

## Recommendations for the management of *Pimelea spinescens* subsp. *spinescens* occurring in a fire control line (V4\_05.15)

Commissioned by VicRoads

Written by D. Reynolds V1\_12.2014, V2\_01.2015, V3\_03.2015, & V4\_05.2015.

The *P. spinescens* Recovery Team does not endorse ploughing or scalping as a fire control line option and strongly recommends that alternatives are adopted. However, when known population sites are faced with this action, the works will follow strict protocols, all plants must be located and none will be significantly impacted by the works.

Endorsed by the *Pimelea spinescens* Recovery Team members:

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### Introduction

In the past many Victorian roadside fire control lines (or fire breaks) have been made and maintained through the action of ploughing or grading (scalping). In many instances these practises have been maintained for years but in some areas the practice has ceased for a short or an extended period of time. During that time of cessation many grassland species such as *P. spinescens* have colonised the ploughed fire control line areas. Currently the Department of Environment, Land, Water and Planning (DELWP) recommends that fire control lines are slashed but if ploughing or scalping is permitted, the Victorian regulations for the “Permitted clearing of native vegetation biodiversity assessment guidelines” must be followed. These guidelines do not replace any of the requirements under the *Flora and Fauna Guarantee Act 1988* (FFG Act) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In areas where threatened species are known to occur and fire control lines are required to be established to carry out planned burns, a native vegetation survey conducted by a qualified Botanist must be undertaken at the appropriate time to determine whether a permit is required before work can commence.

### Spiny Rice-flower status

*Pimelea spinescens* subsp. *spinescens* (here referred to as *P. spinescens* – the other subspecies *pubiflora* is confined to a small area in western Victoria) is an endemic subshrub found within temperate grasslands of Victoria (Figure 1). It is listed as Critically Endangered under the Commonwealth EPBC Act. The species and native grassland community in which it commonly occurs (listed in Victoria in both the Northern Plain grasslands and Western (Basalt) Plains Grasslands Community and in Australia as the Natural grasslands of the Murray Valley Plains and Natural Temperate Grasslands of the Victorian Volcanic Plain) are also recognised as being threatened with extinction under the Victorian FFG Act (DELWP 2015). It is listed under these Acts because it is at high risk of extinction due to the ongoing reduction in both population size and area of occupancy (NSW Parliamentary Counsel's Office, 2010; DSE 2008). Incremental losses without replacement can rapidly lead to extinction particularly for small and isolated populations (Holsinger, 2000, Burgman,

Kieth *et al.*, 2007). Therefore the loss of individual *P. spinescens* plants within a population is contributing to that population's decline in the future.



**Figure 1** – A typical *P. spinescens* individual in full flower.

### **Breeding system and season**

*Pimelea spinescens* is considered to have a dioecious breeding system, flowering from approximately April through to October annually, depending on the prevailing weather conditions. A dioecious species consists of individual plants which only produce male flowers or only produce female flowers (Sakai and Weller, 1999). Seed is usually retained on plants until the warmer weather of late spring.

### **Previous management in grasslands and outcomes for the flora**

As a consequence of natural fire and deliberate and regular burning by humans, fire has become an essential process that influences, and in many ways maintains, many Australian ecosystems (Heywood, 1989, Knox, Ladiges *et al.*, 2001, Attiwill and Wilson, 2003). In Australian grasslands the flora has evolved under these burning regimes and now requires fire for rejuvenation. Many researchers of the Victorian temperate grassland flora south of the Great Dividing Range have found that fire events promote germination in many grassland species (Lunt, 1994, 1997, Morgan, 1998, 2001). This is in part due to the creation of inter-tussock spaces that can be exploited by new individuals (Silvertown and Charlesworth, 2001). In the absence of these spaces, there are limited opportunities for new seeds to obtain the required nutrients to germinate (Lunt and Morgan, 2002), thereby preventing recruitment and resulting in lower species and structural diversity (Morgan, 1999, 2001).

The *in situ* recruitment potential of *P. spinescens* populations has recently been found to be promoted by regular biomass reduction. A long-term study of a *P. spinescens* population at the Western Water treatment plant found that intensive management including an annual weed control programme and biannual burns allowed the *P. spinescens* population to double in a period of five years (Cropper, 2007, 2009). Research at 16 Spiny Rice-flower populations over a two year period

(2009 - 2010) has found that frequent biomass reduction events are associated with a population's capacity for germinant production, survival and an increased number of flowering individuals within the population (Reynolds, 2013).

The most significant effects on *P. spinescens* are loss of habitat via removal of vegetation and changes to agricultural practices, such as fertiliser application, ploughing and overgrazing (Commonwealth of Australia, 2009). *Pimelea spinescens* develops a deep tap root (Mueck, 2000) and any significant damage to this tap root is highly likely to kill the plant.

### **General recommendations**

In areas where threatened species are known to occur and fire control lines are required to be established to carry out planned burns, a native vegetation survey conducted by a qualified Botanist must be undertaken at the appropriate time to determine whether a permit is required before work can commence.

Sites where *P. spinescens* is known to occur will be signposted by the agency responsible for the works for the benefit of machinery operators working on construction of the break.

These recommendations are provided to assist managers of road reserves which can support both native grasslands and populations of *P. spinescens*. Such road reserves are also often used to provide fire control lines within the broader landscape through regular biomass control of part or all of the road reserve. Biomass control measures include slashing, ploughing and burning parts or all of a road reserve. Ploughing or slashing are often used to create a smaller scale fire control line (otherwise known as a containment line) within a road reserve which creates a fuel reduced area that is used to contain the planned burning to the road reserve.

As *P. spinescens* is typically reproductively inactive (not flowering or producing seed) between ~mid November until ~April, this is considered the optimal time to conduct any works (preparation, weed control, new control lines and burning [for further explanation see Fire section below]).

Biomass reduction of some sort is recommended regularly for all *P. spinescens* habitat to maintain a population's health. Biomass reduction can occur many ways, although traditionally it would have occurred via fire. However, regular slashing could be used if the recommendations in this document are adhered to.

## Fire

Burning in either spring or autumn is considered the optimal biomass management strategy within a *P. spinescens* population. Roadsides found to have *P. spinescens* within the previous fire control lines (white stars within the red outlined area) should now be managed within the main planned burn (yellow slashed area). Prior to this burn, managers must ensure that new and appropriate fire control lines (road, slashed, previously burnt and/or watered areas [purple slashed/outlined: adjacent land-owners area]), have been suitably prepared.

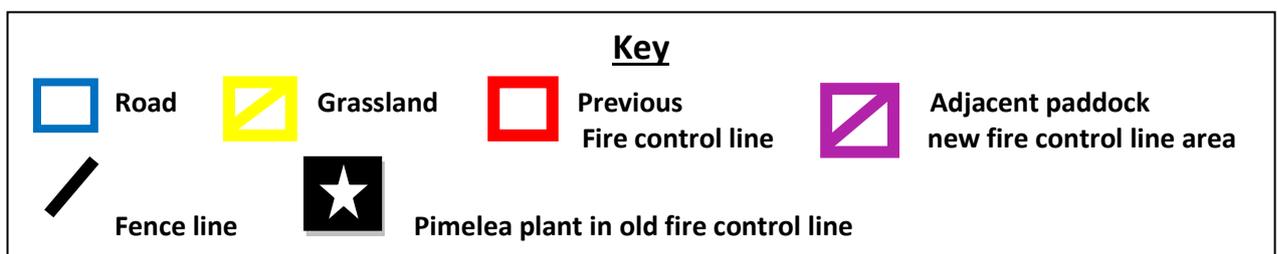
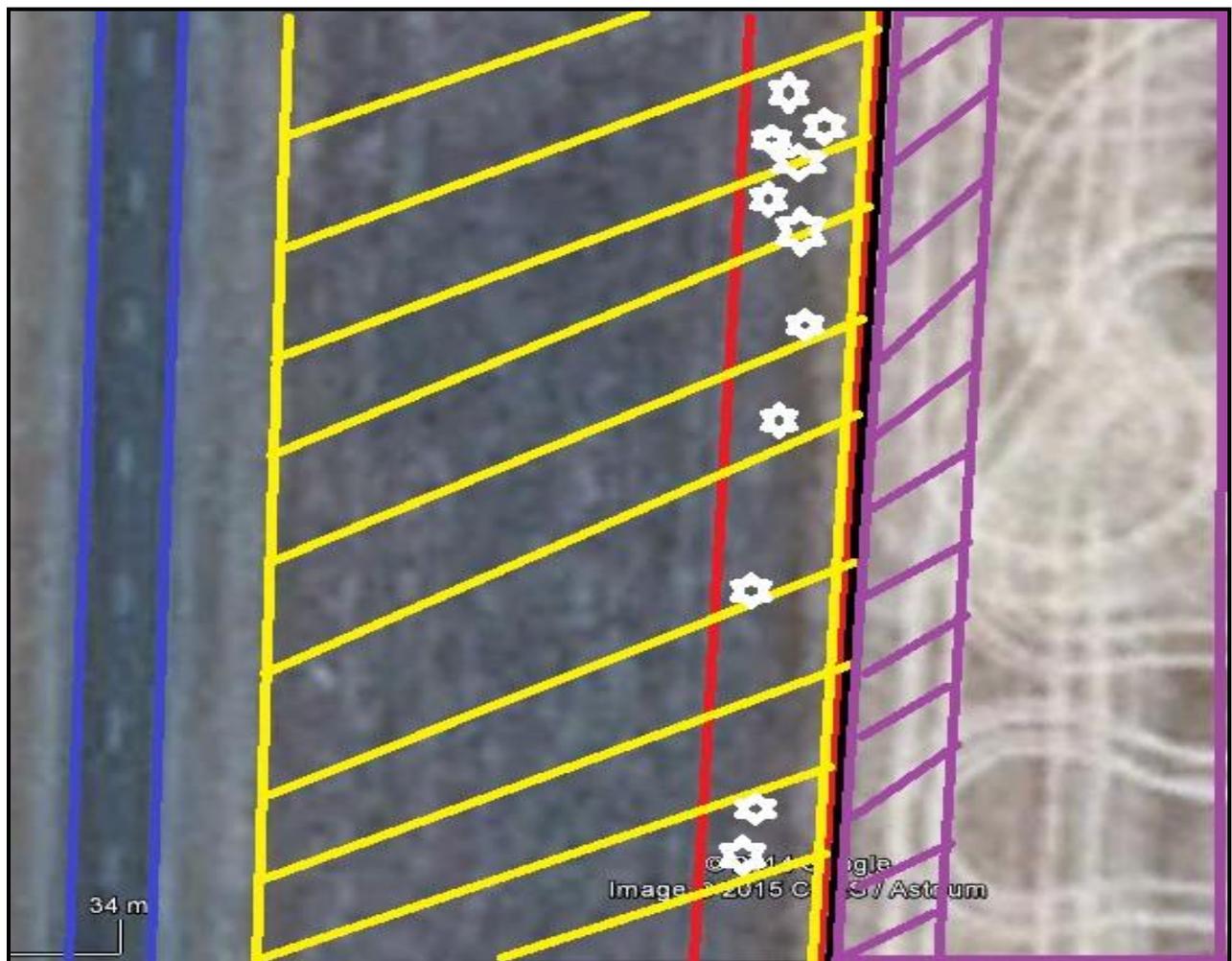


Figure 2 – A typical grassland roadside area.

## Slashing

Where slashing of the fire control line (red outlined area in area Figure 2) containing *P. spinescens* is permitted to occur to for the establishment of a fire containment line the slash height must be at least 10cm, not undertaken during the period of April to November or when the soil is soft. All appropriate hygiene measures and knowledge of the sites weed infestations should be employed to ensure weed seed is not spread across or between sites.

NOTE: It is likely that vehicles will be accessing the old fire control line area during the main burn. As compaction could also be an issue for *P. spinescens*, limiting the standing of vehicles in the area known to have *P. spinescens* is recommended.

ACTIONS: Prior to the burn clearly marking the locality of *P. spinescens* populations on the adjacent fence line will identify areas where vehicles are to avoid stopping for extended periods. The Burn Officer in Charge will provide an explanation for this at the burn briefing which occurs on the burn site prior to ignition.

## Reporting

Agencies permitted to undertake management of *P. spinescens* in a fire break area are recommended to:

1. Consult the *P. spinescens* Recovery Team (PsRT) to formulate site specific plans and recommendations prior to construction of the fire control line.
2. Provide a copy of the relevant Commonwealth and State application for and approval of the proposed works to the PsRT, including copies of FFG permits (State) and Referral Decisions (Commonwealth).
3. Submit a report to the PsRT and the Program Manager, Biodiversity of the relevant DELWP region following management, outlining:
  - the area treated (map)
  - preparation undertaken
  - agencies involved
  - management actions
  - timeline and outcome for the *P. spinescens* population (An audit and photos [points] of the plants prior to the actions and after (following flowering season [winter])
  - following the works, evidence of germinants and plants flowering
4. Maps showing the location of *P. spinescens* populations in the fire control line treatments are to be distributed during toolbox meeting of brigade members and key burn personnel prior to the planned burn.
5. Consult the *P. spinescens* Recovery Team (PsRT) if any concerns are raised during the management or if damage occurs to a *P. spinescens* plant.

The monitoring protocol documents are available from the PsRT ([debbier@tfn.org.au](mailto:debbier@tfn.org.au)) or online at:

<http://www.trustfornature.org.au/special-conservation-trusts/pimelea-conservation-trust-fund/>

## Final recommendations

These recommendations are current for 2015 and will be updated as required. A final report following the management will enable the PsRT to monitor the practice and regularly update the recommendations.

- Management occurs outside *P. spinescens* active season from ~November to April.
- Burning or slashing the fire break area containing *P. spinescens* in either spring or autumn.

## References

- Attiwill, P. & Wilson, B. 2003. *Ecology, an Australian perspective*. Oxford Press, Melbourne, Australia.
- Burgman, M. A., Kieth, D., Widyatmoko, D. & Drill, C. 2007. Threat syndromes and conservation of Australian flora. *Biological Conservation*, 134, 73 - 82.
- Commonwealth of Australia 2009. Significant impact guidelines for the critically endangered spiny rice-flower (*Pimelea spinescens* subsp. *spinescens*) Nationally threatened species and ecological communities EPBC Act policy statement 3.11. [Online]. Available from: <http://www.environment.gov.au/epbc/publications/pubs/spiny-rice-flower.pdf>.
- Cropper, S. 2007. A census of the *Pimelea spinescens* ssp. *spinescens* (Spiny Rice-flower) population on Lake Borrie Spit in 2007 and comparison with the previous census in 2003 that was conducted prior to active management being initiated on site. Report prepared for Melbourne Water by Botanicus Australia Pty Ltd, Sunshine, Victoria.
- Cropper, S. 2009. Monitoring of *Pimelea spinescens* ssp. *spinescens* (Spiny Rice-flower) on Lake Borrie Spit in 2008 and a discussion on the appropriate management of the population. Report prepared for Melbourne Water by Botanicus Australia Pty Ltd, Sunshine, Victoria.
- Department of Environment, Land, Water and Planning (DELWP) 2015. Flora and Fauna Guarantee Act 1988, [Online]. Available from: <http://www.depi.vic.gov.au/environment-and-wildlife/threatened-species-and-communities/flora-and-fauna-guarantee-act-1988>
- DSE 2008. Action Statement 132, Spiny Rice-flower, *Pimelea spinescens* subsp. *spinescens*. Victoria: Department of Sustainability and Environment.
- Heywood, V. H. 1989. Patterns, extents and modes of invasions by terrestrial plants. In: DRAKE, J. A., MOONEY, H. A., CASTRI, F. D., GROVES, R. H., KRUGER, F. J., REJMANEK, M. & WILLIAMSON, M. (eds.) *Biological Invasions: a Global Perspective, Scope 37*. John Wiley & Sons, Great Britain.
- Holsinger, K. 2000. Demography and extinction in small populations. In: YOUNG, A. & CLARKE, G. (eds.) *Genetics, demography and viability of fragmented populations*. Cambridge University Press, United Kingdom.
- Knox, I., Ladiges, P., Evans, B. & Saint, R. 2001. *Biology 2nd Edition*. The McGraw-Hill Book Company, Australia.
- Lunt, I. D. 1994. Variation in flower production of nine grassland species with time since fire, and implications for grassland management and restoration. *Pacific Conservation Biology*, 1, 359 - 366.
- Lunt, I. D. 1997. A multivariate growth-form analysis of grassland and forest forbs in South-eastern Australia. *Australian Journal of Botany*, 45, 691 - 705.
- Lunt, I. D. & Morgan, J. W. 2002. The role of fire regimes in temperate lowland grasslands of Southern Australia. In: BRADSTOCK, R., WILLIAMS, R. & GILL, M. (eds) *Flammable Australia: The fire regimes and biodiversity of a continent*. Cambridge University Press, United Kingdom.
- Morgan, J. W. 1998. Importance of canopy gaps for recruitment of some forbs in *Themeda triandra*-dominated grasslands in south-eastern Australia. *Australian Journal of Botany*, 46, 609 - 627.
- Morgan, J. W. 1999. Effects of population size on seed production and germinability in an endangered, fragmented grassland plant. *Conservation Biology*, 13, 266 - 273.
- Morgan, J. W. 2001. Seedling recruitment patterns over four years in an Australian perennial grassland community with different fire histories. *Journal of Ecology*, 89, 908 - 919.
- Mueck, S. 2000. Translocation of Plains Rice-flower (*Pimelea spinescens* ssp. *spinescens*), Laverton, Victoria. *Ecological Management and Restoration*, 1, 111 - 116.
- NSW Parliamentary Counsel's Office 2010. Threatened Species Conservation Regulation 2010. In: NEW SOUTH WALES GOVERNMENT (ed.). Internet: <http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+495+2010+cd+0+N>.
- Reynolds, D. M. 2013. *Factors affecting recruitment in populations of Spiny Rice-flower (Pimelea spinescens Rye subspecies spinescens) in Victoria's natural temperate grasslands: relationships with management practices, biological and ecological characteristics*. PhD thesis, Victoria University. Available online: <http://vuir.vu.edu.au/25922/>
- Sakai, A. & Weller, S. 1999. *Gender and sexual dimorphism in flowering plants: A review of terminology, biogeographic patterns and, ecological correlates and phylogenetic approaches*. Springer-Verlag, Germany.
- Silvertown, J. & Charlesworth, D. 2001. *Introduction to plant population biology*. Blackwell Science, Great Britain.