR
CWM01	<i>Carrichtera annua</i> (Wards Weed)	NR	2021	NR
CWM01	<i>Carthamus lanatus</i> (Saffron Thistle)	Present	2018, 2023 (1)	NR
CWM01	<i>Centaurea melitensis</i> (Malta Thistle)	NR	NR, 2024(1)	NR
CWM01	<i>Cucumis</i> sp. (Paddy Melon)	NR	2020	NR
CWM01	<i>Cynodon dactylon</i> (Couch)	NR	2021 (2), 2024 (2)	NR
CWM01	<i>Heliotropium curassavicum</i> (Smooth Heliotrope)	NR	2022 (1), 2023 (1), 2024 (3)	2 (Localised at culvert)
CWM01	<i>Heliotropium supinum</i> (Spreading Heliotrope)	Present	2018, 2019, 2021	NR
CWM01	<i>Lysimachia arvensis</i> (Scarlet Pimpernel)	NR	2022 (1)	NR
CWM01	<i>Malva parviflora</i> (Mallow)	NR	2020 2022 (1)	NR
CWM01	<i>Medicago</i> sp. (Medic) including <i>Medicago minima</i>	NR	2022 (3)	1 (localised near drainage)
CWM01	<i>Mesembryanthemum crystallinum</i> (Iceplant)	NR	2020	NR
CWM01	<i>Sisymbrium erysimoides</i> (Smooth Mustard)	NR	2020, 2022 (1), 2023 (2/4)	1 (drainage line)
CWM01	<i>Sonchus oleraceus</i> (Sow Thistle)	Present	2021, 2022 (1), 2023 (1)	3 (largely near drainage)
CWM01	<i>Solanum nigrum</i> (Black Nightshade)	NR	2022 (1)	NR

Transect	Species	2012-2016 ¹	Years recorded between 2018 and 2024 and (CSR) ²	Spring 2025 notes and/or CSR ²
CWM01	<i>Xanthium spinosum</i> (Bathurst Burr)	NR	2018, 2019, 2021, 2023 (3), 2024 (3) (2024 = 30+ plants)	Localised, 7+ at culvert
CWM02	<i>Centaurea calcitrapa</i> (Star Thistle)	Present	NR	NR
CWM02	<i>Citrullus Cucumis</i> (Bitter Melon)	NR	2022 (1)	NR
CWM02	<i>Erodium cicutarium</i> (Cut-leaf Heron's-bill)	NR	2020	NR
CWM02	<i>Heliotropium curassavicum</i> (Smooth Heliotrope)	Present	2019, 2020, 2021, 2022 (3), 2023 (2), 2024 (3)	4 (culvert and water's edge)
CWM02	<i>Heliotropium supinum</i> (Spreading Heliotrope)	NR	NR	2 (near water)
CWM02	<i>Lepidium africanum</i> (Peppercress)	Present	NR	NR
CWM02	<i>Malva parviflora</i> (Mallow)	NR	2020, 2023 (2)	3 (culvert and water's edge)
CWM02	<i>Medicago minima</i> (Medic)	NR	2022 (1), 2024 (4)	NR
CWM02	<i>Solanum nigrum</i> (Black Nightshade)	NR	2022 (1)	NR
CWM02	<i>Sonchus oleraceus</i> (Sow Thistle)	NR	2022 (1), 2024 (4)	1
CWM02	<i>Xanthium spinosum</i> (Bathurst Burr)	Present	2019, 2021, 2023 (2/4), 2024 (3)	1 (Culvert + water's edge but high fruit load)
CWM03	<i>Sisymbrium erysimoides</i> (Smooth Mustard)	Present	NR	NR
CWM04	<i>Sonchus oleraceus</i> (Sow Thistle)	Present	NR	NR
CWM05	<i>Carrichtera annua</i> (Wards Weed)	NR	NR, 2024 (1)	NR
CWM05	<i>Citrullus</i> sp. (Bitter Melon)	NS	2020, 2022 (4/5), 2023 (4/5), 2024 (3)	NR
CWM05	<i>Sisymbrium erysimoides</i> (Smooth Mustard)	NS##	2020, 2024 (1/4)	1/3 (Widespread but sparse on verge and dune)
CWM05	<i>Xanthium spinosum</i> (Bathurst Burr)	NR	NR	1 (c. 10) plants in localised area of cracking clay. No fruit observed
CWM06	<i>Citrullus</i> sp. (Bitter Melon)	NR	2020, 2022 (1), 2023 (2/3)	NR
CWM06	<i>Heliotropium curassavicum</i> (Smooth Heliotrope)	NR	NR	2 (drainage line)
CWM06	<i>Lysimachia arvensis</i> (Scarlet Pimpernel)	NR	2020	NR
CWM06	<i>Sisymbrium erysimoides</i> (Smooth Mustard)	NS	2018, 2019, 2020, 2022 (1), 2023 (1), 2024 (1 to 5)	1 to 5 (widespread)
CWM07	<i>Sonchus oleraceus</i> (Sow Thistle)	NR	NR	1 (two locations)
NWM01	<i>Sonchus oleraceus</i> (Sow Thistle)	NR	NR	1 (drainage line)
NWM01	<i>Tribulus terrestris</i> (Caltrop)	NS	2019	NR
NWM02	<i>Citrullus</i> sp. (Bitter Melon)	NS	2019	NR
NWM02	<i>Cucumis</i> sp. (Paddy Melon)	NS	2019	NR
NWM03	No weeds present	NS	Nil	Nil

Includes weeds recorded along weed transect, but outside of a designated recording quadrat.

¹Data source: baseline surveys autumn 2012 – 2016 (EBS 2015a; EBS 2015b; EBS 2016); ² Presence abundance uses CSR scale (1 = < 12 individuals; 2 = isolated clumps, 3 = isolated individuals, 4 = plants separated by 6-20 crown widths, 5 = plants separated by 1-5 crown widths

#NR = surveyed but not recorded; ##NS = Not surveyed (CWM05 first surveyed 2020. NWM01, NWN02 and NWM03 transects first surveyed 2019); Apple of Sodom (*Solanum linnaenum*) recorded during baseline surveys, but not included in above table as there are no Biological Databases of SA records for this species north of Port Augusta, Ceduna (NatureMaps 2024).



BHP