



Offset Management Plan:
Spiny Rice-flower offset area within
Mount Cottrell Recreation Reserve

FINAL REPORT

Prepared for City of Melton

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1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by City of Melton to prepare an offset management plan (OMP) for a 3 ha management area within the Mount Cottrell Recreation Reserve (MCRR), Mount Cottrell.

As part of the Commonwealth approvals process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Gourlay Road duplication project within Caroline Springs, Council is required to establish a Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* offset reserve.

The 3 ha offset reserve includes three remnant Spiny Rice-flower plants and Council has committed to establish an additional 28 plants within the 10 year management period through plantings. Earlier this year, 28 individuals of local provenance were planted into the reserve by Council's Land Management Officers, which had been propagated locally at the Western Plains Nursery. Each individual has been marked, monitored and continually watered with the perimeter fenced off to avoid any adverse impacts.

A Trust for Nature covenant will be placed over the offset area following formal approval of this report by the Commonwealth Environment Minister.

1.2 Scope

The scope of this OMP is to:

- document the initial conditions of the offset area, including the location of remnant and planted Spiny Rice-flower plants
- provide details of management actions required
- establish monitoring and reporting protocols
- provide a table of actions for the 10 year management period.

2. Description of Offset Reserve

2.1 Site context

The MCRR is located at 180–246 Faulkners Road, Mount Cottrell. The reserve is approximately 40 ha in size and adjacent to land set aside as part of the proposed Western Grassland Reserve system.

The MCRR includes a mixture of high quality grassland, planted trees, dams, landfill sculpturing and other degraded areas. The reserve has been used by three sporting clubs including a motor club, motorcycle club and model aeroplane club. The importance of the ecological values identified within the MCRR prompted Council to restrict access, to the extent that the motor club and motorcycle club have now been excluded from the site. The model aeroplane club located at the eastern end of the MCRR, away from the proposed offset area, is in preliminary discussions with the Department of Environment and Primary Industries to relocate to a degraded section of the Western Grassland Reserve once it is established. Until such a time, the model aeroplane club will remain within the MCRR.

Council is currently in the process of preparing a Rehabilitation and Environmental Management Plan across the entire MCRR to help improve the ecological values present and will include actions such as fence upgrades, decommissioning of tracks as well as general weed control.

It is likely that additional Spiny Rice-flower plants required to be removed for further development projects within Melbourne's Western Growth Area will be translocated into other parts of the MCRR. These individuals will be tagged, monitored and managed separately and are not further considered in this OMP.

The MCRR has previously been assessed by Ecology Partners in 2007 and 2010. These reports demonstrate that an improvement in the quality of the native vegetation has occurred since Council commenced targeted weed management in 2007 and the breaking of the drought (Ecology Partners 2007, 2010).

Aside from Spiny Rice-flower, two additional EPBC-listed species including Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar*, have been recorded within the MCRR during previous assessments (Ecology Partners 2010). Areas of Natural Temperate Grassland of the Victorian Volcanic Plain, an EPBC-listed community, have also been recorded (Ecology Partners 2010).

The 3 ha offset area, which is the focus of this OMP, is located in the north of the MCRR (Figure 1).

The study area is within the Victorian Volcanic Plain Bioregion.

2.2 Existing condition of vegetation

A site inspection was undertaken on 24 June 2013.

The offset reserve consists of a mosaic of Plains Grassland and degraded areas dominated by weeds.

Three management zones have been identified including Spiny Rice-flower planting areas, the inner more high quality zone and the outer weedier zone (Figure 2). Further details of each zone are provided below.

2.2.2 Spiny Rice-flower Zones

Six small areas have been identified around remnant and planted individuals of Spiny Rice-flower. These areas have been hand weeded and in most cases fenced off with rabbit-proof fencing (Plate 1).

Biomass and weed levels are currently very low in these areas due to on-going weed control.



Plate 1: Spiny Rice-flower Zone

2.2.3 Inner Zone

A two-strand wire fence has been erected around the Inner Zone which is an area of high quality Plains Grassland surrounding the Spiny Rice-flower Zones (Figure 2).

The area is dominated by spear grasses *Austrostipa* spp. with scattered Kangaroo Grass *Themeda triandra* and wallaby grasses *Rytidosperma* spp. and is relatively herb-rich (Plate 2). Common indigenous forb species present in the zone include Blue Devil *Eryngium ovinum*, Cotton Fireweed *Senecio quadridentatus* and Sheep's Burr *Acaena echinata*.

This area supports two significant ecological communities:

- Natural Temperate Grassland of the Victorian Volcanic Plain – listed under the EPBC Act
- Western (Basalt) Plains Grassland - listed under the Victorian *Flora and Fauna Guarantee Act 1988*.

Biomass and weed cover are currently relatively low. Council undertook biomass reduction activities in mid 2012 when the remnant Spiny Rice-flowers were first recorded to help aid the identification of further individuals.

Scattered weeds include Galenia *Galenia pubescens*, Paspalum *Paspalum dilatatum*, Ribwort *Plantago lanceolata* and Serrated Tussock *Nassella trichotoma*.



Plate 2: Inner Zone

2.2.4 Outer Zone

The vegetation outside the fenced off area but within the remainder of the offset area consists of a mosaic of lower quality grassland dominated by spear grasses and more degraded areas dominated by a number of weed species including *Paspalum*, Ribwort, Galenia and Spear Thistle *Cirsium vulgare*.

Overall, this area has a relatively high biomass. Isolated higher quality grassland patches dominated by Kangaroo Grass occur in the northern part of this area.



Plate 3: Outer Zone

2.3 Spiny Rice-flower

A total of three remnant and nine planted individuals of Spiny Rice-flower were recorded within the offset reserve (see Table 1 for further details).

During the site inspection dead specimens of a number of additional planted individuals were observed.

Council has committed to continue to propagate and plant individuals within the Spiny Rice-flower Zones until the minimum target of 28 established plants by the completion of the 10 year management period is achieved (in addition to the three remnant plants).



Plate 4: Planted Spiny Rice-flower



Plate 5: Remnant flowering Spiny Rice-flower

Table 1: Details of Spiny Rice-flower plants present within the offset area

Spiny Rice-flower Zone	Plant No.	Remnant/planted	Sex
1	1	Remnant	Male
2	2	Planted	Male
3	3	Planted	Female?
	4	Remnant	Male
	5	Planted	Female
	6	Planted	Insufficient flowering material
	7	Planted	Insufficient flowering material
	8	Planted	Insufficient flowering material
4	No alive plants present		
5	9	Planted	Insufficient flowering material
6	10	Planted	Insufficient flowering material
	11	Planted	Insufficient flowering material
	12	Remnant	Female

3. Management Actions

A variety of management actions are required across the offset reserve in order to improve vegetation condition and provide favourable conditions for Spiny Rice-flower establishment including:

- fencing, information and access control
- weed control
- pest animal control
- ecological burning or other methods of biomass reduction
- supplementary planting/seeding
- management of Spiny Rice-flower plantings.

Further detail regarding each of these management actions is provided below.

3.1 Permanent protection of offset area

An appropriate security agreement will need to be placed over the offset area to protect the site in perpetuity. Council have an agreement with Trust for Nature to place a conservation covenant over the offset area under the *Victorian Conservation Trust Act 1972*. Such a covenant will provide for the prohibition, restriction or regulation on the use or development of the land in order to protect the biodiversity values in perpetuity.

Action

- Council must place a Conservation Covenant on the 3 ha offset area as soon as possible following approval of this document by the Commonwealth Environment Minister.

3.2 Fencing, information and access control

Existing fencing around the Spiny Rice-flower and Inner Zones should be maintained. Fencing around the Outer Zone is also required to identify the extent of the offset reserve for management purposes.

Given that Council intends to manage the remaining area of the MCRR for conservation, a post and wire fence with two locked gates will be sufficient for this purpose. Bollards and rocks will also be used to restrict access to the reserve.

Rabbit-proof fencing is to be erected around any new Spiny Rice-flower plants observed.

Access to the MCRR is currently restricted to Council contractors and members of the model aeroplane club.

A process for communicating relevant information within this OMP to those with access to the site will be developed. As a minimum, all those with access to the MCRR will be made aware of the offset area and that access to or disturbance of the area is prohibited. Signage shall be erected around the perimeter of the Outer Zone to clearly identify the reserve boundary.

Actions

- Construct post and wire fencing around the Outer Zone.
- Maintain fencing in functional condition and repair promptly if damage occurs.
- Ensure that all those with access to MCRR are aware of the offset reserve and that disturbance of the reserve is prohibited.
- Install signage to ensure that everyone is aware of the offset reserve boundaries and no-one enters these areas inadvertently.

3.3 Weed control

High-threat weeds require ongoing control across the offset reserve. A list of priority high-threat weeds identified during the site inspection is provided in Table 2. Any other significant environmental weeds identified during the ongoing site monitoring should also be controlled.

Weeding is to be undertaken by hand within the Spiny Rice-flower Zones.

In the Inner and Outer Zones, weed management techniques are to be selected to minimise off-target damage and to facilitate the natural regeneration of native species.

Weed levels are to be monitored and management techniques adapted over time in response to site results.

Table 2: Priority high-threat weeds to be controlled

Name	Common Name
<i>Cenchrus clandestinus</i>	Kikuyu
<i>Cirsium vulgare</i>	Spear Thistle
<i>Cynara cardunculus</i>	Artichoke Thistle
<i>Cynodon dactylon</i>	Couch
<i>Dactylis glomerata</i>	Cocksfoot
<i>Galenia pubescens</i>	Galenia
<i>Helminthotheca echioides</i>	Ox-tongue
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hypericum perforatum</i>	St John's Wort
<i>Nassella neesiana</i>	Chilean Needle-grass
<i>Nassella trichotoma</i>	Serrated Tussock
<i>Paspalum dilatatum</i>	Paspalum
<i>Physalis hederifolia</i>	Sticky Ground-cherry
<i>Plantago lanceolata</i>	Ribwort

Actions

- Reduce cover of all high-threat weeds from current levels (refer Table 2 above).
- Control any new high-threat weeds observed before they reproduce.
- Control any other significant environmental weeds identified during the ongoing site monitoring.
- Protect natural regeneration from off-target damage during weed control.

3.4 Pest animal control

Rabbits and hares are considered to be present both within the offset reserve and the surrounding MCRR.

Rabbit-proof fencing has been erected around the Spiny Rice-flower Zones to prevent impacts from herbivory.

Ongoing rabbit/hare baiting should occur across the MCRR on a quarterly basis.

Action

- Implement an ongoing quarterly rabbit/hare baiting regime.

3.5 Ecological burning

Ecological burning has multiple benefits, including weed control, biomass control and stimulating natural regeneration of native species.

Both the Inner and Outer Zones should be burnt every 1–3 years depending on seasonal conditions and biomass loads. Burning of the Spiny Rice-flower Zones should be avoided until the plantings are well established (i.e. have survived more than three years).

Burning should occur in autumn when soil cracks are visible to minimise impacts to Striped Legless Lizard. The ecological burns must be undertaken by qualified and experienced staff.

Biomass loads currently vary across the offset reserve with the highest biomass observed in the Outer Zone. A small section of the Outer Zone was burnt in the autumn of 2013 as part of management of surrounding parts of the MCRR. The remainder of the offset area was burnt after the site inspection in July 2013.

Slashing of the Inner and Outer Zones may be considered as an alternative biomass reduction method if burning is not possible.

Action

- Undertake ecological burns every 1–3 years in the Inner and Outer Zones in autumn.

3.6 Supplementary planting/seeding

To increase diversity of indigenous species within the offset reserve, four small (approximately 10 x 10 m) degraded areas should be identified within the Outer Zone for re-introduction of indigenous grass and forb species. After the ecological burns, intensive weed spraying followed by micro-scalping and planting of tube-stock or directing seeding of a mix of locally sourced indigenous species should be undertaken.

Suitable species for seed collection and planting/seeding within the Outer Zone are listed in Appendix 1. Supplementary planting/seeding should occur in late autumn after ecological burns and the onset of the first autumn rains.

Action

- Undertake supplementary planting/seeding of herbaceous indigenous species in degraded areas of the Outer Zone.

3.7 Management of Spiny Rice-flower plantings

The mulch spread across much of the Spiny Rice-flower Zones at the time of site inspection has since been removed. Mulch is not an effective soil moisture retention strategy given the clay soils present and prevents seed dispersal and recruitment from the remnant and more established planted individuals.

Watering of planted individuals should occur every two weeks over the first the summer (December–February) and until the first autumn rain.

Monitoring of the health of planted individuals is required on an annual basis (see Section 4 for further details). Dead plants identified during monitoring are to be replaced until the target of 28 established plants is achieved.

It is important that a mixture of male and female seedlings is planted. Each new plant is to be numbered and tagged.

Actions

- Water planted individuals every two weeks during their first summer.
- Replace dead plants with a mixture of male and female plants until target of 28 established plants is achieved.

4. Monitoring and Reporting

To ensure that the vegetation within the offset area is being managed appropriately and to comply with Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) requirements, monitoring and reporting are to occur on an annual basis.

Monitoring must be conducted by an experienced ecologist from an organisation different to the management contractor. As Council employs independent contractors for all environmental management works, staff from Council's Environment Department are expected to undertake this work.

Three types of monitoring are required:

1. General vegetation condition
2. Photo monitoring
3. Spiny Rice-flower monitoring.

Appropriate records are to be kept for each monitoring event (date, time, observations etc.).

Further details regarding each monitoring type are described below.

4.1 General vegetation condition

Monitoring of the general condition of the vegetation is to include a walk-over of the site to identify improvements in vegetation condition as a consequence of management actions or other changes including weed outbreaks, rabbit/hare warrens and the success of supplementary planting/seeding efforts. Short inspections by the managing ecologist to monitor management progress are recommended every three months for the first two years and then on an annual basis for the remaining 8 years. Feedback is to be provided to the vegetation management contractor.

To further capture changes in the condition of the vegetation, five 10 x 10 m quadrats (aligned north) are to be established in representative areas (including two in the Inner Zone and three in the Outer Zone). A single star picket is to be placed at the centre of the northern boundary of each quadrat, clearly labelled with the quadrat number.

Within each quadrat a species list is to be prepared and the cover of native and weed species estimated based on the data collection template provided in Appendix 2.

At commencement, the quadrats are to be established and baseline condition data collected. Annual quadrat monitoring will then occur annually in October of each year.

4.2 Photo monitoring

During each monitoring event, a total of 11 photos are to be taken including one each facing south from the star picket marking each quadrat and six facing south into each of the Spiny Rice-flower zones.

Photos are to be taken at the commencement of this OMP as part of baseline condition data collection and annually in October of each year.

4.3 Spiny Rice-flower monitoring

Monitoring of the health and survivorship of known Spiny Rice-flowers within the reserve is to occur on an annual basis during the flowering period (April to August). All plants are to be tagged and given a unique ID number. A data collection template is provided in Appendix 2.

A search for any new germinants across the reserve is also to occur as part of the monitoring process.

4.4 Reporting

An annual report will be provided to DSEWPaC and the Spiny Rice-flower Recovery Team documenting the following:

- summary of management actions undertaken in the year
- results of data collected during the monitoring events including photographs and accompanying notes
- an assessment of whether each of the management actions outlined in Table 3 have been completed successfully
- recommendations for remedial actions if necessary
- recommended changes to the annual works program for the following year.

5. Table of Actions

Table 3 outlines the management actions required as part of this management plan.

5.1 Responsibility

It is the responsibility of City of Melton that each of the actions outlined in Table 3 is completed.

5.2 Timing

The time frame of this management plan is 10 years. The 10 year period is to commence once this document has been approved by the Commonwealth Minister.

5.3 Adaptive management

Prior to works being undertaken each year the annual works program (based on Table 3) should be reviewed. The works program for the coming year should also address issues that may not have been anticipated in formulating this original management plan.

Table 3: Management plan actions and timing for Spiny Rice-flower offset area, Mount Cottrell Recreation Reserve.

Note: the annual management cycle is from November to October the following year.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
Year 1				
1	1.1	Establish and protect offset area.	As soon as possible	Arrange permanent legal protection. Install permanent fencing, with gates and signage around perimeter of Outer Zone as per Section 3.2.
1	1.2	Using an appropriately qualified person, undertake baseline monitoring, establish photo monitoring points.	Spring	Use methods outlined in Section 4.
1	1.3	Maintain fences in good working order.	Ongoing	Post and wire fence around Outer Zone and Inner Zone. Rabbit-proof fencing around Spiny Rice-flower Zones.
1	1.4	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond baseline levels. Minimum off-target damage.
1	1.5	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
1	1.6	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
1	1.7	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
1	1.8	Undertake ecological burn within Outer and Inner Zones.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
1	1.9	Undertake supplementary planting/seeding in the Outer Zone.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
1	1.10	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
1	1.11	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
1	1.12	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report .	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
Year 2				
2	2.1	Update management actions required for Year 2 based on observations made at the end of Year 1.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
2	2.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
2	2.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
2	2.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
2	2.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
2	2.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
2	2.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
2	2.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period	May	Use methods described in Section 4.
2	2.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
2	2.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 3				
3	3.1	Update management actions required for Year 3 based on observations made at the end of Year 2.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
3	3.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
3	3.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
3	3.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
3	3.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
3	3.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
3	3.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
3	3.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
3	3.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
3	3.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 4				
4	4.1	Update management actions required for Year 4 based on observations made at the end of Year 3.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
4	4.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
4	4.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
4	4.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
4	4.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
4	4.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
4	4.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
4	4.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
4	4.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
4	4.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 5				
5	5.1	Update management actions required for Year 5 based on observations made at the end of Year 4.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
5	5.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
5	5.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
5	5.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
5	5.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
5	5.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1-3 years in autumn.
5	5.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
5	5.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
5	5.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
5	5.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 6				
6	6.1	Update management actions required for Year 6 based on observations made at the end of Year 5.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
6	6.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
6	6.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
6	6.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
6	6.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
6	6.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1-3 years in autumn.
6	6.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
6	6.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
6	6.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
6	6.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 7				
7	7.1	Update management actions required for Year 7 based on observations made at the end of Year 6.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
7	7.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
7	7.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
7	7.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
7	7.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
7	7.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
7	7.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
7	7.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
7	7.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
7	7.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 8				
8	8.1	Update management actions required for Year 8 based on observations made at the end of Year 7.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
8	8.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
8	8.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
8	8.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
8	8.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
8	8.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
8	8.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
8	8.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
8	8.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
8	8.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 9				
9	9.1	Update management actions required for Year 9 based on observations made at the end of Year 8.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
9	9.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.
9	9.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
9	9.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
9	9.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
9	9.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
9	9.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
9	9.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
9	9.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
9	9.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPaC.
Year 10				
10	10.1	Update management actions required for Year 10 based on observations made at the end of Year 9.	Nov	Maintain relevant goals and objectives of OMP throughout the 10 year management period.
10	10.2	Spot spray all high-threat grass / herb weeds in Outer and Inner Zone before seed set using appropriate herbicide. Control total cover of weeds.	Ongoing	Reduce cover of high-threat environmental weeds. No increase in cover of other weeds beyond current levels. Minimum off-target damage.

Year number	Action No	Activity Description	Timing of activity - month(s)	Standard to be achieved
10	10.3	Hand weed all introduced species from within Spiny Rice-flower Zones.	Ongoing	Maintain 0% coverage of weeds across all Spiny Rice-flower Zones.
10	10.4	Control pest animals (e.g. rabbits, hares) within the offset and surrounding area (i.e. MCRR).	Quarterly	No surface disturbance within offset site. No active rabbit warrens present within offset site, minimal surface harbour for rabbits and hares present (excluding natural harbour such as rocks).
10	10.5	Water planted Spiny Rice-flower individuals every 2 weeks for first summer.	Dec-Feb	Maintain soil moisture during first dry period to prevent planted seedling death.
10	10.6	Undertake ecological burn within Outer and Inner Zones as required.	Mar-Apr	Burning of Outer and Inner Zones to occur every 1–3 years in autumn.
10	10.7	Undertake supplementary planting/seeding in the Outer Zone as required.	Apr-May	Increase diversity of indigenous species. See Section 3.5 for methods and Appendix 1 for a list of suitable species.
10	10.8	Undertake annual monitoring of Spiny Rice-flower population during flowering period.	May	Use methods described in Section 4.
10	10.9	Plant additional Spiny Rice-flower seedlings in Spiny Rice-flower Zones.	May-Jun	28 established planted individuals by the end of the 10 year management period.
10	10.10	Undertake annual monitoring of reserve including general condition, quadrats and photo monitoring and prepare report.	Oct	Use methods described in Section 4. Prepare report and submit to DSEWPAC.

References

Ecology Partners 2007. Flora and fauna survey and habitat hectare assessment of several grassland sites within the Shire of Melton. Report prepared for Melton Shire Council.

Ecology Partners 2010. Vegetation and net gain analysis of the Mount Cottrell Recreation Reserve, Mount Cottrell, Victoria. Report prepared for Melton Shire Council.

Appendices

Appendix 1: Indigenous species suitable for supplementary planting/seeding

The following species have been identified as suitable for supplementary planting/seeding based on previous assessments of the site and the benchmark for *Heavier-soils* Plains Grassland Ecological Vegetation Class.

Table A1.1: Indigenous species suitable for supplementary planting/seeding

Life-form	Scientific Name	Common Name
Grasses	<i>Anthosachne scabra</i>	Common Wheat-grass
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass
	<i>Austrostipa scabra</i>	Rough Spear-grass
	<i>Bothriochloa macra</i>	Red-leg Grass
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass
	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass
	<i>Themeda triandra</i>	Kangaroo Grass
Forbs	<i>Calocephalus citreus</i>	Lemon Beauty-heads
	<i>Haloragis heterophylla</i>	Varied Raspwort
	<i>Leptorhynchos squamatus</i>	Scaly Buttons
	<i>Plantago gaudichaudii</i>	Narrow Plantain
	<i>Solenogyne dominii</i>	Smooth Solenogyne
	<i>Tricoryne elatior</i>	Yellow Rush-lily
	<i>Velleia paradoxa</i>	Spur Velleia
	<i>Wahlenbergia luteola</i>	Bronze Bluebell

Appendix 2: Monitoring templates

Monitoring requirements for general vegetation condition (quadrats) and Spiny Rice-flower plants are described in Section 4. Templates for data collection for both forms of monitoring are provided below.

Table A2.1: Template for quadrat data collection

Weed/ Native	Understorey Vegetation	Quadrats				
		Inner Zone		Outer Zone		
		1	2	3	4	5
Weeds	Woody weeds					
	Herb weeds					
	Grass weeds					
	OVERALL weed cover					
Natives	Native grasses					
	Native forbs					
	Native shrubs (small < 1 m)					
	Native shrubs (large > 1 m)					
	Native climbers/scramblers					
	Immature trees (eucalypts)					
	OVERALL native understorey cover					
	Bare ground					

* cover less than 5% is also noted separately


Table A2.2: Spiny Rice-flower monitoring – data collection template

Zone	Plant No.	Year planted	Sex	Year X		
				Alive/Dead	Flowering (Yes/No)	Condition

Figures



Legend

 Study Area

Acknowledgement: VicRoads
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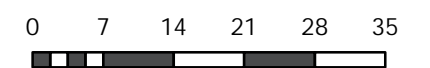


Legend

Offset Reserve Zones

- Inner Zone
- Outer Zone
- Spiny Rice-flower Zone

Figure 2. Spiny Rice-flower offset reserve, Mount Cottrell



Metres
 Scale: 1:750 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



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Matter: 16741,
 Date: 23 July 2013,
 Checked by: VCW, Drawn by: PMA, Last edited by: pangas
 Location: P:\16700s\16741\Mapping\16741_Figure 2