Hornsdale Wind Farm SEB Offset Area

Annual Monitoring Report 2026

Final

April 2026

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Prepared by
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Report No.:	33203 / R01
Date:	April 2026

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Acknowledgement of Country

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Document Status

Rev No.	Reviewer Name	Date	Approved for Issue Name	Date
V1	Dr M. Louter	07/04/2026	Dr T. How	10/04/2026
V2	Dr M. Louter	15/04/2026	Dr T. How	15/04/2026

Executive Summary

Hornsdale Wind Farm (HWF) is a 315 Megawatt (MW) renewable electricity project consisting of 99 wind turbine generators and battery storage (the Project) located north of Jamestown in the Mid North region of South Australia (SA). The Project Area extends approximately 15 kilometres (km) in a north-south direction, and approximately 8 km in an east-west direction, with a footprint covering 75 hectares (ha).

As part of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval process an offset was calculated to offset the potential impacts to the EPBC Act listed Pygmy Blue-tongue Lizard (PBTL) (*Tiliqua adelaidensis*) (see EPBC Act referral 2012/6573). To meet the requirements under the South Australian *Native Vegetation Act 1991* (NV Act) figures for a Significant Environmental Benefit (SEB) were calculated to determine the required offset for clearance of native vegetation associated with the construction of the Project (see Hornsdale Wind Farm Native Vegetation Clearance Report (EBS Ecology 2013)).

Annual PBTL and vegetation surveys within the SEB Offset Area are part of a long-term annual monitoring program, which is an EPBC Act approval condition (approval 3d) of the Project (see Hornsdale Wind Farm Annual Compliance Report under the EPBC Act September 2018 (EBS Ecology 2018a)). The program involves annual surveys that will run until 2027, as per the approval conditions.

The key results of the 2026 **PBTL survey** include:

- A total of 1,213 burrows across the 11 quadrats were checked for PBTL occupancy in 2026, of which 48 burrows (3.96%) contained one or more PBTLs (compared to 1,582 burrows in 2025, 6.26% containing PBTL).
- A total of 57 PBTLs were recorded in 48 burrows including 35 adults, 5 subadults and 17 juveniles (compared to 101 PBTL in 2025). PBTLs were found in 10 of the 11 quadrats.
- The mean number of PBTLs per quadrat observed in 2026 was less than the baseline and the 2025 survey results but was still greater than 2023 and 2024. The mean number of PBTLs differed significantly between the monitoring years with high totals detected in 2016-2019 and low totals detected in 2021 and 2023.
- A significant negative relationship between total annual rainfall and numbers of PBTLs detected (p-value >0.001, $r^2 = 0.048$). This indicates that as annual rainfall increases, the number of PBTLs detected decreases.
- A significant negative relationship between spring – summer rainfall and numbers of PBTLs detected (p-value >0.001, $r^2 = 0.094$). Again, this indicates that as spring – summer rainfall increases, the number of PBTLs detected decreases.

The key results of the 2026 **vegetation survey** include:

- A total of 61 flora species were observed across the 12 vegetation monitoring quadrats in 2026, compared to 65 in 2025, including:
  - 31 native flora species, of which three are State Rare under the *National Parks and Wildlife Act 1972*,
    - *Cryptandra campanulata* (Long-flower Cryptandra)
    - *Maireana rohrlachii* (Rohrlach's Bluebush)

    - *Rumex dumosus* (Wiry Dock)
  - 29 weed species, of which five are Declared under the *Landscape South Australia Act 2019*:
    - *Chondrilla juncea* (Skeleton Weed) (Quadrat 3);
    - *Echium plantagineum* (Salvation Jane) (Quadrats 1–12);
    - *Marrubium vulgare* (Horehound) (Quadrats 1–2, 4-7, 9-10, and 12);
    - *Rosa canina* (Dog Rose) (Quadrats 5, 7, 9, and 12); and
    - *Tribulus terrestris* (Caltrop) (Quadrat 12).
- Weed cover was higher in 2026 than in 2025.
- Native and weed species diversity has increased since 2018, which may reflect variations in survey effort and climatic conditions, rather than an improvement of vegetation condition.
- In 2026, grass tussock spacing was higher and grass tussock height was lower, compared to 2025, indicating an opening up of vegetation cover. The percentage of dead material on grass tussocks was lower in 2026, compared to 2025.
- The mean percentage of bare ground and cryptogam cover was lower in 2026 compared to 2025.
- Data continues to show relationships between rainfall in the year preceding surveys, and spring-summer period leading into monitoring surveys and most vegetation data sets.

Current management of the site remains consistent with the Management Plan in line with the Project's approval conditions. Further, in recent years, the landowner has been responsive to recommendations aimed at improving vegetation condition through fluctuating environmental conditions.

However, there continues to be a downward trend in the number of PBTLs recorded and corresponding increase in weed cover, particularly annual grassy weeds, at some monitoring sites. The Management Plan is currently due for review, with this work scheduled for mid-2026. This review should aim to develop strategies that contribute to decreasing the cover of grassy weed species.

Recommendations

- As part of the Management Plan review scheduled in mid-2026, determine if current grazing management as per the *Hornsdale Wind Farm SEB – Native Vegetation and Pygmy Bluetongue Lizard Management Plan* is adequately maintaining vegetation and PBTL habitat condition.
- As part of the Management Plan review scheduled in mid-2026, investigate potential weed control methods that might help reduce the cover of grassy annual weeds, such as *Avena* spp. If effective, targeted methods can be determined, they should be implemented as part of a revised management plan.
- During the spring/summer growing season 2026 to 2027, continue control of woody weeds, specifically Dog Rose and Horehound.
- Continue to control Bathurst Burr.
- Concentrate weed control efforts in drainage lines and sites frequented by livestock, such as feed out areas and watering points.

- When stock is removed from the SEB Offset Area in late 2026, in consultation with the landowner, consider closing off watering points to reduce summer grazing pressure from kangaroos, as recommended by the Department for Environment and Water in 2025.
- A concerted effort should be made to reduce the cover of annual grassy weeds (e.g. *Avena* spp. and *Bromus* spp.). This may require an altered approach to grazing management. As the management plan is currently due for review, this should be a focus going forward.

Abbreviations

Abbreviation	Definition
ANOVA	Analysis of Variance – statistical method used to test differences between two or more means by analysing the variance of the sampling distribution of the mean.
BOM	Bureau of Meteorology
Cryptogam	Biological soil crust most often composed of fungi, lichens, cyanobacteria, bryophytes and algae in varying proportions.
EBS Ecology	Environmental and Biodiversity Services Pty Ltd – trading as EBS Ecology
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
GPS	Global Positioning System
HWF	Hornsdale Wind Farm
LSA Act	*Landscape South Australia Act 2019* (SA)
MW	Mega Watt(s)
NPW Act	*National Parks and Wildlife Act 1972* (SA)
NV Act	*Native Vegetation Act 1991* (SA)
PBTL	Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*)
PCQM	Point Centre Quarter Method
p-value	The level of marginal significance within a statistical hypothesis test representing the probability of the occurrence of a given event. The p-value is used as an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected.
r^2	The coefficient of determination – the proportion of the variance in the dependent variable that is predictable from the independent variable(s).
SA	South Australia(n)
SEB	Significant Environmental Benefit
sp.	Species
ssp.	Sub-species
the SEB Offset Area	The SEB offset for native vegetation (142.54 ha) which incorporates the PBTL offset (3.1 ha), [redacted].
%	Percent

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1.0 Introduction

1.1 Hornsdale Wind Farm

Hornsdale Wind Farm (HWF) is a 315 Megawatt (MW) renewable electricity project consisting of 99 wind turbine generators and battery storage (the Project) located north of Jamestown, South Australia (SA). The location of HWF is shown on the map in **Figure 1.1**. The project was constructed in three stages, labelled Hornsdale Wind Farm Stage 1 to 3.

A Significant Environmental Benefit (SEB) offset was required under the *Native Vegetation Act 1991* (NV Act) to offset the clearance of native vegetation associated with the construction of each stage. A Pygmy Blue-tongue Lizard (PBTL) (*Tiliqua adelaidensis*) offset was also required as part of an approval condition under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), to compensate for the potential impact to PBTLs resulting from the wind farm development. The PBTL is listed as Endangered under the EPBC Act and the *National Parks and Wildlife Act 1972* (NPW Act). A summary of EPBC Act and previous NV Act approvals for the Project is provided in **Table 1.1**.

The SEB offset for native vegetation has been delivered for all three stages of the Project in a parcel of land 142.54 hectares (ha) in size, located [redacted] (henceforth referred as the SEB Offset Area). A significant population of PBTLs is present in the SEB Offset Area and a PBTL offset of 3.1 ha has been incorporated inside it. The SEB Offset Area is protected under the NV Act and is listed on the property title.

The establishment of the SEB Offset Area and PBTL offset has required the implementation of a management plan which aims to ensure the habitat suitability and vegetation condition are maintained and/or improved over time.

Table 1.1 Summary of the Relevant Environmental Approvals for the Hornsdale Wind Farm

Development Stage	Relevant Legislation	Approval Reference
Hornsdale Wind Farm Stage 1	NV Act	2013/3012/764
Hornsdale Wind Farm Stage 2	NV Act	2013/3012/764
Hornsdale Wind Farm Stage 3	NV Act	2016/3101/764
All stages	EPBC Act	EPBC 2012/6573

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FIGURE 1.1

Hornsdale Windfarm Location

Legend

- Hornsdale Windfarm
- PBTL Monitoring quadrat
- Access track

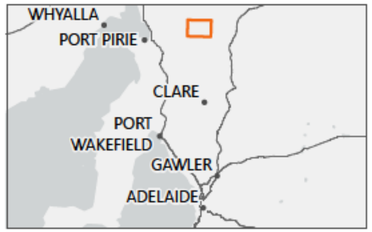

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Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

1.2 Objectives

To assess the effectiveness of the management plan, monitoring of vegetation (grassland) condition and the PBTL population inside the SEB Offset Areas is required. The objectives of this monitoring are as follows:

- Undertake long-term (10 years) monitoring of native vegetation and the PBTL population.
- Identify any threats acting on native vegetation condition and/or the PBTL population that may be occurring in the SEB Offset Area, such as increasing weed presence/abundance or changing vegetation structure.
- Identify any actions that are required to manage any threats or undesirable outcomes identified.

This report discusses the results of the 2026 survey, which is the ninth year of monitoring. The report aims to compare results between years to determine any trends that can be linked to threats. Where threats are identified, the report makes recommendations for management actions that may address these threats.

1.3 SEB Offset Area

The SEB Offset Area within the HWF was selected based on the following key considerations:

- The occurrence of a poor to moderate quality native grassland that could be improved over time with active management.
- The occurrence of a significant population (>30 individuals) of PBTLs.
- The location within the HWF Project Area and the Northern and Yorke Landscape Management Region.

A management plan was prepared for the SEB Offset Area by EBS Ecology (EBS Ecology 2017a). The management plan developed long-term management measures aimed at improving vegetation condition and maintaining the PBTL population.

1.4 Current Land Management and Ownership

The cadastral and ownership details of the SEB Offset Area are provided in **Table 1.2**. Since the land's purchase in 2008, it has been lightly grazed by sheep, mainly by lambing ewes. Generally, little to no grazing occurs prior to 1 May each year to facilitate the growth of fodder.

Since 2017, gazing has generally occurred according to the regime recommended in EBS Ecology 2017a. Since 2023 however, in response to climatic conditions that resulted in undesirable changes in vegetation structure and a perceived decrease in PBTL numbers, grazing periods were increased. This is discussed in detail in EBS Ecology 2024.

Since the end of 2024, the grazing regime has returned to that stipulated in the management plan.

Table 1.2 SEB Offset Area Land Ownership

Owner	[redacted]
Land Manager	[redacted]
Contact Address	PO Box 233, Jamestown SA 5491
Local Government Area	Northern Areas Council
Land Management Region	Northern and Yorke
Hundred	Belalie
Parcel Details	[redacted]
Titles	[redacted]
Location	[redacted], Jamestown

1.5 Weather and Climate

1.5.1 Annual Rainfall

Rainfall data is important as it impacts heavily on vegetation growth. Monthly rainfall data was sourced from the closest weather station to HWF, which is located at Yongala (Station: 019062, BOM 2026). The recorded monthly rainfall at Yongala has been highly variable since 2015, the year preceding the commencement of monitoring, as shown in **Table 1.3**.

This table shows the mean monthly rainfall and annual total and includes all years from 2015 until 2025. The table shows annual rainfalls recorded during that period have seldom been close to the long-term mean. Totals have tended to fluctuate from years of much higher than average to below average. In particular, the years from 2019 to 2023 have alternated between periods of very much below average to very much above average rainfall. During this period, annual totals have varied from a low of 174.2 mm in 2019 to as high as 444.3 in 2020 (see **Table 1.3**).

In 2025, the year leading up to the 2026 monitoring period, annual rainfall was 84.4 mm below the long-term mean. A similar annual rainfall was recorded in the two previous years, with only 243.1 mm in 2023 and 260.7 mm in 2024 recorded.

Table 1.3 Summary of Mean Monthly and Annual Rainfall, Recorded at Yongala Station from 2015 to 2025 (BOM 2026)

Year	Mean Monthly Rainfall (mm)	Annual Rainfall (mm)
2015	27.5	329.6
2016	41.9	502.4
2017	25.0	300.5
2018	17.8	213.2
2019	14.5	174.2
2020	37.0	444.3
2021	24.7	296.4
2022	34.8	418.1
2023	20.3	243.1
2024	21.7	260.7
2025	23.1	277.2
Long-term Mean	30.1	361.6

1.5.2 Spring and Summer Rainfall

Rainfall during the 2025–26 spring–summer period (September–January) was 95 mm, which is well below the long-term average of 146.4 mm. This represents the lowest rainfall for this period since 2019–20 (**Figure 1.2**).

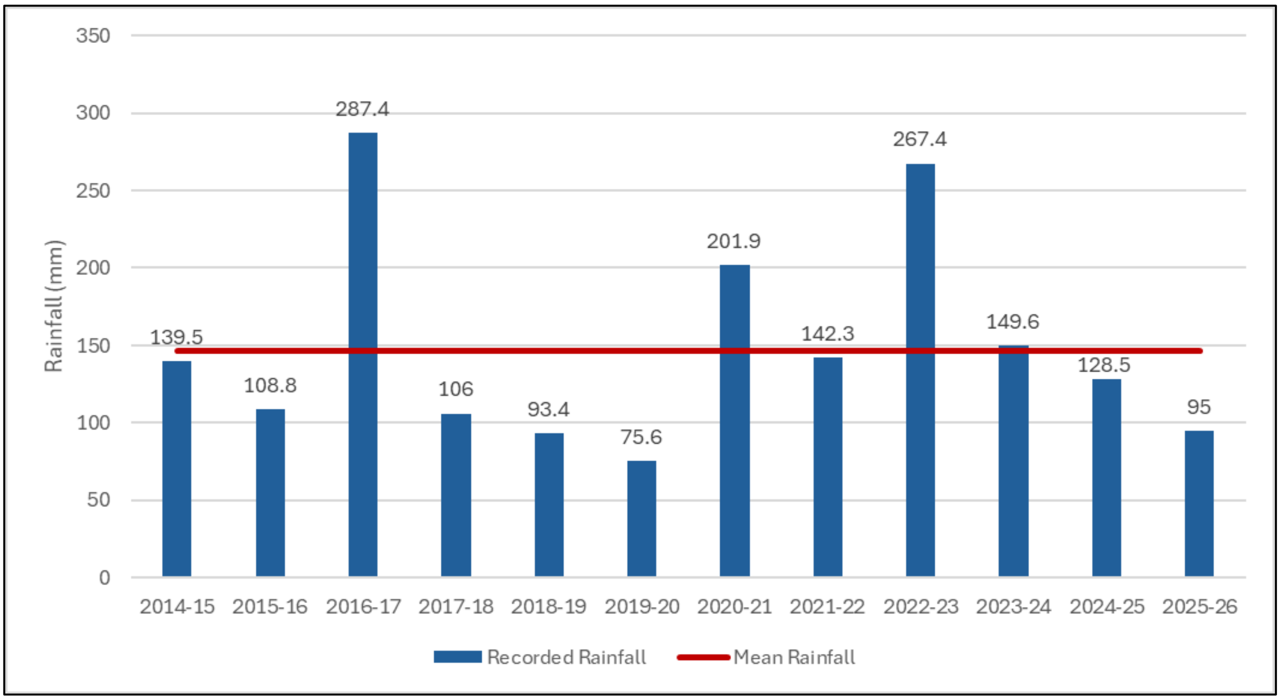

Figure 1.2 Spring-summer (September to January) Rainfall Recorded at Yongala Station Since 2014. The Graph Also Shows the Long-term Mean for the Same Period (BOM 2026)

2.0 Methods

The 2026 monitoring survey was undertaken over from 23 to 26 February 2026 using the same methods as used during all previous monitoring periods. Detailed discussions of the methods used for monitoring PBTL and vegetation condition are provided in previous annual monitoring reports (EBS Ecology 2022, EBS Ecology 2023). The following sections provide a summary of those methods.

2.1 Monitoring Quadrats

Monitoring was conducted within 12 quadrats (see **Figure 2.1**). Eight quadrats (Quadrat 1 to 8) were established in 2015 and four (Quadrat 9 to 12) were established in 2018. Of the 12 quadrats, 11 are located within open grassland, while one (Quadrat 12) is located within a small area of *Allocasuarina verticillata* (Drooping Sheoak) Woodland. Drooping Sheoak Woodland is considered unsuitable habitat for PBTLs and, therefore, Quadrat 12 is not monitored for PBTL presence and abundance.

Each quadrat is 100 x 100 m (1 ha) in size and oriented in a north-south direction. A steel dropper is located in each corner of the quadrat and form permanent markers. The GPS Coordinates of the corner posts for each quadrat are provided in **Table 2.1**.

The PBTL monitoring was first conducted at Quadrats 1–8 in 2016 (EBS Ecology 2016b) as the baseline survey and repeated in 2018 when Quadrats 9–11 were added. From 2018 onwards, all 11 quadrats were surveyed each year. While the vegetation monitoring was first conducted at Quadrats 1-12 in 2018 as a baseline and surveyed yearly afterwards. Additional vegetation monitoring attributes were collected as baseline data in 2020 and in 2022 to assist in determining vegetation condition trends.

A photo of each quadrat is taken from the north-eastern corner looking to the south-western corner during each annual monitoring survey (OEH 2009). These photos are provided in **Appendix 1**.

Table 2.1 Location Coordinates of Quadrat Corner Posts

Quadrat	North-east		South-east		South-west		North-west	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
4	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
5	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
6	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
7	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
8	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
9	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
10	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
11	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
12	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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FIGURE 2.1

Location of Monitoring Quadrats 1-12 Within the SEB Offset Area. Pygmy Blue-tongue Lizards are not Monitored in Quadrat 12

Legend

- Hornsdale Windfarm
- PBTL Monitoring quadrat
- Access track

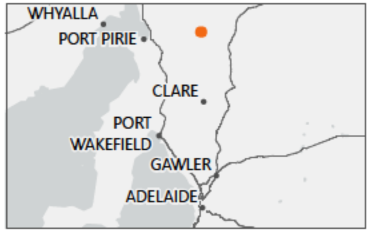

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Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

2.2 Statistical Analysis

The PBTL and vegetation data analyses were conducted using the R software environment for statistical and graphical computing (R Core Team 2020). Software coding was updated in 2025 and data management protocols reconfigured to ease future data analysis processes.

2.2.1 PBTL Monitoring

Type II one-way ANOVAs were used for statistical analyses to detect differences in the number of burrows, spiders and PBTLs recorded across all monitoring years. Type II ANOVAs are used to test for effects in an unbalanced design when there is no interaction observed between the explanatory variables, which is appropriate here given the different number of quadrats sampled during the baseline survey and since no interactions between the explanatory variables were detected. When ANOVA model assumptions were violated, Welch's ANOVAs were used, which does not assume equal variances, a common violation of linear models. A p-value of 0.05 was used to infer a significant difference in PBTL numbers in response to the explanatory variables. If a significant difference was detected by the ANOVA tests, post hoc analyses were undertaken to determine in which year significant differences occurred. Model fit values (r^2) are provided for select models that it could be calculated.

Type II two-way ANOVAs were used for statistical analyses to detect differences in the number of PBTLs in response to year and the number of burrows and spiders, respectively, as well as any differences in the number of PBTLs in response the various rainfall variables (i.e., the total rainfall from the past 12 months and rainfall from the spring and summer period preceding surveys – data from BOM 2026).

A subset of the PBTL data (i.e., 2018–2026 data) was also analysed using ANOVAs to test for the influence of vegetation condition variables (collected during the 2018–2026 vegetation surveys) on the number of PBTLs.

2.2.2 Vegetation Monitoring

One-way ANOVAs were used for statistical analyses to detect differences in the vegetation attributes recorded across all monitoring years, as well as in response to rainfall variables, namely total rainfall from the past 1 months and rainfall from the spring and summer period preceding surveys. A p-value of 0.05 was used to infer a significant difference, and post hoc analyses were undertaken to determine in which year significant differences occurred. Model fit values (r^2) are provided for select models that it could be calculated.

2.2.3 Influence of Rainfall on Vegetation Condition Variables and PBTLs

Given anecdotal comments from the landowner regarding spring – summer rainfall, the total rainfall recorded for the spring – summer period (September to January) prior to each monitoring survey was analysed. Previous years data analysis has concentrated only on rainfall totals for the three months prior to the monitoring survey, that is December, January and February.

The September to January rainfall (**Section 1.5.2**) was compared to the total number of PBTLs recorded and variables that might influence the habitat suitability and detectability of PBTL:

- Total number of spider holes surveyed across all quadrats.
- Cover (%) of bare ground + cover (%) of cryptogam, using the mean of the 1 m x 1 m quadrat measure calculated across all 12 monitoring sites.
- Basal width, tussock height and per-cent dead material, using the mean of the 1 m x 1 m quadrat measure calculated across all 12 monitoring sites.

While weed cover and litter cover may also influence habitat suitability, these variables were not compared to rainfall as those datasets have only been recorded since 2020.

The Pearson Correlation Coefficient of each dataset was calculated to determine if any relationships exist with increasing spring – summer rainfall.

3.0 Pygmy Blue-tongue Lizard Monitoring Results

3.1 2026 Results

3.1.1 Pygmy Blue-tongue Lizards

Across all 11 PBTL monitoring quadrats, a total of 1,213 burrows were located and checked for the PBTL. Of these, 48 burrows were recorded to contain one or more PBTLs (3.96%). PBTLs were found alone in 41 burrows, with four burrows having one adult and one neonate and three having one adult with two neonates. A total of 57 PBTLs were recorded. These results are summarised in **Table 3.1**.

PBTLs were recorded in all quadrats except Quadrat 2. Only Quadrat 3 recorded more than 10 PBTLs, with a high of 19 recorded, where the second highest number of burrows were detected and checked (221). Interestingly, although 239 burrows were located and checked at Quadrat 10, the highest of any quadrat, only two PBTLs were found. Similarly, only a single PBTL was found at Quadrat 8 from 135 burrows checked.

Quadrat 7 had the highest percentage of burrows that was occupied by PBTLs with 12.2%, followed by 8.64% at Quadrat 3 which had the highest total number of PBTLs. Quadrat 8 which had the lowest total number of PBTLs also had the lowest percentage of burrows occupied by PBTLs with 0.74%, when excluding Quadrat 7 where no PBTLs were recorded.

Maps showing the locations of burrows checked and PBTLs recorded are provided in **Appendix 2**.

Table 3.1 Summary of the Results of the 2026 PBTL Monitoring Survey

Quadrat	Slope Aspect	Burrows with PBTL	Juvenile PBTLs	Adult PBTLs	Total PBTLs	Total Burrows	% Burrows with PBTL
1	West	2	0	2	2	33	6.06
2	East	0	0	0	0	23	0
3	West	16	7	12	19	220	8.64
4	East	6	2	4	6	94	6.38
5	West	5	3	3	6	88	6.82
6	East	8	4	6	10	183	5.46
7	West	5	1	5	6	49	12.20
8	East	1	0	1	1	135	0.74
9	East	1	2	1	3	58	5.17
10	East	2	1	1	2	91	2.20
11	West	2	2	0	2	239	0.84
Total		**48**	**22**	**35**	**57**	**1,213**	**3.96**

3.1.2 Burrowing Spiders

The survey recorded 401 Wolf Spiders (*Lycosidae* spp.) and only a single Trapdoor Spider (*Mygalomorphae* spp.), with 33.14% of burrows containing spiders. Wolf Spiders were recorded at all monitoring quadrats, with the most recorded at Quadrat 6 (84 Wolf Spiders). Quadrats 1, 2, and 7 had less than 10 spiders present, while a singular Trapdoor Spider was recorded at Quadrat 5 (**Table 3.3**).

In 2026, there was non-significant weak positive correlation ($r^2 = 0.347$) between the number of spiders in a quadrat and the number of PBTLs recorded (p-value = 0.0566) (**Figure 3.2**), which is likely affected by the low number of PBTLs occurring at quadrats where a high number of spiders were recorded (e.g. Quadrat 8 and 11).

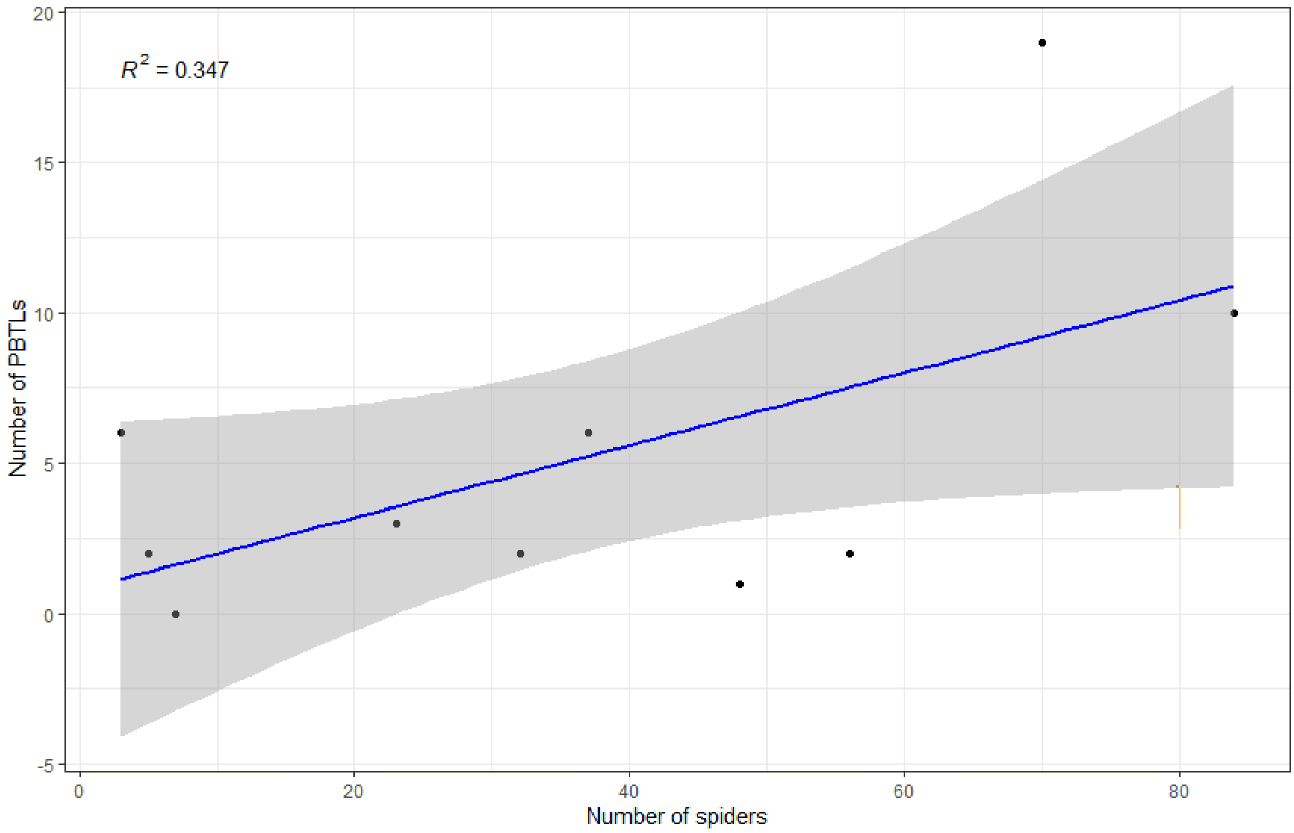

Figure 3.1 The Number of PBTLs Detected and Number of Spiders in 2026

3.1.3 Burrow Parameters

Depth

Most burrows located and surveyed were 0 to 10 cm deep, with 498 burrows, or 41.05%, within this depth range. Quadrat 11 had the highest number of burrows in this depth category of any site (114) along with the most burrows less than 20 cm deep (189 burrows). Quadrat 6 had the highest number of deep burrows of any site with 50 burrows deeper than 20 cm (**Table 3.2**).

PBTLs were observed in burrows of all depth categories, with the least number of PBTLs recorded in burrows less than 10 cm deep and the most recorded burrows between 20 cm and 30 cm deep.

Table 3.2 Burrow Depths Recorded at Each Monitoring Quadrat in 2026

Quadrat	<10 cm	10-20 cm	21-30 cm	>30 cm	Total
1	13	10	4	6	33
2	3	10	1	9	23
3	108	68	26	18	220
4	43	37	13	1	94
5	50	27	9	2	88
6	63	70	38	12	183
7	22	14	9	4	49
8	40	46	13	36	135
9	22	23	10	3	58
10	20	36	26	9	91
11	114	75	34	16	239
Total Burrows	**498**	**416**	**183**	**116**	**1,213**
Total PBTL	**2**	**25**	**26**	**4**	**57**

Density

As stated previously, 1,213 burrows were located by the 2026 survey. As expected, these were not evenly distributed across the 11 monitoring quadrats, with density of burrows between the sites highly variable. Quadrat 11 had the highest number of burrows (239), whilst Quadrat 2 had the lowest number (23).

The quadrat with the highest number of burrows (Quadrat 11) is located on a west-facing slope, whereas the quadrat with the fewest burrows (Quadrat 2) is on an east-facing slope. Average burrow numbers were also higher on west-facing slopes (126 burrows per quadrat) compared to east-facing slopes (97 burrows per quadrat).

In 2026, there was no statistically significant relationship between the number of burrows searched in a quadrat and the number of PBTLs recorded (p-value = 0.095), which is likely affected by the occurrence of a low number of PBTLs occurring at quadrats where the highest number of burrows were searched (Quadrat 8 and 11). However, a weak positive correlation was observed ($r^2 = 0.279$) (**Figure 3.2**).

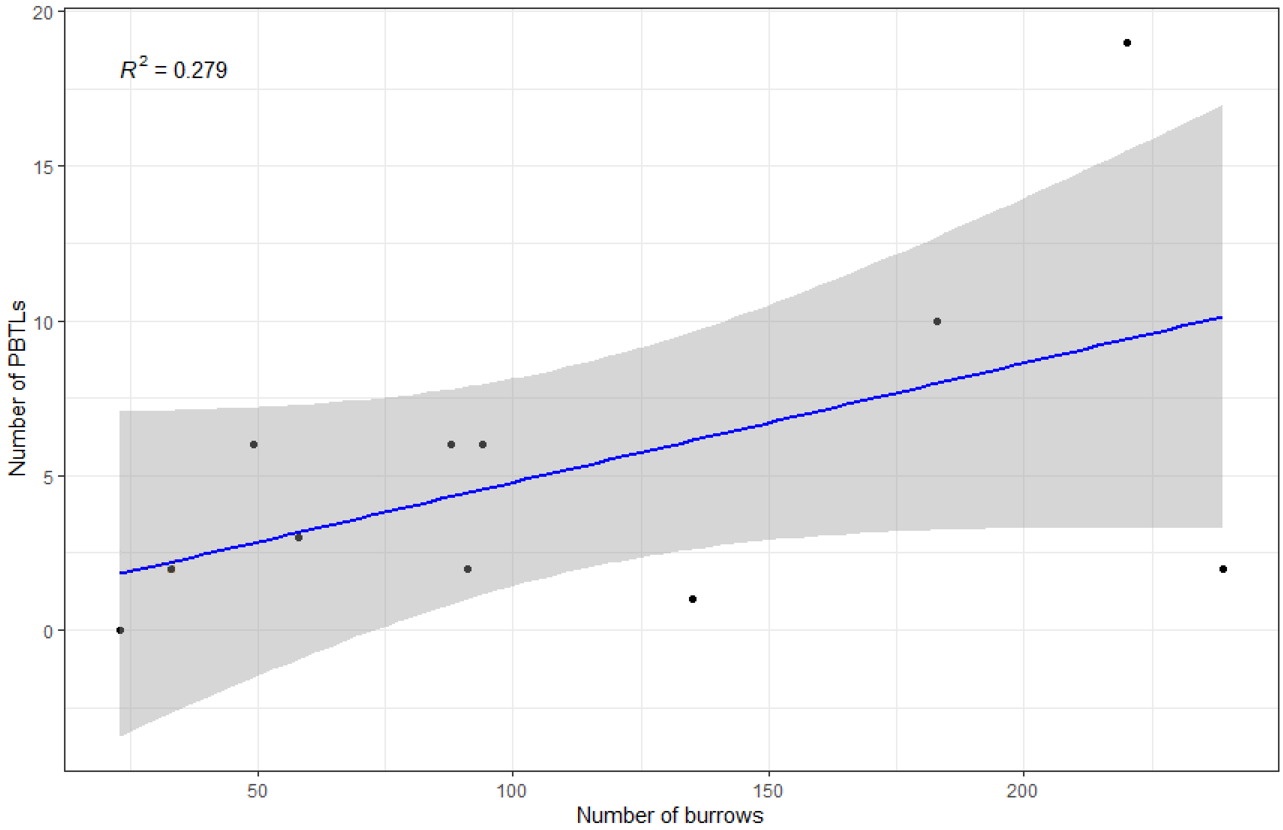

Figure 3.2 The Number of PBTLs Detected and Number Burrows Searched in 2026

Other Burrow Contents

Of all burrows searched, 527 (43%) were filled with debris, consisting of vegetation litter, soil or animal material such as shed spider skins. A total of 169 burrows contained invertebrates other than burrowing spiders. This includes weevils, ants, beetles, snails, centipedes, millipedes, and redback spiders. Other fauna which was recorded once in a burrow includes a scorpion at Quadrat 3 and a snake (probably a juvenile Eastern Brown Snake (*Pseudonaja textilis*) at Quadrat 6.

Table 3.3 Summary of the Burrow Contents of the 2026 PBTL Monitoring Survey

Quadrat	Slope Aspect	Burrows with PBTL	Juvenile PBTLs	Adult PBTLs	Total PBTLs	Wolf Spider	Trapdoor Spider	Other Invertebrate[1]	Snake	Debris	Total Burrows	% Burrows with PBTL
1	West	2	0	2	2	5	0	5	0	20	33	6.06
2	East	0	0	0	0	7	0	4	0	12	23	0
3	West	16	7	12	19	70	0	20	0	101	220	8.64
4	East	6	2	4	6	37	0	9	0	37	94	6.38
5	West	5	3	3	6	36	1	14	0	26	88	6.82
6	East	8	4	6	10	84	0	21	1	65	183	5.46
7	West	5	1	5	6	3	0	7	0	28	49	12.20
8	East	1	0	1	1	48	0	17	0	69	135	0.74
9	East	1	2	1	3	23	0	5	0	28	58	5.17
10	East	2	1	1	2	32	0	29	0	27	91	2.20
11	West	2	2	0	2	56	0	46	0	114	239	0.84
Total		**48**	**22**	**35**	**57**	**401**	**1**	**177**	**0**	**527**	**1,213**	**3.96**

[1]Other Invertebrates includes weevils, beetles, ants, centipedes, snails etc.

3.2 Comparison of Pygmy Blue-tongue Lizard Results Between Years

3.2.1 Number of Pygmy Blue-tongue Lizards

Compared to 2025, fewer PBTLs were detected across the SEB Offset Area in 2026 with there being less at Quadrats 1, 2, 4, 5, 6, 8, 10, and 11 (**Figure 3.3**). No PBTLs were detected at Quadrat 2 in 2026 despite two detections in 2025. The number of PBTLs detected at Quadrat 2 have historically been low with no PBTLs recorded in 2023 and 2024 and no more than two found since 2021.

Contrary, no PBTLs were detected in Quadrat 9 in 2025 but the 2026 monitoring recorded one burrow containing three PBTLs. An increased number of PBTLs was also detected in Quadrats 3 and 7 in 2026 compared to 2025 (**Figure 3.3**), where the increase was eight and two respectively.

The number of juvenile PBTLs was lower in 2026 (17) compared to 2025 (31). The number of juvenile PBTLs detected in 2026 was still higher compared to most previous survey years (**Table 3.4**).

The mean number of PBTL per quadrat in 2026 was 5.2 individuals which is lower in the previous year but still the second highest since the 2022 monitoring survey (**Table 3.3** and **Figure 3.4**). There was a significant difference in the mean number of PBTLs across the monitoring years (p-value = 0.0006), with the significant differences occurring between years as indicated below:

- Baseline and 2021 (p-value = 0.03).
- Baseline and 2023 (p-value = 0.01).
- 2018 and 2023 (p-value = 0.03).
- 2019 and 2021 (p-value = 0.02)
- 2019 and 2023 (p-value = 0.01).

The total number of PBTLs reached a significantly low levels in the years 2021 and 2023 compared to the early monitoring years, but the total has increased (**Table 3.3**) with no significant difference between the total in 2026 compared to baseline.

Table 3.4 The Total and Mean Number of PBTLs Recorded Within Each Age Class for all Monitoring Surveys

Age Class	Baseline	2018	2019	2020	2021	2022	2023	2024	2025	2026
Adult	100	142	193	95	39	84	18	47	50	**35**
Sub-adult	10	8	15	0	0	0	0	0	20	**5**
Juvenile	29	20	2	18	2	12	14	9	31	**17**
Total	**139**	**170**	**210**	**113**	**41**	**96**	**32**	**56**	**101**	**57**
Mean	**17.4**	**16.6**	**19.1**	**10.3**	**3.7**	**8.7**	**2.9**	**5.1**	**9.2**	**5.2**

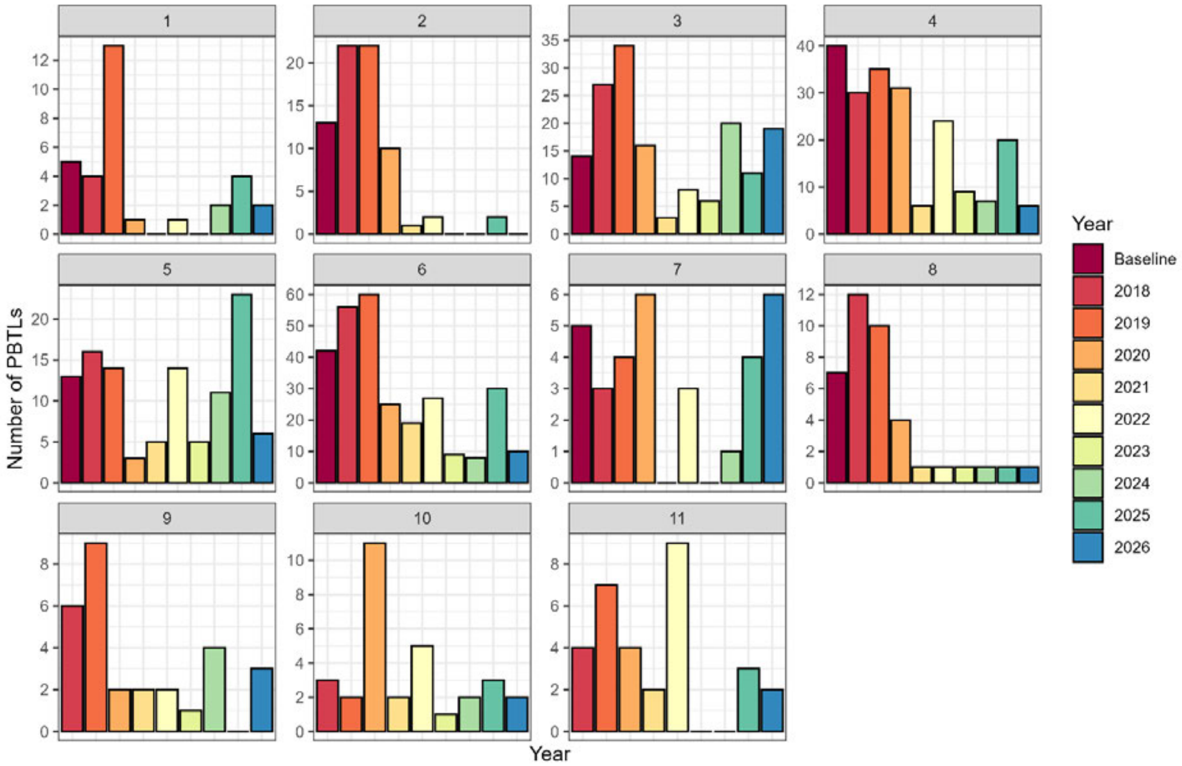

Figure 3.3 The Total Number of PBTLs Recorded at Each Quadrat During Each Monitoring Survey Since the Baseline Survey, Noting that Baseline Monitoring Surveyed Quadrats 1 to 8 Only

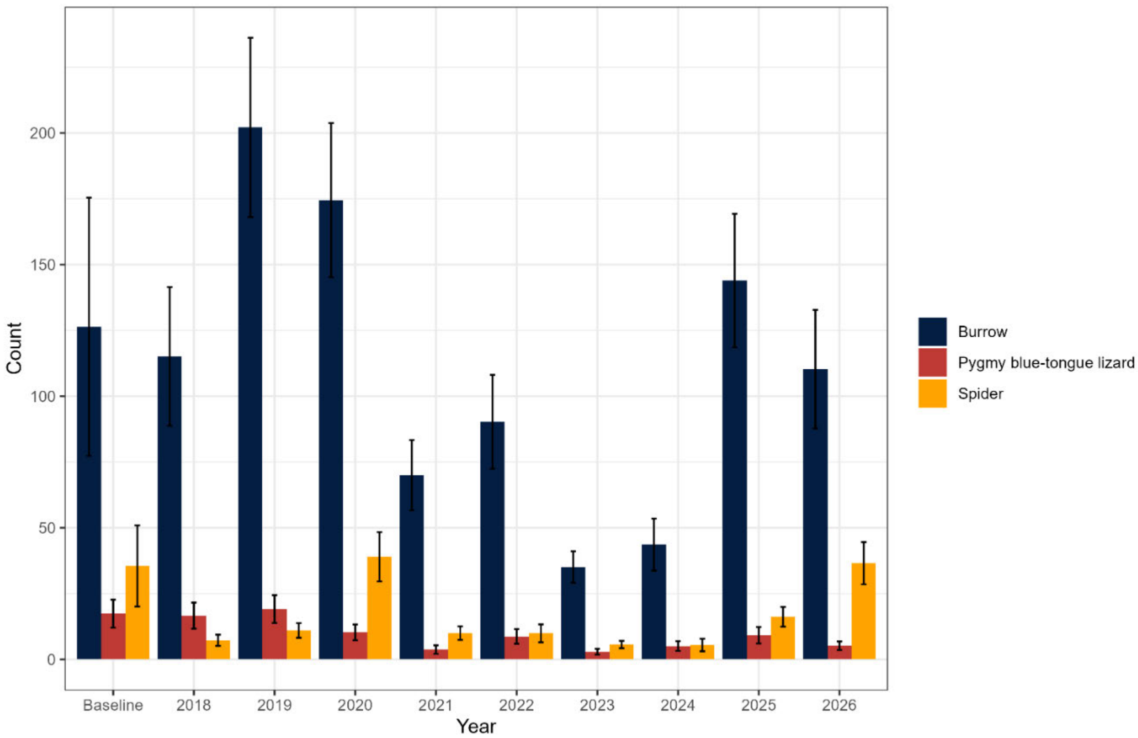

Figure 3.4 The Mean Number of PBTL, Spiders and Burrows (+/- S.E.) Across the 11 Quadrats for All Monitoring Years, Noting that Baseline Monitoring Surveyed Quadrats 1 to 8 Only

3.2.2 Burrowing Spiders

The mean number of burrowing spiders per quadrat observed in 2026 (36.54) has increased since 2025 and now is comparable to the mean in the baseline and was the second highest recorded behind 2020. The 2020 monitoring period recorded the highest mean spider abundance per quadrat of any year, with a mean of 39 spiders.

There was significant difference between the mean number of spiders per quadrat recorded during the 2026 monitoring compared to the monitoring in 2018, 2023, and 2024 but not with the baseline. When comparing years, the following significant differences in spider numbers were found between:

- 2018 and 2020 (p-value = 0.014)
- 2018 and 2026 (p-value = 0.043)
- 2020 and 2023 (p-value = 0.005)
- 2020 and 2024 (p-value = 0.003)
- 2023 and 2026 (p-value = 0.018)
- 2024 and 2026 (p-value = 0.009).

The mean number of spiders recorded per quadrat in each monitoring year is indicated on the graph in **Figure 3.5**.

As stated in **Section 3.1.2**, there was no statistically significant relationship between the number of spiders in a quadrat and the number of PBTLs recorded in 2026. However, a positive relationship between the number of burrows and PBTLs recorded is detected across all monitoring years (p-value >0.001) with a weak positive correlation remaining (r^2 = 0.122) (**Figure 3.6**).

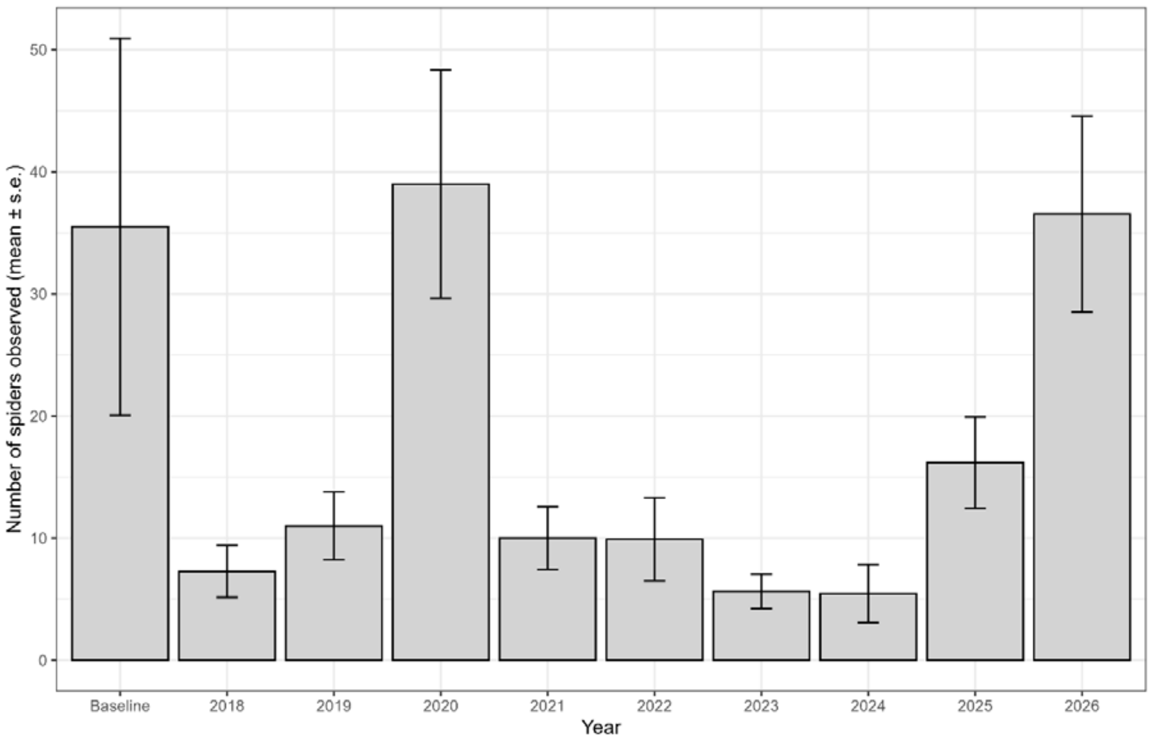

Figure 3.5 The Mean Number of Spiders per Monitoring Quadrat for Each Year of Monitoring Surveys

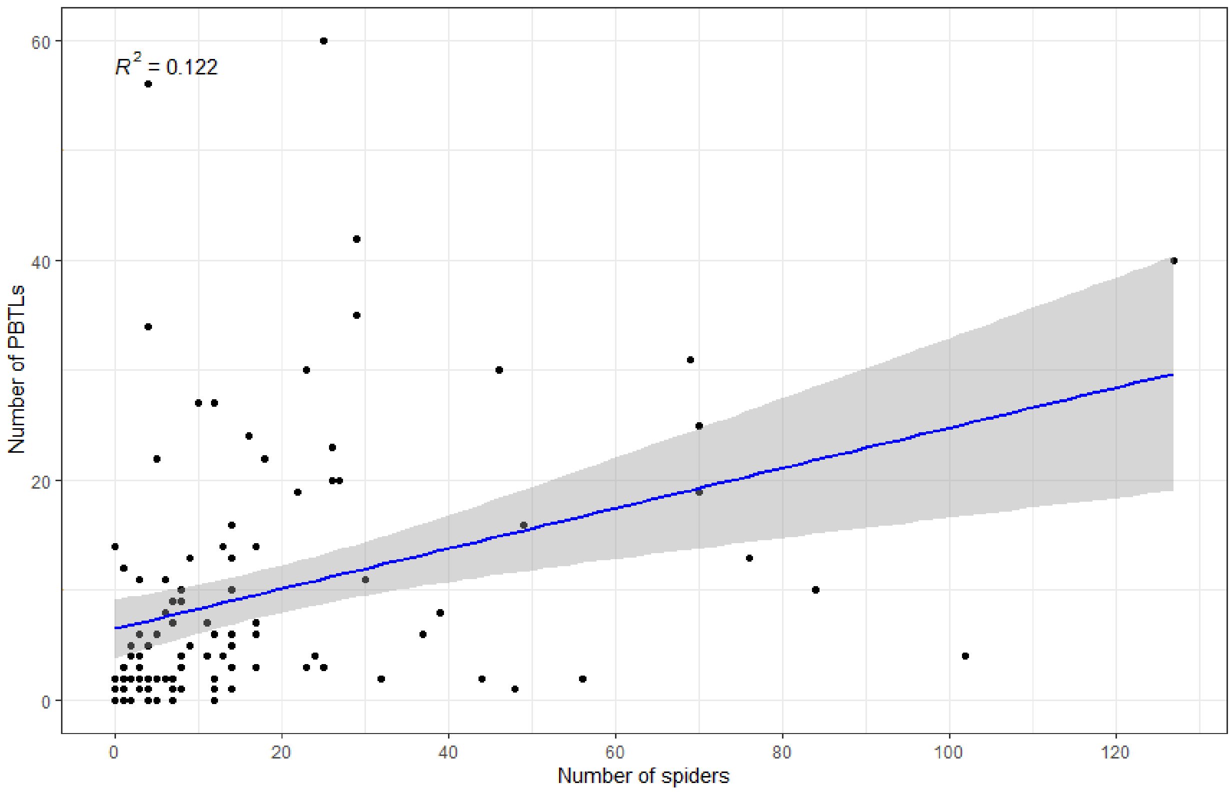

Figure 3.6 The Number of PBTLs and Spiders Recorded at Quadrats in all Monitoring Years

3.2.3 Burrows

The mean number of burrows per quadrat observed in 2026 (110.27) was lower than the year previous but still the second highest since 2020. The 2026 survey found more burrows (1,213) in total than was recorded during the 2016 baseline survey (1,011 burrows), although it should be noted that quadrats 9, 10 and 11 were not surveyed until 2018.

There was no significant difference between the mean number of burrows per quadrat recorded during the 2026 monitoring compared to the baseline or any other monitoring years. When comparing years, the following significant differences in burrow numbers were found between:

- 2019 and 2021 (p-value = 0.013)
- 2019 and 2023 (p-value >0.001)
- 2019 and 2024 (p-value >0.001)
- 2020 and 2021 (p-value = 0.039)
- 2020 and 2023 (p-value >0.001)
- 2020 and 2024 (p-value = 0.002)
- 2023 and 2025 (p-value = 0.001)
- 2024 and 2025 (p-value = 0.007).

The mean number of burrows recorded per quadrat in each monitoring year is indicated on the graph in **Figure 3.7**.

As stated in **Section 3.1.3**, there was no statistically significant relationship between the number of burrows searched in a quadrat and the number of PBTLs recorded in 2026. However, a positive relationship between the number of burrows and PBTLs recorded is detected across all monitoring years (p-value >0.001) with a weak positive correlation remaining (r^2 = 0.461) (**Figure 3.8**).

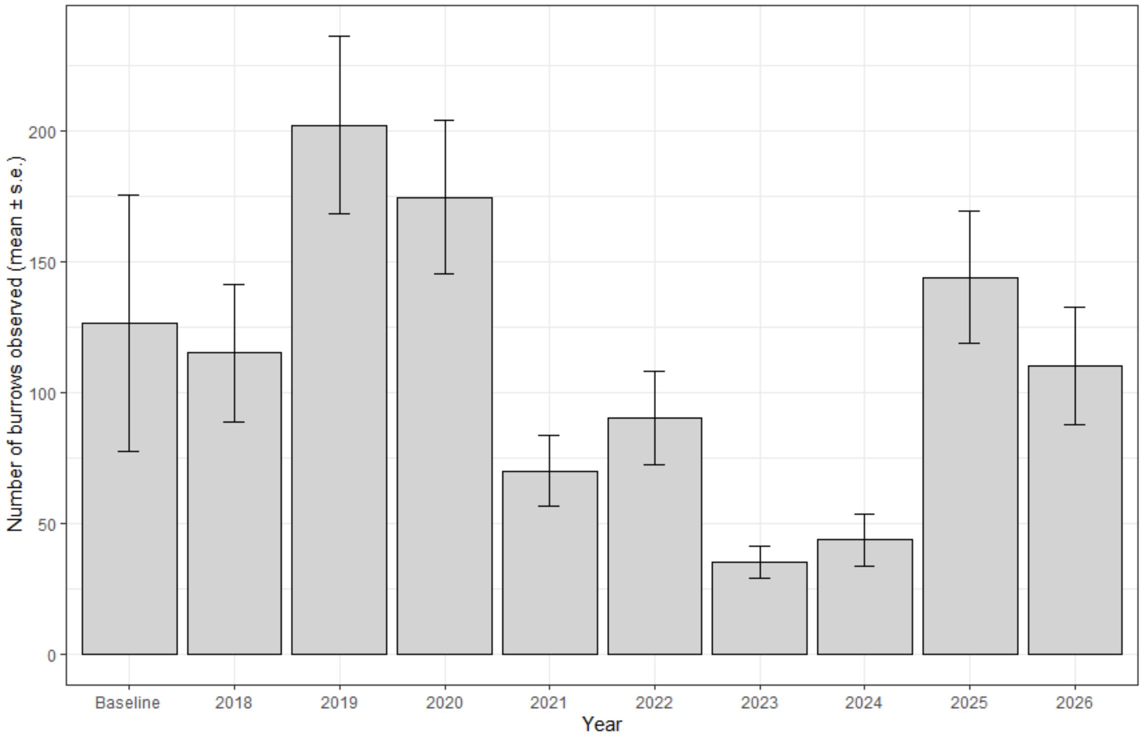

Figure 3.7 The Mean Number of Burrows Detected by Monitoring Year

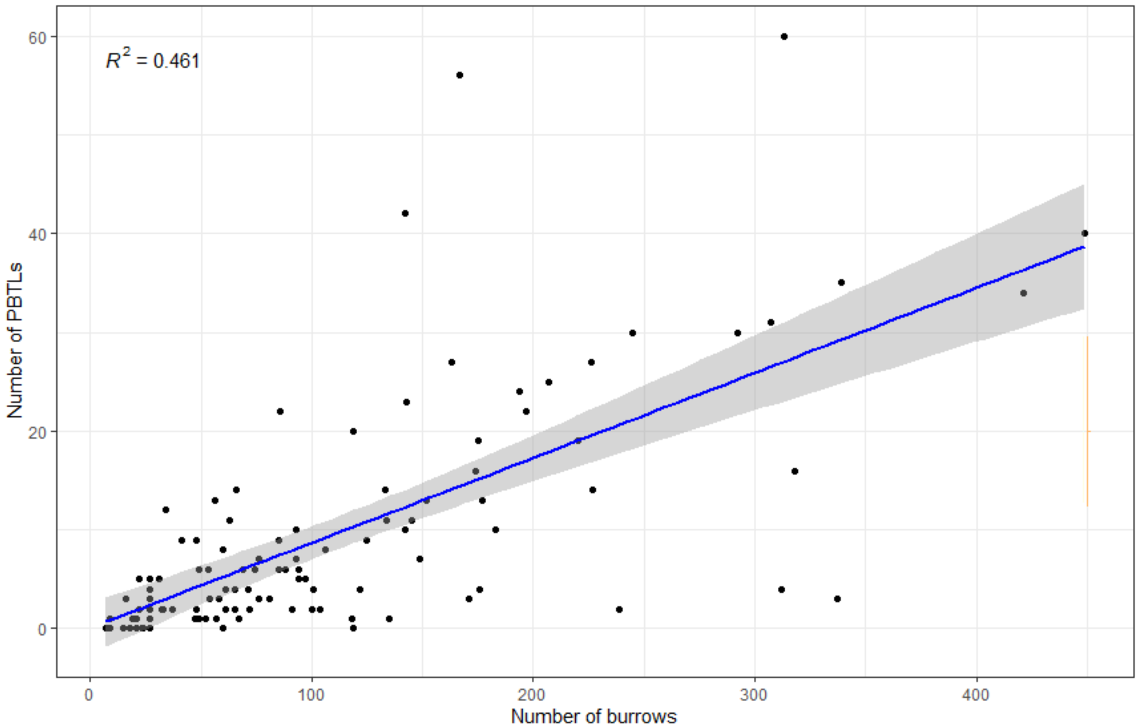

Figure 3.8 The Number of PBTLs and Burrows Recorded at Quadrats in all Monitoring Years

3.3 Influence of Rainfall, Aspects and Vegetation

3.3.1 Rainfall

The number of PBTLs were compared against total rainfall for the year prior to survey (**Figure 3.9**) and rainfall during the spring–summer period preceding the survey (September 2025 – January 2026) (**Figure 3.10**).

The analysis indicates the following relationships:

- A significant negative relationship between total annual rainfall and numbers of PBTLs detected (p-value >0.001, $r^2 = 0.048$). This indicates that as annual rainfall increases, the number of PBTLs detected decreases.
- A significant negative relationship between spring – summer rainfall and numbers of PBTLs detected (p-value >0.001, $r^2 = 0.094$). Again, this indicates that as spring – summer rainfall increases, the number of PBTLs detected decreases.

Similarly, there are significant negative relationships between the number of burrows with the annual rainfall (p-value >0.001, $r^2 = 0.121$) and rainfall during the spring-summer period (p-value >0.001, $r^2 = 0.24$), which is displayed in **Figure 3.11** and **Figure 3.12** respectively.

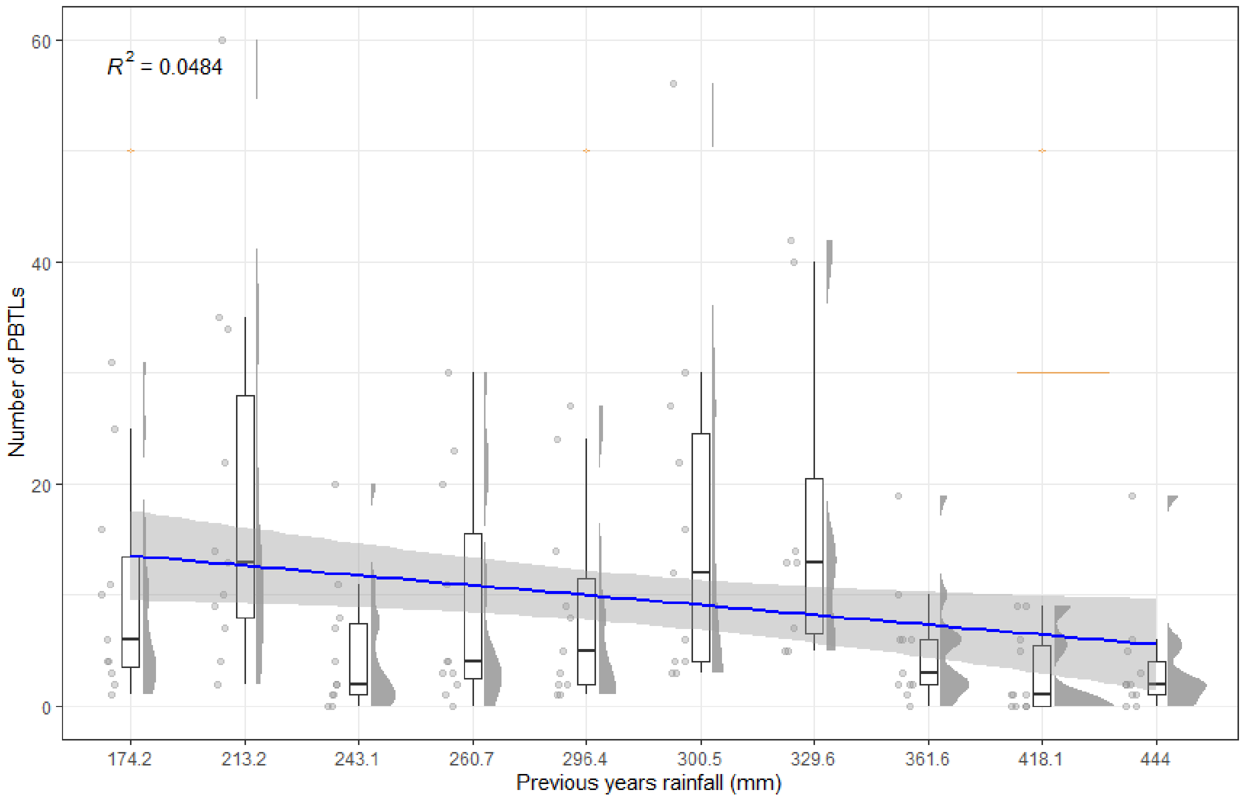

Figure 3.9 The Total Number of PBTLs Recorded Each Year Plotted Against Annual Rainfall

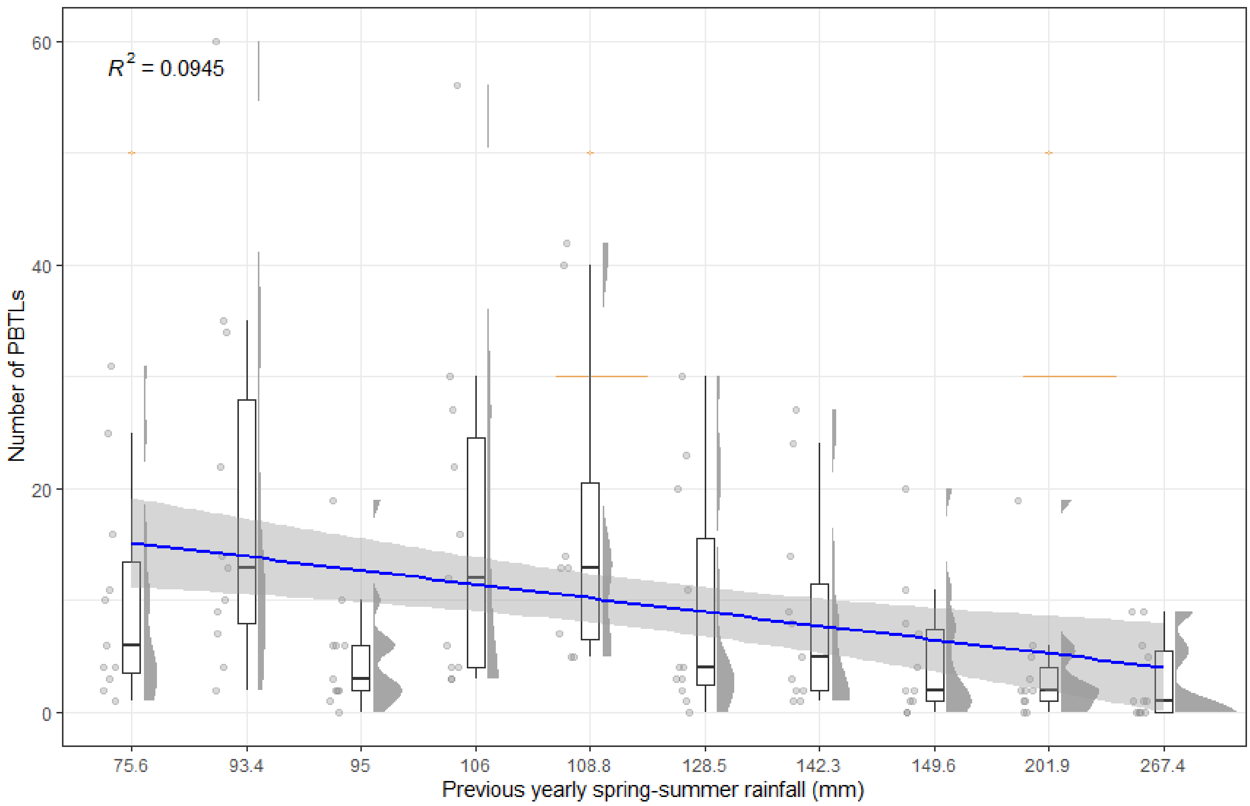

Figure 3.10 The Total Number of PBTLs Recorded Each Year Plotted Against Spring – Summer Rainfall

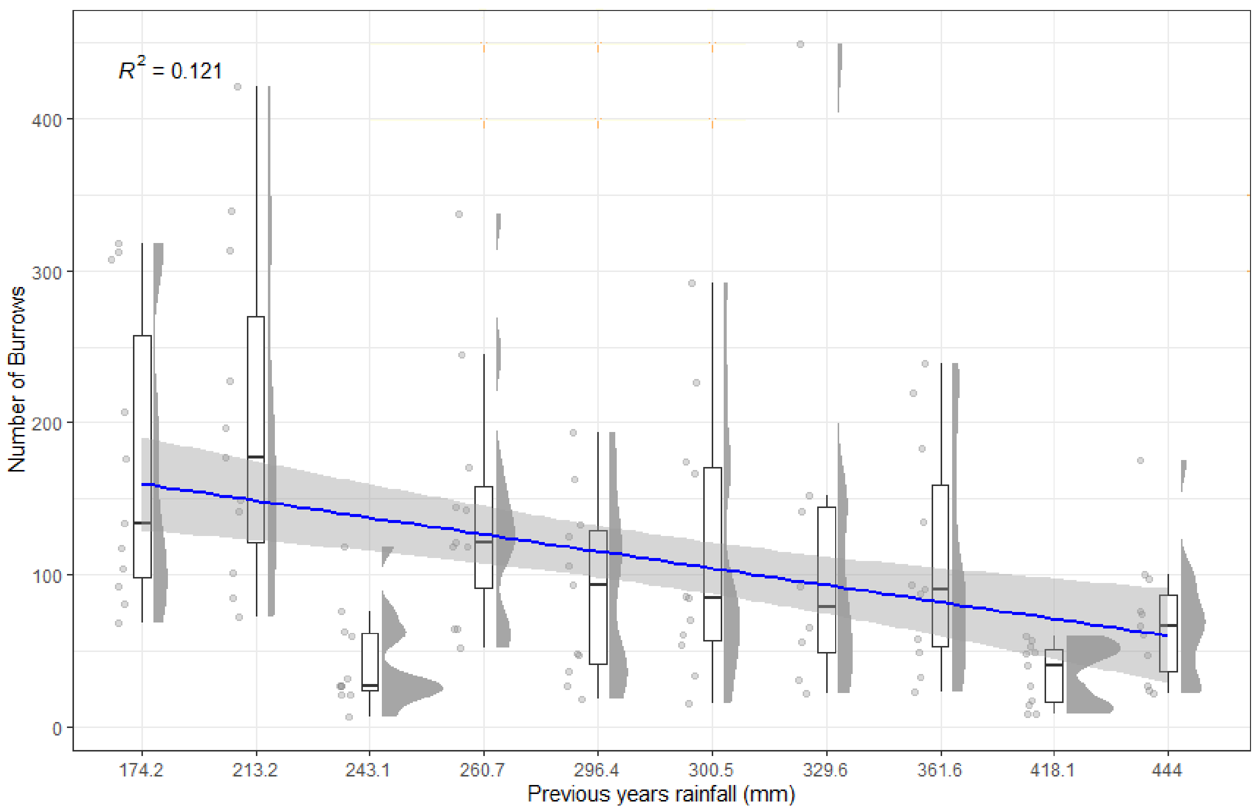

Figure 3.11 The Total Number of Burrows Recorded Each Year Plotted Against Annual Rainfall

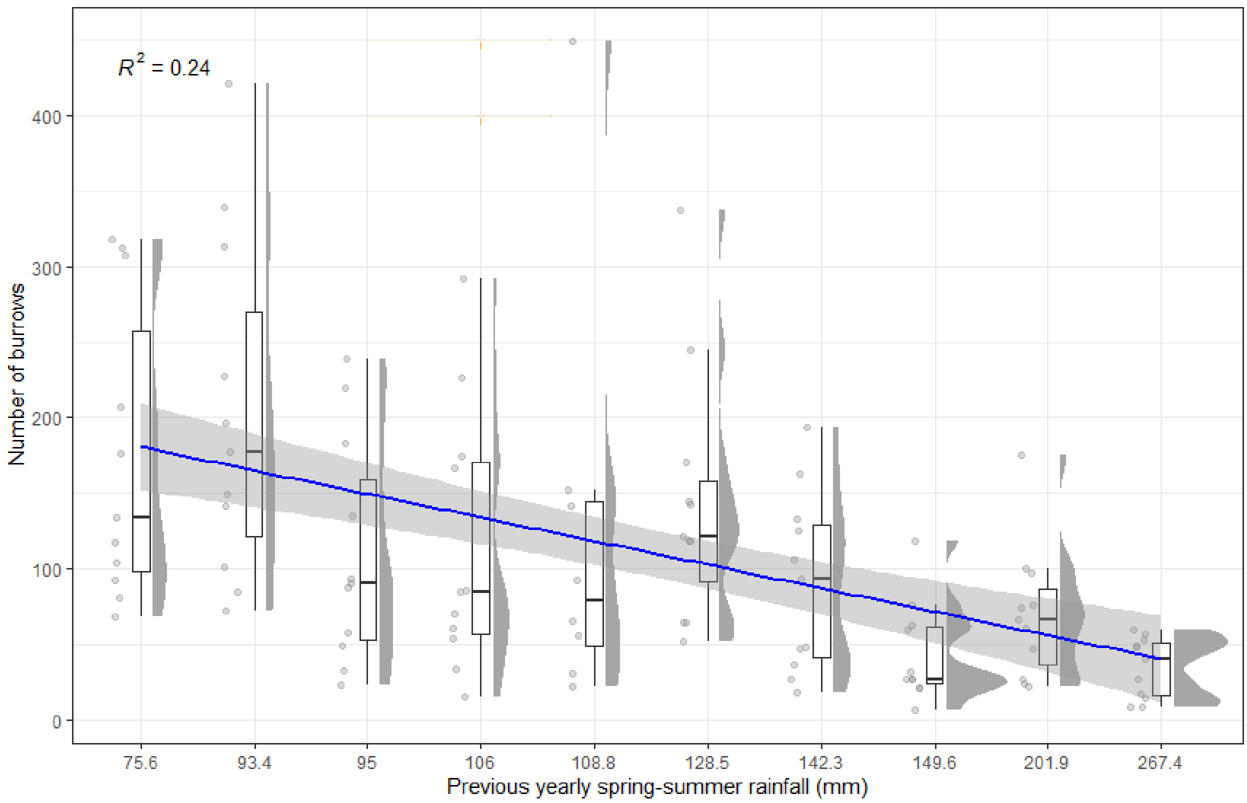

Figure 3.12 The Total Number of Burrows Recorded Each Year Plotted Against Spring – Summer Rainfall

3.3.2 Aspect

The distribution of PBTL numbers recorded on east and west facing slopes is illustrated in **Figure 3.13**. Over the initial years of monitoring, there has been a significantly more PBTLs detected on east facing slopes over those that face west (p-value = 0.006). However, there has been no significance since 2024 which has remained consistent in 2026 as there was no significant difference in the number of PBTLs observed on east or west facing slopes (p-value = 0.290).

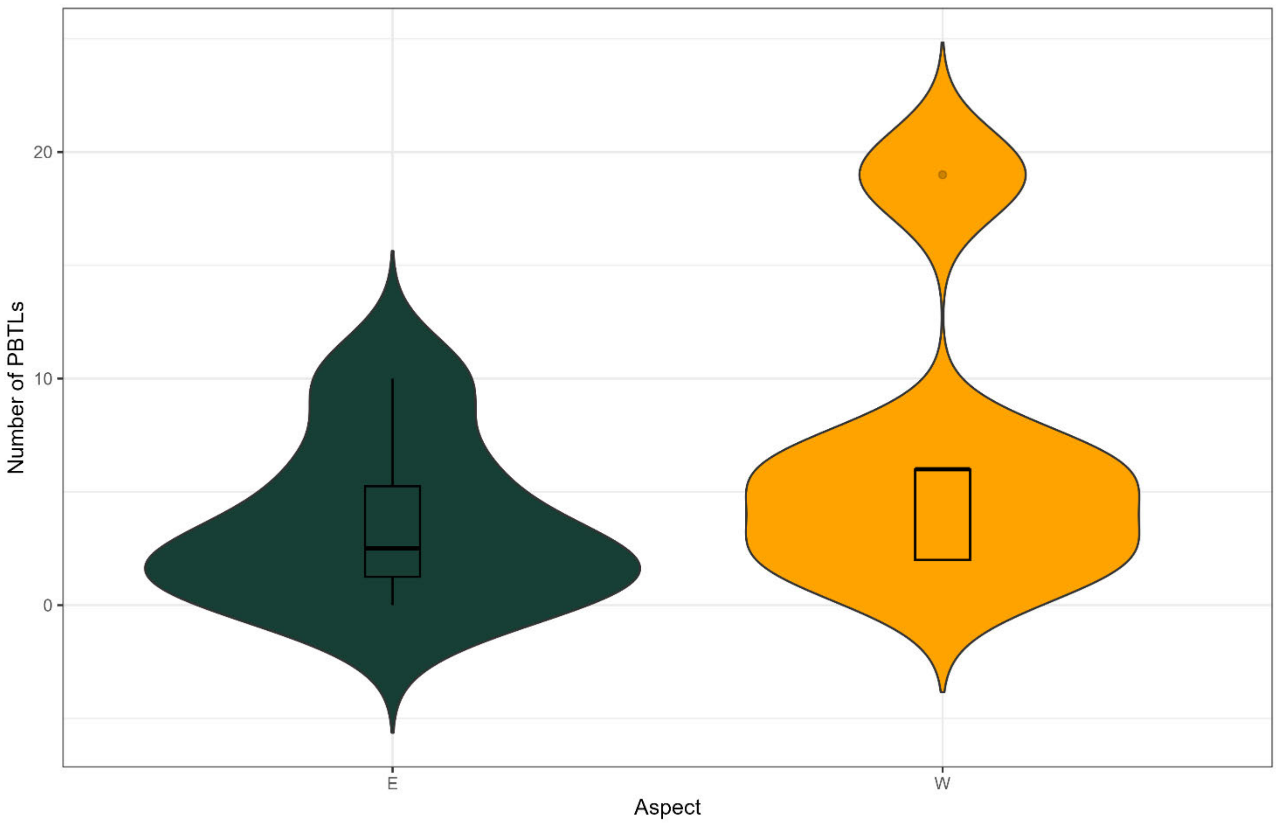

Figure 3.13 The Distribution (Minimum, Maximum, Median, 25th and 75th Percentile and Outliers) of the Number of PBTLs Observed in Quadrats on East (E) and West (W) Facing Slopes

3.3.3 Vegetation Condition Variables

Most vegetation variables did not significantly impact the number of PBTLs. The following three vegetation parameters significantly impacted PBTL in 2026:

- Bare ground (r^2 = 0.2, p-value >0.001) – a positive relationship, indicating the number of PBTLs increase as cover of bare ground increases (**Figure 3.14**).
- Weed diversity (r^2 = 0.177, p-value = 0.0259) – a negative relationship, indicating the number of PBTLs decreases as weed diversity increases (**Figure 3.15**).
- Number of tussocks (r^2 = 0.048, p-value = 0.0475) - a positive relationship, indicating the number of PBTLs increase as the number of tussocks increases (**Figure 3.16**).

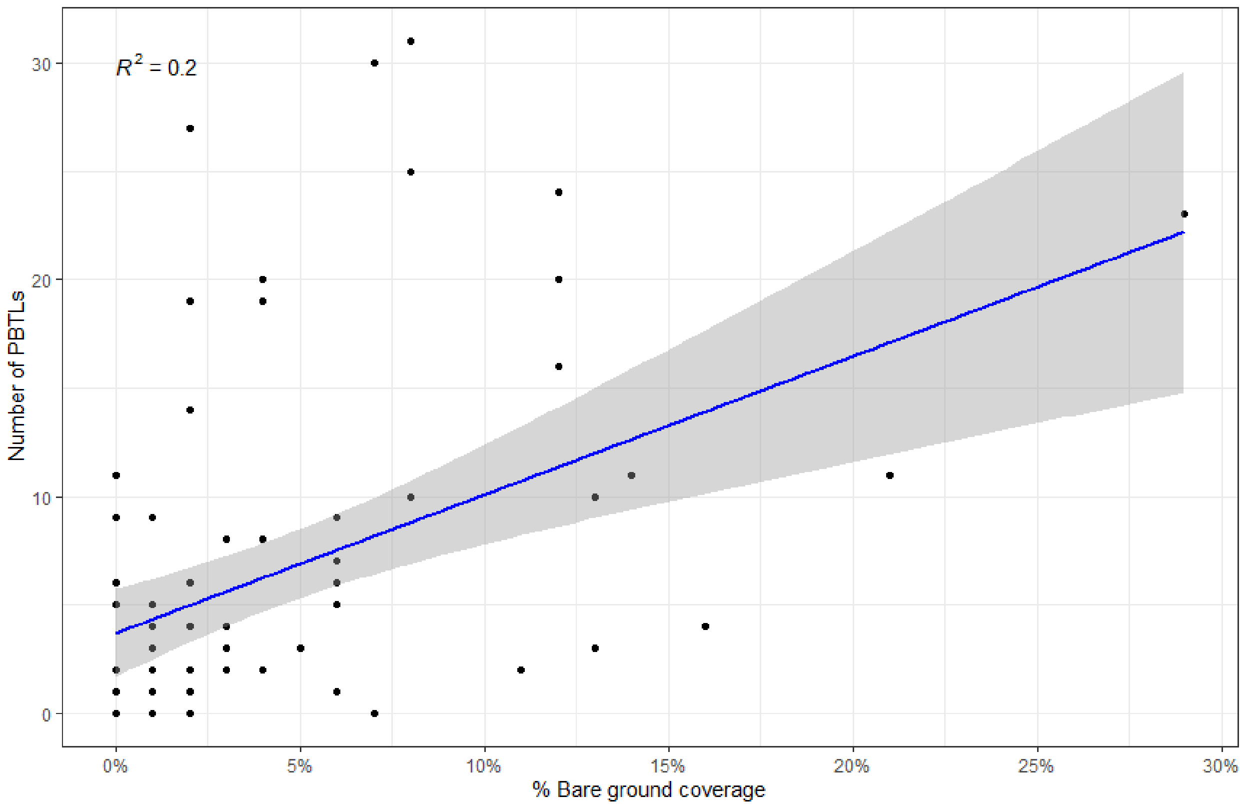

Figure 3.14 The Number of PBTLs Plotted Against Bare Ground Cover

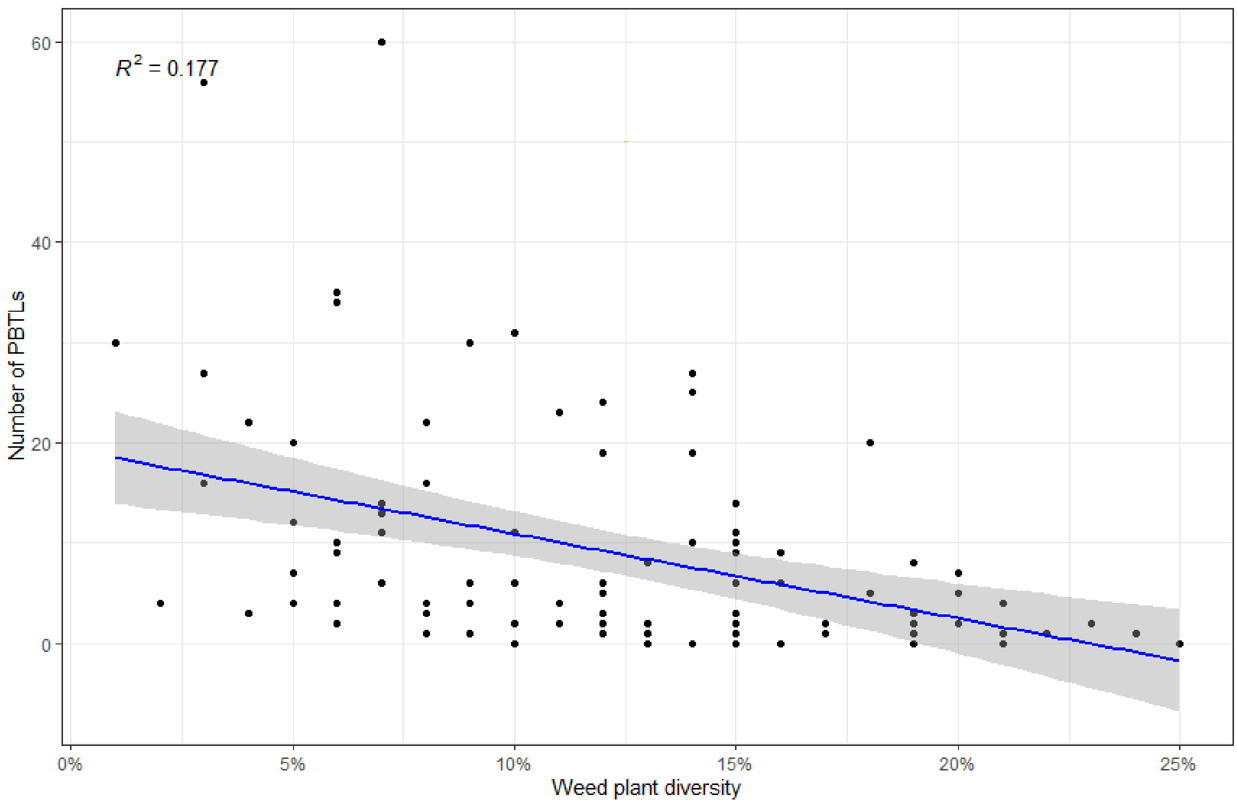

Figure 3.15 The Number of PBTLs Plotted Against Weed Plant Diversity

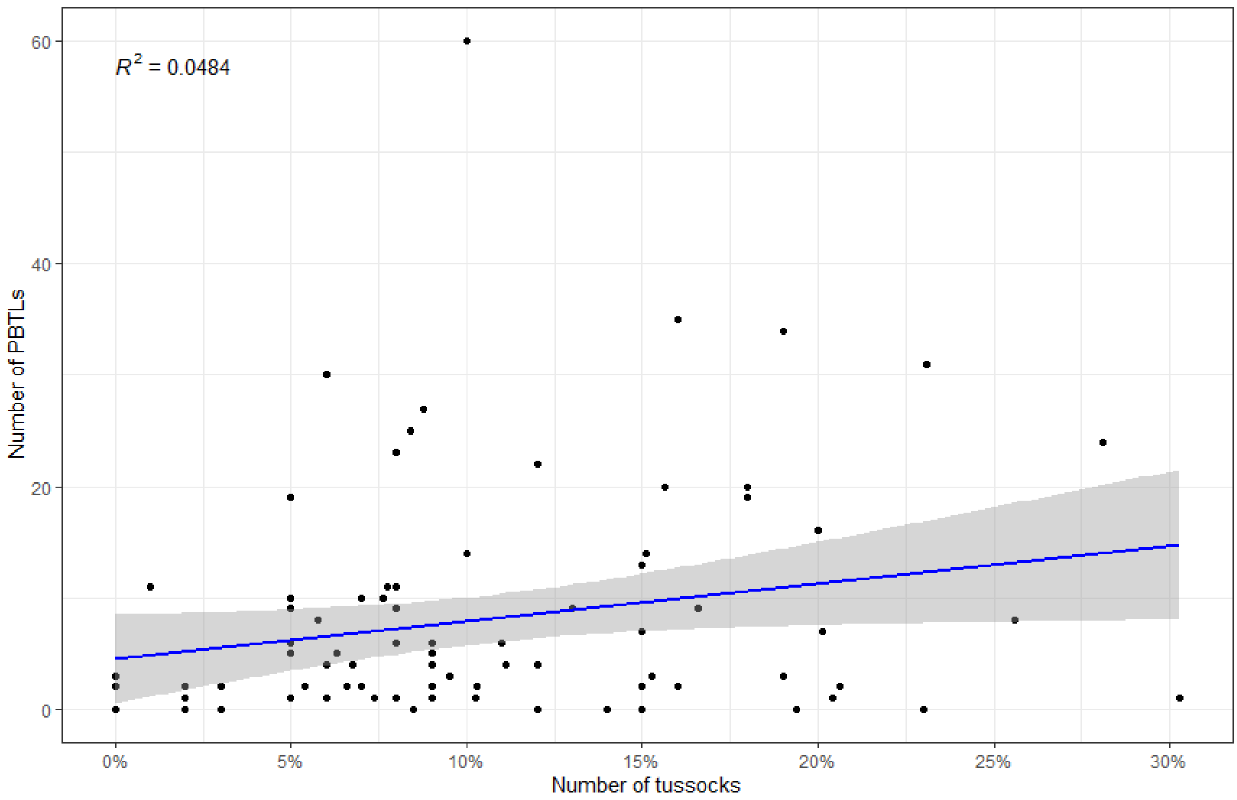

Figure 3.16 The Number of PBTLs Plotted Against the Number of Tussocks

4.0 Vegetation Monitoring Results

4.1 2026 Results

4.1.1 Photo Point Observations

Photographs taken from designated photopoints at each quadrat are provided in **Appendix 1**. General observations on vegetation condition based on these photographs are summarised in **Table 4.1**. Across the site, an increase of the cover of weed and litter (mat composed of dead grass and vegetative material) compared to 2025 was easily observed and now started to return to similar condition as 2023 and 2024.

The photographs show that the grassland structure is becoming more closed , with increased height and width of grass tussocks. Sites that in recent years have has an increased cover of *Themeda triandra* now show reduced foliage cover of this species, even where tussock density remains similar.

In general, vegetation condition appears similar to other years which had a similar annual rainfall in recent years.

Table 4.1 Photographic Observations of Vegetation Condition

Quadrat	Vegetation Association	Vegetation Condition Observations
1	Tussock Grassland on Low Footslopes and Drainage Areas	The conditions in 2026 has returned to be more similar to 2023 and 2024 as the litter and weed cover has increased since 2025. The structure of the native tussocks has also increased to be more similar to 2024 besides the height.
2	Tussock Grassland on Eastern Slopes	There has been an increase of litter and weed cover in 2026 compared to 2025 making the conditions similar to 2024 but there is not as much litter as 2023. However, no native tussocks were recorded in 2026
3	Tussock Grassland on Western Slopes	Vegetation cover increased from 2025 and now is similar to 2024 with comparable litter and weed cover and native tussock structure.
4	Tussock Grassland on Eastern Slopes	The conditions are comparable to 2024 as the litter and weed cover has increased from 2025 but open spaces are still present.
5	Tussock Grassland on Western Slopes	The conditions in 2026 has remained comparable to 2025 with similar structure of native tussocks and a slight increase of litter and weed cover but not as much as 2024. The cryptogam cover has increased greatly
6	Tussock Grassland on Eastern Slopes	Increase of litter cover but weed cover decreased from 2025 with the conditions being comparable to 2024 but the structure of the native tussocks being comparable to 2023.
7	Tussock Grassland on Low Footslopes and Drainage Areas	Similar conditions and structure of native tussocks as 2025 besides an increase of litter cover in some areas.

Quadrat	Vegetation Association	Vegetation Condition Observations
8	Tussock Grassland on Low Footslopes and Drainage Areas	Litter cover as returned to similar conditions as 2024 with an increase from 2025. There is also comparable native tussock structure to 2024. The vegetation from the impact from the vehicle tracks from the SEB site clean-up in 2025 is slowly recovering.
9	Tussock Grasslands on Rocky Ridges	2025 photograph missing but conditions seem similar as 2024. However, no native tussocks were recorded.
10	Tussock Grasslands on Rocky Ridges	There was an increased weed cover from 2025 with the conditions being comparable to 2024.
11	Tussock Grassland on Western Slopes	The photograph indicates that the cover of *Themeda* is reduced compared to 2023 and 2024 as it is similar to 2025, due to foliage die back although tussock density remains similar. The litter and weed cover has increased to comparable conditions as 2024.
12	Woodlands on Rocky Slopes	The litter cover has increased from 2025 but is still lower than the high cover present from 2021 to 2024. The native tussock structure is also similar to 2024. There was a decrease of cryptogam cover.

4.1.2 Summary of 2026 Results

A total of 61 flora species were recorded across the monitoring quadrats in 2026. This included 31 native and 29 introduced species, or weeds (**Appendix 3**). Three flora species listed as Rare under the *National Parks and Wildlife Act 1972* (NPW Act) were observed within the SEB Offset Area:

- *Cryptandra campanulata* (Long-flower Cryptandra) (Quadrats 1, 3, 5, and 12).
- *Maireana rohrlachii* (Rohrlach's Bluebush) (Quadrat 6).
- *Rumex dumosus* (Wiry Dock) (Quadrats 8).

Five weed species Declared under the *Landscape South Australia Act 2019* (LSA Act) were observed within the SEB Offset Area:

- *Chondrilla juncea* (Skeleton Weed) (Quadrat 3).
- *Echium plantagineum* (Salvation Jane) (Quadrats 1–12).
- *Marrubium vulgare* (Horehound) (Quadrats 1–2, 4-7, 9-10, and 12).
- *Rosa canina* (Dog Rose) (Quadrats 5, 7, 9, and 12).
- *Tribulus terrestris* (Caltrop) (Quadrat 12).

This is two less Declared weed species than in 2025 with *Reseda lutea* (Cut-leaf mignonette) and *Xanthium spinosum* (Bathurst Burr) not being recorded in 2026. Salvation Jane appeared to be more prevalent and widespread, while Dog Rose has appeared to be less prevalent than in recent monitoring years. Cover of grassy weeds, such as *Avena barbata* (Bearded Oat) was noticeably increased compared to the previous year.

Complete lists of all the native and weed species observed within in each quadrat are provided in **Appendix 3**.

The mean number of tussocks per hectare was 78,333 and the mean number of juvenile tussocks per hectare was 2,812 (**Table 4.2**). The mean percentage of dead material in grass tussocks was 66.21%. Mean weed cover was 3.53%, which was similar to, but slightly less than, the 1 ha estimate of weed cover (21.2%). Mean cryptogam cover (6.33%) and mean cover of bare ground (4.5%) were both low.

Mean litter cover (79.08%) was recorded for the fourth time (baseline collected in 2022) and was the highest to be recorded to date, which accounts for the lower weed cover percentages, since all dead plant material laying on the ground was counted as litter.

The mean plant spacing was 33.07 cm, and the mean plant basal width and height were 5.31 cm and 11.05 cm, respectively.

A summary of the 2026 per quadrat and per plant results for each of the 12 quadrats is provided in **Table 4.2**, with vegetation data used for analysis provided in **Appendix 4**.

Table 4.2 Summary of 2026 Vegetation Monitoring Results

Quadrat	Native Species Diversity	Weed Species Diversity	Tussocks (per ha)	Juvenile Tussocks (per ha)	Dead Material (%)	Weed Cover (%)	Weed Cover 1 ha Estimate (%)	Cryptogam Cover (%)	Bare Ground Cover (%)	Litter Cover (%)	Plant Spacing (cm)	Plant Basal Width (cm)	Plant Height (cm)
1	11	19	70,000	0	82.94	4	25	12.14	4.29	78.57	26.71	5.29	2026
2	2	15	0	0	-	1	45	0.25	0.25	98.50	-	-	11.18
3	8	12	178,750	0	46.50	2	10	5.00	4.38	68.75	25.07	3.91	-
4	10	15	81,250	16,250	47.78	2	10	0.63	5.63	76.13	26.33	4.64	8.25
5	8	15	86,250	0	54.78	2	15	15.00	6.25	73.63	34.26	2.67	8.96
6	11	14	50,000	0	45.72	3	20	6.13	13.13	71.38	35.94	5.72	8.23
7	9	12	50,000	0	83.95	3	25	0.63	0.00	85.63	35.53	13.35	11.44
8	10	12	57,500	0	68.81	3	20	1.13	0.00	92.88	36.43	5.67	22.32
9	8	19	0	0	-	3	35	1.63	3.00	91.50	-	-	14.76
10	10	17	3,750	0	97.50	5	30	0.38	0.25	94.50	33.00	2.00	-
11	11	10	155,000	2,500	79.50	10	15	9.38	10.63	65.63	24.37	4.55	3.85
12	19	14	207,500	3,750	54.64	4	5	23.75	6.25	51.88	23.11	5.31	8.68
Mean	**9.75**	**14.5**	**78,333**	**2,812.50**	**66.21**	**3.53**	**21.2**	**6.33**	**4.50**	**79.08**	**30.07**	**5.31**	**12.82**

4.2 Comparison of Vegetation Between Years

4.2.1 Native Species Diversity

The total native species recorded across all quadrats in 2026 was 31 (**Appendix 4**) which was less than the 36 recorded in 2025.

The mean native species diversity during the 2026 monitoring was significantly lower than the previous year, with a mean of 9.75 compared to 13.0 in 2025. Although native species diversity has significantly dropped further from the 2024 high (p-value = 0.005), it remains higher than in the early years of monitoring, with mean native species diversity being 5.75 in 2018 and 7.41 in 2019.

The mean native species diversity is still greater than the baseline in 2018, but the difference is not significant (**Figure 4.1**). Overall, there has been a significance increase of native species diversity across all years since the 2018 baseline (p-value > 0.001).

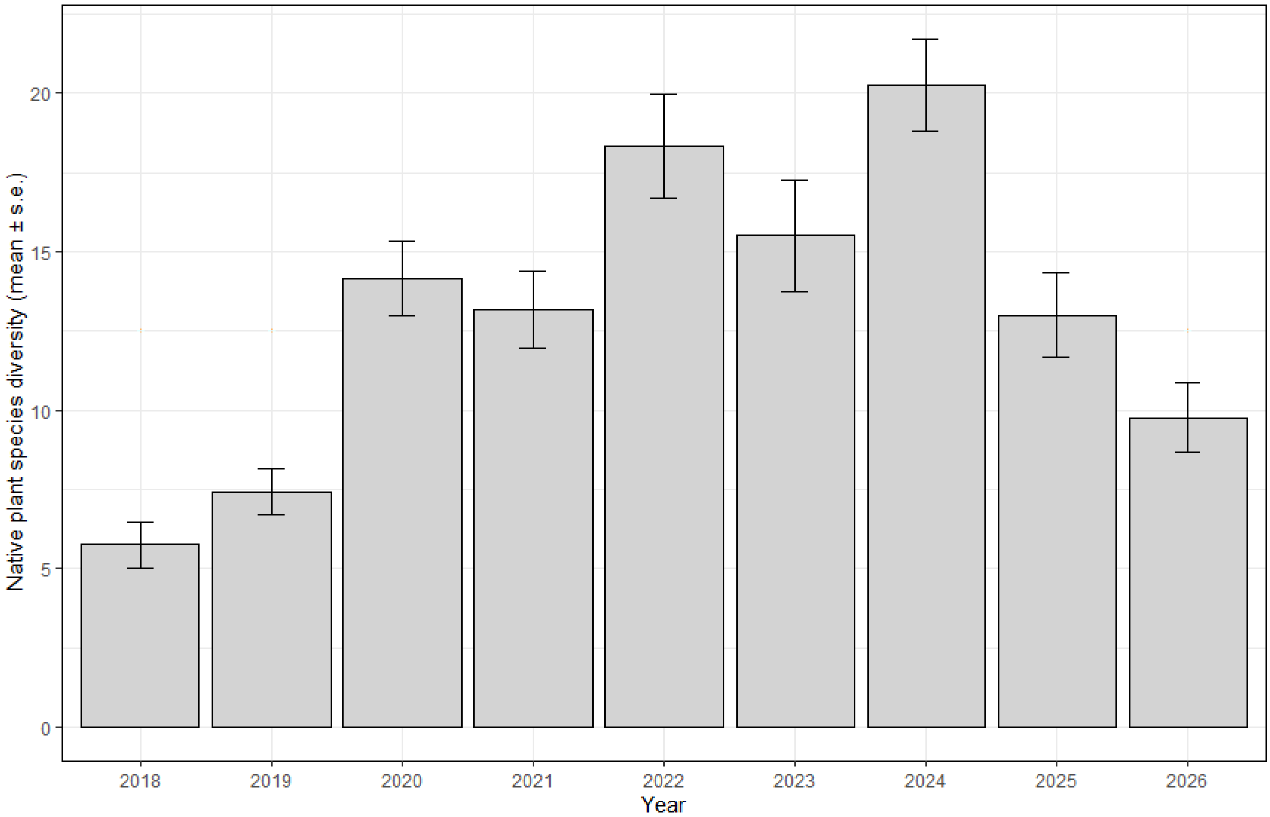

Figure 4.1 Mean Native Species Diversity Since 2018

4.2.2 Weed Species Diversity

The total number of weed species recorded across all quadrats was 29 which remained the same from 2025 (**Appendix 4**).

The mean weed species significantly increased, rising from 9.75 species per quadrat in 2025 to 14.5 in 2026 (p-value = 0.022). The mean weed diversity in 2026 is still the second lowest since 2021 and is a significant decrease compared to the peaks in 2023 (p-value = 0.032) and 2024 (p-value = 0.043). The mean weed diversity has significantly increased since monitoring began in 2018 (p-value >0.001) as there has been an increase in most years except in 2025 when it decreased to 9.75 from 19.1 in 2024 (**Figure 4.2**). The significant increase is still consistent in 2026 (p-value >0.001).

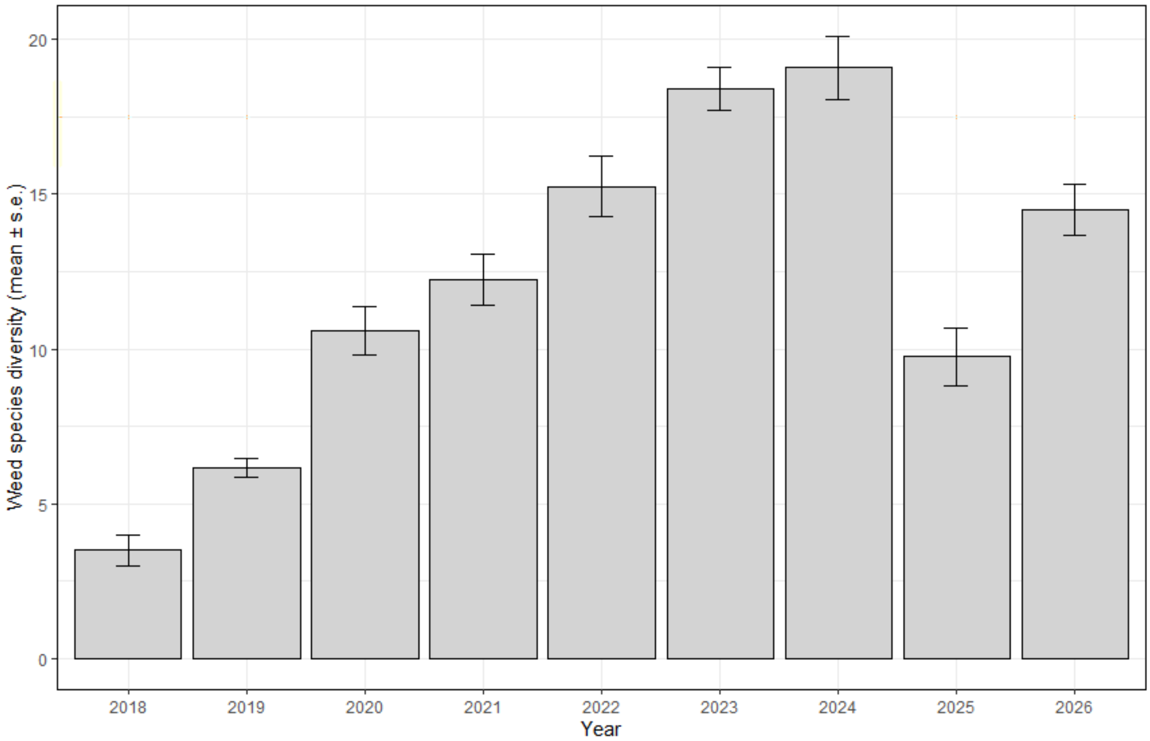

Figure 4.2 Mean Weed Species Diversity Recorded Since 2018

4.2.3 Tussock Spacing and Tussocks per Hectare

Tussock Spacing

In 2026, the mean perennial grass tussock spacing increased slightly from 2025, from 27.01 cm to 30.07 cm but the increase was not significant. There is also no significant difference in tussock spacing between the baseline and 2026 surveys, which is consistent with most years besides in 2020 where a mean of 56.93 cm was recorded which was a significant increase compared to 29.7 in 2018 (p-value = 0.031). After a significant decrease from 56.9 cm in 2020 to 26 cm in 2021 (p-value = 0.005), the mean tussock distance has remained comparable, with a mean distance ranging from a low of 20.87 in 2022 to a high of 30.07 in 2026. The mean distance in 2026 is also significantly different to the mean in 2020 (p-value = 0.044) These years are also comparable to the baseline in 2018, when a mean tussock distance of 29.70 was recorded (**Figure 4.3**).

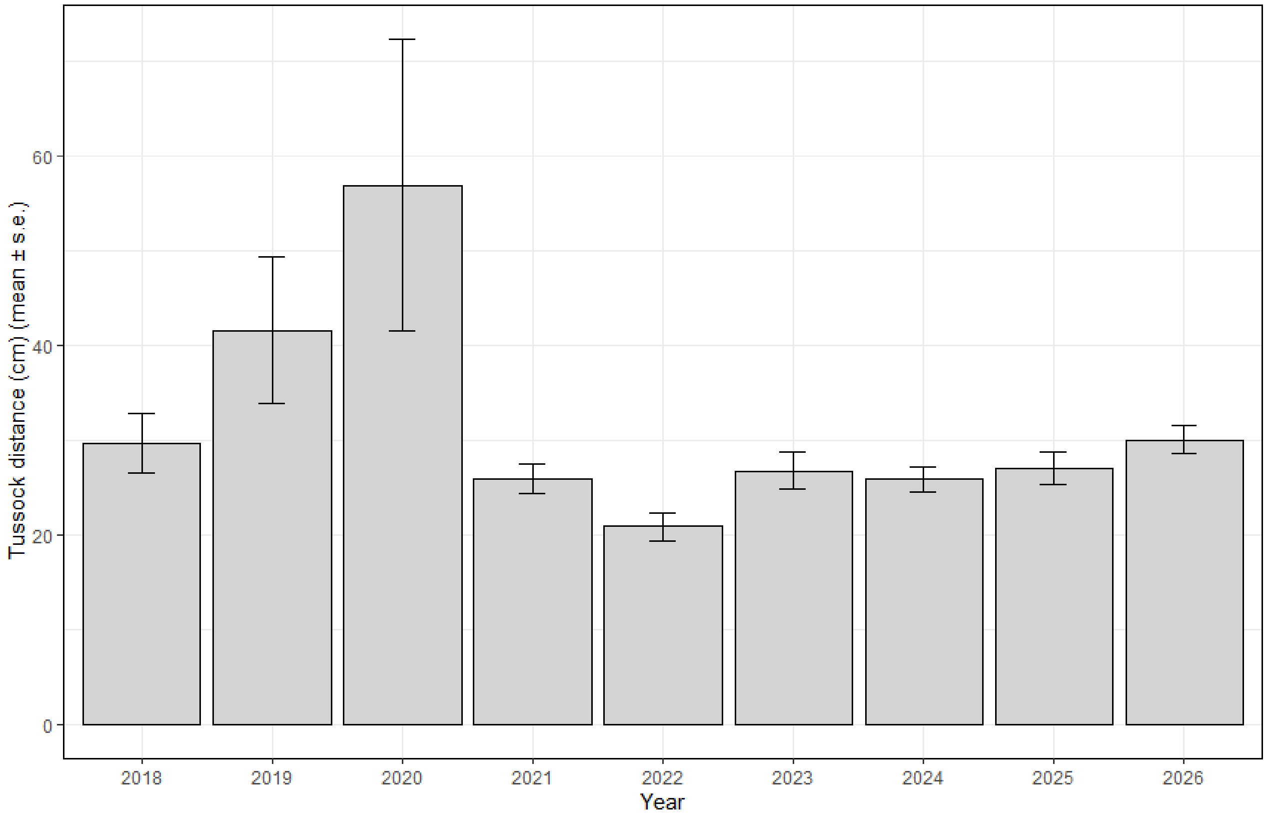

Figure 4.3 Mean Tussock Spacing (Tussock Distance) Recorded Since 2018

Tussocks Per Hectare

The recorded mean tussocks per hectare was 78,333 in 2026, which is lower than the 104,375 in 2025 and is the lowest of any monitoring period. This shows an overall downwards trend since 2024, where the mean of 140,000 tussocks per hectare was recorded which is the second highest of any monitoring period (**Figure 4.4**). However, the observed changes of mean tussocks per hectare between the years throughout the monitoring period are not significant.

The analysis has not considered the 2018 data, since it contains tussocks per hectare measures for quadrats 9–12 only.

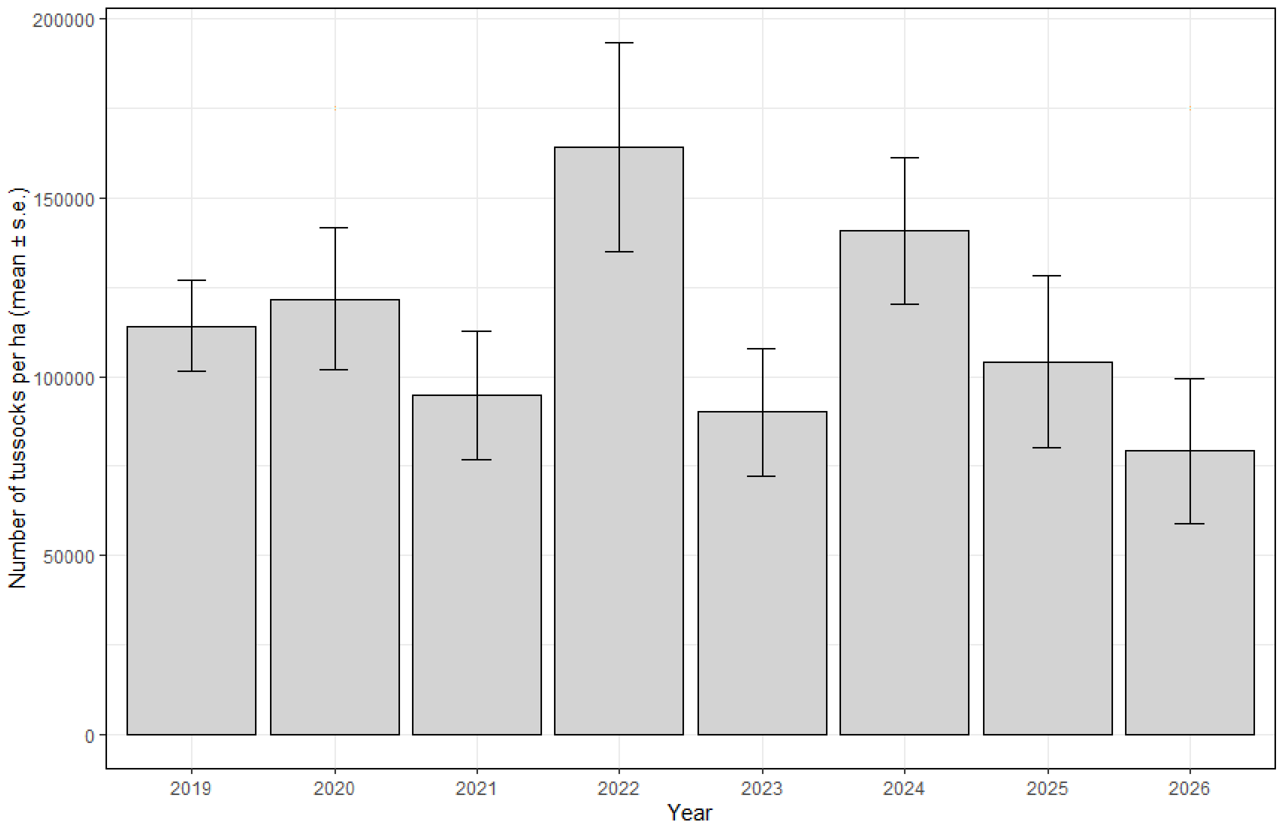

Figure 4.4 Mean Tussocks per Hectare Recorded Since 2019

4.2.4 Juvenile Tussocks per Hectare

Mean juvenile tussock density in 2026 was low (2,812.5), with slightly more juvenile tussocks observed than in 2025 (1,041.67), which was the lowest of any monitoring year.

The mean juvenile tussocks per hectare has been consistently low for most years, with the exception of 2020 (85,788.69) (**Figure 4.5**).

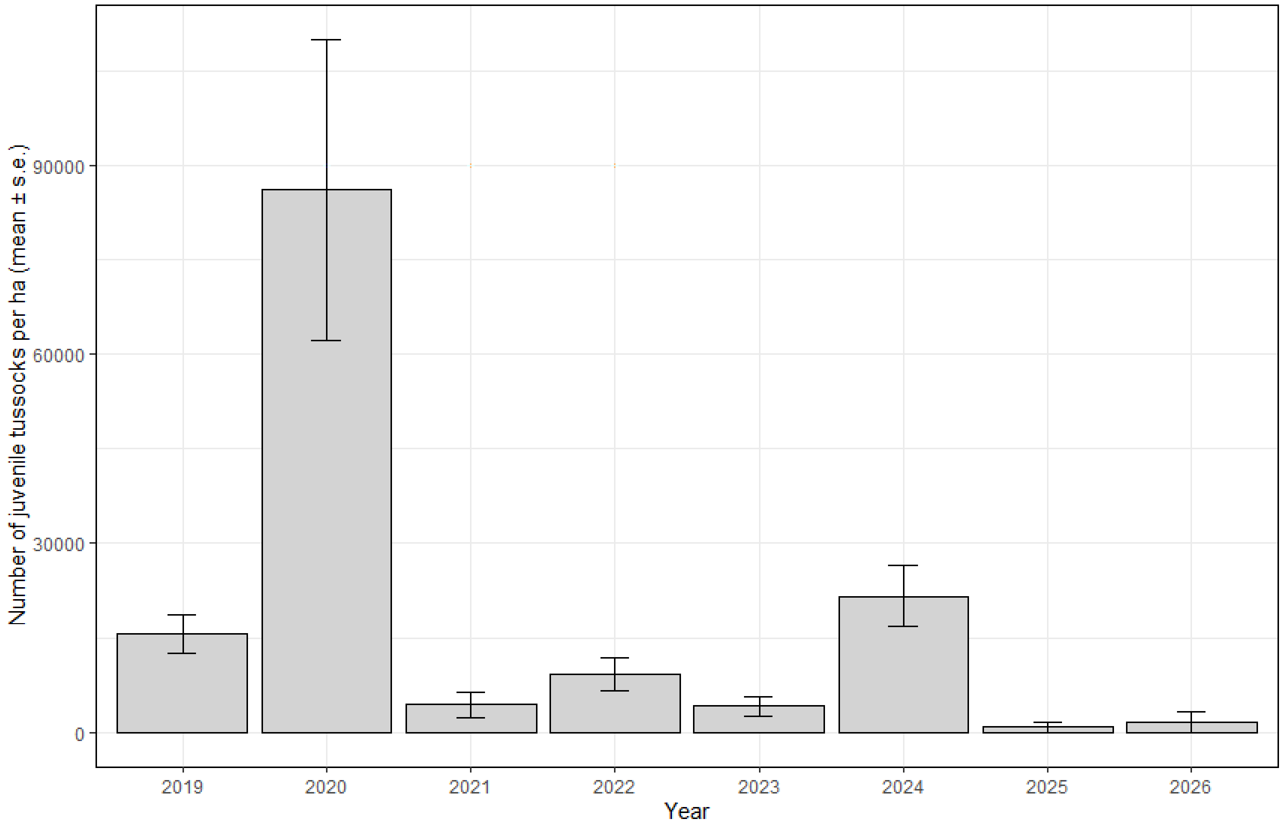

Figure 4.5 **Mean Juvenile Tussocks per Hectare Recorded Since 2019**

4.2.5 Perennial Tussock Size and Health Attributes

Perennial Tussock Basal Width

The mean basal width of perennial grass tussocks of 2026 was 5.31 cm, which is comparable to the mean of 5.64 in 2025. The mean basal width of perennial grass tussocks has been decreasing (**Figure 4.6**) and 2026 represents a significant decrease in the mean basal width of tussocks from the baseline data collected in 2018 (p-value >0.001).

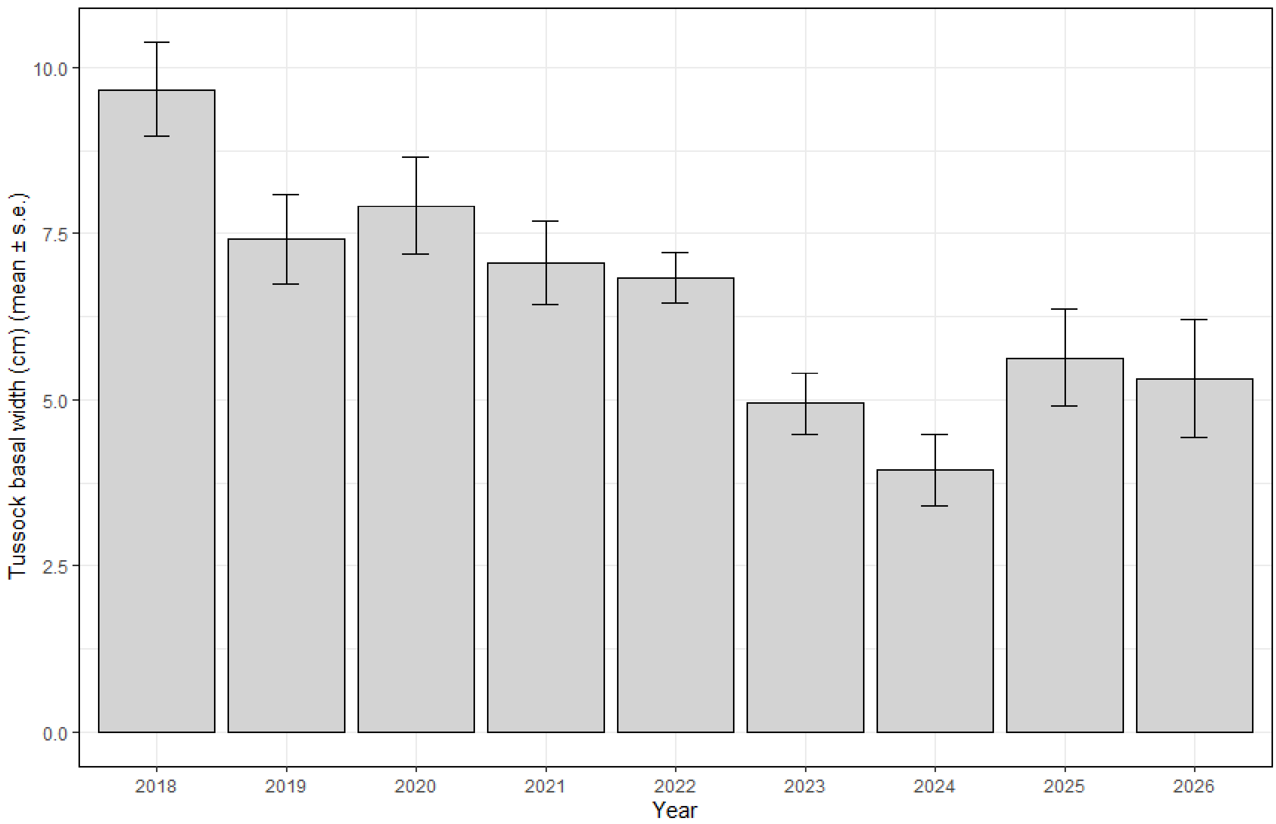

Figure 4.6 Mean Basal Width of Perennial Grass Tussocks Since 2018

Perennial Tussock Height

The mean perennial tussock height of 11.05 cm in 2026 was slightly higher than the8.15 cm recorded in 2025. On 2028 (**Figure 4.7**). Tussock height in 2026 was lower than the baseline survey of 2018, but the difference was not significant (p = 0.401).

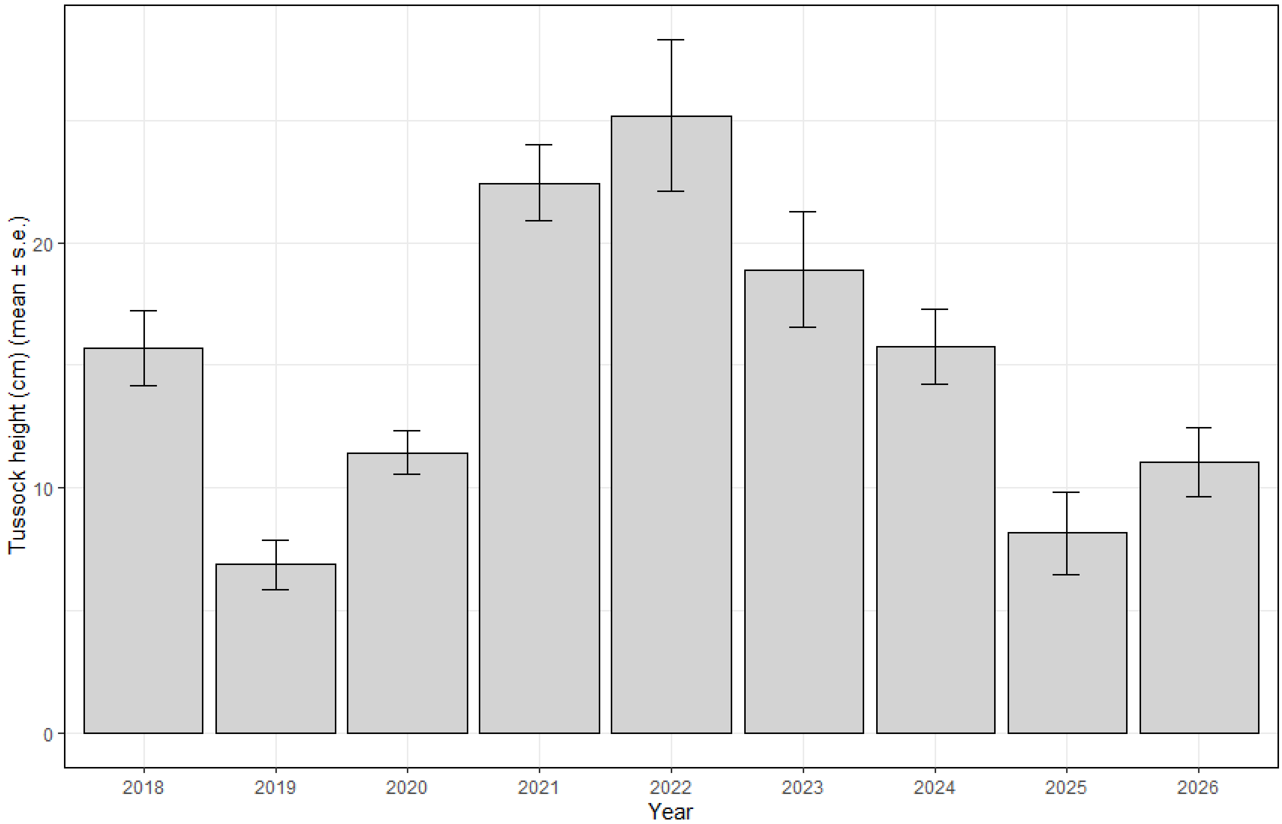

Figure 4.7 Mean Height of Perennial Grass Tussocks Since 2018

Dead Material (%) on Perennial Tussocks

The mean percentage of dead material on perennial grass tussocks was 66.21% in 2026, which was a significant decrease from 92.16% recorded in 2025 (p-value = 0.026 (**Figure 4.8**). There is no significant difference in mean percentage of dead material on perennial grass tussocks between 2019 (first year where all quadrats were surveyed) and 2026.

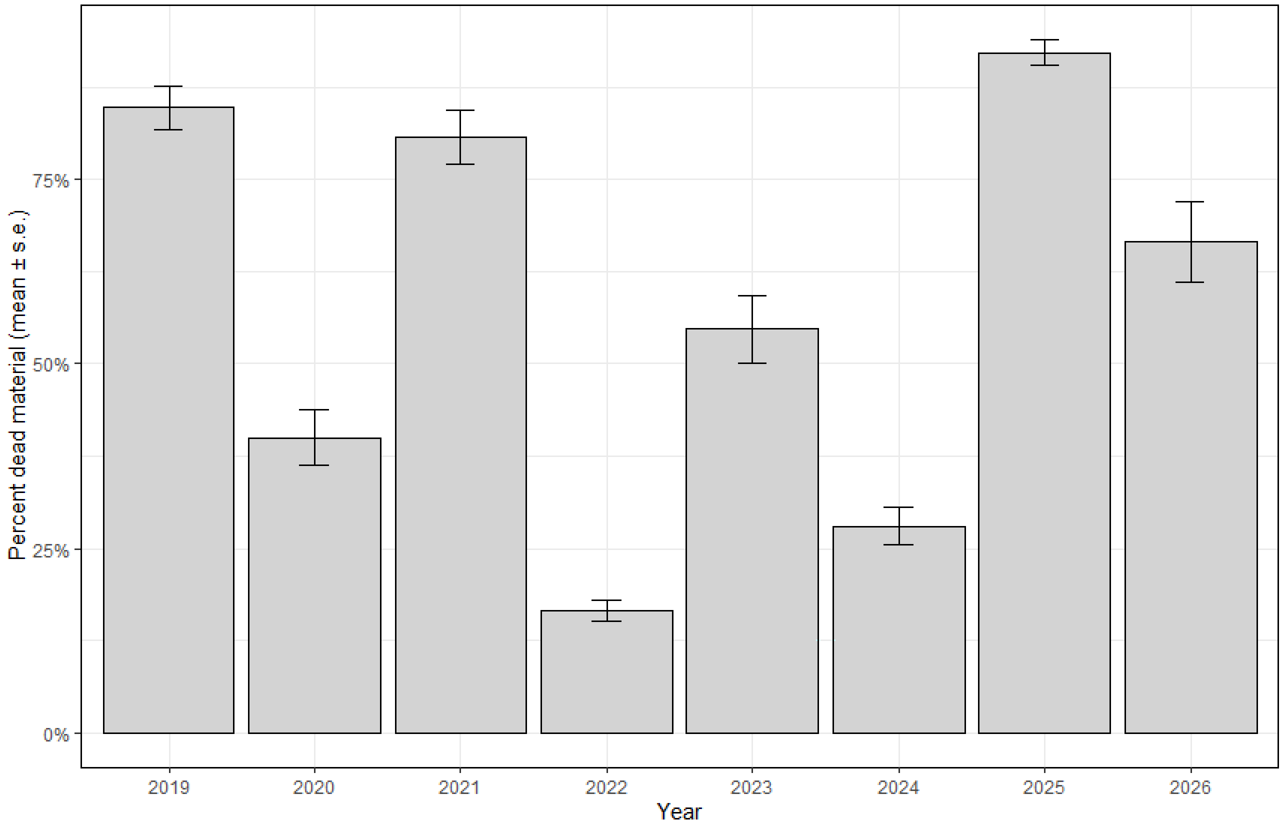

Figure 4.8 Mean Percent Dead Material on Perennial Tussocks Since 2019

Percent Weed Cover

The mean weed cover based on the 1 m^2 surveys was low, being measured at only 3.53%. This is the lowest of all monitoring periods expect for 2022 (mean of 2.41%, see **Figure 4.9**). Weed cover of the 1 m^2 quadrats was significantly below the baseline 2019 mean of 39.41% (p-value = <0.001).

Unsurprisingly, mean weed cover based on 1 ha estimates follows similar trends to those found based on the 1 m^2 mean weed cover. That is, the first three years of data collection show high, increasing weed cover per hectare, followed by five years of lower weed cover (**Figure 4.10**). The 2026 weed cover per hectare estimate of 21.25% is similar to cover measured in 2023 and 2024 and higher than in 2025.

Despite cover remaining lower than the baseline measure in 2019, the difference is not a significant decrease (p-value = 0.057).

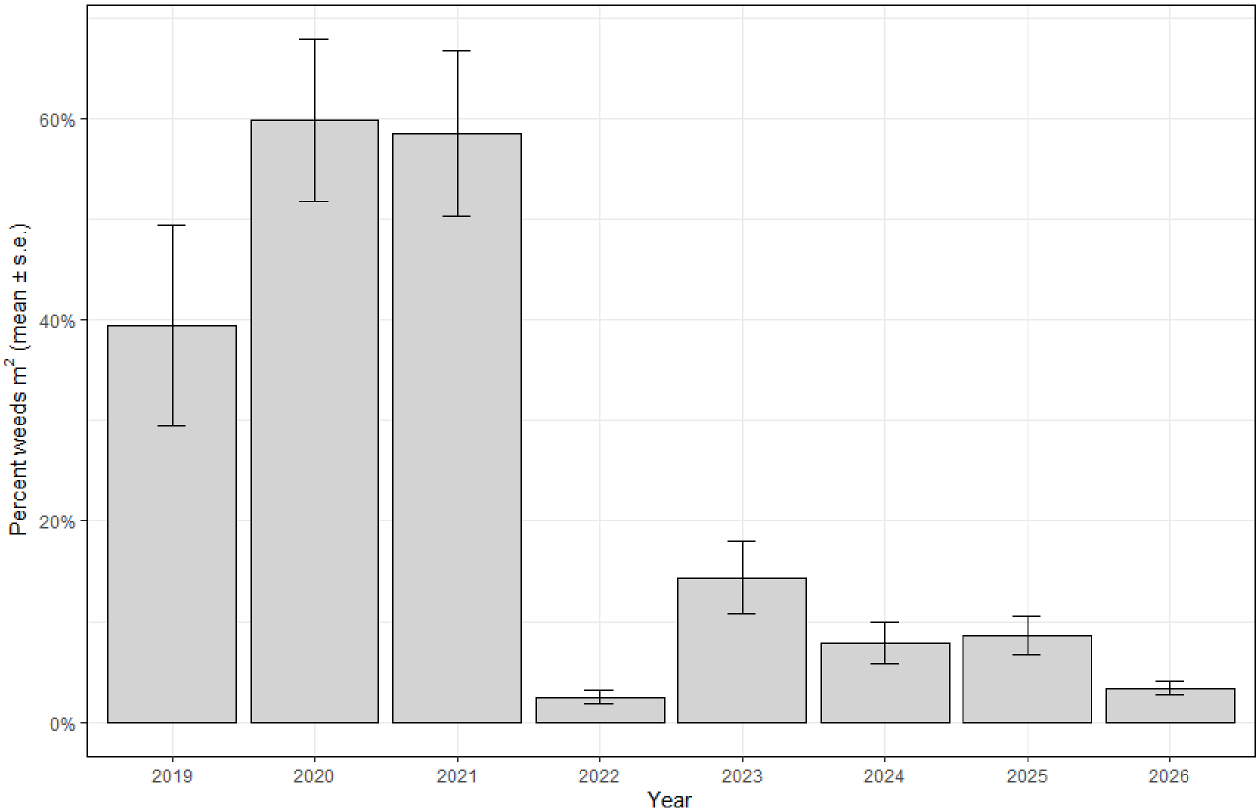

Figure 4.9 Mean Percent Weed Cover of 1 m^2 Survey Quadrats Since 2019

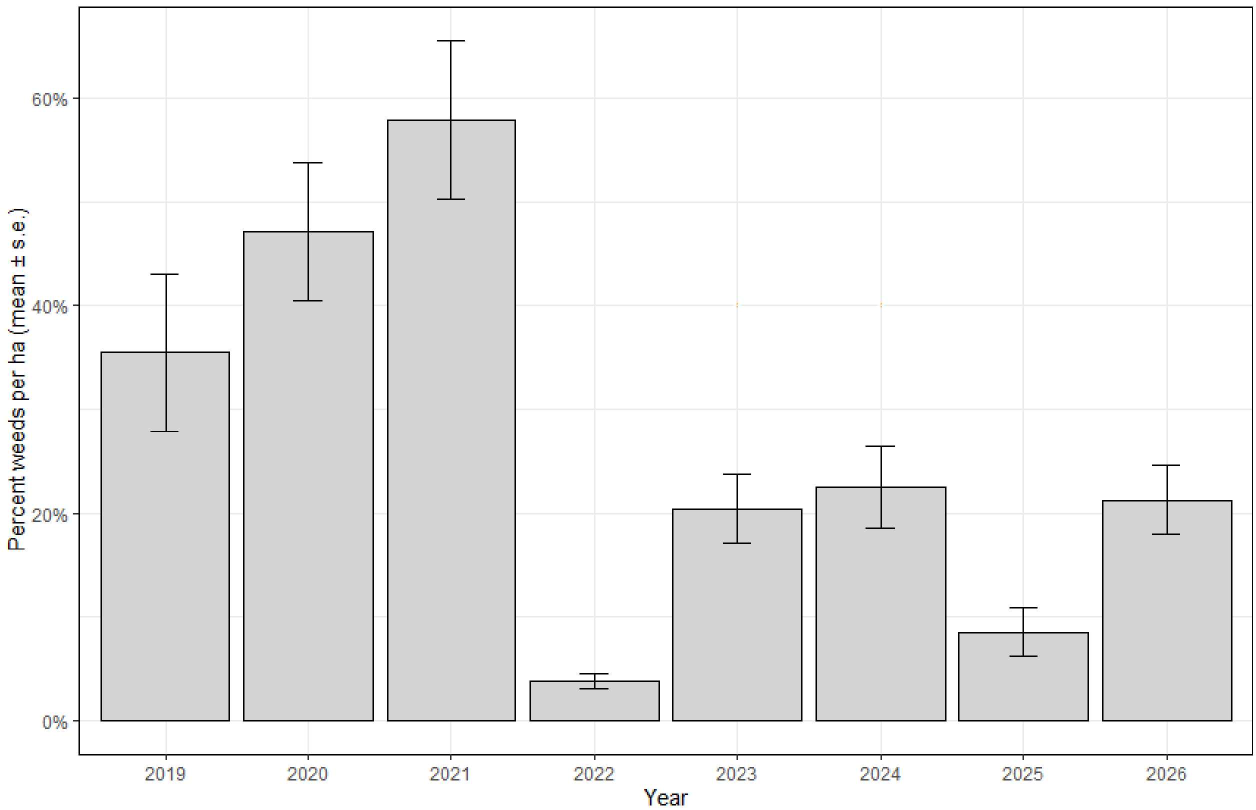

Figure 4.10 Mean Percent Weed Cover per Hectare Since 2019

4.2.6 Cryptogam, Bare Ground and Litter Cover

Mean Cryptogam Cover

The cover of cryptogam inside 1 m^2 quadrats was measured for the first time in 2020, when a mean of 20.25% cover was recorded. Since then, cryptogam cover has been low, reaching only 1.33% in 2024, a significant decrease (p-value = 0.003) (**Figure 4.11**).

In 2026, the mean cryptogam cover based on the 1 m^2 surveys was 6.25%. This is a non-significant decrease from 8.75% in 2025 (p-value = 1). Although a rise from the low cover measured in 2024, that difference is also not significant (p-value = 0.287). There is no significant difference in cryptogam cover between 2026 and the 2020 baseline (p-value = 0.386).

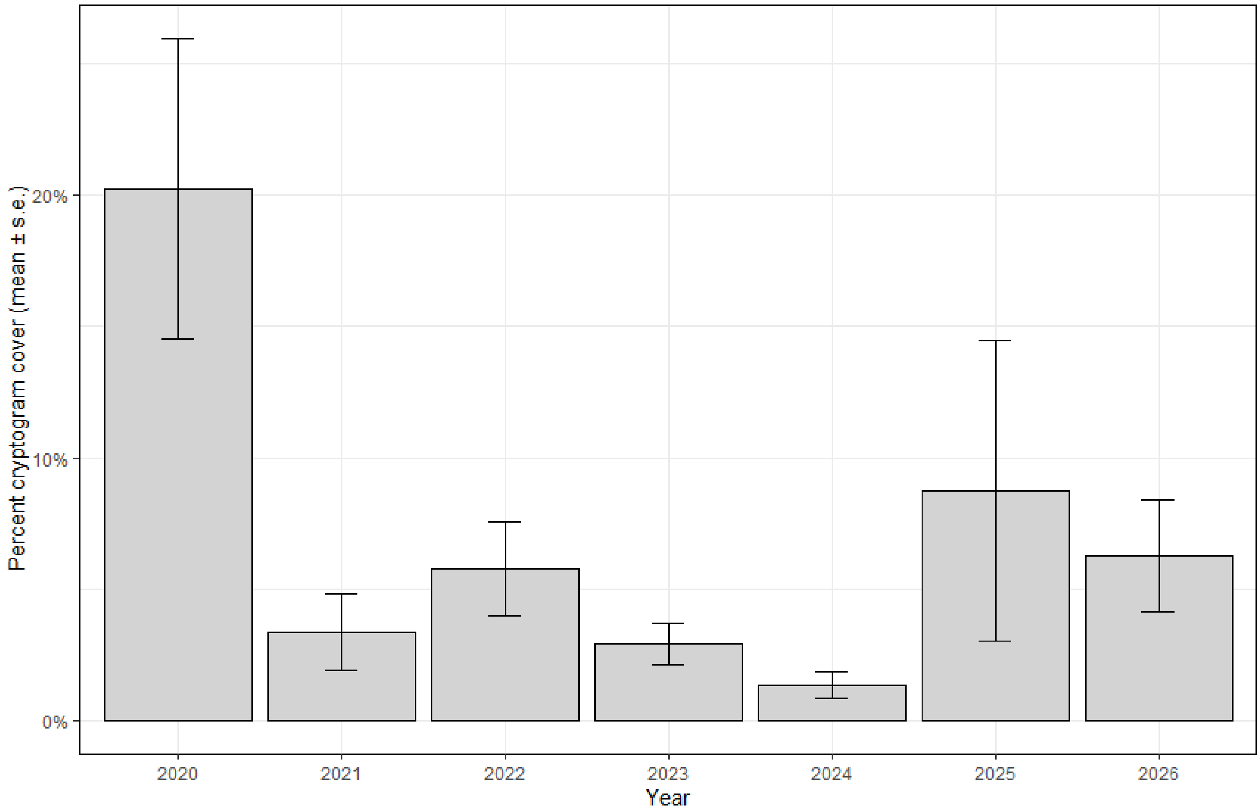

Figure 4.11 The Mean Percent of Cryptogam Cover Measured Since 2020

Mean Percentage of Bare Ground

The mean bare ground cover based on the 1 m^2 surveys was 4.42% in 2026, which is a non-significant decrease from a peak of 8.64% in 2025. The initial decrease in mean bare ground from 8.08% in 2020 to 2.33% in 2021 is statistically significant (p-value = 0.026), as is the difference between 2020 and the low of 1.5% mean bare ground recorded in 2023 (p-value = 0.002). The mean cryptogam cover recorded in 2026 did not significantly differ from the baseline that was first recorded in 2020 as 8.08%. (**Figure 4.12**).

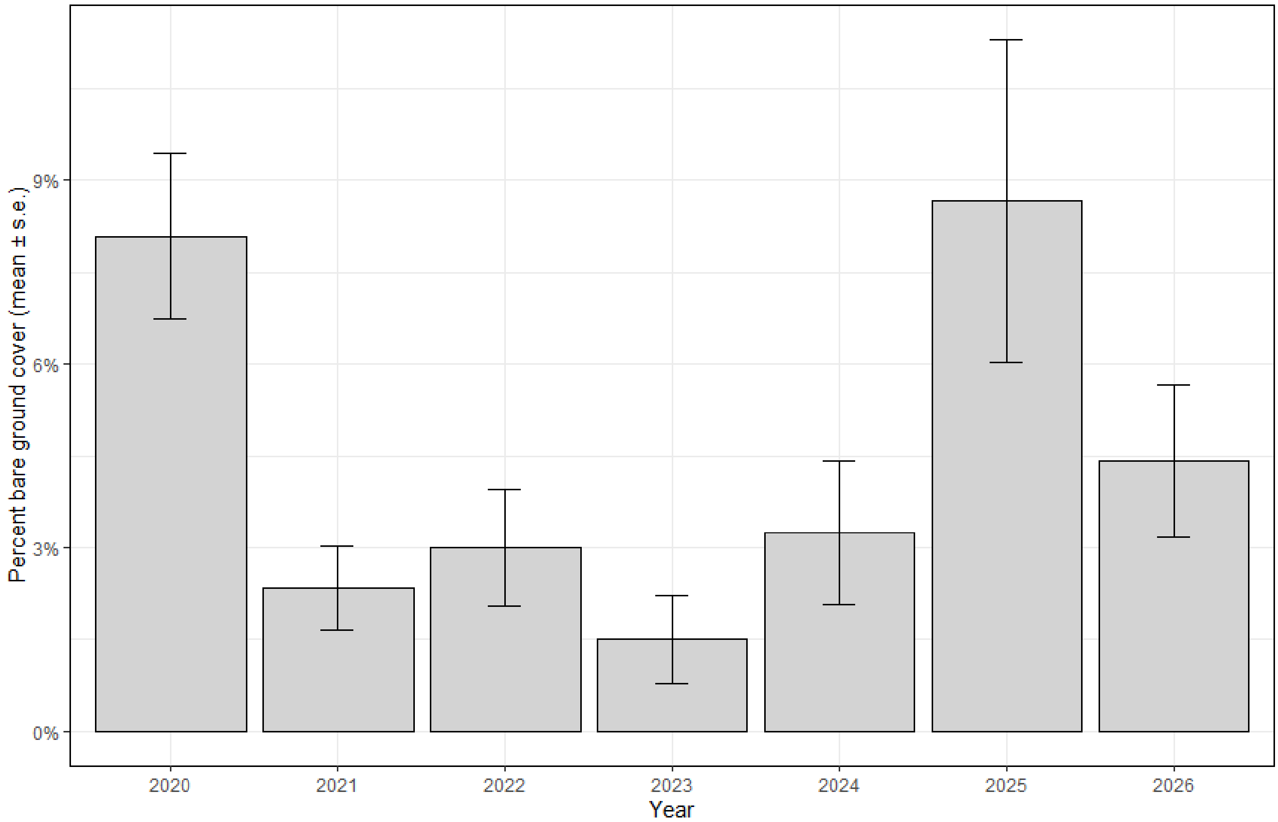

Figure 4.12 The Mean Percent of Bare Ground Measured Since 2020

Mean Percent Litter Cover

The mean percent of litter cover based on the 1 m^2 surveys was 79.08% in 2026, which is the highest of all monitoring periods and is a non-significant increase from 68.93% in 2025 which was the lowest of all monitoring periods. The mean percent of litter cover has fluctuated little since 2022 when the percentage of litter cover was first recorded, with the largest change being between 2025 and 2026 (**Figure 4.13**).

There has not been a significant difference in litter cover since the collection of this statistic commenced.

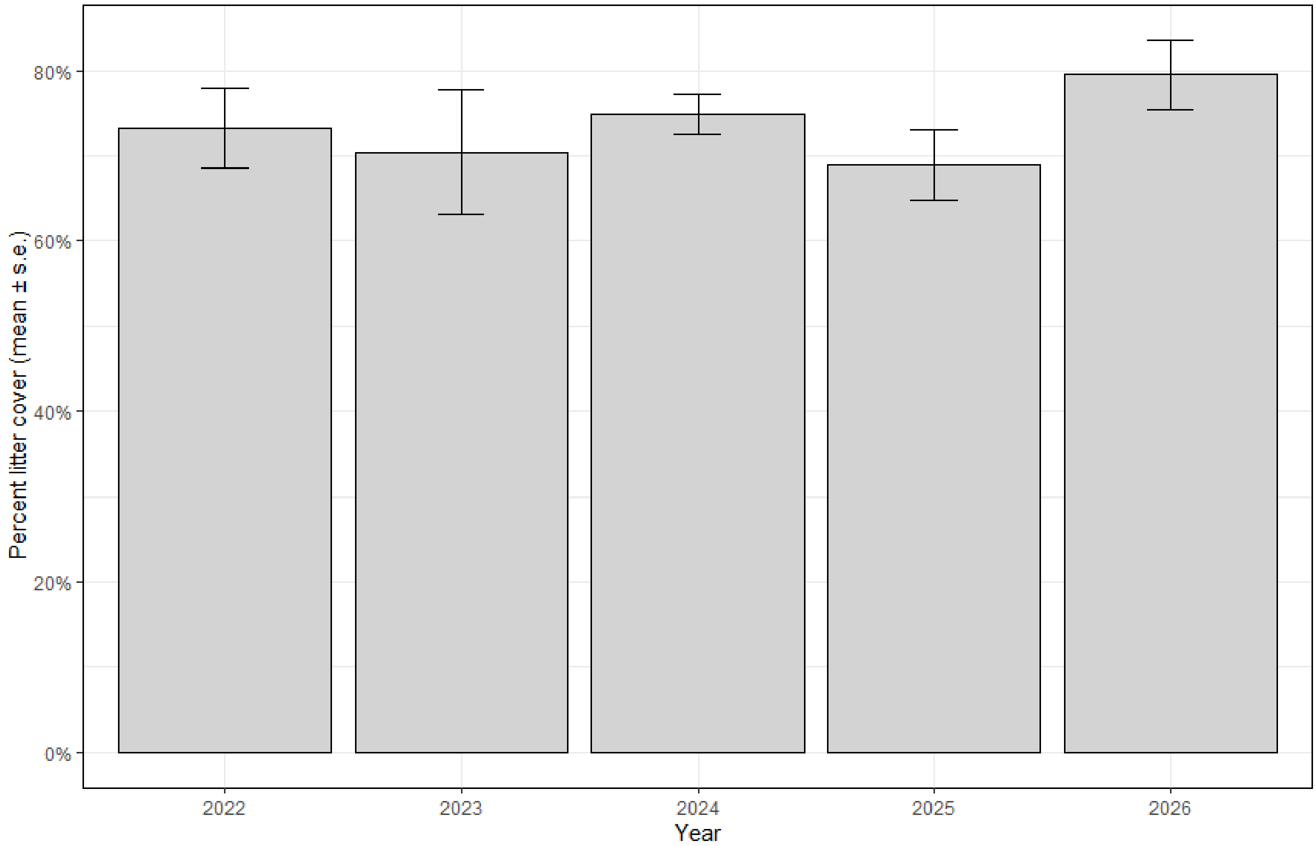

Figure 4.13 The Mean Percent of Litter Cover Recorded Since 2022

4.2.7 Influence of Rainfall on Vegetation Variables

When plotted against rainfall totals recorded during the year prior to the monitoring survey, there were strong or moderate positive correlations between the following vegetation variables:

- Native plant species diversity (r^2 = 0.58).
- Weed species diversity (r^2 = 0.78).
- Percent cover of weeds (m^2) (r2 = 0.99).
- Percent cover of weeds (hectare) (r2 = 0.67).
- Tussock basal width (r^2 = 0.38).
- Tussock spacing (r^2 = 0.43).
- Tussock height (r^2 = 0.57).

This means that generally, as rainfall increases, so does the measure of the above variables. As has been discussed in previous years, rainfall provides a key driver in vegetation condition in the SEB area.

5.0 Discussion

5.1 PBTL Monitoring

5.1.1 PBTL Abundance

Mean per Quadrat and Total Abundance

The mean number of PBTLs observed per quadrat has declined since baseline monitoring in 2017, when a mean of 17.4 individuals was recorded. Numbers fell to a low of 3.7 in 2021, followed by a gradual increase with two declines. The first occurred in 2023, which recorded the lowest mean of all monitoring years, although numbers recovered in 2024. The second occurred in 2026, when density dropped to 5.2 from 9.2 in 2025, though it remained comparable to 2024.

Monitoring data collected since baseline in 2017 suggests that the PBTL population in the SEB area is highly variable, with peaks and troughs, possibly brought on by rainfall and its influence on vegetation condition. The results of the recent years support this trend, as the PBTL numbers has increased from a low of 32 in 2023 to 101 in 2025 but dropped to 57 in 2026.

This shows that there was an upwards trend with the total number of PBTLs approaching the observed total observed in the early monitoring period, as the total in 2025 was comparable to the total in 2020. However, in 2026 the decrease has stopped this upwards trend and the PBTL numbers is comparable to 2024. The decreased total of observed PBTLs from 2025 to 2026 is likely due to the increased litter and weed cover making it more difficult to see burrows. This is supported by the fact that both the total number of PBTLs and the litter and weed cover in 2026 was found to be comparable to 2024.

There were a high number of juvenile PBTLs found during 2026 compared to most other recent years, with the 17 juvenile PBTLs detected comparable to 2019 and 2020, where 20 and 18 juveniles were detected respectively. The timing of surveys is likely to influence the number of juveniles recorded. Although surveys are generally conducted at a similar time each year, PBTL breeding can occur earlier or later depending on spring environmental conditions. Juvenile numbers may also be influenced by rainfall, as discussed further in **Section 5.1.2**.

The current management plan covers one more year (2027) (EBS Ecology 2017a) which will determine if the trend returns to what has been observed previous or continue. However, an updated version of the management plan is scheduled to be finalised in 2026 which will likely override the current management plan.

Slope Aspect and PBTL Abundance

Historically over the initial years of monitoring, the mean number of PBTLs per quadrat across the seven surveys was significantly greater on eastern than western slopes (p-value = 0.006). However, this trend has not been found to be statistically significant since 2024 which is consistent in 2026 (p-value = 0.290).

Spiders and Burrow Influence on PBTL Abundance

The mean number of spiders per quadrat observed in 2026 (36.54) was the highest recorded since the 2020 monitoring and shows an upwards trend since the lowest number of spiders (5.45) recorded in 2024.The mean in 2026 is now comparable to the mean recorded in the 2017 baseline survey. There were significant differences between 2026 and the low years of 2023 (p-value = 0.018) and 2024 (p-value = 0.009).

As in previous years, a positive correlation was detected in 2026 between the number of PBTLs and the number of spiders (r^2 = 0.347) and burrows (r^2 = 0.279). However, unlike earlier years, these correlations were not statistically significant in 2026 for either parameter. When the data are assessed across all monitoring years combined, these relationships become significant, with the number of PBTLs positively correlated with both spider abundance (p-value >0.001) and the number of burrows (p-value >0.001). This is expected since it is widely accepted that PBTLs occupy single-entrance, vertical burrows made by Lycosid and Mygalomorph spiders (Hutchinson *et al.* 1994; Milne 1999; Milne and Bull 2000; Milne *et al.* 2003; Souter *et al.* 2007).

5.1.2 Rainfall and PBTLs

Negative relationships were detected between the number of PBTLs observed with annual rainfall (p-value >0.001) and spring-summer rainfall (p-value >0.001). This indicates that as rainfall increases in the prior to monitoring, the number of PBTLs detected falls. Apart from the early years of monitoring (2017–2020), the lowest number of PBTLs have been recorded following high rainfall years. The number of juvenile PBTLs detected follows a similar pattern.

It can also be shown that there are less burrows are also found during years of high annual and spring/summer rainfall (p-value >0.001). Given that results indicate a positive relationship between the number of burrows and number of PBTLs, it is not surprising that less PBTLs would be detected following high rainfall periods.

The cause of these patterns is not clear and there could be a number of contributing factors, as listed below:

- High rainfall results in a higher cover of vegetation, with the following impacts on burrows and PBTLs possible:
  - Burrows are more difficult for observers to detect (**Figure 5.1**), thus influencing survey results even though the number of burrows and lizards may not actually be decreased significantly
  - A structure of dense vegetation cover caused by high rainfall represents less suitable habitat for spiders and PBTLs, resulting in an actual decrease in burrows and PBTLs.
- High rainfall temporarily influences soil characteristics, such as moisture content, which may not be as conducive to burrow integrity and longevity, resulting in loss of burrows and therefore PBTLs.

The results of the 2025 survey shows that when dry conditions return following high rainfall years, the number of PBTLs and burrows increases. This indicates that:

- Low rainfall results in die back of perennial grass tussocks and a sparse cover of annual plants that contributes to a more open vegetation structure. This could influence the number of burrows and PBTLs observed for the following reasons:

  - Burrows are more easily detected by observers thus influencing survey results even though the number of burrows and lizards may not actually be significantly changing (**Figure 5.2**).
  - An open vegetation structure represents more suitable habitat for spiders and PBTLs.
- Increase in the number of PBTLs following resource rich periods (i.e. high rainfall) impacts on survey results in the year following the high rainfall.

Figure 5.1 High Weed and Litter Cover Hinders the Detection of Burrows

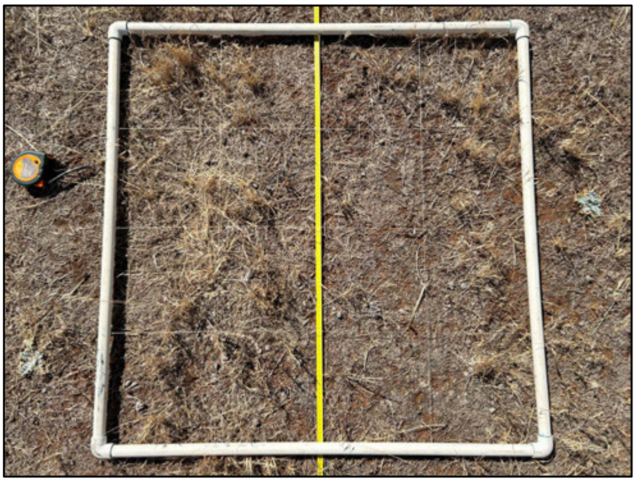

Figure 5.2 High Cover of Bare Ground and Cryptogam with Open Vegetation Structure Improves Burrows Detection

5.2 Vegetation Monitoring

5.2.1 Vegetation Condition Variables

Native Plant Species Diversity

There were 31 native plant species recorded in 2026, a decrease from 36 species in 2025. This reduction is likely linked to another dry year, with limited spring–summer rainfall resulting in annual species being seldom observed. The native diversity has also fell to 9.75 in 2026, showing a downwards trend since the highest number of native plant species of 20.42 in 2024.

The significant decline in mean native species diversity from 20.2 in 2024 to 9.75 in 2026 (p-value = 0.005) means the current mean is no longer significantly different from the mean recorded in the baseline (5.75), although it remains slightly higher.

Increases in diversity may be due to winter grazing on weedy annual grass, facilitating opportunities for recruitment of more vulnerable native herbaceous species and an overall decrease in grazing pressure. Decreased grazing pressure may result in palatable native species becoming easier to detect and increase successful recruitment. Small shrubs such as *Eutaxia microphylla* (Common Eutaxia), for example, are palatable species that suffer from preferential grazing when land is heavily grazed.

Similarly, photopoint monitoring indicates increased recruitment of canopy species (notably *Allocasuarina verticillata*) at the woodland site (Quadrat 12). This species is also preferentially grazed under heavy stocking rates and thus benefits from low grazing pressure.

There is always likely to be some fluctuation in native plant diversity from year to year, brought on by climatic conditions, as discussed in **Section 5.2.2**. Identification of some native plants, particularly grasses and seasonal forbs, can be difficult. Observer bias may also play a part in fluctuating diversity recorded and the high weed and litter cover in 2026 may also have made detection of some species difficult.

Weed Diversity and Cover

A total of 29 weed species were recorded in 2026, consistent with 2025. While grazing remains a land management tool within the SEB area, there is a continued likelihood that new weed species might be recorded. New species might be introduced by being transported by livestock or in contaminated feed, for example.

Despite the same total of weed species, mean weed diversity increased from 9.75 in 2025 to 14.5 in 2026, following the first decline observed between 2024 (19.08) and 2025 since baseline monitoring. Despite this increase, the mean weed diversity in 2026 remains comparable to 2022.

The number of weed species present is highly dependent on seasonal conditions, particularly rainfall. Under normal climatic conditions of dry summers, weed diversity is likely to be low, since many species, particularly annual grasses, are present during the high rainfall seasons of winter and spring. They are then grazed back as conditions dry off through mid-to-late spring. However, under wet summer conditions such as those experienced from 2021 – 2023, and without grazing pressure, there may be a continued presence of these annual weeds. This would explain, in part, the high weed diversity noticed in those years.

Following the increased weed diversity, the weed cover over the hectare also increased from 8.5% in 2025 to 21.2% in 2026. Per hectare, this is no longer a significant decrease of weed cover than recorded in 2019 or 2020 but still is significant compared to 2021 (p-value = 0.039) where the weed cover per hectare peaked. However, the weed cover in the 1 m^2 survey has decreased from 8.67% in 2025 to 3.53% in 2026 with there being significantly less weed cover per m^2 than in 2019, 2020 and 2021 (all p-values >0.001).

Spring–summer (September–January) rainfall was limited leading into the 2025 monitoring, so lower weed cover was expected. Although conditions were also dry prior to the 2026 survey, heavy rainfall occurred in February within a week of monitoring, which may have increased weed presence and cover. As noted following the 2024 monitoring however, the statistics do not support expectations that weed cover should be higher following years of high rainfall. This may be due to variations in observers and the way in which data has been collected. Since 2022, for example, most weed material was annual grasses and forbs that were dead and detached by the late summer monitoring period. This was therefore counted as litter cover and not weed cover. It is unclear what was counted as weed cover in previous years. So long as future monitoring is consistent with methods used since 2022, this limitation may become less prevalent.

Although recorded in previous years, the Declared weeds Bathurst Burr and Cut-leaf mignonette were not recorded during the survey. Bathurst Burr has been a target for control since 2025, while the non-detection of Cut-leaf mignonette may be more related to seasonal conditions.

A high cover of grassy weeds, such as *Avena* spp., recorded in 2026 accounts for the low percentage of bare ground recorded at monitoring sites. This increases the difficulty in detecting spider burrows, possibly influencing the number of PBTLs observed.

Bare Ground, Cryptogam and Litter Cover

The mean percentage of cryptogam cover decreased from 8.64% in 2025 to 6.33% in 2026, after it raised from a monitoring low of 1.33% recorded in 2024. Although the 2026 mean is lower than the 20.25% recorded in 2020 (the first year this statistic was measured), it does not represent a significant decrease.

Following the greatest mean bare cover recorded in 2025 of 8.59%, it has decreased to 4.50% in 2026. However, there is no significant difference between the mean bare cover 2026 to 2025 or the first year that it was measure in 2020 where the mean was 8.08%.

The cover of bare ground and cryptogam is effectively an indication of the openness of grassland habitat. Greater cover of these two variables may be indicative of more ideal PBTL habitat. It may also be true that a higher amount of bare ground and cryptogam makes detection of spider burrows easier, leading to the detection of more PBTLs.

Despite the increase of mean percentage of litter cover from the lowest of 68.93% in 2025 to the highest of 79.08% in 2026, the mean has remained similar to the previous years when this statistic has been collected (2022, 2023 and 2024).

As this variable was measured for the first time in 2022, it is likely that there is not enough data be able to determine whether changes in litter cover are statistically significant. Previously, litter was included as a part of weed cover percentage and may account for the reduction in weed cover in 2022 and 2023. It is important to continue to measure these variables for future data analysis.

Perennial Grass Tussock Spacing, Number of Tussocks and Juvenile Tussocks

In 2026, the mean spacing of perennial plants increased from 27.01 cm in 2025 to 30.07 in 2026. The monitoring shows that since a significant decrease in tussock spacing after 2020 (p-value = 0.044), it has remained comparable since 2021 with no significant changes. The 2026 spacing is also comparable to the baseline mean spacing of 29.70 cm.

The increase in tussock spacing from baseline to its greatest distance of 56.93 cm in 2020 indicates that grassland structure was opening up in the first three year of monitoring. The rapid decline in tussock spacing from 2020 to 2021 is potentially caused by a high survival of juvenile tussocks in those years, with 2020 also recording the highest mean number of juvenile tussocks for any year (85,788.69). Since then, it appears that management practices have been successful at maintaining tussock spacing to a level conducive to also maintaining the PBTL population.

The mean number of tussocks per hectare in 2025 was 104,375 which has decreased to 78,333 in 2026 which is the lowest of all monitoring periods The 2026 mean is not significantly different from either the highest or lowest mean number of tussocks per hectare, with the number of tussocks possibly fluctuating due to rainfall, as discussed in **Section 5.2.2**.

Given that fewer juvenile tussocks were observed in 2026 (2,812.50) than most other years besides 2025 (1,041.67), it is likely that the next monitoring period would detect an increase in tussock spacing or decrease in the number of tussocks per hectare. This significant drop in juvenile tussocks has been recorded despite recent years being open to observer bias due to the difficulty of detecting small plants, as discussed in EBS Ecology 2024. It is most likely related to low rainfall in the spring-summer period leading up to the monitoring.

Perennial Grass Tussocks Size and Health Attributes

The mean basal width of perennial plants was decreasing since the baseline survey to 2018 with a low of 3.94 cm in 2024. Since 2024, the mean has increased to 5.64 cm and 5.31 cm in 2025 and 2026 respectively. However, this is still below the baseline of 9.67 cm and is a significant decrease from that year. Despite this, it is pleasing that the general downward trend in basal width was reversed in 2025 and remains similar in 2026. The increased basal width may be caused by high numbers of juvenile tussocks recruited in 2020 and onwards surviving to measurable size.

The mean tussock height in 2026 (11.05 cm) was the first increase since 2022. Prior to 2026, there was a decreasing trend since the tallest tussock height of 25.2 cm was recorded in 2022. Despite the increase in 2026, the mean is still the second lowest since 2022 and is still significantly shorter than the 2022 height (p-value = 0.005) but is no longer significantly different to the mean of 15.71 cm recorded in the baseline. Although stock have been removed for the summer resting period, the shorter tussock height in 2026 may be caused by grazing pressure from kangaroos, or plant dieback caused by the dry conditions of recent years, as discussed further in **Section 5.2.2**.

The mean percentage of dead material on perennial grass tussocks significantly decreased from 92.17% in 2025 to 66.21% in 2026 (p-value = 0.026). The mean in 2025 was the highest mean percentage of dead material since the start of the monitoring.

The photographs taken at each quadrat (**Appendix 1**), present visual changes in the grassland over time at Quadrats 1–8 since 2016; and all twelve quadrats since 2018. The photos show that a gradual reduction in bare ground and increase in dead litter and thatch noticed over the past few years has now decreased. The 2025 photographs resembled conditions seen in the early years of monitoring but now is similar to the other years.

5.2.2 Rainfall and Vegetation Parameters

It seems clear from relationships found between vegetation data and rainfall statistics that climatic conditions experienced in the year and months leading into monitoring surveys influences vegetation condition. Over the years of monitoring to date, this includes variable measured such as:

- Native plant species diversity.
- Weed species diversity.
- Percent cover of weeds (per m^2 and hectare).
- Tussock basal width.
- Tussock spacing.
- Tussock height.
- Bare ground.

These parameters are closely related to the relationships between PBTLs and spider holes, indicating that with higher rainfall and resulting denser vegetation structure is linked to lower number of PBTL and spider hole detections. This would indicate that vegetation cover can increase to a point that it becomes less than ideal PBTL habitat.

Despite fluctuations in vegetation characteristics that are probably influenced by rainfall, the data does indicate that there has been some improvement in vegetation condition measures over time. For example, native plant species diversity remains significantly higher than the baseline, despite annual fluctuations possibly related to rainfall.

5.3 Grazing Impact and Ongoing Management

In response to increasing weed cover and the thickening structure of vegetation that occurred prior to 2023, an on-site meeting was held to discuss management approaches. This resulted in an extended grazing period being implemented in spring 2023 and autumn 2024 (EBS Ecology 2024).

The 2025 monitoring indicated that vegetation structure had returned to conditions similar to years when higher numbers of PBTLs were recorded. This shift was likely influenced by a temporary increase in grazing pressure, as noted above, and the drier climatic conditions experienced in 2024–2025. In contrast, vegetation conditions in 2026 reverted to those observed in the years prior to 2025, which corresponded with a similar trend to the PBTL numbers.

Whilst stock are not present in the SEB Offset Area during the dry summer and early autumn months, light grazing pressure may still act on vegetation due to kangaroos frequenting the area. During exceptionally dry periods, impact resulting from this on native vegetation condition may be problematic. This should be addressed according to the recommendation made in **Section 6.0**.

Monitoring of grassland condition in response to rainfall and adaptive management will be important going forward, if habitat is to be maintained in an ideal condition for maintaining the PBTL population.

Weeds continue to be recorded throughout the SEB Offset Area, despite annual control activities being undertaken. While grassy weeds such as Wild Oats (*Avena* sp.) are not feasible to control other than through grazing management, woody weeds such as Dog Rose (*Rose canina*) should be targeted annually during the growing season (spring and summer). Weeds are particularly prevalent near feed out areas and watering points.

Recent monitoring reports have indicated that the numbers of PBTLs recorded falls as weed cover increases. It is uncertain whether this represents an actual decrease in the number of PBTL, or if increased vegetative cover and litter attributable to annual grassy weed growth makes detection difficult. It is clear though, that less PBTLs are recorded in years of high weed and litter cover.

6.0 Recommendations

It seems clear from the monitoring at Hornsdale that PBTLs benefit from an open grassland structure. This includes a low cover and diversity of weed species, which also benefits vegetation condition. Within the Hornsdale SEB Offset Area, this structure is maintained by allowing periodic grazing in line with the current management plan.

What is clear from recent years, however, is that being reactive to climatic conditions is important in maintaining vegetation condition and ideal habitat conditions for PBTLs. This has occurred from 2023 to 2024 by increasing grazing pressure during periods of high rainfall, as discussed in the 2024 report (EBS Ecology 2024).

During this period, additional grazing periods were implemented following very low numbers of PBTL and high weed and vegetation cover recorded in the 2023 and 2024 surveys. The period between 2024 and 2025 was again dry, and grazing management had returned to the levels set by the initial management plan which led to the grassland to return to an open structure and numbers of PBTLs continued to increase in 2025. However, in 2026 the open structure of the grassland and the number of PBTLs is declining once more. The cause of this decrease is currently unclear, as conditions have remained dry and rainfall has been similar to or lower than recent years. One possible contributing factor is the late heavy rainfall in February 2026, which triggered a rapid increase in weeds, although this does not explain the higher litter cover. Ongoing monitoring will help determine whether the decline in PBTLs reflects a broader trend or is a one-off fluctuation.

Whilst being reactive with management to high rainfall conditions has benefited the SEB Offset Area, it should be noted that dryer than average conditions may also require an adaptive management approach. Overgrazing during dry periods is likely to be detrimental to, particularly, vegetation condition. Whilst stock may have been removed during these times (specifically dry summers), grazing pressure may still be present due to kangaroos.

Given observations made during the 2026 monitoring field work and the results of the analysis, the following recommendations have been made:

- As part of the Management Plan review scheduled in mid-2026, determine if current grazing management as per the *Hornsdale Wind Farm SEB – Native Vegetation and Pygmy Bluetongue Lizard Management Plan* is adequately maintaining vegetation and PBTL habitat condition.
- As part of the Management Plan review scheduled in mid-2026, investigate potential weed control methods that might help reduce the cover of grassy annual weeds, such as *Avena* spp. If effective, targeted methods can be determined, they should be implemented as part of a revised management plan.
- During the spring/summer growing season 2026 to 2027, continue control of woody weeds, specifically Dog Rose and Horehound.
- Continue to control Bathurst Burr.
- Concentrate weed control efforts in drainage lines and sites frequented by livestock, such as feed out areas and watering points.
- When stock are removed from the SEB Offset Area in late 2026, in consultation with the landowner, consider closing off watering points to reduce summer grazing pressure from kangaroos, as recommended by the Department for Environment and Water in 2025.

- A concerted effort should be made to reduce the cover of annual grassy weeds (e.g. *Avena* spp. and *Bromus* spp.). This may require an altered approach to grazing management. As the management plan is currently due for review, this should be a focus going forward.

7.0 References

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Appendix 1

Monitoring Quadrat Photographs

Table A1.1 Photographs of Quadrat 1

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.2 Photographs of Quadrat 2

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.3 Photographs of Quadrat 3


Baseline (2016)


2018


2019


2020


2021


2022

2023

2024

2025

2026

Table A1.4 Photographs of Quadrat 4

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.5 Photographs of Quadrat 5

Baseline (2016)

2018

2019

2020

2021

2022


2023


2024


2025


2026

Table A1.6 Photographs of Quadrat 6

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.7 Photographs of Quadrat 7

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.8 Photographs of Quadrat 8

Baseline (2016)

2018

2019

2020

2021

2022

2023

2024

2025

2026

Table A1.9 Photographs of Quadrat 9

Baseline (2018)

2019

2020

2021

2022

2023

2024

2025

2026

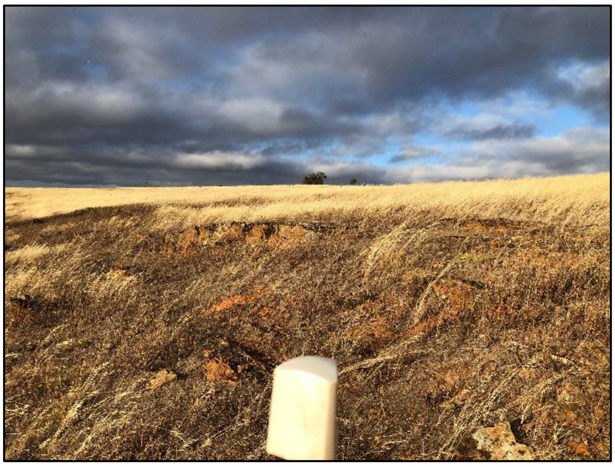
Table A1.10 Photographs of Quadrat 10


Baseline PBTL (2018)


2019


2020


2021


2022


2023


2024


2025


2026

Table A1.11 Photographs of Quadrat 11


Baseline (2018)


2019


2020


2021


2022


2023

2024

2025

2026

Table A1.12 Photographs of Quadrat 12


Baseline (2018)


2019


2020


2021


2022


2023

2024

2025

2026

Appendix 2

2026 PBTL Records Locations Maps

umwelt

APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 1

Legend

PBTL Monitoring quadrat

PBTL

Spider Burrow

0 10 20

Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 2

Legend

PBTL Monitoring quadrat

Spider Burrow

0 10 20

Metres

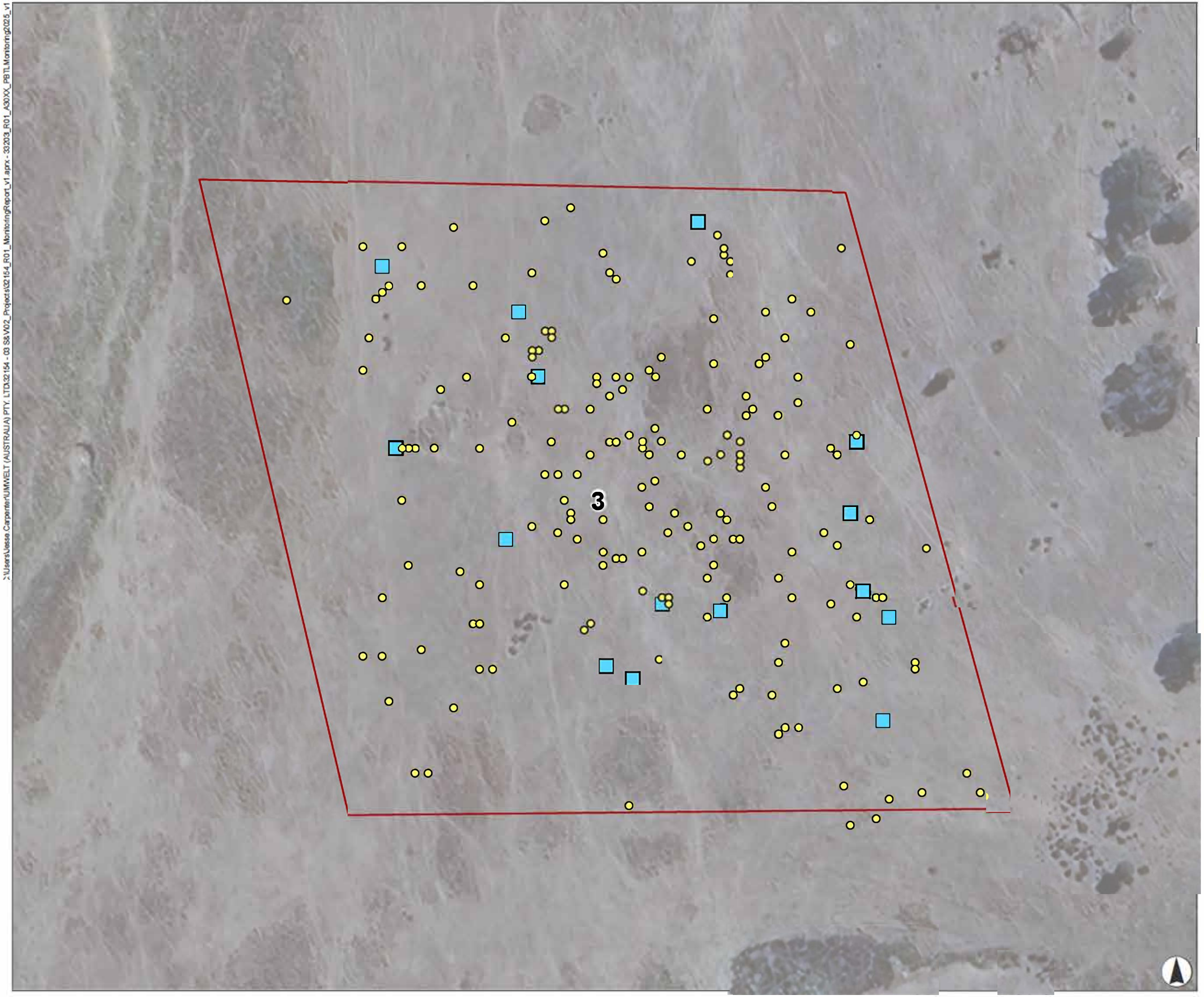
Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 3



Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

0 10 20

Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 4

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

0 10 20
Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

APPENDIX 3

Title: 2026 PBTL Records Location Map - Quadrat 5

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

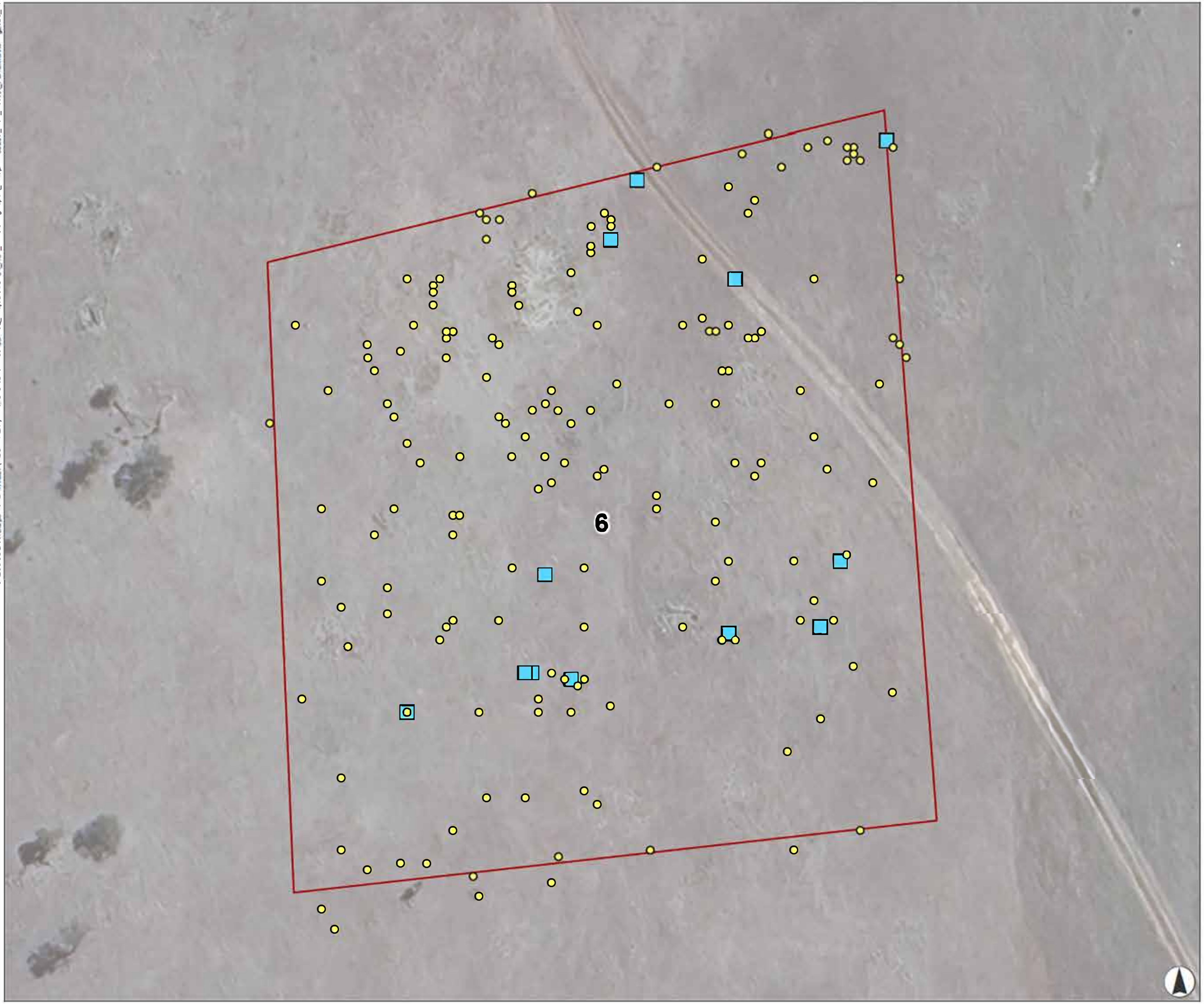
0 10 20
Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

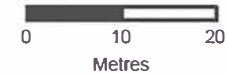
APPENDIX 2



Title: 2026 PBTL Records Location Map - Quadrat 6

Legend

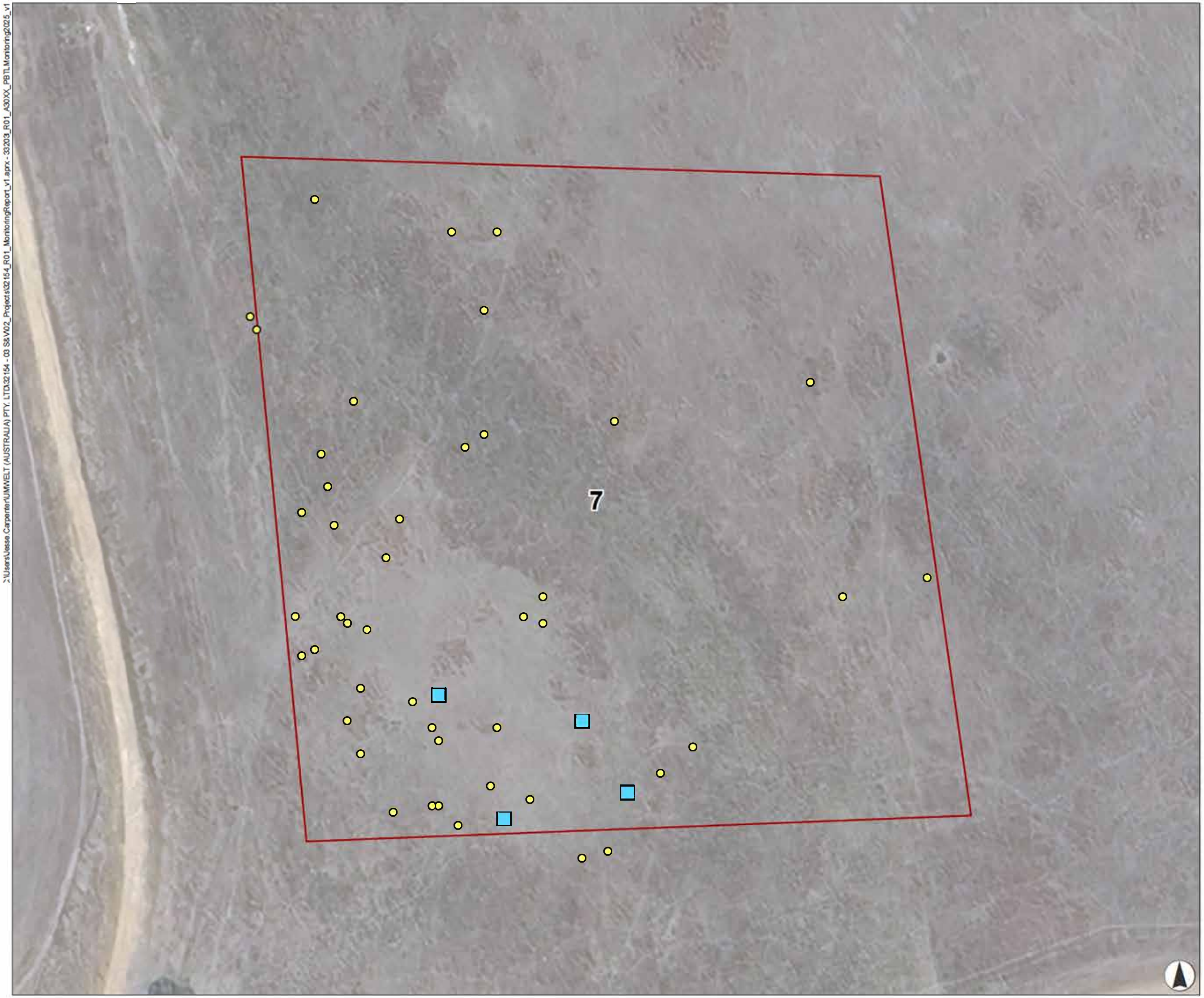
- PBTL Monitoring quadrat
- PBTL
- Spider Burrow



Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)



APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 7

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

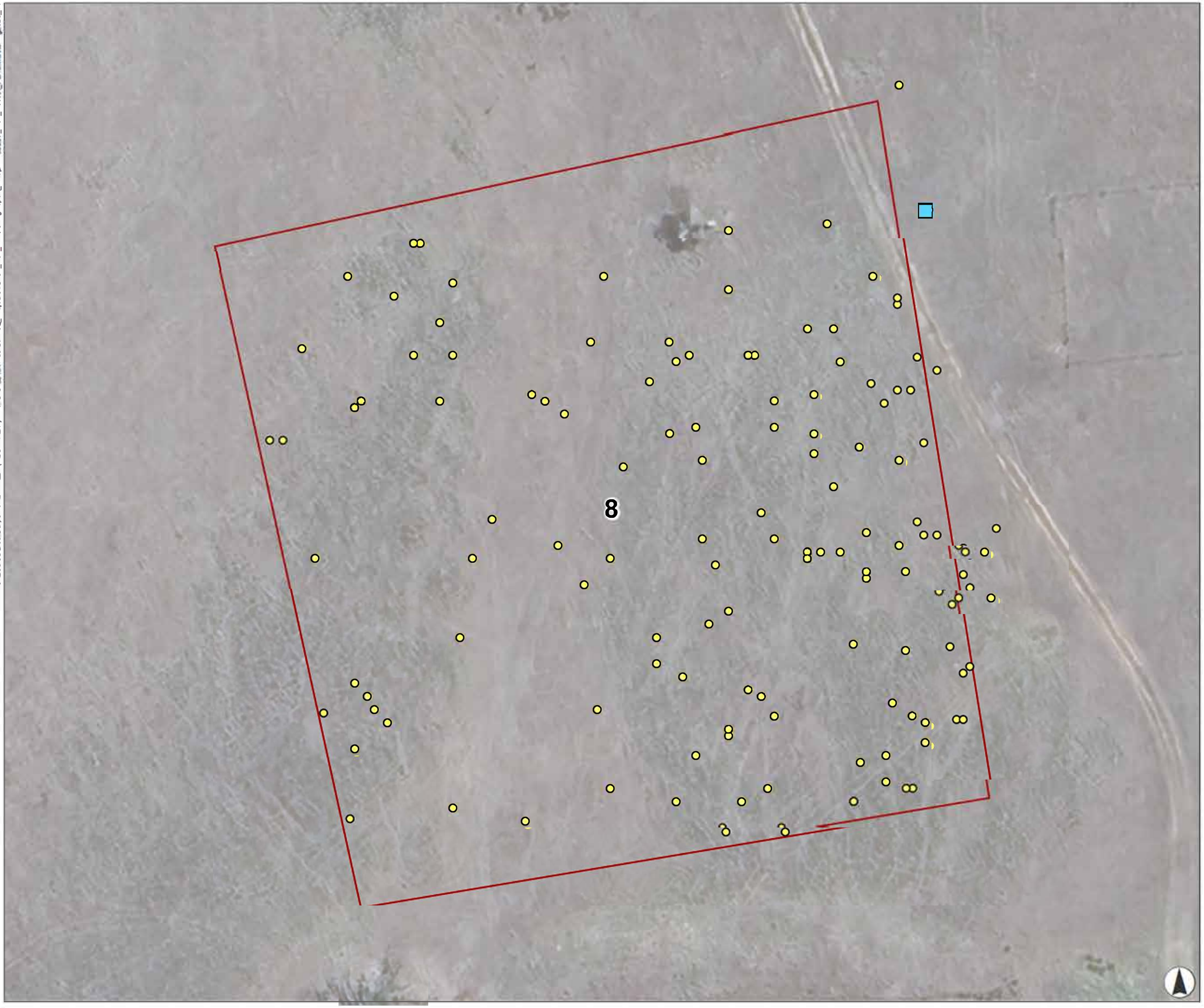
0 10 20

Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)



APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 8

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

0 10 20

Metres

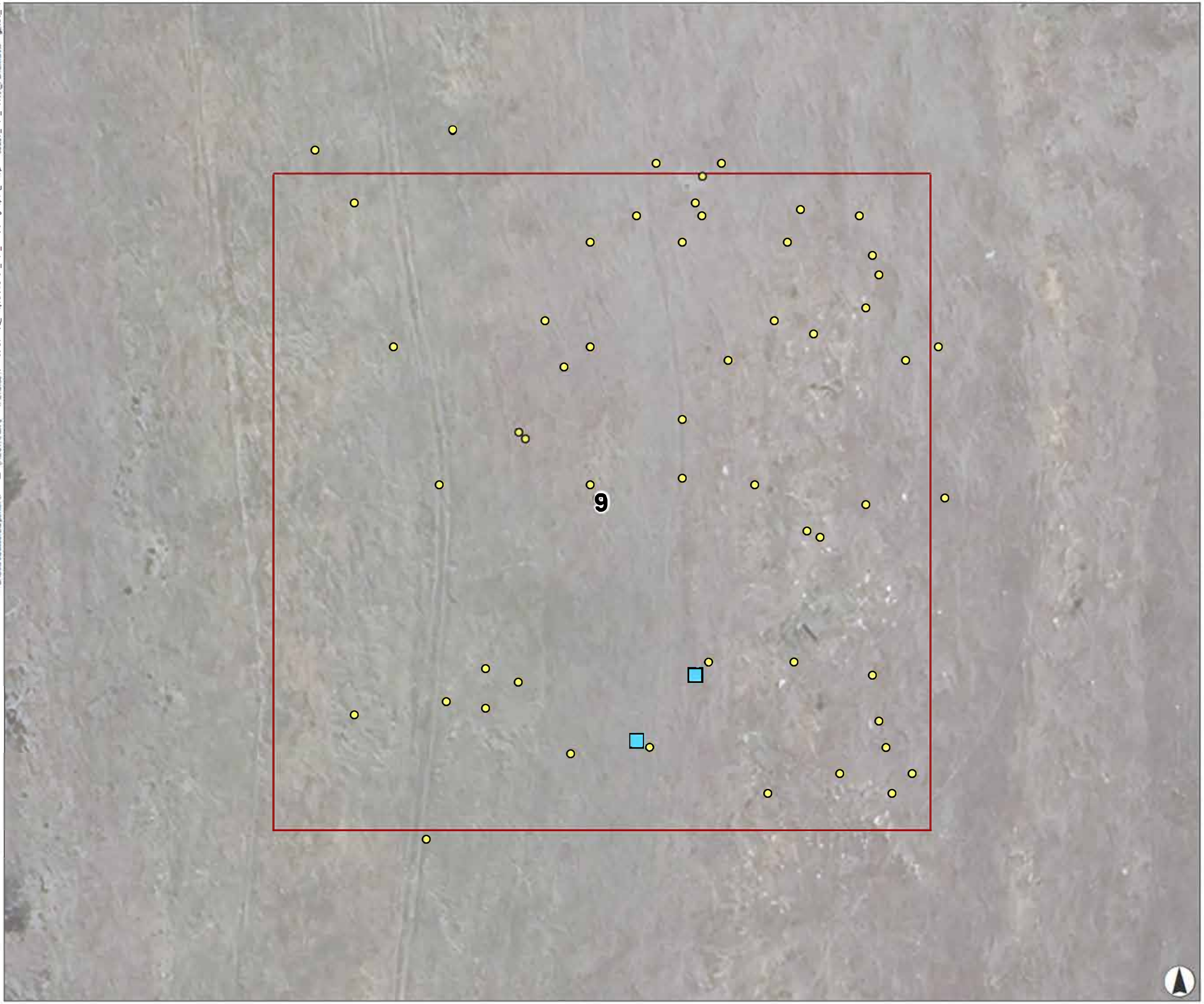
Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | Data Source: SA DIT (2025)

APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 9



Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

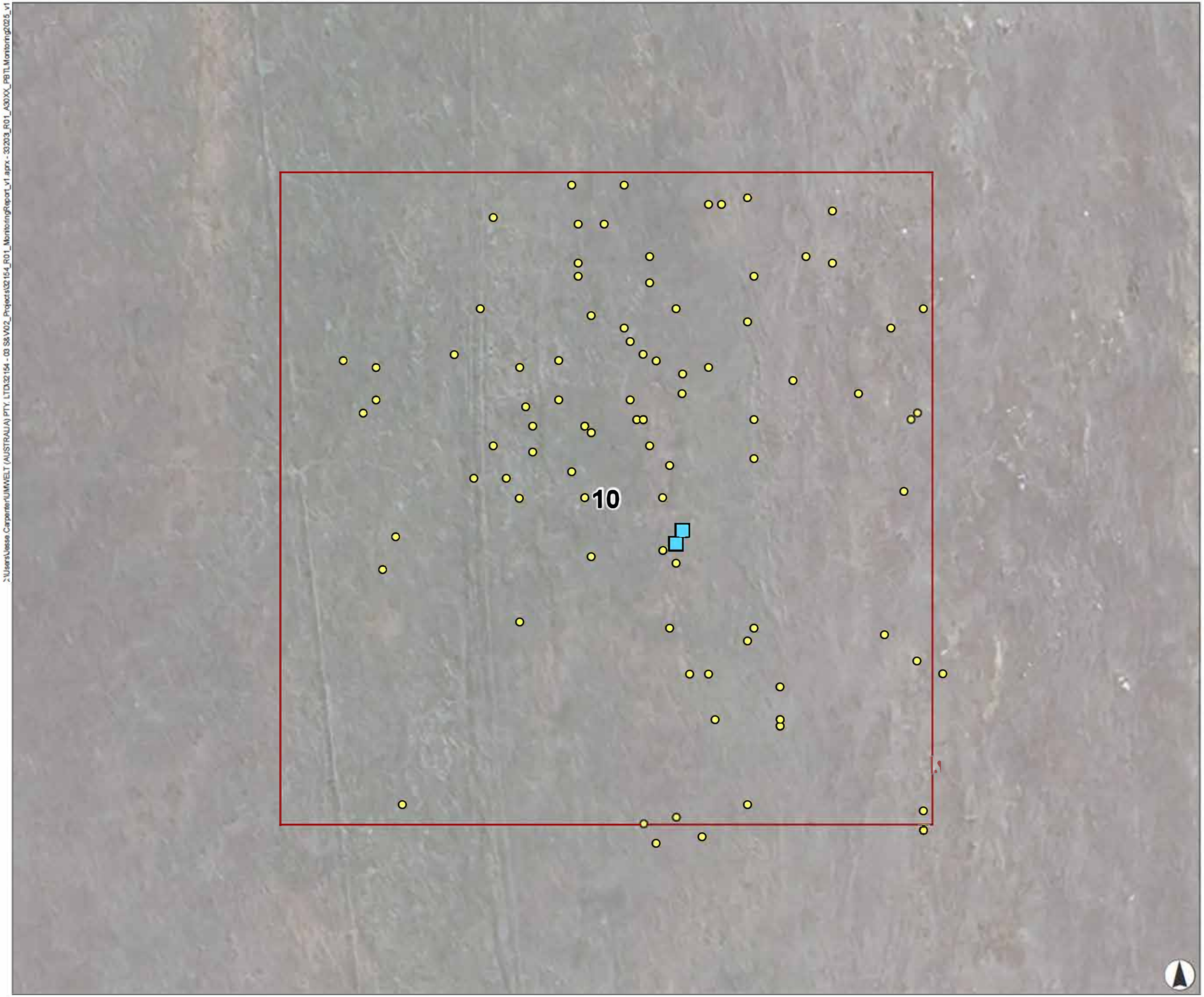
0 10 20

Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)



APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 10

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

0 10 20

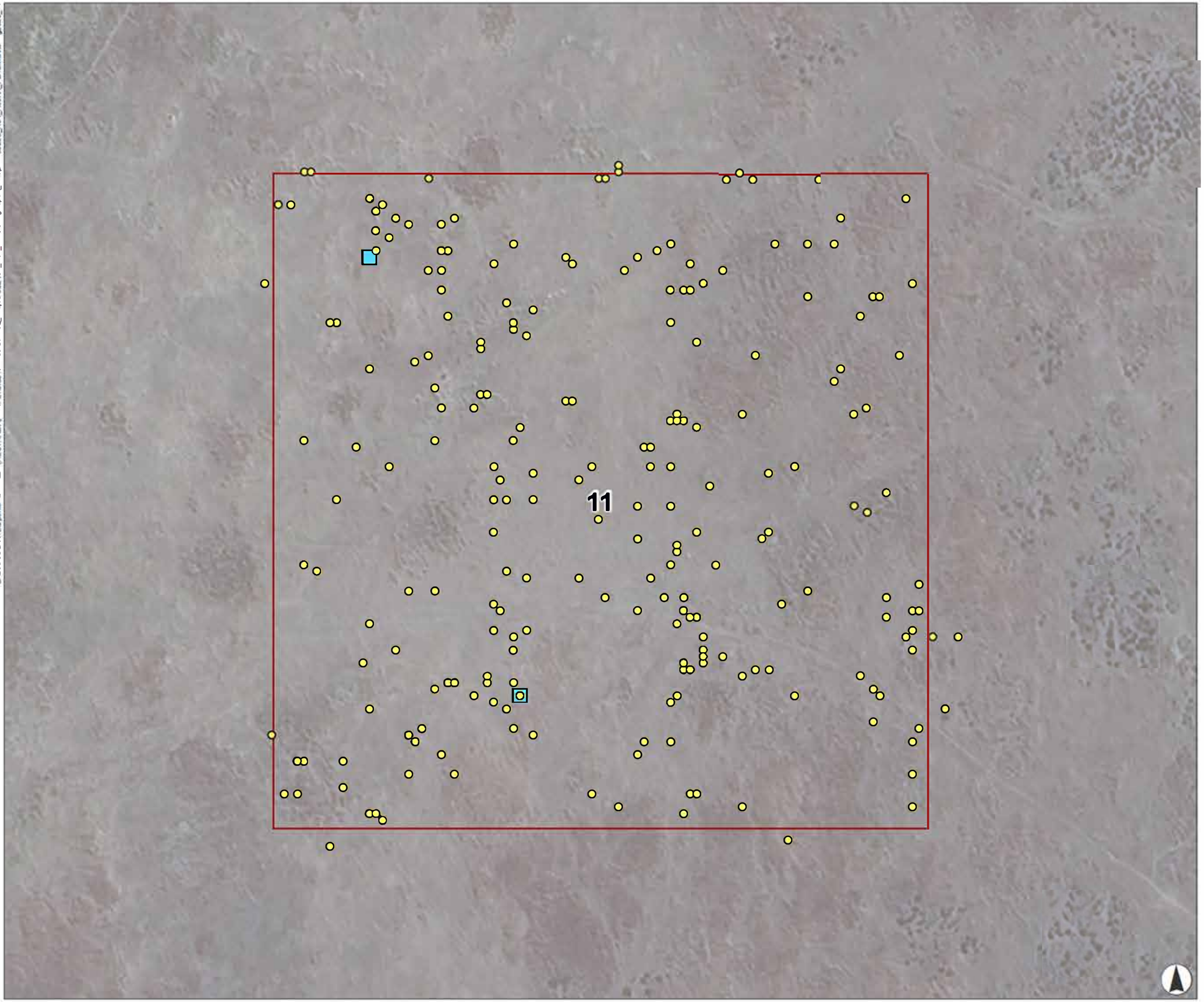
Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

umwelt

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

J:\Users\Jesse.Carpenter\UMWELT (AUSTRALIA) PTY LTD\32154 - 03 S&V\02_Projects\32154_R01_MonitoringReport_v1.aprx : 33203_R01_A3XX_PBTL_Monitoring2025_v1



APPENDIX 2

Title: 2026 PBTL Records Location Map - Quadrat 11

Legend

- PBTL Monitoring quadrat
- PBTL
- Spider Burrow

0 10 20
Metres

Scale 1:800 at A4
GDA2020 MGA Zone 54

Image Source: ESRI Basemap (2025) | **Data Source:** SA DIT (2025)

Appendix 3

Flora Species Recorded in 2026

umwelt

Scientific Name	Common Name	EPBC Act Status[1]	NPW Act Status[1]	Weed Status[3]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Acacia pycnantha	Golden Wattle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Aira sp.	Hair-grass	-	-	Int	✓	-	-	-	✓	-	-	-	-	-	✓	✓
Allocasuarina verticillata	Drooping Sheoak	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓
Anthosachne scaber	Wheat-grass	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓
Aristida behriana	Bruch Wire-grass	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Atriplex semibaccata	Berry Saltbush	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Austrostipa scabra	Falcate-awn Spear-grass	-	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓
Austrostipa sp.	Spear-grass	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓
Avena barbata	Bearded Oat	-	-	Int	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Boerhavia dominii	Tar-vine	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-
Bromus diandrus	Great Brome	-	-	Int	✓	-	-	-	✓	-	✓	✓	✓	✓	-	✓
Bursaria spinosa	Bursaria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Calocephalus citreus	Lemon Beauty-heads	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Carthamus lanatus	Safron Thistle	-	-	Int	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓
Centaurea melitensis	Malta Thistle	-	-	Int	-	-	✓	-	-	✓	-	✓	-	✓	-	-
Chondrilla juncea	Skeleton Weed	-	-	D	-	-	✓	-	-	-	-	-	-	-	-	-
Convolvulus remotus	Grassy Bindweed	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	✓
Cryptandra campanulata	Long-flower Cryptandra	-	R	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓
Cucumis myriocarpus	Paddy Melon	-	-	Int	✓	-	-	-	-	-	-	-	-	-	-	-
Echium plantagineum	Salvation Jane	-	-	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Enneapogon nigricans	Black-head Grass	-	-	-	✓	-	-	✓	✓	✓	✓	-	-	✓	-	✓
Erodium cicutarium	Cut-leaf Herons-bill	-	-	Int	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Scientific Name	Common Name	EPBC Act Status[1]	NPW Act Status[1]	Weed Status[3]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Euphorbia drummondii	Euphorbia drummondii	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
Heliotropium europaeum	Common Heliotrope	-	-	Int	-	✓	-	✓	✓	-	-	-	✓	✓	✓	-
Hordeum glaucum/leporinum	Barley Grass	-	-	Int	✓	✓	-	✓	-	✓	-	✓	-	✓	-	-
Hypochaeris radicata	Rough Cats-ear	-	-	Int	✓	-	✓	✓	✓	-	✓	-	✓	-	-	-
Juncus aridicola	Inland Rush	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Lepidium africanum	Common Peppercress	-	-	Int	✓	✓	-	-	-	-	-	-	✓	-	-	-
Lolium sp.	Ryegrass	-	-	Int	✓	✓	-	✓	-	-	-	-	✓	✓	-	✓
Lomandra multiflora ssp. *dura*	Hard Mat-rush	-	-	-	✓	-	-	✓	-	-	✓	-	-	-	✓	✓
Lomandra sp.	Mat-rush	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Lysiana exocarpi ssp. *exocarpi*	Harlequin Mistletoe	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Maireana enchylaenoides	Wingless Fissure-plant	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓
Maireana rohrlachii	Rohrlach's Bluebush	-	R	-	✓	-	-	-	-	✓	-	-	-	-	-	-
Malva sp.	Mallow	-	-	Int	✓	-	-	-	-	-	-	-	-	-	-	✓
Marrubium vulgare	Horehound	-	-	D	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓
Medicago minima	Small Burr-medic	-	-	Int	-	-	-	✓	-	-	-	-	✓	✓	-	-
Moraea setifolia	Thread Iris	-	-	Int	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Onopordum acaulon	Horse Thistle	-	-	Int	✓	✓	-	✓	-	✓	-	✓	✓	✓	-	-
Polygonum aviculare	Wireweed	-	-	Int	-	✓	-	-	-	✓	✓	-	✓	-	-	-
Rosa canina	Dog Rose	-	-	D	-	-	-	-	✓	-	✓	-	✓	-	-	✓
Rumex dumosus	Wiry Dock	-	R	-	-	-	-	-	-	-	-	✓	-	-	-	-
Rumex sp.	Dock	-	-	Int	✓	-	-	-	-	-	-	-	-	-	-	-

Scientific Name	Common Name	EPBC Act Status[1]	NPW Act Status[1]	Weed Status[3]	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Rytidosperma caespitosum	Common Wallaby-grass	-	-	-	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Salvia verbenaca	Wild Sage	-	-	Int	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
Sida petrophila	Rock Sida	-	-		-	-	-	-	-	-	-	-	-	✓	-	-
Sonchus oleraceus	Common Sow-thistle	-	-	Int	-	-	✓	-	✓	✓	-	-	✓	✓	-	-
Teucrium racemosum	Grey Germander	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Themeda triandra	Kangaroo Grass	-	-	-	✓	-	✓	✓	✓	✓	✓	-	-	-	✓	✓
Tribulus terrestris	Caltrop	-	-	Int	-	-	-	-	-	-	-	-	-	-	-	✓
Trifolium angustifolium		-	-	Int	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
Trifolium campestre	Hop Clover	-	-	Int	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Trifolium sp.	Clover	-	-	Int	✓	-	-	-	-	-	-	-	-	-	✓	✓
Triodia irritans	Spinifex	-	-	-											✓	✓
Verbascum virgatum	Twiggy Mullein	-	-	Int					✓							
Vittadinia cuneata	Fuzzy New Holland Daisy	-	-	-										✓		
Vittadinia gracilis	Woolly New Holland Daisy	-	-	-				✓		✓	✓					
Vittadinia sp.		-	-	-						✓			✓			
Walwhalleya proluta	Rigid Panic	-	-	-								✓	✓	✓		
Xanthorrhoea quadrangulata	Rock Grass-tree	-	-	-	✓										✓	✓

[1]EPBC Act (*Environment Protection and Biodiversity Conservation Act 1999*) Status

[2]NPW Act (*National Parks and Wildlife Act 1972*) Status: R, Rare.

[3]Weed Status: D, Declared under the LSA Act (*Landscape South Australia Act 2017*). Int, Introduced species

Appendix 4

Vegetation Monitoring Data Tables

Native Species Diversity

Quadrat	Native Diversity								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	6	8	23	18	27	23	29	21	11
2	4	4	9	7	9	10	13	9	2
3	5	8	16	15	22	19	24	15	8
4	4	6	11	11	15	12	17	7	10
5	8	10	14	17	23	18	22	18	8
6	6	8	15	13	16	14	21	12	11
7	4	5	12	12	15	15	17	13	9
8	4	8	11	10	12	11	15	7	10
9	5	8	15	15	20	12	18	14	8
10	3	4	14	11	16	7	18	8	10
11	8	7	10	8	20	16	21	14	11
12	12	13	20	21	25	29	30	18	19
Mean	**5.75**	**7.42**	**14.92**	**13.17**	**18.33**	**15.50**	**20.42**	**13.00**	**9.75**

Weed Species Diversity

Quadrat	Weed Diversity								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	2	7	9	10	15	21	20	11	19
2	4	8	16	13	23	19	25	11	15
3	3	6	9	12	13	16	18	7	12
4	1	6	11	10	12	16	20	5	15
5	3	7	9	12	15	18	15	11	15
6	3	7	15	14	14	16	19	9	14
7	4	6	9	13	12	19	19	9	12
8	5	6	8	17	15	22	24	8	12
9	7	6	13	15	17	21	21	16	19
10	4	6	11	13	20	21	20	15	17
11	5	5	8	6	15	15	13	8	10
12	1	4	9	11	12	17	15	7	14
Mean	**3.50**	**6.17**	**10.58**	**12.25**	**15.25**	**18.42**	**19.08**	**9.75**	**14.5**

Mean Plant Spacing

Quadrat	Mean Perennial Tussock Spacing (cm)								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	24.00	22.20	30.72	18.10	12.86	17.67	24.83	25.39	26.71
2	37.50	22.50	41.48	33.90	26.89	33.55	29.70	22.29	-
3	15.30	21.20	23.53	20.10	15.36	26.88	23.63	29.93	25.07
4	24.50	24.50	17.73	22.90	13.30	20.97	22.29	25.63	26.33
5	32.40	31.60	40.25	29.50	19.09	35.87	32.27	34.44	34.26
6	19.70	91.10	76.78	23.40	26.66	31.69	29.44	34.35	35.94
7	23.50	30.10	69.88	24.20	20.23	24.25	24.81	24.05	35.53
8	37.70	44.90	58.15	27.80	24.69	33.85	32.33	27.21	36.43
9	49.20	38.60	45.19	31.10	27.34	31.06	26.52	28.00	-
10	47.40	99.80	216.88	33.20	24.88	27.77	24.67	35.83	33.00
11	21.60	24.20	29.11	26.90	19.17	18.75	23.41	21.63	24.37
12	23.60	48.30	33.45	20.30	19.77	18.61	16.42	15.27	23.11
Mean	**29.70**	**41.60**	**56.93**	**26.00**	**20.85**	**26.74**	**25.86**	**27.01**	**30.07**

Mean Number of Tussocks Per Hectare

Quadrat	Mean Number of Perennial Tussocks per Hectare								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	150,000	204,000	230,000	302,000	144,000	150,000	122,500	70,000
2	-	120,000	76,000	50,000	54,000	17,000	85,000	22,500	0
3	-	190,000	200,000	190,000	256,000	114,000	156,250	82,500	178,750
4	-	160,000	231,000	110,000	281,000	130,000	201,250	175,000	81,250
5	-	100,000	95,000	90,000	151,000	48,000	77,500	83,750	86,250
6	-	100,000	84,000	50,000	88,000	53,000	57,500	55,000	50,000
7	-	90,000	90,000	120,000	153,000	119,000	90,000	117,500	50,000
8	-	70,000	60,000	60,000	74,000	57,000	102,500	78,750	57,500
9	80,000	80,000	103,000	30,000	66,000	24,000	67,500	25,000	0
10	60,000	30,000	10,000	20,000	63,000	17,000	206,250	3,750	3,750
11	120,000	150,000	111,000	90,000	166,000	149,000	193,750	193,750	155,000
12	120,000	130,000	195,000	100,000	321,000	207,000	292,500	292,500	207,500
Mean	**95,000**	**114,167**	**121,583**	**94,815**	**164,583**	**90,000**	**140,000**	**104,375**	**78,333**

Mean Number of Juvenile Tussocks Per Hectare

Quadrat	Mean Number of Juvenile Tussocks per Hectare								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	30,000	98,750	13,333	13,750	8,000	50,000	0	0
2	-	10,000	58,750	0	2,500	1,000	5,000	0	0
3	-	40,000	12,500	10,000	8,750	14,000	15,000	0	0
4	-	10,000	36,250	0	12,500	4,000	20,000	1,250	16,250
5	-	20,000	32,500	0	7,500	2,000	21,250	0	0
6	-	10,000	15,714.3	0	10,000	0	3,750	0	0
7	-	10,000	130,000	20,000	26,250	11,000	47,500	5,000	0
8	-	2,500	48,750	10,000	11,428.57	3,000	10,000	2,500	0
9	1,000	5,000	157,500	0	1,250	1,000	3,750	0	0
10	6,000	10,000	307,500	0	2,500	4,000	18,750	0	0
11	1,200	20,000	67,500	0	3,750	7,000	22,500	0	2,500
12	30,000	20,000	63,750	0	18,750	7,000	36,250	3,750	3,750
Mean	**9,550**	**15,625**	**85,788.69**	**4,444.42**	**9,910.71**	**5,166.67**	**21,145.83**	**1,041.67**	**2,812.50**

Mean Perennial Tussock Basal Width

Quadrat	Mean Perennial Tussock Basal Width (cm)								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	12.90	6.70	7.06	6.60	8.55	6.45	4.15	3.77	5.29
2	8.50	7.00	5.14	4.70	4.97	2.56	2.18	4.00	-
3	7.20	6.20	5.83	6.90	6.69	5.75	4.00	3.53	3.91
4	8.70	6.10	5.66	6.20	6.25	3.21	5.32	4.54	4.64
5	6.30	5.40	6.25	6.70	8.68	4.04	3.51	4.64	2.67
6	9.80	4.90	7.58	7.10	6.58	6.36	5.00	5.88	5.72
7	11.40	13.20	11.27	5.20	8.25	6.67	6.83	12.03	13.35
8	13.50	8.20	11.30	10.40	6.79	6.18	7.02	9.15	5.67
9	6.90	6.30	6.40	4.40	5.98	3.66	2.38	5.85	-
10	9.10	6.60	7.69	6.10	6.91	2.82	0.89	3.33	2.00
11	11.90	8.80	8.25	8.80	7.45	6.12	3.20	5.75	4.55
12	8.80	9.80	12.81	11.60	4.45	5.33	2.85	5.19	5.31
Mean	**9.58**	**7.43**	**7.95**	**7.06**	**6.80**	**4.93**	**3.94**	**5.64**	**5.31**

Mean Perennial Tussock Height

Quadrat	Mean Perennial Tussock Height (cm)								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	21.00	9.40	12.59	22.60	38.14	29.99	21.79	6.44	11.18
2	14.00	3.50	8.06	19.70	21.78	14.69	12.25	7.29	-
3	13.60	5.50	10.28	29.20	17.08	18.22	10.40	2.99	8.25
4	10.70	3.50	8.20	22.50	25.02	14.29	12.46	5.35	8.96
5	14.50	5.70	9.59	30.50	25.25	13.28	11.09	5.93	8.23
6	17.30	4.30	10.13	26.70	21.70	12.04	10.80	8.73	11.44
7	27.90	15.90	18.00	18.60	52.68	28.93	27.04	23.59	22.32
8	19.80	7.00	12.61	20.60	25.63	28.42	18.62	14.15	14.76
9	10.00	5.00	8.05	28.30	22.66	8.46	13.61	6.85	-
10	9.50	5.80	11.81	14.30	14.72	10.38	17.13	2.00	3.85
11	13.60	7.80	12.03	14.40	13.62	17.76	20.12	5.87	8.68
12	16.60	9.10	16.03	21.80	24.08	30.44	13.82	8.59	12.82
Mean	**15.71**	**6.88**	**11.44**	**22.43**	**25.19**	**18.91**	**15.76**	**8.15**	**11.05**

Mean% Dead

Quadrat	Mean Dead Material per Tussock (%)								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	77.00	30.00	59.00	17.00	55.40	22.50	95.21	82.94
2	-	86.00	42.14	94.00	9.00	24.40	37.57	96.43	-
3	-	66.00	27.50	74.00	20.13	66.40	24.53	92.24	46.50
4	-	82.00	17.00	88.00	15.50	52.30	36.87	95.93	47.78
5	-	83.00	51.25	73.00	17.25	67.30	19.85	75.40	54.78
6	-	96.00	55.71	88.00	15.00	80.70	35.82	90.00	45.72
7	-	88.00	51.88	58.00	10.75	45.50	15.22	92.24	83.95
8	-	94.00	46.43	82.00	10.88	46.20	14.31	87.50	68.81
9	97.00	97.00	39.63	95.00	15.25	55.00	34.44	95.50	-
10	96.00	95.00	51.67	95.00	21.25	35.60	38.28	96.67	97.50
11	97.00	83.00	43.75	84.00	25.25	57.90	30.31	93.00	79.50
12	79.00	70.00	21.88	78.00	22.63	69.70	25.90	95.78	54.64
Mean	**92.25**	**84.74**	**39.91**	**80.67**	**16.66**	**54.70**	**27.97**	**92.16**	**66.21**

Mean% Weed Cover in 1x1

Quadrat	Mean Weed Cover (%) in 1m² Quadrats								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	10	36	36	1	30	7	11	4
2	-	41	84	90	4	4	17	13	1
3	-	5	16	26	1	18	3	3	2
4	-	19	57	48	1	43	2	12	2
5	-	21	60	39	2	12	7	4	2
6	-	53	79	69	3	15	11	11	3
7	-	31	76	62	1	17	3	4	3
8	-	86	63	74	9	1	6	4	3
9	62	89	79	97	2	2	12	18	3
10	88	98	96	94	2	2	24	21	5
11	7	19	68	62	2	19	2	3	10
12	1	1	4	5	2	10	0	0	4
Mean	**39.50**	**31.98**	**59.73**	**58.50**	**2.41**	**14.42**	**7.80**	**8.67**	**3.53**

Weed Cover 1 ha

Quadrat	Weed Cover (%) per 1 ha								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	30	30	40	1	25	10	5	25
2	-	30	60	90	5	15	50	10	45
3	-	5	20	30	1	25	15	5	10
4	-	25	30	50	2	50	20	5	10
5	-	25	40	40	5	20	20	1	15
6	-	40	60	70	5	20	30	10	20
7	-	25	50	60	5	25	20	5	25
8	-	70	60	70	10	10	15	5	20
9	70	70	75	90	3	10	35	25	35
10	80	85	85	90	3	10	40	25	30
11	10	20	50	60	3	25	10	5	15
12	2	1	5	5	2	10	5	1	5
Mean	**40.50**	**35.50**	**48.33**	**57.92**	**3.75**	**20.42**	**22.50**	**8.5**	**21.2**

Mean Cryptogram Cover (%) in 1 m^2

Quadrat	Mean Cryptogram Cover (%), 1 m^2								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	-	25.10	5.00	1.75	1.30	0.00	0.63	12.14
2	-	-	2.14	0.00	0.00	0.00	0.00	0.00	0.25
3	-	-	58.13	6.00	14.13	2.40	3.53	3.75	5.00
4	-	-	25.63	1.00	6.75	3.30	2.88	5.63	0.63
5	-	-	30.25	4.00	2.13	2.80	2.19	3.00	15.00
6	-	-	11.50	3.00	0.38	1.80	0.97	1.25	6.13
7	-	-	15.00	2.00	1.13	1.30	0.00	1.88	0.63
8	-	-	1.25	1.00	0.43	1.10	0.00	0.00	1.13
9	-	-	2.19	0.00	3.50	4.60	0.00	0.63	1.63
10	-	-	1.31	0.00	12.50	0.60	0.00	0.00	0.38
11	-	-	16.00	0.00	17.50	8.90	1.06	16.88	9.38
12	-	-	55.00	18.00	7.75	7.30	5.28	70.00	23.75
Mean	**-**	**-**	**20.29**	**3.33**	**5.66**	**2.95**	**1.33**	**8.64**	**6.33**

Mean Percent (%) Bare Ground, 1 m^2

Quadrat	Mean Percent (%) Bare Ground, 1 m^2								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	-	5.80	2.00	1.75	0.33	2.22	16.25	4.29
2	-	-	8.13	1.00	1.38	0.00	0.25	2.75	0.25
3	-	-	11.63	3.00	3.38	1.90	4.28	20.63	4.38
4	-	-	7.63	6.00	12.25	1.30	5.53	11.88	5.63
5	-	-	13.38	6.00	1.75	1.10	14.16	28.75	6.25
6	-	-	8.00	2.00	1.63	0.20	3.94	7.13	13.13
7	-	-	5.63	1.00	1.13	1.20	0.25	2.13	0.00
8	-	-	16.13	1.00	0.00	1.80	0.47	0.50	0.00
9	-	-	4.38	0.00	2.88	0.10	1.03	7.00	3.00
10	-	-	0.19	0.00	0.00	0.00	0.16	0.88	0.25
11	-	-	2.75	0.00	5.50	2.10	1.78	5.25	10.63
12	-	-	13.13	6.00	4.38	9.00	5.78	0.00	6.25
Mean	**-**	**-**	**8.06**	**2.33**	**3.00**	**1.59**	**3.32**	**8.59**	**4.50**

Mean Litter Cover (%), 1 m^2

Quadrat	Mean Percent (%) Litter Cover, 1m^2								
	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	-	-	-	-	68.75	53.90	75.03	63.13	78.57
2	-	-	-	-	88.50	98.90	79.13	83.13	98.50
3	-	-	-	-	76.88	63.30	79.63	70.63	68.75
4	-	-	-	-	65.63	44.40	75.88	71.25	76.13
5	-	-	-	-	72.50	81.10	73.69	60.88	73.63
6	-	-	-	-	89.38	83.30	78.06	76.88	71.38
7	-	-	-	-	74.13	47.80	61.25	62.50	85.63
8	-	-	-	-	89.29	90.60	79.34	79.38	92.88
9	-	-	-	-	88.13	96.10	83.16	76.88	91.50
10	-	-	-	-	78.13	100.00	75.34	89.38	94.50
11	-	-	-	-	48.75	65.60	81.56	56.88	65.63
12	-	-	-	-	37.50	20.00	56.25	36.25	51.88
Mean	**-**	**-**	**-**	**-**	**73.13**	**70.42**	**74.86**	**68.93**	**79.08**

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