

Final Report

# Annual Report for the Caroline Springs Railway Station Grassland – Year 7

PREPARED FOR

**VicTrack**

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- *Pimelea spinescens* Recovery Team (PsRT).

## GLOSSARY

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Acronym	Description
CMP	Conservation Management Plan
DELWP	Victorian Department of Environment, Land, Water and Planning
DAWE	Commonwealth Department of Agriculture, Water and the Environment
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
OMP	Offset Management Plan
PsRT	<i>Pimelea spinescens</i> Recovery Team
SLL	Striped Legless Lizard <i>Delma impar</i>
SRF	Spiny Rice-flower <i>Pimelea spinescens</i> subsp. <i>spinescens</i>
WLS	Western Land Services

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## EXECUTIVE SUMMARY

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Ecology and Heritage Partners were engaged by VicTrack to undertake the Year 7 monitoring of the conservation reserve and associated native grassland (hereby referred to as the offset site), in accordance with the EPBC referral 2010/5463, and the corresponding Conservation Management Plan and Offset Management Plan.

This report details the results of the Year 7 monitoring, including the status of three matters of National Environmental Significance, Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* population, Striped Legless Lizard *Delma impar* population and condition of the ecological community, *Natural Temperate Grassland of the Victorian Volcanic Plain*.

### Spiny Rice-flower

The Spiny Rice-flower population included 58 translocated individuals and a number of in-situ individuals located within the offset site. The translocated individuals were established during 2014-2017, translocated in three cohorts. Of the initial 58 individuals translocated, 16 were recorded as alive in the current monitoring period. The current survival numbers are below the threshold which triggers a contingency response to occur. Contingency measures for Spiny Rice-flower are detailed in the Conservation Management Plan (Ecology and Heritage Partners 2014a). The threshold for survival of the translocated individuals is 50% (i.e. 29 individuals surviving). Due to currently being below the survival threshold, all previous years collected seed will be passed along to the *Pimelea spinescens* Recovery Team to be germinated. Germination is scheduled to occur in November 2021 (pers. comm. Debbie Reynolds). Any successful germinates will be transplanted into the recipient site when suitable.

Mitigation measures to prevent further population declines are recommended in the current report for the Year 7 monitoring period, and germination of previous collected seed is due to commence in November 2021 in an attempt to increase the population size of the translocated individuals and maintain the 50% minimum target survival rate.

### Striped Legless Lizard

The population monitoring of Striped Legless Lizard resulted in 12 individuals being recorded within the offset site for Year 7. This contrasts with Years 1 and 2 where no more than three individuals were observed during the targeted surveys; Year 3 where a total of 14 individuals were recorded; Year 4 where a total of 18 were recorded; and Years 5 and 6 where a total of 19 were recorded. The population size appears to be consistent with that recorded in recent years and will be continued to be monitored as a part of this program until the end of management in Year 10.

### Natural Temperate Grassland of the Victorian Volcanic Plain

An assessment of the condition and extent of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) was undertaken to observe any changes in the native vegetation cover and weed extent within the grassland. NTGVVP remains in good condition, with weed levels being actively managed to maintain at low levels. Small areas of the offset site contain slightly higher weed cover, primarily around the existing rock pile and herb plantings, where weeds are present and spreading into the surrounding grassland. Concentrated management is required to prevent further weed spread in these areas.



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# 1 INTRODUCTION

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## 1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by VicTrack to undertake and oversee management and monitoring works for Year 7 relating to a 2.04 hectare offset area, and associated areas of retained grassland at the site of the Caroline Springs Railway Station, located on Christies Road, Caroline Springs (Figure 1).

The management, monitoring and auditing works required to be undertaken at Caroline Springs are detailed in the Conservation Management Plan (CMP) (Ecology and Heritage Partners 2014a) and Offset Management Plan (OMP) (Ecology and Heritage Partners 2014b) prepared for the site, and approved by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) (formally the Department of Environment and Energy (DoEE)) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC 2010/5463), and the Victorian Department of Environment, Land, Water and Planning (DELWP) (formerly the Department of Environment and Primary Industries [DEPI]).

Specifically, the works relate to the protection and ecological monitoring of the quality of the EPBC Act-listed community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), weed and pest control works, biomass control methods such as prescribed ecological burns, and management and monitoring of the existing populations of the EPBC Act-listed Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* and Striped Legless Lizard *Delma impar*.

Ecology and Heritage Partners subcontracted Western Land Services Pty Ltd (WLS) in June 2014 to implement pest plant and animal control, biomass reduction, revegetation and fencing works for the ecological management works between Years 1-4. WLS have been contracted directly by VicTrack for Year 5, 6 and 7 works.

The Year 7 annual monitoring report presented below outlines the management and monitoring actions undertaken throughout the offset area and the other area of retained grassland between 1 July 2020 and 30 June 2021 (i.e. seventh year of the overarching CMP and OMP), with the beginning of Year 1 being 24 June 2014 (being the date of approval of the CMP and OMP) (Figure 2). The monitoring report for Year 1, Year 2, Year 3, Year 4, Year 5 and Year 6 is detailed in Ecology and Heritage Partners (2015; 2016; 2017; 2018a; 2018b; 2019a; 2020). The methods utilised for the monitoring and management actions follow those set out in the CMP (Ecology and Heritage Partners 2014a) and the OMP (Ecology and Heritage Partners 2014b).

Section 2.1 predominately relates to the monitoring and management of the Spiny Rice-flower as prescribed by the CMP, Section 2.2 relates to the Striped Legless Lizard population and habitat monitoring, while Section 2.3 relates to the monitoring and management of the offset site as a whole as required by the OMP.

## 1.2 Objectives

The objective is to monitor and manage the biodiversity at the Caroline Springs Railway Station in accordance with EPBC 2010/5463 and the Commonwealth approved CMP and OMP (Year 7), between January and June 2021.

The methodology focuses on biodiversity monitoring of the quality of the EPBC Act-listed community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), weed and pest control works, biomass control methods such as prescribed ecological burns, and monitoring of the Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* population. Habitat and population monitoring of Striped Legless Lizard was completed in the first half of the Year 7 monitoring (July – December 2020).

On-ground monitoring surveys were undertaken, with an overall objective to provide a framework for the continuation of the management, auditing and reporting required to be undertaken as part of the approved CMP and OMP as per EPBC 2010/5463, to ensure the enhancement of the 2.04 hectare offset area, and other areas of retained grassland at the Caroline Springs Railway Station.

## 1.3 Scope of Works

### Review of EPBC 2010/5463, OMP and CMP requirements

Ecology and Heritage Partners reviewed the ongoing obligations required as part of the existing approvals and ensure the proposed monitoring protocols and schedule have been designed to ensure that all relevant approval conditions are and can be achieved. This report details if targets are being met as per the management actions outlined in the OMP and if management actions are required.

### Spiny Rice-flower Monitoring

- Monitoring of translocated Spiny Rice-flower within the offset site were conducted in accordance with the recommended monitoring protocol for transplanted individuals detailed in Vallee *et al.* (2004).
  - Establish translocated recipients monitored in August 2020 (as detailed in the mid-year 6 report – Ecology and Heritage Partners 2020) and April 2021;
  - Attributes including growth, sex, virility (percentage of plant in flower), recruitment, health and survival rates were undertaken;
  - A sample of 25 of the existing *in-situ* plants in the offset site were monitored concurrently to compare growth, survival and recruitment with that of the transplants.
- To mitigate the threat of drought stress, particularly between January – April 2021, the translocated Spiny Rice-flower were watered monthly in accordance with the regime summarised in Table 1.

**Table 1** – Watering requirements for replanted salvaged material.

Months after planting	Period between significant rainfall events that will trigger watering	Watering Required
0-3	1 week	Weekly
3-9	3-4 weeks	Fortnightly
9 - 21	1 – 2 Months	Monthly

- Biomass adjacent to each transplanted Spiny Rice-flower were subject to subject to ongoing hand-weeding activity during each monitoring and/or watering event to ensure sufficient inter-tussock space is maintained to encourage growth.
- Ongoing maintenance of tags/labels for marked Spiny Rice-flower. Tags were replaced if required.

- This Report (Year 7) details the monitoring results from August 2020 (Ecology and Heritage Partners 2020).

### Striped Legless Lizard

Monitoring is required of both the status of the Striped Legless Lizard (SLL) population and their habitat for a period of ten years within the offset site. Monitoring will determine if management actions and habitats are suitable for the longevity of a viable Striped Legless Lizard population and determine when remedial actions are required. Two tile grids have been established within the offset site to assist with population monitoring for the species (Figure 3).

Monitoring of the SLL population and habitat was undertaken in accordance with Section 8.8.2 of the CMP (Ecology and Heritage Partners 2014a), and is discussed further in Section 2.2.

### Natural Temperate Grassland of the Victorian Volcanic Plain

- Monitor the quantity and quality of native grassland within the offset area during October 2020 and April 2021.
  - Surveys (Habitat Hectare assessment) were structured around biomass reduction activities;
  - Fixed photo points were utilised in areas of both intact vegetation and those dominated by weeds in order to also visually record any successive changes;
  - Surveys were on the quality and structure of remnant grassland as suitable habitat for Striped Legless Lizard (SLL) and Spiny Rice-flower (SRF), and also whether the cover of native species is retained and or enhanced by ongoing management.
- Regular monitoring events were conducted for high threat weeds, with the aim of eventual elimination of all woody weeds (currently approx. 1% cover) and reduction of herbaceous weeds to at or below 10% cover (currently approx. 15%);
- High threat weeds including Serrated Tussock *Nassella trichotoma*, Paterson's Curse *Echium plantagineum* and Artichoke Thistle *Cynara cardunculus* are present within the offset area. The cover and distribution of weeds were mapped and described, with management recommendations included to inform ongoing weed control works.

### Monitor survivorship of planted herbs

Approximately eight species of herbs (comprising a total of 436 specimens) were planted in August 2017 to assist in increasing floristic diversity within the offset site. Additional herbs were planted in September 2018.

Survivorship of the herbs were to be monitored during April 2021. Where survivorship is found to have dropped below 80%, supplementary planting will be required to replace those specimens that have perished.

## 1.4 Vegetation and Site Condition

Biomass across the offset site is very dense, with vegetation condition ranging from moderate to high due to the overall low cover of high threat weeds and mixture of native herbs and grasses present.



Three habitat zones of differing quality were recorded in the offset site and have remained relatively consistent with conditions recorded during the Year 6 monitoring period. The habitat zones are specified below:

- Habitat zone PG1 was present along the eastern boundary of the offset site and is dominated by Kneed Spear-grass *Austrostipa bigeniculata*, with a low diversity of other grasses and herbs.
- Habitat Zone PG2 is located in the eastern half of the offset site and is dominated by Kangaroo Grass *Themeda triandra*, and occurrences of Kneed Spear-grass, Wallaby-grasses *Rytidosperma* spp., Windmill Grass *Chloris truncata*, and a variety of herbs within the ground layer. Weed cover is relatively low in this habitat zone.
- Habitat zone PG3 is present across the western half of the offset site, comprising of similar species composition to PG2. A greater number of weeds was present within this area, comparative to PG2. However, it is recognised that the cover of weeds is reducing when compared to previous years, due to ongoing weed control efforts.

A range of native herbaceous flora species persist throughout the eastern section of the grassland, including the nationally significant Spiny Rice-flower, Curved Rice-flower *Pimelea curviflora*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*, Cotton Fireweed *Senecio quadridentatus*, Narrow-leaf Plantain *Plantago gaudichaudii*, Berry Saltbush *Atriplex semibaccata*, Cotton Fireweed *Senecio quadridentalis*, Common Woodruff *Asperula conferta*, and Plains Candles *Stackhousia subterranean* (Plate 2). In addition to Kangaroo Grass, other native grasses occur in low abundances, including Rigid Panic *Walwhalleya proluta*, Windmill Grass, Common Wallaby-grass *Rytidosperma caespitosa* and the State-significant Rye Beetle-grass *Tripogon loliiformis*. Weed cover within this section remains low, with scatterings of an annual weed, Wild Oat *Avena fatua*, present during spring to summer and a limited number of Serrated Tussock *Nassella trichotoma* individuals observed.



**Plate 1.** Native Grass was prevalent throughout the offset site (Ecology and Heritage Partners 28/09/2020)



**Plate 2.** Native vegetation within the offset site (Ecology and Heritage Partners 28/09/2020)

Native grasses within the western section of the offset site have regained dominance in cover since the 2018 winter burn, with a mixture of Kangaroo Grass and Spear-grasses occurring across the section in a moderate cover. Weeds are still prevalent with moderate cover in this area, with Wild Oat remaining the dominant exotic species. The western area also contained a lower occurrence of native herbs; however, several supplementary herb planting sites are located within this section to increase the diversity. The

supplementary herb plantings continue to persist within the area, maintaining diversity from the previous year. Native grasses are also observed to be increasing within this area. However, bare ground is still providing opportunity for weed species to recruit and spread outwards from the plantings. Ongoing management should be continue to be targeted around these areas to control weed establishment and to assess if further plantings are required to reduce the cover of bare ground following weed control activities.

Weeds of national significance are present including, Serrated Tussock and African Boxthorn. Sporadic recruitment of Serrated Tussock is evident across the offset site, with a low number of small tussocks observed growing amongst the native grassland. A limited number (<5) of African Boxthorn were noted growing in the rock pile and must be removed to prevent further weed spread into the offset site and surrounding areas.

The retained grassland located east of the railway station remains in a relatively constant state, with higher quality areas appearing in the centre of the grassland, and low levels of weed encroachment surrounding the edges.

## 1.5 Security

Condition 1 of the EPBC Act approval specifies that the land identified in Annexure 1 of approval 2010/5463 (the protected land) adjacent to the clearing site must be protected in perpetuity to compensate for impacts to the nationally significant ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), Spiny Rice-flower and Striped Legless Lizard using a conservation covenant under the *Victorian Conservation Trust Act 1972*. This conservation covenant was agreed between the Public Transport Development Authority and Trust for Nature (TfN) and signed on 27 June 2014.

The Offset Annual Report (Year 6) prepared by VicTrack (site reference: TFN-C1723) was submitted to Trust for Nature in May 2020, as required by the Offset Management Plan.

The offset site is a total of 2.04 hectares, comprising 1.92 hectares of Plains Grassland vegetation, and 0.12 hectares of exotic vegetation.

## 2 ANNUAL REPORT 2021

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### 2.1 Spiny Rice-flower Monitoring

Monitoring is required of both the status of the translocated Spiny Rice-flower (SRF) population within the designated recipient site, and a sample of the existing *in-situ* population and their habitat for a period of ten years within the offset site (Figure 4a). Monitoring will determine if management actions to improve habitat are suitable for the longevity of a viable Spiny Rice-flower population and determine when remedial actions are required.

#### 2.1.1 Monitoring Methods

Long-term independent monitoring of translocated plants within the recipient site (Figure 4b) is crucial to ensuring ongoing survival (Vallee *et al.* 2004). Monitoring must be undertaken in accordance with the current PSRT protocols (PSRT 2013) which are summarised in Section 8 of the CMP (Ecology and Heritage Partners 2014a).

Monitoring was undertaken by a qualified botanist, familiar with the ecology and growth habits of Spiny Rice-flower. Spiny Rice-flower monitoring was undertaken in April 2021, during the remaining Year 7 management period. The April monitoring aligned with the beginning of the flowering season, allowing for an assessment of the overall plant health (i.e. are they producing reproductive material). The initial monitoring during Year 7 was undertaken in August 2020 at the end of the flowering season, with results included in Table 2, Table 3 and Table 4 below.

As detailed in Section 8.8.1 of the CMP, Spiny Rice-flower monitoring is to occur every six months, provided site condition remains similar. To ensure that monitoring provided an accurate and ongoing assessment of the health of the translocated plants, the following variables were measured on each plant (where able):

- Sex (Male or Female);
- Presence of flowering material and percentage of the plant in flower;
- Growth;
- Survival;
- Presence of germinants (recruitment); and,
- Health.

In addition to the indicators of growth and reproductive success, monitoring looked at drought stress, pest plant and animal impacts, biomass and other site disturbances that may negatively impact the translocated plants.

A subset of 25 individuals from the existing *in situ* SRF population was monitored concurrently with the translocated specimens.



### 2.1.2 Recipient Site Conditions

As the recipient site is located near the entrance to the offset site and the carpark for Caroline Springs Railway Station, the potential for disturbance is therefore higher due to access issues. As such, a two-metre-tall fixed wire fence has been built adjacent to the railway station site to discourage unintended access by vehicles entering the offset site.

Kangaroo Grass remains dominant within the recipient site with lower occurrences of Wallaby-grass, Kneed Spear-grass and Windmill Grass. Biomass within the site was very high. Weeds are present in low density within the recipient site, primarily Wild Oat, Ryegrass and Rat's-tail Fescue *Vulpia myuros*. Targeted weed control is required within this area to reduce the weed levels around the Spiny Rice-flowers, with hand removal of weeds undertaken during watering events and the monitoring event.

Maintenance of Spiny Rice-flower labels was undertaken to ensure that all numbers were visible, or re-labelled where faded. Damaged or missing labels were replaced.

A remnant population of Spiny Rice-flower is present along the southern boundary of the recipient site, and care was taken to ensure these plants were not disturbed during ongoing monitoring and management activities.

Overall, due to the ongoing weed control taking place, the recipient site is considered to be in good condition (Plate 4). Photo points of the offset site, including the recipient site, are included in Appendix 3, with locations shown in Figure 5.



**Plate 3.** Healthy Spiny Rice Flower within the offset site (Ecology and Heritage Partners 03/12/2020).



**Plate 4.** Good quality vegetation and healthy Spiny Rice-flower in offset site (Ecology and Heritage Partners 21/04/2021)

### 2.1.3 Plant Deaths and Disturbances

#### *June 2014 Transplants*

As part of the most recent monitoring event of Year 7 (June 2020), there was six additional deaths during Year 7 from the previous Year 6 results of the original 23 SRF salvaged specimens (June 2014 transplants). Although the SRF were hand weeded and watered during the summer period in response to drought stress triggers, the losses may be attributed to increased level of biomass which accumulated quickly between weeding, watering and monitoring events and increased water runoff due to the condition of the substrate

(i.e. an increase). The remaining eight alive specimens remain in varying health conditions, from moderate to excellent condition (Appendix 2). Of this cohort of SRF transplanted individuals, six (6) specimens perished in Year 1, with no plant deaths in Year 2 or Year 3, two plant deaths recorded during Year 4, no plant deaths in Year 5 and one plant death in Year 6. Although the transplanted individuals were regularly water during the summer period, the recent deaths have been contributed to drought stress.

**Table 2.** Survival rate compared to initial number translocated for the 2014 SRF cohort

	Year 1	Year 2	Year 3	Year 4	Year 5	Mid-Year 6	Year 6	Year 7
<b>Survival rate compared to initial number translocated</b>	17/23	17/23	17/23	15/23	15/23	15/23	14/23	8/23

### *June 2015 Transplants*

As of April 2021, there was four additional deaths recorded during the Year 7 assessment when compared to the Year 6 assessment from the original 32 SRF salvaged specimens (June 2015 transplants). In total, 25 of the 32 SRF specimens transplanted in June 2015 appear dead (with 12 SRF deaths in Year 2). The increase in deaths of the transplanted individuals are thought to be a result of drought stress.

The majority of the living specimens were recorded in moderate to good health, showing signs of new growth (Table 3; Appendix 2). Continued watering during dry conditions will improve the survival rate of these individuals into the future (refer to Section 2.1.6)

**Table 3.** Survival rate compared to initial number translocated for the 2015 SRF cohort

	Year 1	Year 2	Year 3	Year 4	Mid-Year 5	Year 5	Mid-Year 6	Year 6	Year 7
<b>Survival rate compared to initial number translocated</b>	32/32	20/32	18/32	15/32	13/32	13/32	12/32	11/32	7/32

### *June 2017 Transplants*

Of the three specimens transplanted in June 2017, only one remains alive (# 56) (Table 4). It is likely that the two dead specimens perished due to drought stress during the summer of 2017/2018. The remaining alive one has maintained a stable health score over monitoring events and was flowering in the most recent assessment.

**Table 4.** Survival rate compared to initial number translocated for the 2017 SRF cohort

	Year 1	Year 2	Year 3	Year 4	Mid-Year 5	Year 5	Mid-Year 6	Year 6	Year 7
<b>Survival rate compared to</b>	na	na	3/3	3/3	1/3	1/3	1/3	1/3	1/3



initial translocated	number									
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### *In-situ monitoring*

All 25 in-situ SRF specimens are in moderate to good condition during April of Year 7 despite not being subject to the watering regime applied to the translocated plants. However, due to the high level of biomass, and missing tags individuals were difficult to find.

#### **2.1.4 General Health and Growth**

The health of all SRF plants was assessed at each monitoring event in accordance with the metric detailed in Table 5.

**Table 5.** Health Rating Metric for Spiny Rice-flower

Health Rating	Description	Health Indicator
1	Excellent	Less than 5% dieback
2	Good	Between 15 < 30% dieback
3	Moderate	Between 30 < 75% dieback
4	Poor	Between 75 < 99% dieback
5	Dead	No evidence of live biomass

##### *2.2.4.1 June 2014 Transplants*

Of the eight plants (of the original 23) to survive Year 7, all are in moderate to good health (i.e. – a health score between 1-3 [Figure A4]), as of April 2021.

All of the eight plants were not flowering during the survey conducted in late April (Plate 5; Plate 6), however buds were present and in various stages of development. New shoots of regrowth were observed sprouting from the base of several plants, suggesting that the plants are successfully established and stabilised.

##### *June 2015 Transplants*

Of the seven plants (of the original 32) to survive Year 7, all are in moderate-good health (i.e. – a health score between 1-3), as of April 2021.

All seven plants were not flowering during the survey conducted in late April; however, buds were present and in various stages of development.

##### *June 2017 Transplants*

Only one specimen (#56) from the 2017 cohort was alive during the most recent monitoring event. No germinates were recorded, and the alive specimen was in moderate health and was not flowering during the survey conducted in late April, however buds were present and in various stages of development.



**Plate 5.** Flowering Spiny Rice-flower within recipient site (Ecology and Heritage Partners 28/04/2020).



**Plate 6.** Spiny Rice-flower (Ecology and Heritage Partners 21/04/2021).

#### 2.2.4.4 General Comments

Overall, the Year 7 results indicate a declining level of survivorship when compared to the previous Year 6 monitoring and Year 5 monitoring. Between the final Year 6 assessment and Year 7 assessment 11 individuals were recorded as dead. Throughout the summer of the Year 7 monitoring event, regular watering occurred of the transplanted individuals to reduce the threat of drought stress. Watering events were undertaken during prolonged periods of dry, hot weather, between November 2020 and April 2021.

Of the 58 SRF transplants, 16 specimens were alive during the most recent monitoring event. Of the 16 alive individuals, the majority appeared in good to excellent health, with minimal signs of drought stress. Competition from surrounding vegetation is being actively managed through hand weeding, however biomass was very high during the April 2021 assessment and is likely to lead to increased competition if biomass reduction is not undertaken.

The number of deaths recorded during the Year 7 monitoring period noted that the deaths have increased between the final Year 6 survey and the final Year 7 monitoring survey. The current survival numbers are below the threshold which triggers a contingency response to occur. Contingency measures for Spiny Rice-flower are detailed in the Conservation Management Plan, Section 8.9 (Ecology and Heritage Partners 2014a). The threshold for survival of the translocated individuals is 50% (i.e. 29 individuals surviving). The causes of the decline in survivorship are thought to be due to drought stress. While the transplanted individuals were watered throughout the summer period, the nature of the area (i.e. cracked soil, flat, dry and windy) may have resulted in increased run-off and decreased absorption by the transplanted individuals.

Currently, 16 individuals were recorded as alive, and therefore, all previous year's seed which has been collected will be passed along to the *Pimelea spinescens* Recovery Team to be germinated. Germination is scheduled to occur in November 2021 (pers. comm. Debbie Reynolds). Any successful germinates will be transplanted into the recipient site when suitable. A total of 28 individuals will be ready to pick up and transplant in late May 2021 (pers. Comm. Megan O'Shea), however, pick up was delayed due to COVID lockdown number 4.0. Individuals will need to be planted in the appropriate conditions in Year 8. These individuals are able to be picked up and planted in the June/July period, provided COVID lockdown eases.



Summaries of the 2021 recorded data for the monitoring of July 2020 – June 2021 of Year 7 are presented in Appendix 2 and a photo of each translocated individual is provided in Appendix 4.

### 2.1.5 Threatening Processes

Weed invasion, biomass accumulation and drought stress present the greatest threats to the health and survival of translocated plants at the recipient site. In all cases, remedial actions to mitigate these threats were undertaken throughout the monitoring period, and these actions are summarised below in Section 2.3. Drought stress was observed in some Spiny Rice-flower individuals during the summer of 2020/2021, which triggered a hand-watering management response. The plates below show how hand watering can improve the health of a translocated individual (Plate 7; Plate 8).

Weeds such as Serrated Tussock, Common Sow-thistle, Patterson’s Curse and Spear Thistle, and native grasses including Kangaroo-grass have the potential to out-compete or smother translocated Spiny Rice-flower plants and prevent recruitment. However, ongoing weed control, biomass removal and implementation of the watering regime are anticipated to continue to mitigate these threats as the translocated plants further establish.



**Plate 7.** Evidence of drought stressed Spiny Rice-flower that triggered hand-watering response (Ecology and Heritage Partners 2019).

**Plate 8.** Hand-watering during periods of drought stress ensures Spiny Rice-flower survival (Ecology and Heritage Partners 2019).

### 2.1.6 Management Actions

The current main threat to the translocated Spiny Rice-flower population remains as drought stress and biomass accumulation by the surrounding Kangaroo Grass and exotic grasses. To manage drought stress, translocated individuals were hand watered during periods of hot, dry weather, with a minimum of three litres applied to each individual. Ongoing control of high threat weeds, such as Serrated Tussock, has reduced the risk to the Spiny Rice-flower population. Biomass control around the Spiny Rice-flowers is undertaken at each monitoring event by Ecology and Heritage Partners, in which hand weeding occurs around the individuals. This opens up inter-tussock spaces, reduce competition for resources and space, and encourage growth and establishment.

Western Land Services also conducted selective herbicide application on those high-threat weeds within the recipient site and surrounds (with a particular focus on Serrated Tussock, thistles, and Patterson’s Curse) that

have a higher potential to impact the Spiny Rice-flower population, but avoid the use of herbicides within close proximity to Spiny Rice-flower individuals.

As per the contingency measures detailed in the CMP (Ecology and Heritage Partners 2014a), seed was collected from translocated SRF following the 2019 flowering season. Successful germination of collected seeds took place during April 2021, with germinated individuals scheduled to be planted in Winter 2021.

### *Performance Targets*

The ultimate aim of translocation is to ensure the conservation of the genetic diversity of a species. The conservation of genetics is especially critical for endangered species and the loss of genetics from even a single plant can be seen as a failure of the translocation process.

Vallee *et al.* (2004) and the PsRT have detailed stringent criteria for determining the success of translocated plant species. The outlined criteria are detailed in the CMP (Ecology and Heritage Partners 2014a).

In order to meet the short-term performance target of 50% survival, a total of 29 plants should be alive at the end of Year 7. As of mid-Year, 6, 29 plants were alive. The final survival count for the end of Year 7 decreased to 16 plants. Due to the survival target falling below 50%, previously collected seed was germinated in April 2021 (as detailed in Section 2.2.4.4). Successful germination of collected seeds took place during April 2021, with germinated individuals scheduled to be planted in Winter 2021.

Monitoring indicated that the condition and structure of habitat within the recipient site, and offset site in general remains in good condition for Spiny Rice-flower persistence and no trigger values were exceeded for any of the measured habitat components. Frequent monitoring for cracks around each 'plug', ongoing weed control and additional watering during the summer months should continue to ensure the population does not decline.

Continued monitoring in line with the CMP will ensure habitat for the Spiny Rice-flower and survival rates for translocated and *in-situ* individuals is maintained or improved within the site over the coming years.

## **2.2 Striped Legless Lizard monitoring**

Monitoring is required for both the status of the Striped Legless Lizard population and their habitat for a period of ten years within the offset site (Figure 3). Monitoring of the Striped Legless Lizard population was undertaken during the first half of the Year 7 monitoring, and results are presented below.

### **2.2.1 Population Monitoring Results**

A total of 12 Striped Legless Lizard (SLL) captures were recorded within the study area during the Year 7 targeted surveys (Plate 9) (Table 6). It is possible that some of the individuals recorded during Year 7 were recaptures.

This result is in contrast to Years 1 and 2 where no more than three individuals were observed during the targeted surveys, Year 3 where a total of 14 individuals were recorded, Year 4 where a total of 18 were recorded, and Years 5 and 6 where 19 individuals were recorded. These results suggest a stable population for the study area as the number of individuals recorded has remained relatively consistent over the past three years.

**Table 6.** Summary of Striped Legless Lizard surveys

Date	Observer	Time	Air Temp	Cloud Cover	Wind Direction and Spd	Above Tile Temp	Under Tile Temp	Grid 1 (east)	Grid 2 (west)
01/10/2020	AW, GT	12:00	15.3	90%	W (17 km)	17.4	15.9	1 x SLL	1 x SLL
09/10/2020	AW, BJ	10:10	13.1	100%	W (15 km)	17.5	13.5	-	-
22/10/2020	EK, BJ	11:40	15.1	70%	SSE (13.3 km)	44.2	32	2 x SLL	2 x SLL
28/10/2020	AW, CL	11:20	17.2	10%	E (7 km)	50.9	50.9	1 x SLL	1 x EBT
19/11/2020	GT, NP	09:40	27.5	10%	N (24.1)	35	25.5	-	1 SLL
26/11/2020	GT, EK	09:45	18.1	99%	SSW (15.8)	27.3	22.9	1 x EBT	4 x SLL

**Note.** SLL = Striped Legless Lizard; EBT = Eastern Blue-tongue.

Eastern Blue-tongue *Tiliqua scincoides* were also recorded in the study area during tile grid checks. No other vertebrate fauna species of note were recorded during targeted surveys.



**Plate 9.** Grid 2 – Striped Legless Lizard (Ecology and Heritage Partners 26/11/2020)

### 2.2.2 Habitat monitoring results

Monitoring of Striped Legless Lizard habitat was undertaken in accordance with Section 8.8.2 of the CMP (Ecology and Heritage Partners 2014a) and results are presented in this report.

The CMP details the requirements for Striped Legless Lizard habitat rehabilitation and management. For each habitat variable, the recorded value must be compared to the trigger value to determine if a management response is triggered, and the nature of the response required. Table 7 summarises the monitoring categories and trigger thresholds for Striped Legless Lizard monitoring, while Table 8 summarises the results of Year 7 habitat monitoring. One trigger value was exceeded, the cover of introduced grass, which is



discussed in more detail below (Section 2.2.3). No additional values were triggered, and therefore no further specific management response is required following Year 7 of Striped Legless Lizard habitat monitoring.

**Table 7.** Striped Legless Lizard habitat monitoring criteria

Habitat variable	Ideal level <sup>^</sup>	Trigger level for action	Response if triggered	Response Triggered? *
Native clumping grass cover	50%	<30%	Plant native clumping species	<b>No</b>
Introduced grass cover	<10%	>20%	Remove weeds	<b>Yes*</b>
Bare ground	20%	<5%	Removal of vegetation	<b>No</b>
		>50%	Plant native clumping species	<b>No</b>
Exposed rock	10%	<5%	Removal of vegetation	<b>No</b>
Inter-tussock spacing	30 centimetres	<10 cms	Removal of vegetation	<b>No</b>
		>50 cms	Plant native clumping species	<b>No</b>

**Note:** <sup>^</sup>The ideal level value is the average value for each tile grid. \* Refer to Table 8 for further information.

**Table 8.** Striped Legless Lizard habitat monitoring results

Habitat Variable	Grid 1 (East)					Grid 2 (West)					Response Triggered
	Q 1	Q 2	Q 3	Q 4	Average	Q 1	Q 2	Q 3	Q 4	Average	
<b>Native clumping grass cover</b>	50%	60%	85%	70%	<b>66.25%</b>	40%	30%	60%	60%	<b>47.5%</b>	<b>No</b>
<b>Introduced grass cover</b>	5%	10%	10%	8%	<b>8.25%</b>	40%	50%	10%	10%	<b>27.5%</b>	<b>Yes*</b>
<b>Bare ground</b>	30%	20%	0%	0%	<b>12.5%</b>	15%	15%	0%	0%	<b>7.5%</b>	<b>No</b>
<b>Exposed rock</b>	15%	10%	1%	1%	<b>6.75%</b>	5%	5%	1%	3%	<b>3.5%</b>	<b>No</b>
<b>Inter-tussock spacing</b>	30 cm	20 cm	5 cm	3 cm	<b>14.5 cm</b>	15 cm	20 cm	3 cm	3 cm	<b>10.25 cm</b>	<b>No</b>

**Note:** \*A specific management response is not considered to be required (see Section 2.2.3); Q1 and Q2 results are from Year 6 monitoring report (July – December) (Ecology and Heritage Partners 2019). Q3 and Q4 are from the current, Year 7, monitoring period.

### 2.2.3 Conclusion

A population of Striped Legless Lizard is still present in the study area, with the species being recorded during five of the six tile grid checks.

It is noted that there was a total of 12 individuals recorded during Year 7, down from 19 individuals recorded during Year 6 and Year 5, 18 individuals recorded during Year 4, and 14 individuals in Year 3. However, this is still an increase from the two and three individuals recorded in Year 1 and Year 2, respectively. Continued monitoring in accordance with the CMP will improve this data over time and photographs of dorsal head scale pattern of individuals captured in subsequent monitoring years will continue to be undertaken to assist in identifying individual lizards (where able).

Monitoring indicated habitat within the offset site has improved in condition for Striped Legless Lizard since the commencement of the project, with the eastern side of the offset site showing good native grass regeneration since the June 2019 burn. However, trigger responses for one management action was identified within the western grid, being introduced grass cover which has increased in cover since the ecological burn event in June 2018. The management response for this habitat variable is to remove weeds.

Continued monitoring in line with the CMP will ensure habitat for the Striped Legless Lizard is maintained or improved within the site over the coming years.

## 2.3 Management Actions for Year 7 (as per Table 12 of the OMP)

The following section relates to the management actions and targets summarised in Table 12 of the OMP prepared for the offset site (Ecology and Heritage Partners 2014b).

### 2.3.1 Undertake control of woody weeds

#### *Timing of Action and key performance target*

Before seed heads mature in summer. Ensure cover of woody weeds is <1%.

#### **Status – Year 7**

Action Completed. Western Land Services mechanically removed woody weed infestations during Year 1 and Year 2, with woody weed control works during Year 7 focussed on the controlling any emerging African Box-thorn recruits that were observed re-sprouting from previously removed infestations. Where present, emergent African Box-thorn was treated via cut and paint method, herbicide (Tricopyr).

Based on the removal of existing infestations within the offset site and areas of retained grassland, woody weed cover is now considered to be at approximately <1%.

#### Actions Required

The performance target for the cover of woody weeds is being met. Due to the existing stored soil seedbank, further monitoring and control will be required over the coming years to ensure additional woody weed infestations do not re-establish within the site. A low number (< 5) of African Boxthorn individual was recorded within the rock pile and must be eradicated from the offset area.

### 2.3.2 Undertake control of exotic grasses and herbaceous broadleaves

#### *Timing of Action and key performance target*

Before seed heads mature in spring/summer. Reduce perennial grass cover <5%, and annual grasses/broadleaves <5%.

#### **Status – Year 7**

##### Action Completed

Western Land Services have undertaken measures to control exotic grasses within the study area, primarily through targeted management actions for Serrated Tussock, Spanish Artichoke and Paterson's Curse. WLS have also spread native grass seeds throughout burnt areas within the site, to encourage native grass establishment and reduce the cover of exotic species.

##### Actions Required

There is a low cover of exotic grasses and herbaceous broadleaves within the offset site. After the ecological burn in the western half of the study area, Wild Oat was noted to flourish, but has since died down with native tussocks re-establishing and naturally out-competing exotic grasses. This western area should be monitored to ensure the native grasses continue to re-establish and that exotic grass cover is maintained in low densities. In addition, spot spraying within this area should be undertaken to manage any emerging herbaceous broadleaf species and high threat grasses, such as Serrated Tussock.

Within the broader offset area, the site formerly contained large infestations of Serrated Tussock throughout. Much of the Serrated Tussock has been successfully treated, and Year 7 efforts focussed on monitoring for, and treating new infestations. Exotic grasses were sprayed multiple times with Glyphosate bi-active and selective herbicide was used for Broadleaf weeds, particularly Patterson's Curse, Oxtongue, Galenia and Brassica.

Future management of annual grasses within the offset site should be re-visited in consultation with the management contractor to determine an appropriate technique to successfully reduce the cover of annual grass within the offset site.

### 2.3.3 Conduct Rabbit Control

#### *Timing of Action and key performance target*

Peak breeding season: late summer/early autumn. Significant reduction in number/signs of rabbits

#### **Status – Year 7**

##### Action Completed

All harbour has been removed from the site during Year 1. No damage as a result of pest animal activity was observed in Year 7 of monitoring with the pest-animal proof fence appearing to be successfully excluding pest fauna from the offset site.

##### Actions Required

Continued monitoring for the presence of pest fauna during the remainder of the 10 Year management plan is required. If pest fauna (rabbits, foxes) are observed, or signs thereof, appropriate control measures should be undertaken.

#### **2.3.4 Maintain Perimeter Fence**

##### *Timing of Action and key performance target*

Ongoing; Fence is maintained and repaired if broken.

##### **Status – Year 7**

###### Action Completed

Western Land Services and Ecology and Heritage Partners regularly check on the fencing during site visits. All fences and gates are currently in good order. No maintenance is currently required.

###### Actions Required

Continued monitoring of fence condition to ensure signage and the integrity of the pest fauna-proof fence is maintained during future monitoring events.

#### **2.3.5 Undertake biomass reduction via mosaic burning/weeding in selected areas**

##### *Timing of Action and key performance target*

Autumn; Areas of inter-tussock space opened up to allow for recruitment.

##### **Status – Year 7**

###### Action Completed

Hand weeding was undertaken around all transplanted Spiny Rice-flower to ensure that the presence and/or recruitment of grasses do not limit the growth, or detrimentally impact the Spiny Rice-flower plants. This was undertaken by Ecology and Heritage Partners during the two monitoring visits and watering events, and also undertaken by Western Land Services during management visits.

###### Actions Required

Continue to monitor the biomass accumulation around transplanted SRF. Given how quickly biomass seemed to accumulate between monitoring events during Year 7 (2020/2021 ) additional monitoring and biomass management during Year 8 (2021-22) may be required for translocated individuals to ensure increased survivorship.

#### **2.3.6 Undertake supplementary planting of herbs**

##### *Timing of Action and key performance target*

Herb plantings monitored in April 2021.

##### **Status – Year 7**

###### Action Completed

A total of 436 herbs were planted during Year 3, and an additional 200 during September 2018, with survivorship monitored in October 2019. The planted herbs were observed seeding (Plate 9; Plate 1) and remained in a relatively weed free state during the mid-Year 6 monitoring period. The Year 7 monitoring period determined that the herbs are establishing well, with no additional supplementary planting required at this stage.



**Plate 9.** Established supplementary herb plantings producing seed within the offset site (Ecology and Heritage Partners 2020).

#### Actions Required

Survivorship of the planted herbs from the Year 3 and Year 5 cohort will require continual monitoring to ensure overall survival does not fall below 80%. Weed management efforts must focus on reducing the cover of weeds within and directly adjacent to the herb planting areas.

### **2.3.7 Monitor status of vegetation condition, Spiny Rice-flower and Striped Legless Lizard.**

#### *Timing of Action and key performance target*

Progress report to the satisfaction of DELWP/DAWE

#### **Status – Year 7**

#### Action Completed

This report satisfies this requirement for the annual Year 7 report.

### **2.3.8 Removal of all existing rubbish from site**

#### *Timing of Action and key performance target*

At least every 2 months. All rubbish removed and removed immediately if dumping occurs.

#### **Status – Year 7**

#### Action Completed



Western Land Services undertake bi-monthly inspections across the year to monitor and remove rubbish from the offset site and areas of retained grassland. Limited rubbish was present within the offset site during Year 7, with the high fence likely to prevent rubbish being dumped or blown from the adjacent carpark.

Actions Required

Continued monitoring of rubbish within the site, and immediate removal where appropriate during future years of management.

### 3 CONCLUSION

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Following the management and monitoring activities undertaken during Year 7 of the works as required under the approval conditions of EPBC 2010/5463, two trigger thresholds have been activated; survivorship of Spiny Rice-flower and the level of exotic grass cover within Grid 2 (western section) of Striped Legless Lizard habitat. As a result, germination of the collected Spiny Rice-flower seed is scheduled to occur in the June/July period (COVID permitting) and ongoing weed control management should prioritise areas around and within Grid 2.

No other management responses, as identified in the CMP and OMP, were triggered, indicating that the current management method for ensuring the quality of the offset site is gradually improved is effective in meeting the current management objectives.

A total of 16 Spiny Rice-flower are alive out of the 58 specimens that have been transplanted to the recipient site. The survival target for Spiny Rice-flower of 50% survival at the end of Year 7 was not achieved. Due to the current survival level sitting below 50% survival, seeds collected from Spiny Rice-flower in previous years have been successfully germinated with successful germinates scheduled to be transplanted into the recipient site in August 2021. These measures will aim to ensure the survival rate increase above 50% once again.

The condition of the offset site and retained grassland is moderate to high, with perennial and woody weeds intensively managed during Years 1-5, resulting in the current cover of these species exceeding or achieving the performance targets at the final Year 7 monitoring event. During the Year 7 monitoring a low cover of exotic grasses and graminoids was observed throughout the offset site, while a previously identified increase in the coverage of Wild Oat has since reduced in conjunction with native grasses re-establishing and naturally outcompeting exotic grasses. The eastern section has recovered well from the ecological burn conducted in June 2019, and the section should continue to be monitored to ensure the re-establishment native species and any emerging high threat grasses and herbaceous broadleaf species should be spot sprayed. Furthermore, Serrated Tussock across the site has been successfully treated, with Year 7 efforts focussed on monitoring for, and treating new infestations.

Overall, the offset site continues to improve in condition since its establishment, with the native vegetation cover remaining at 1.92 hectares, however, the vegetation quality is improving across the site, as is the stabilisation of the Striped Legless Lizard population. However, biomass reduction and planting of germinates to the recipient site (schedule to occur August 2021) will be required to ensure the translocated Spiny Rice-flower population numbers increase above 50% once again.

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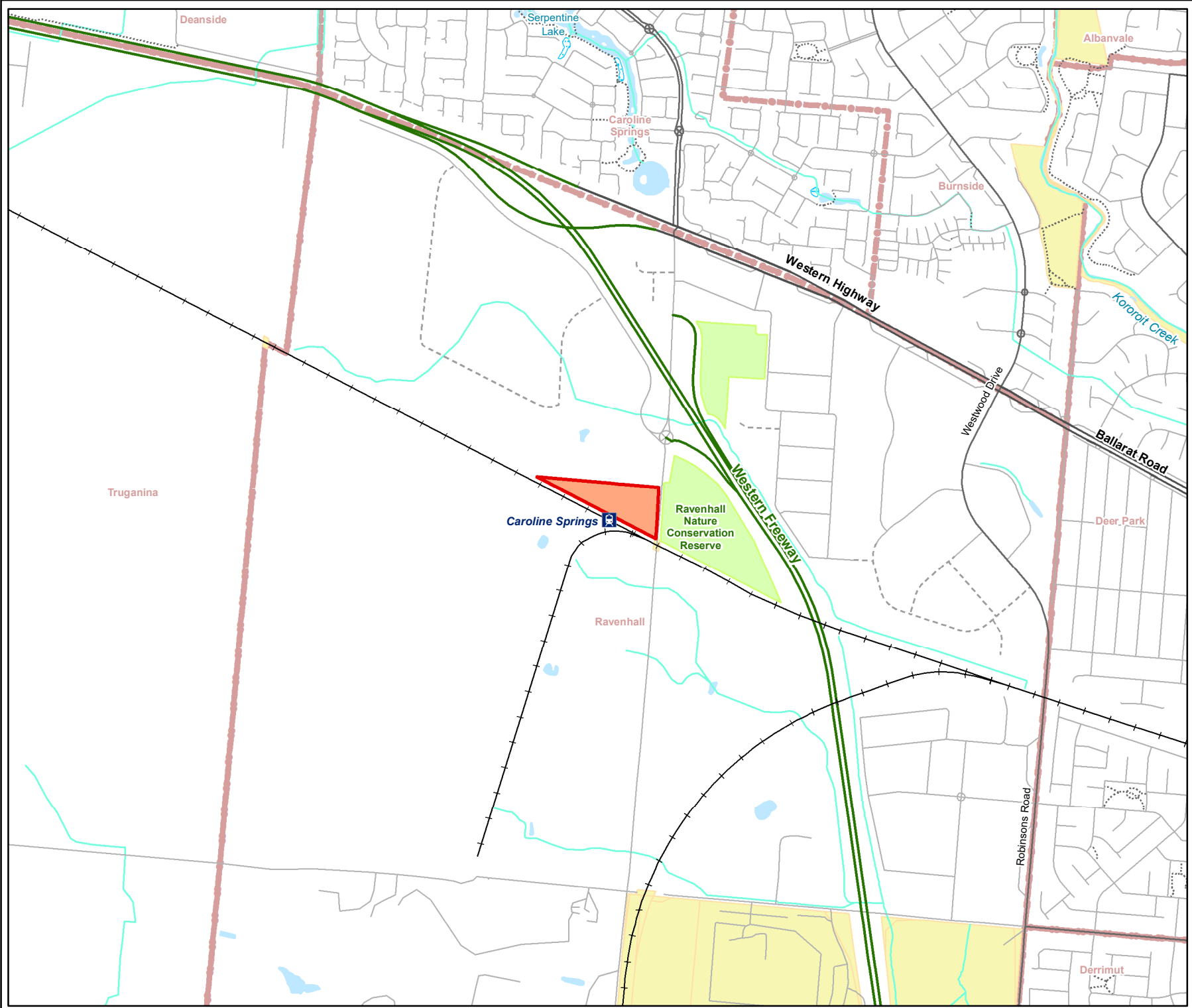
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# FIGURES

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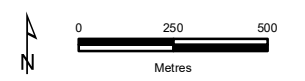




- Legend**
- Study Area
  - Railway
  - Freeway
  - Major Road
  - Collector Road
  - Minor Road
  - Proposed Road
  - Walking Track
  - Minor Watercourse
  - Permanent Waterbody
  - Wetland/Swamp
  - Parks and Reserves
  - Crown Land
  - Localities



**Figure 1**  
**Location of the study area**  
*Caroline Springs*  
*Year 7 Annual Report*









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14160\_fr13379\_Fig01\_StudyArea 7/06/2021 psorensen

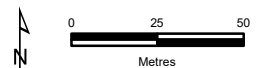




- Legend**
-  Offset site
  -  Spiny Rice-flower recipient site
  -  Plains Grassland / Retained areas of NTGVVP and Striped Legless Lizard habitat
  -  Plains Grassland / Removed areas of NTGVVP and Striped Legless Lizard habitat
  -  Lot boundary
  -  Rockpile



**Figure 2**  
**Ecological features and extent of NTGVVP and Striped Legless Lizard habitat**  
*Caroline Springs*  
*Year 7 Annual Report*



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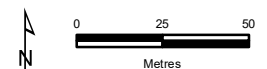




- Legend**
- Study Area
  - + Recorded Striped Legless Lizards (19 records in total)
  - Tile grids



**Figure 3**  
**Striped Legless Lizard grid locations and records**  
*Caroline Springs*  
*Year 7 Annual Report*



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14160\_Fig03\_SLL\_GridLoc 7/06/2021 psorensen

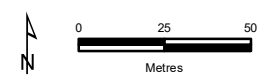




- Legend**
- Spiny Rice-flower recipient site
  - Monitored *In-situ* Spiny Rice-flower
  - Translocated Spiny Rice-flower (2017)
  - Translocated Spiny Rice-flower (2015)
  - *In-situ* Spiny Rice-flower population (August 2014)
  - *In-situ* Spiny Rice-flower population (August 2015)
  - Translocated Spiny Rice-flower (2014)
  - Offset site
  - Retained areas of Grassland



**Figure 4a**  
**Spiny Rice-flower recipient site, and monitored and translocated Spiny Rice-flowers**  
*Caroline Springs*  
 Year 7 Annual Report



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14160 Fig04a SRF RecipientSite 7/06/2021 psorensen

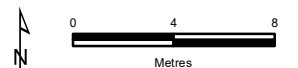




- Legend**
- Spiny Rice-flower recipient site
  - Monitored *In-situ* Spiny Rice-flower
  - Translocated Spiny Rice-flower (2017)
  - Translocated Spiny Rice-flower (2015)
  - Translocated Spiny Rice-flower (2014)
  - Offset site



**Figure 4b**  
**Spiny Rice-flower recipient site, and monitored and translocated Spiny Rice-flowers**  
*Caroline Springs*  
*Year 7 Annual Report*









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14160 Fig04b SRF RecipientSite 7/06/2021 psorensen



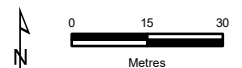


**Legend**

-  Photo points
-  Ecological burn 2018
-  Ecological burn 2019
-  Offset site
-  Spiny Rice-flower recipient site
-  Herb plantings



**Figure 5**  
**Location of photo points**  
**and ecological burn**  
*Caroline Springs*  
*Year 7 Annual Report*



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14160\_Fig05\_PhotoPoints\_Ecoburn 7/06/2021 psorensen



## APPENDICES

### Appendix 1. Habitat Hectare Assessment

**Table A1.1.** Habitat hectare assessment

Vegetation Zone		PG <sub>1</sub>	PG <sub>2</sub>	PG <sub>3</sub>
Bioregion		Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain
EVC / Tree		Plains Grassland (Heavier Soils)	Plains Grassland (Heavier Soils)	Plains Grassland (Heavier Soils)
EVC Number		132_61	132_61	132_61
EVC Conservation Status		Endangered	Endangered	Endangered
Patch Condition	Large Old Trees /10	Na	Na	Na
	Canopy Cover /5	Na	Na	Na
	Under storey /25	5	15	10
	Lack of Weeds /15	9	9	6
	Recruitment /10	0	0	0
	Organic Matter /5	5	3	5
	Logs /5	Na	Na	Na
	Treeless EVC Multiplier	1.36	1.36	1.36
	Subtotal =	25.84	36.72	28.56
Landscape Value /25		16	16	16
Habitat Points /100		42	53	45
Habitat Score		0.42	0.53	0.45

**Note:** Habitat zones are shown in Figure 2.

## Appendix 2. Spiny Rice-flower Monitoring Data

### A2.1. 2014/2015 Transplant Cohort – Annual Year 7 Status

**Table A2.1.** Sex and status of translocated Spiny Rice-flower.

Plant #	Sex	End of Year 7 Status	Flowering & per cent in flower	% Foliage	Heath score (1-5)	Germinants
#1	Female	<b>Dead</b>	-	-	-	-
#2	Male	<b>Dead</b>	-	-	-	-
#3	Female	<b>Dead</b>	-	-	-	-
#4	Female	Alive	0	60	2	0
#5	Female	<b>Dead</b>	-	-	-	-
#6	Female	Alive	0	75	2	0
#7	Female	<b>Dead</b>	-	-	-	-
#8	Female	<b>Dead</b>	-	-	-	-
#9	Female	<b>Dead</b>	-	-	-	-
#10	Male	Alive	0	80	2	0
#11	Male	Alive	0	60	2	0
#12	Male	<b>Dead</b>	-	-	-	-
#13	Female	Alive	0	70	2	0
#14	Female	<b>Dead</b>	-	-	-	-
#15	Male	<b>Dead</b>	-	-	-	-
#16	Male	<b>Dead</b>	-	-	-	-
#17	Male	<b>Dead</b>	-	-	-	-
#18	Female	<b>Dead</b>	-	-	-	-
#19	Male	Alive	0	35	3	0
#20	Male	<b>Dead</b>	-	-	-	-
#21	Female	<b>Dead</b>	-	-	-	-
#22	Female	Alive	0	55	2	0
#23	Male	Alive	0	70	2	0

## A2.2. 2015/2016 Transplant Cohort – Annual Year 7 Data (Year 3 of CMP)

**Table A2.2.** Sex and status of translocated Spiny Rice-flower.

Plant #	Sex	End of Year 7 Status	% flowering	% Foliage	Heath score (1-5)	Germinants
#24	Male	Dead	-	-	-	-
#25	Male	Dead	-	-	-	-
#26	Female	Dead	-	-	-	-
#27	Female	Alive	0	50	2	0
#28	Male	Alive	0	70	1	0
#29	Female	Dead	-	-	-	-
#30	Male	Dead	-	-	-	-
#31	Male	Dead	-	-	-	-
#32	Female	Dead	-	-	-	-
#33	Male	Dead	-	-	-	-
#34	Male	Dead	-	-	-	-
#35	Female	Dead	-	-	-	-
#36	Male	Dead	-	-	-	-
#37	Female	Alive	0	55	2	0
#38	Male	Dead	-	-	-	-
#39	Female	Dead	-	-	-	-
#40	Male	Dead	-	-	-	-
#41	Male	Dead	-	-	-	-
#42	Female	Alive	0	45	3	0
#43	Male	Alive	0	75	1	1
#44	Female	Alive	0	60	3	1
#45	Male	Dead	-	-	-	-
#46	Female	Dead	-	-	-	-
#47	Female	Dead	-	-	-	-
#48	Male	Dead	-	-	-	-
#49	Male	Dead	-	-	-	-
#50	Male	Dead	-	-	-	-
#51	Male	Dead	-	-	-	-
#52	Female	Dead	-	-	-	-
#53	Female	Alive	0	70	2	0
#54	Female	Dead	-	-	-	-
#55	Female	Dead	-	-	-	-

## Appendix 3. Photo points

### 2021 - Year 7 (Jan - June) Photo points



Plate A2.1. Photo point 1 (April 2021)



Plate A2.2. Photo point 2 (April 2021)



Plate A2.3. Photo point 3 (April 2021)



Plate A2.4. Photo point 4 (April 2021)





**Plate A2.5.** Photo point 5 (April 2021)



**Plate A2.6.** Photo point 6 (April 2021)



**Plate A2.7.** Photo point 7 (April 2021)



**Plate A2.8.** Photo point 8 (April 2021)



**Plate A2.9.** Photo point 9 (April 2021)



**Plate A2.10.** Photo point 10 (April 2021)



## Appendix 4. Translocated Spiny Rice-Flower photos

All photos taken by Ecology and Heritage Partners (21/04/2021)



Plate A3.1. Transplant 1 (dead)



Plate A3.2. Transplant 2 (dead)



Plate A3.3. Transplant 3 (dead)



Plate A3.4. Transplant 4



Plate A3.5. Transplant 5 (dead)



Plate A3.6. Transplant 6





**Plate A3.7.** Transplant 7 (dead)



**Plate A3.8.** Transplant 8 (dead)



**Plate A3.9.** Transplant 9 (dead)



**Plate A3.10.** Transplant 10



**Plate A3.11.** Transplant 11



**Plate A3.12.** Transplant 12 (dead)





Plate A3.13. Transplant 13



Plate A3.14. Transplant 14 (dead)



Plate A3.15. Transplant 15 (dead)



Plate A3.16. Transplant 16 (dead)



Plate A3.17. Transplant 17 (dead)



Plate A3.18. Transplant 18 (dead)





Plate A3.19. Transplant 19



Plate A3.20. Transplant 20 (dead)



Plate A3.21. Transplant 21 (dead)



Plate A3.22. Transplant 22



Plate A3.23. Transplant 23



Plate A3.24. Transplant 24 (dead)





**Plate A3.25.** Transplant 25 (dead)



**Plate A3.26.** Transplant 26 (dead)



**Plate A3.27.** Transplant 27



**Plate A3.28.** Transplant 28



**Plate A3.29.** Transplant 29 (dead)



**Plate A3.30.** Transplant 30 (dead)





**Plate A3.31.** Transplant 31 (dead)



**Plate A3.32.** Transplant 32 (dead)



**Plate A3.33.** Transplant 33 (dead)



**Plate A3.34.** Transplant 34 (dead)



**Plate A3.35.** Transplant 35 (dead)



**Plate A3.36.** Transplant 36 (dead)





Plate A3.37. Transplant 37



Plate A3.38. Transplant 38 (dead)



Plate A3.39. Transplant 39 (dead)



Plate A3.40. Transplant 40 (dead)



Plate A3.41. Transplant 41 (dead)



Plate A3.42. Transplant 42





Plate A3.43. Transplant 43



Plate A3.44. Transplant 44



Plate A3.45. Transplant 45 (dead)



Plate A3.46. Transplant 46 (dead)



Plate A3.47. Transplant 47 (dead)



Plate A3.48. Transplant 48 (dead)





**Plate A3.49.** Transplant 49 (dead)



**Plate A3.50.** Transplant 50 (dead)



**Plate A3.51.** Transplant 51 (dead)



**Plate A3.52.** Transplant 52 (dead)



**Plate A3.53.** Transplant 53



**Plate A3.54.** Transplant 54 (dead)





**Plate A3.55.** Transplant 55 (dead)



**Plate A3.56.** Transplant 56



**Plate A3.57.** Transplant 57 (dead)



**Plate A3.58.** Transplant 58 (dead)