ecology & heritage partners

Final Report

Annual Report for the Caroline Springs Railway Station Grassland – Year 6

PREPARED FOR

VicTrack

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Ecology and Heritage Partners Pty Ltd

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- *Pimelea spinescens* Recovery Team (PsRT).

GLOSSARY

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	*Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth)
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
OMP	Offset Management Plan
PsRT	*Pimelea spinescens* Recovery Team
SLL	Striped Legless Lizard *Delma impar*
SRF	Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*
WLS	Western Land Services

EXECUTIVE SUMMARY

Ecology and Heritage Partners were engaged by VicTrack to undertake the Year 6 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 6 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, 26 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 2020 (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 2020 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 19 individuals being recorded within the offset site for Year 6, which is consistent with the Year 5 monitoring results. This 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 fourteen individuals were recorded and Year 4 where a total of 18 were recorded. The population appears to be stabilising 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

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by VicTrack to undertake and oversee management and monitoring works for Year 6 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 Years 5 and 6 works.

The Year 6 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 2019 and 30 June 2020 (i.e. sixth 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 mid-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).

Sections 2.1 predominately relate 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 6), between January and June 2020.

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 6 monitoring (July – December 2019).

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 will be conducted in accordance with the recommended monitoring protocol for transplanted individuals detailed in Vallee *et al*. (2004).
  - Established translocated recipients monitored in August 2019 (as detailed in the mid-year 6 report – Ecology and Heritage Partners 2020) and April 2020;
  - Attributes including growth, sex, virility (percentage of plant in flower), recruitment, health and survival rates will be undertaken;
  - A sample of 25 of the existing *in-situ* plants in the offset site will be monitored concurrently to compare growth, survival and recruitment with that of the transplants.
- To mitigate the threat of drought stress, particularly between January – April 2020, the translocated Spiny Rice-flower will be 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 will be 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 will be replaced if required;

- Following the monitoring, a final report for Year 6 covering monitoring between January – June 2020 will be produced in June 2020 summarising the current population status and the condition of their habitat.
- The mid-year 6 report details the monitoring results from August 2019 (Ecology and Heritage Partners 2020).

Striped Legless Lizard

Monitoring results associated with the Striped Legless Lizard population are provided in the Year 6 July – December 2019 report (Ecology and Heritage Partners 2020).

Natural Temperate Grassland of the Victorian Volcanic Plain

- Monitor the quantity and quality of native grassland within the offset area during April 2020.
    - Surveys (Habitat Hectare assessment) will be structured around biomass reduction activities;
    - Fixed photo points will be utilised in areas of both intact vegetation and those dominated by weeds in order to also visually record any successive changes;
    - Surveys will focus 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.
- Conduct regular monitoring 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. 20%.);
- 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 will be 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 be monitored during April 2020. 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 relatively 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. 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. Zone PG2 is located in the eastern half of the offset site and is

dominated by Kangaroo Grass *Themeda triandra*, but also contains occurrences of Kneed Spear-grass, Wallaby-grasses *Rytidosperma* spp., Windmill Grass *Chloris truncata*, and a wide range of herbs within the ground layer. Weed cover is relatively low in this habitat zone. Habitat zone PG3, present across the western half of the offset site, comprises a similar species composition to PG2. However, a greater cover of weeds is present which results in reduced recruitment opportunities and lower herb diversity within the understory (Figure 2). It is recognised that this cover of weeds is reducing when compared to previous years, due to a combination of the weed control efforts and the native grass regeneration post the 2018 burn.

The eastern side of the offset site was subject to an ecological burn in June 2019 (excluding the Spiny Rice-flower translocation area) and the western half of the offset site was subject to an ecological burn in June 2018. The eastern side of the offset site is responding well from the recent burn, with Kangaroo Grass remaining the dominant species, and Wallaby-grasses and Spear-grasses evident in moderate cover (Plate 1; Plate 2). A range of native herbaceous flora species persist throughout this section, 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, Spear Grass, was prevalent in the western section of the offset site (Ecology and Heritage Partners 28/04/2020)

Plate 2. Western section of offset site (burnt) where native grasses are recovering, and exotic grass has declined (Ecology and Heritage Partners 22/04/2020)

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 contains a lower occurrence of native herbs, however, several supplementary herb planting sites are located within this section to increase the diversity. The herb plantings contain a number

of native species shown to be producing seed at the time of the site visits, which will ideally spread throughout the offset site. The herb plantings were placed in areas where African Boxthorn *Lycium ferocissimum* removal previously occurred in the early stages of the offset site establishment, where native grasses were not as prevalent due to the weed presence. Native grasses have not naturally re-established in these areas, and although this provides a suitable area for the native herb plantings, it is also providing bare ground for weed species to recruit and spread outwards from the plantings, with a noticeable expansion of weed species present. Ongoing management should be targeted around these areas to control weed establishment and assess if further plantings are required to reduce the cover of bare ground.

Weeds of national significance are present including, Serrated Tussock and African Boxthorn. These species were present in high abundance during years 1-3 of management, with past weed control targeting the removal of these species, and recent weed management work has further reduced the cover abundance of these two species across past management years, with both species currently present in very low concentrations. 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 5) prepared by VicTrack (site reference: TFN-C1723) was submitted to Trust for Nature in June 2019, 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 2020

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 2020, during the remaining Year 6 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 6 was undertaken in August 2019 at the end of the flowering season, as detailed in the mid-year 6 report (Ecology and Heritage Partners 2020), with results also included in Table 2 and Table 3 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. The recent burn within the eastern portion of the offset site has reduced the thick biomass of Kangaroo Grass, with the tussocks recovering well from the burn. 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.

No 'floating rock' is present within the recipient site, and no rocks were disturbed or removed as part of the translocation process. 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 as part of the translocation, along with 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. Hand weeding undertaken around transplanted Spiny Rice-flowers (Ecology and Heritage Partners 22/04/2020).

Plate 4. Good quality vegetation and healthy Spiny Rice-flower in offset site (Ecology and Heritage Partners 28/04/2020)

2.1.3 Plant Deaths and Disturbances

June 2014 Transplants

As part of the most recent monitoring event of Year 6 (June 2020), there was one additional death during Year 6 from the previous mid-Year 6 results of the original 23 SRF salvaged specimens (June 2014

transplants). The 14 alive specimens remain in varying health conditions, from poor 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, and no plant deaths in Year 5.

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
Survival rate compared to initial number translocated	17/23	17/23	17/23	15/23	15/23	15/23	14/23

June 2015 Transplants

As of June 2020, there was one additional death recorded during the final Year 6 assessment when compared to the mid-Year 6 from the original 32 SRF salvaged specimens (June 2015 transplants), with individual 47 appearing dead. In total, 21 of the 32 SRF specimens transplanted in June 2015 appear dead (with 12 SRF deaths in Year 2). Individual 47 has been recorded as alive in all previous years, although was recorded as a small plant. There is the possibility that the individual will re-sprout, especially if burnt in the near future.

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
Survival rate compared to initial number translocated	32/32	20/32	18/32	15/32	13/32	13/32	12/32	11/32

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
Survival rate compared to initial	na	na	3/3	3/3	1/3	1/3	1/3	1/3

number translocated								

In-situ monitoring

All 25 in-situ SRF specimens are in moderate to good condition during June of Year 6 despite not being subject to the watering regime applied to the translocated plants.

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 14 plants (of the original 23) to survive Year 6, all are in moderate to good health (i.e. – a health score between 1-3 [Figure A4]), as of April 2020.

All of the 14 plants were flowering during the final survey conducted in June (Plate 5; Plate 6), however no germinates were recorded during the June monitoring event. New shoots of regrowth were observed sprouting from the base of most plants, suggesting that the plants are successfully established and stabilised.

June 2015 Transplants

Of the 11 plants (of the original 32) to survive Year 6, all are in good health (i.e. – a health score between 1-3), as of June 2020.

All 11 plants were flowering during the June monitoring event, with a small number of germinates observed.

June 2017 Transplants

Only one specimen (#56) from the 2017 cohort was alive during the most recent monitoring event (19 June 2019). No germinants were recorded, and the alive specimen was in moderate health with only a small percentage of flowering material recorded.

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

Plate 6. Flowering Spiny Rice-flower (Ecology and Heritage Partners 28/04/2020).

2.2.4.4 General Comments

Overall, the Year 6 results indicate a declining level of survivorship when compared to the earlier mid-Year 6 monitoring, and previous Year 5 monitoring, with no specimens perishing between the Year 5 and Year 6 (July – Dec 2019) monitoring events, and a total of two deaths between the mid and final Year 6 assessment, with individuals 12 and 47 being recorded as dead, Despite being recorded as dead, there is the possibility that these individuals, along with any previously recorded dead individuals, will re-sprout in the future (e.g. after a burn). Throughout the summer of the Year 6 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 2019 and April 2020.

Of the 58 SRF transplants, 26 specimens were alive during the most recent monitoring event. Of the 26 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, with the combination of weeding and watering contributing to the healthy appearance of the transplanted individuals.

The number of deaths occurring between years is decreasing as the plants become more established within the recipient site, with the surviving individuals within the main two transplant cohorts (2014 and 2015) appearing in moderate to excellent health. However, 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). Currently, 26 individuals were recorded as alive, and therefore, all previous years 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 2020 (pers. comm. Debbie Reynolds). Any successful germinates will be transplanted into the recipient site when suitable.

Summaries of the 2020 recorded data for the monitoring of January – June 2020 of Year 6 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 2019/2020, 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, where 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.

An ecological burn was conducted in June 2018 in the western section of the offset site. Additional details are provided in the Year 4 annual report (Ecology and Heritage Partners 2018).

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. Collected seed will be used for propagation purposes, with germination of previous collected seed scheduled to occur within a controlled environment in November 2020 (as detailed in Section 2.2.4.4).

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 6. As of mid-Year 6, 29 plants were alive (with six lost in Year 1, 12 lost in Year 2, two lost in Year 3, five lost in Year 4 and four lost in Year 5. The final survival count for the end of Year 6 decreased to 26 plants. Due to the survival target falling below 50%, previously collected seed is scheduled to be germinated in November 2020 (as detailed in Section 2.2.4.4). The number of germinants will depend on the success of the germination event. Any successful germinants will be grown and planted into the recipient site location, and included in the on-going monitoring and management of the site (as detailed in Appendix 1 of the CMP (Ecology and Heritage Partners 2014a).

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. Due to the population barely meeting the 50% minimum performance target, it would be practical to germinate any previously collected seed and grow replacement plants in case future monitoring events see further decline in the species. By germinating individuals now, it will allow time for individuals to grow in a nursery environment, and be hardened off for survival, to ensure they are ready to be introduced into the population.

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 5 monitoring, and results are presented in the mid-Year 5 report (Ecology and Heritage Partners 2019) and below.

2.2.1 Population Monitoring Results

A total of 19 Striped Legless Lizard (SLL) captures were recorded within the study area during the Year 6 targeted surveys (Plate 9) (Table 6). It is possible that some of the individuals recorded during Year 6 were recaptures.

This result remains consistent with the Year 5 results, which also recorded 19 individuals. This 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 fourteen individuals were recorded and Year 4 where a total of 18 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)
25/09/2019	TR	12:30	16	5%	WSW (9km/hr)	19.8	14	**3 x SLL**, 1 x LWS	**3 x SLL**, 1 x Spotted Marsh Frog
9/10/2019	TR	10:30	13.4	80%	S (19 km/hr)	20.5	23	**3 x SLL**, 1 x EBT, 1 x LWS, 1 x Tussock Skink	-
30/10/2019	TR/EH	11:00	21.4	0%	SSE (19 km/hr)	64.3	45.8	-	-
7/11/2019	AF/GT	9:09	13.4	5%	W (30 km/hr)	15.6	13.5	1 x LWS, 1 x EBT	**4 x SLL**, 1 x EBT, 1 x Tussock Skink
15/11/2019	TR/ ET	10:30	16.9	15%	WSW (26km/hr)	21.5	18.8	**3 x SLL**, 1 x LWS	**1 x SLL**, 1 x EBT
28/11/2019	GT	10:30	17.6	20%	SW (8km/hr)	39	34.2	1 x Field Mouse	**2 x SLL**, 1 x LWS

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

The common rodent species House Mouse *Mus musculus* and Eastern Blue-tongue *Tiliqua scincoides* were also recorded in the study area during tile grid checks (Plate 10). No other vertebrate fauna species of note were recorded during targeted surveys.

Plate 5. Grid 1 – Striped Legless Lizard (Ecology and Heritage Partners 25/09/2019)

Plate 6. Grid 1 – Little Whip Snake (Ecology and Heritage Partners 25/09/2019)

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 6 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 6 of Striped Legless Lizard habitat monitoring.

Table 7. Striped Legless Lizard habitat monitoring criteria

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

		>50 cms	Plant native clumping species	**No**

Note: ^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	
Native clumping grass cover	50%	60%	70%	70%	**62.5%**	40%	30%	60%	60%	**47.5%**	**No**
Introduced grass cover	5%	10%	10%	10%	**8.75%**	40%	50%	20%	20%	**32.5%**	**Yes***
Bare ground	30%	20%	5%	5%	**15%**	15%	15%	3%	3%	**9%**	**No**
Exposed rock	15%	10%	1%	1%	**6.75%**	5%	5%	5%	5%	**5%**	**No**
Inter-tussock spacing	30 cm	20 cm	10 cm	15 cm	**18.75 cm**	15 cm	20 cm	3 cm	5 cm	**10.75 cm**	**No**

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

Striped Legless Lizard is a highly cryptic species and as such there is currently no reliable method for assessing the size of a given Striped Legless Lizard population (O'Shea 2013). With minimal data pertaining to the study area and surrounding suitable habitat areas, a long-term pattern of distribution and abundance for Striped Legless Lizard cannot be inferred for the local population until the results of monitoring over the subsequent years are available.

However, it is noted that there was a total of 19 individuals recorded during Year 6 and Year 5, up from 18 individuals recorded during Year 4, 14 individuals in Year 3 and two and three individuals 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. The increase in weed cover within the study area is almost entirely due to the seasonal cover of the annual weed Wild Oat, and is also a response to the increase in availability of bare ground which resulted after the ecological burn in June 2018. However, native species within this area are recruiting and supressing introduced grasses, as evident in the final monitoring results, where the introduced grass cover in Grid two declined from 50% during the mid-Year 6 monitoring to 20% during the current monitoring period, and is likely to continue to decline as the native grasses recover and ongoing weed management continues. As a result, the current weed management approach is likely to achieve the target levels set out in the CMP, noting that seasonal fluctuations in weed cover occur and that burns will impact the short term cover of weeds until the seed bank is depleted of exotic seed. It is recommended that additional native grass seed be spread into the western area of the offset site to aid in the establishment of native grass species and reduce available space for weeds to germinate. Ongoing weed management following the recommended methods in the CMP will lead to a decrease in stored seed, and overall decrease in weeds within the offset site.

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 6 (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 6

Action Completed. Western Land Services mechanically removed woody weed infestations during Year 1 and Year 2, with woody weed control works during Year 6 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 6

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 6 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 6

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 6 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 6

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 6

Action Completed

Hand weeding has been 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 also undertaken by Western Land Services during management visits.

An ecological burn was undertaken in winter 2019 in the eastern section of the offset area by Western Land Services, as detailed in the Year 5 report (Ecology and Heritage Partners 2019). A previous ecological burn was undertaken in June 2018 in the western half of the offset area, with the aim of reducing biomass. Refer to the Year 4 report for further information (Ecology and Heritage Partners 2018).

Actions Required

Monitor recovery of native grasses in response to the recent burn undertaken. Continue weed control in areas subject to the ecological burn is required to reduce the prevalence of exotic flora within the eastern section of the offset site. Monitor the western section of the offset area for biomass accumulation as the area recovers from the ecological burn undertaken in June 2018. Assess the potential to burn the recipient site location.

2.3.6 Undertake supplementary planting of herbs

Timing of Action and key performance target

Herb plantings monitored in April 2020.

Status – Year 6

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 11; Plate 12) and remained in a relatively weed free state during the mid-Year 6 monitoring period. However, during the Year 6 monitoring period (Jan – June 2020) weed encroachment was evident throughout the supplementary herb plantings. Despite this, 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).

Plate 10. Supplementary herb plantings 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 6

Action Completed

This report satisfies this requirement for the annual Year 6 report.

2.3.8 Removal of all existing rubbish from site

Timing of Action and key performance target

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

Status – Year 6

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 6, 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

Following the management and monitoring activities undertaken during Year 6 of the works as required under the approval conditions of EPBC 2010/5463, two trigger threshold 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 and the ongoing weed control management should priorities areas around and within Grid 2, where the cover of Wild Oat has increased since the June 2018 ecological burn.

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 26 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 6 was not achieved. Due to the current survival level sitting below 50% survival, seed collected from Spiny Rice-flower in previous years will be germinated to ensure plants are available to replace any these losses from the transplanted individuals. Any successful germinates will be transplanted into the recipient site, however, it is noted that this is dependent on the see provided, and the success of the germination, so exact numbers for germination and transplanting cannot be provided due to the uncertainty in success. The germination and transplantation will aim to ensure the survival rate increase above 50% once again.

The condition of the offset site and retained grassland is good, 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 6 monitoring event. However, the supplementary herb plantings are showing signs of weed encroachment and several recruiting Serrated Tussock individuals were observed, mainly around the outer edges and at the entrance gate to the offset site. African Boxthorn was also observed to recruiting around the rock pile to the north of the offset site. Whilst this spread of weeds was overall low in cover, the noxious weeds should be controlled as a priority. A notable benefit to the site is the recent management of the land directly north of the offset site, where African Boxthorn, Serrated Tussock and Artichoke Thistle are now being actively managed and controlled, reducing the spread south into the Caroline Springs offset site.

The eastern section of the offset site is recovering well since the recent burn in June 2019 and is currently in excellent condition with low weeds present. Targeted weed control works should continue within this area, focussing on Serrated Tussock recruits. However, the western section of the offset site requires ongoing weed control to reduce the current cover of Wild Oat.

Overall, the offset site continues to improve in condition since its establishment, with the native vegetation cover expanding across the site and the stabilisation of the Striped Legless Lizard population. However, germinating seed collected from Spiny Rice-flower in previous years will be required to ensure the translocated Spiny Rice-flower population numbers increase above 50% once again.

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FIGURES

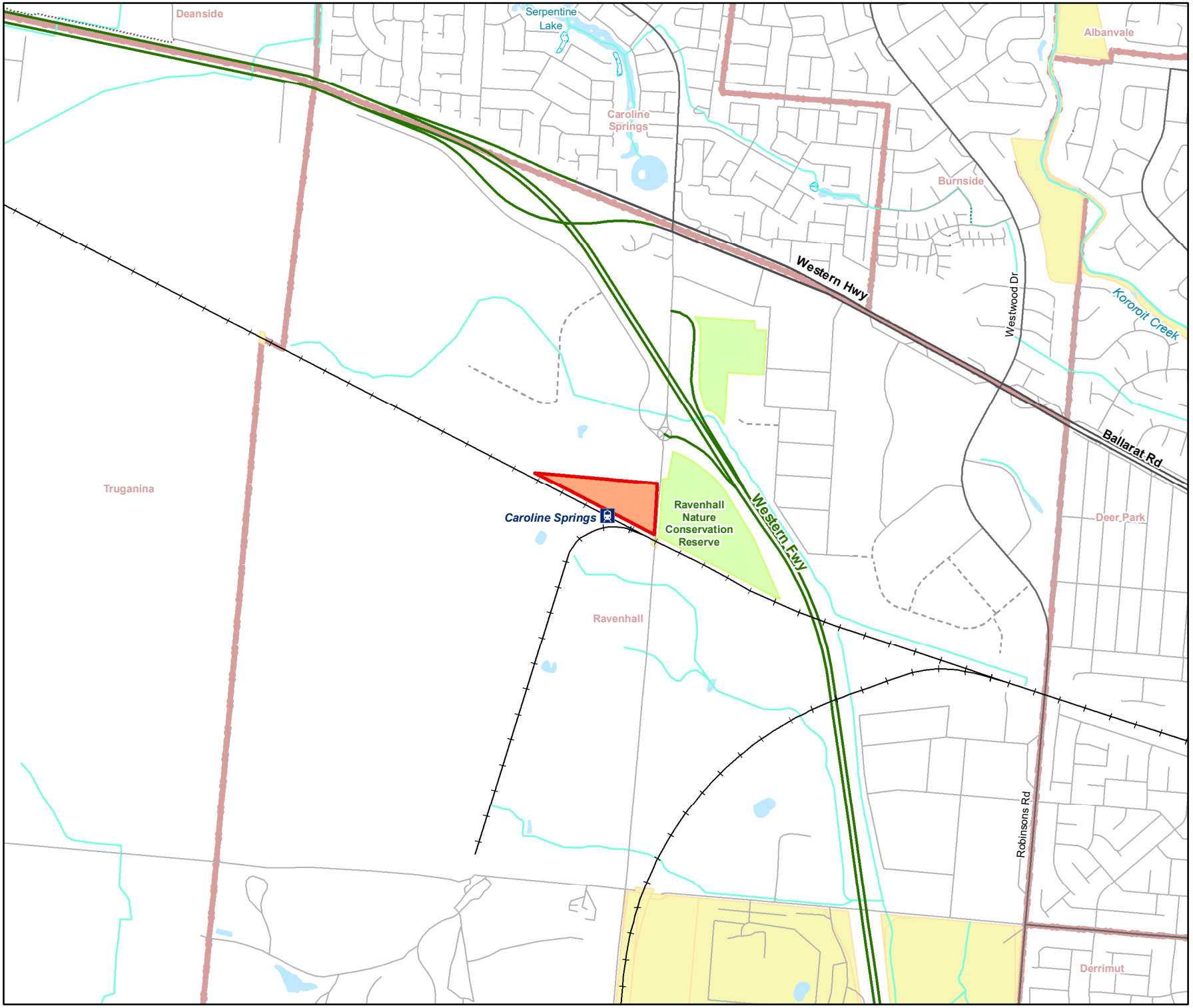

Figure 1

Location of the study area

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13379_fr12732_Fig01_StudyArea 4/03/2020 melsley

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

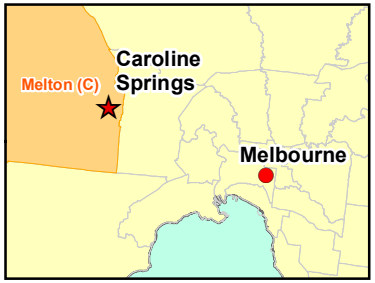

Figure 2

Ecological features and extent of NTGVVP and Striped Legless Lizard habitat

Caroline Spings
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N

0 25 50
Metres

ecology & heritage partners

13379_Fig02_EcoFeat_NTGVVP_SLL 4/03/2020 melsley

Aerial source: Nearmap 2019

Legend

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

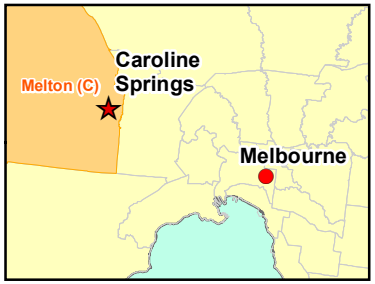

Figure 3

Striped Legless Lizard grid locations and records

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N

0 25 50

Metres

ecology & heritage partners

13379_Fig03_SLL_GridLoc 4/03/2020 melsley

Aerial source: Nearmap 2019

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

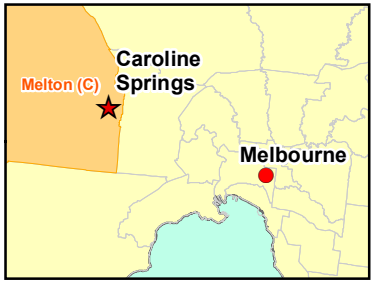

Figure 4a

Spiny Rice-flower recipient site, and monitored and translocated Spiny Rice-flowers

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N

0 25 50
Metres

ecology & heritage partners

13379_Fig04a_SRF_ReipientSite 4/03/2020 melsley

Aerial source: Nearmap 2019

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

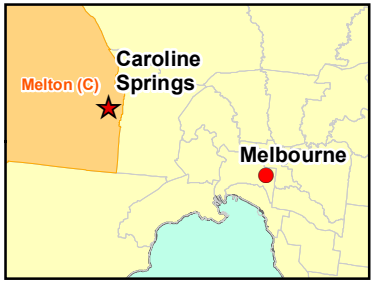

Figure 4b

Spiny Rice-flower recipient site, and monitored and translocated Spiny Rice-flowers

Caroline Spings
Year 6 Annual Report

N

0 4 8
Metres

ecology & heritage partners

13379_Fig04b_SRF_ReipientSite 5/03/2020 melsley

Aerial source: Nearmap 2019

Legend

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

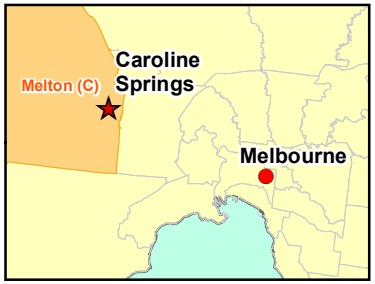

Figure 5

Location of photo points and ecological burn

Caroline Spings

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N

0 15 30

Metres

ecology & heritage partners

13379_Fig05_Photopoints_Ecoburn 5/03/2020 melsley

Aerial source: Nearmap 2019

APPENDICES

Appendix 1. Habitat Hectare Assessment

Table A1.1. Habitat hectare assessment

Vegetation Zone		PG1	PG2	PG3
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	6	6	6
	Organic Matter /5	5	3	5
	Logs /5	na	na	na
	Treeless EVC Multiplier	1.36	1.36	1.36
	Subtotal =	34	44.88	36.72
Landscape Value /25		16	16	16
Habitat Points /100		50	61	40
Habitat Score		0.50	0.61	0.40

Note: Habitat zones are shown in Figure 2.

Appendix 2. Spiny Rice-flower Monitoring Data

A2.1. 2014/2015 Transplant Cohort – Annual Year 6 Status

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

Plant #	Sex	End of Year 6 Status	Flowering & per cent in flower	% Foliage	Heath score (1-5)	Germinants
#1	Female	**Dead**	-	-	-	-
#2	Male	**Dead**	-	-	-	-
#3	Female	**Dead**	-	-	-	-
#4	Female	Alive	5	60	2	0
#5	Female	Alive	5	55	2	0
#6	Female	Alive	5	75	2	0
#7	Female	**Dead**	-	-	-	-
#8	Female	Alive	15	60	2	0
#9	Female	**Dead**	-	-	-	-
#10	Male	Alive	25	80	2	0
#11	Male	Alive	15	60	2	0
#12	Male	**Dead**	-	-	-	-
#13	Female	**Dead**	-	-	-	-
#14	Female	Alive	5	70	1	0
#15	Male	Alive	30	55	2	0
#16	Male	Alive	5	40	3	0
#17	Male	Alive	0	25	3	0
#18	Female	Alive	5	55	2	0
#19	Male	Alive	0	35	3	0
#20	Male	**Dead**	-	-	-	-
#21	Female	**Dead**	-	-	-	-
#22	Female	Alive	10	55	2	0
#23	Male	Alive	1	70	2	0

A2.2. 2015/2016 Transplant Cohort – Annual Year 6 Data (Year 3 of CMP)

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

Plant #	Sex	End of Year 6 Status	% flowering	% Foliage	Heath score (1-5)	Germinants
#24	Male	**Dead**	-	-	-	-
#25	Male	**Dead**	-	-	-	-
#26	Female	**Dead**	-	-	-	-
#27	Female	Alive	5	55	2	0
#28	Male	Alive	5	75	1	0
#29	Female	**Dead**	-	-	-	-
#30	Male	**Dead**	-	-	-	-
#31	Male	**Dead**	-	-	-	-
#32	Female	**Dead**	-	-	-	-
#33	Male	**Dead**	-	-	-	-
#34	Male	Alive	10	40	3	0
#35	Female	**Dead**	-	-	-	-
#36	Male	**Dead**	-	-	-	-
#37	Female	Alive	10	55	2	0
#38	Male	Alive	10	40	2	0
#39	Female	**Dead**	-	-	-	-
#40	Male	Alive	25	85	1	0
#41	Male	**Dead**	-	-	-	-
#42	Female	Alive	15	45	3	0
#43	Male	Alive	40	75	1	1
#44	Female	Alive	15	60	3	1
#45	Male	Alive	15	40	3	0
#46	Female	**Dead**	-	-	-	-
#47	Female	**Dead**	-	-	-	-
#48	Male	**Dead**	-	-	-	-
#49	Male	**Dead**	-	-	-	-
#50	Male	**Dead**	-	-	-	-
#51	Male	**Dead**	-	-	-	-
#52	Female	**Dead**	-	-	-	-
#53	Female	Alive	30	70	2	0
#54	Female	**Dead**	-	-	-	-
#55	Female	**Dead**	-	-	-	-

Appendix 3. Photo points

2020 - Year 6 (Jan - June) Photo points

Plate A2.1. Photo point 1 (April 2020)

Plate A2.2. Photo point 2 (April 2020)

Plate A2.3. Photo point 3 (April 2020)

PlateA2.4. Photo point 4 (April 2020)

Plate A2.5. Photo point 5 (April 2020)

PlateA2.6. Photo point 6 (April 2020)

PlateA2.7. Photo point 7 (April 2020)

Plate A2.8. Photo point 8 (April 2020)

Plate A2.9. Photo point 9 (April 2020)

Plate A2.10. Photo point 10 (April 2020)

Appendix 4. Translocated Spiny Rice-Flower photos

All photos taken by Ecology and Heritage Partners (28/04/2020)

Plate A3.1. Transplant 1 (dead)

Plate A3.2. Transplant 2 (dead)

Plate A3.3. Transplant 3 (dead)

Plate A3.4. Transplant 4

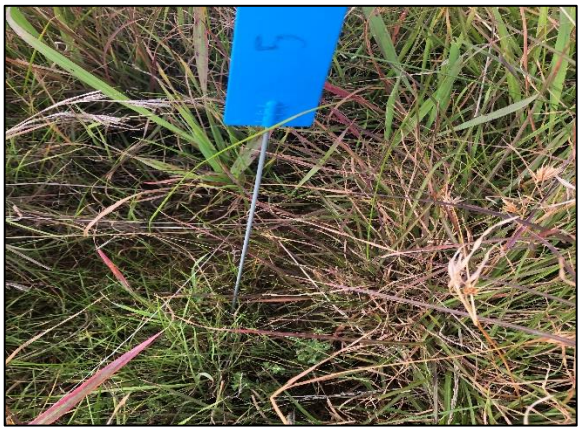

Plate A3.5. Transplant 5

Plate A3.6. Transplant 6

Plate A3.7. Transplant 7 (dead)

Plate A3.8. Transplant 8

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 (dead)

Plate A3.14. Transplant 14

Plate A3.15. Transplant 15

Plate A3.16. Transplant 16

Plate A3.17. Transplant 17

Plate A3.18. Transplant 18

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

Plate A3.35. Transplant 35 (dead)

Plate A3.36. Transplant 36 (dead)

Plate A3.37. Transplant 37

Plate A3.38. Transplant 38

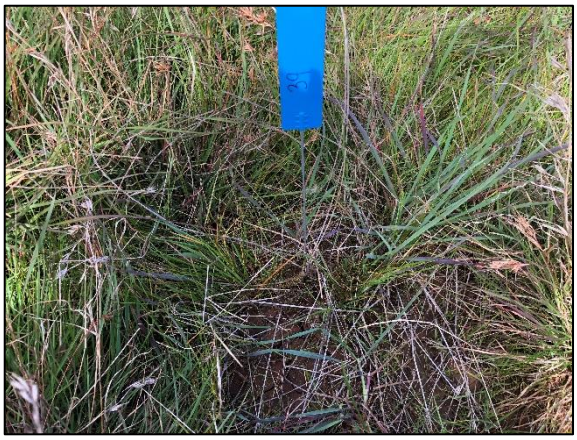

Plate A3.39. Transplant 39 (dead)

Plate A3.40. Transplant 40

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

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

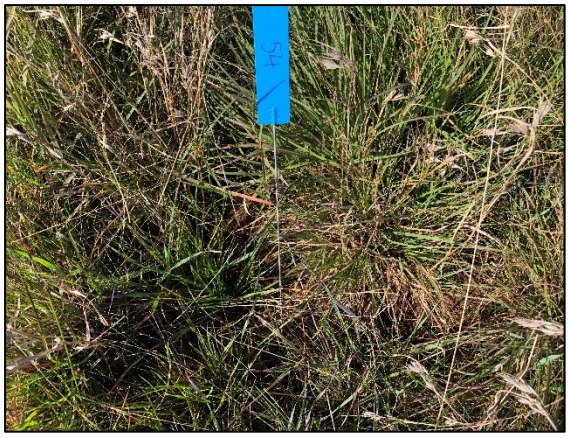

Plate A3.54. Transplant 54 (dead)

Plate A3.55. Transplant 55 (dead)

Plate A3.56. Transplant 56

Plate A3.57. Transplant 57 (dead)

Plate A3.58. Transplant 58 (dead)