

# Getting Edgy

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*Results of vegetation management on interface of an urban Grassland Reserve:  
Ngarri-djarrang in Reservoir*

*Merri Creek Management Committee, December 2014*

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## Introduction

Monitoring of vegetation of a grassland reserve has attempted to evaluate the effectiveness of a treatment to reduce weed management costs associated with the edge effects resulting from a legacy of boundary disturbance. The results of the pre-treatment and the first 6 months of treatment are presented.

## Background

A range of generally undesirable influences on reserve ecosystems from adjacent landscapes with different land uses is termed 'edge effect'. It may include; influx of weed propagules, shading by buildings, excess water and nutrients inflow from adjacent hard surfaces, spray drift from pesticides or fertilisers and disturbance from adjacent infrastructure construction and from visitors.

Another source of edge disturbance arises from the requirement to conduct fuel reduction along boundaries where wildfire is a risk to property. Best practice reserve design can minimise the impact of edge effects through the use, for instance of boulevard roads. However for many reserves there is a legacy of non-optimal interfaces.

At the Ngarri-djarrang grassland reserve in Reservoir in the northern suburbs of Melbourne, a 190 metre boundary of the reserve adjoins housing developed in the early to mid-1980s. The vegetation alongside the paling fence boundary has been managed with slashing for most of that time. Despite guidelines to minimise this, the slashing treatment has introduced and spread weed species, caused soil disturbance during wet conditions and smothered adjacent indigenous vegetation from windrowed slash. By early 2014, the strip was entirely occupied by exotic vegetation including highly invasive species such as Kikuyu (*Pennisetum clandestinum*), Couch (*Cynodon dactylon*) and Sour-sob (*Oxalis pes-caprae*). A high proportion of maintenance resources were devoted to preventing these highly invasive weed species from extending into the grassland.

The replacement of this weedy strip with a gravelled track in 2014 sought to replace the weeds while increasing the effectiveness of the fire protection boundary. The installation of the gravel has been accompanied by additional weed control and revegetation to remove the remaining weed invasion front beyond the gravel and consolidate the indigenous vegetation.

Surveying has been used to identify initial site conditions and detect the changes to vegetation to evaluate the effectiveness of gravel installation, weed control and revegetation. The data seeks to inform ongoing

management of the weed treatment and identify the value of the approach for similarly compromised grassland reserve sites.

## Aim

To record vegetation changes across a grassland reserve interface following conversion from a weedy slashed interface to a gravelled track with associated restoration works.

## Objective

Record the proportion of indigenous plants and low priority and high priority weeds present at two metre intervals within twenty metres of the reserve boundary. Record the species of high priority weeds present and whether weed management and revegetation has resulted in reduction in weed types and increase in indigenous vegetation.

## Method

Three permanently marked transects were located in the area subjected to replacement of slashed boundary with gravelled track and subsequent weed control and revegetation. The transects were each twenty metres long and perpendicular (aligned east-west) to the orientation of the north-south boundary.

A 70 cm high flag was placed upright at 50cm intervals along the transect. All vascular plant species that touched the flag were recorded as 'present'.

Results from the surveys were tabulated and a chart created. Weeds were classed according to whether they were high or 'not-high' priority. Priority weeds are those that present a high level of threat to the local grassland ecology and are difficult to control.

Charts showed the results of four sample points (spanning two metres of transect) where each of the three vegetation types were detected. Where no vegetation was detected, it was recorded whether the ground was bare or covered by dead vegetation, gravel or jute mat.

## Results

The following pages show;

- Lists priority weeds identified in each of the quadrats
- Chart showing the percentage of survey points where each of the three vegetation types, Indigenous, exotic-(non-priority) and exotic- (priority) were recorded.
- Photopoints taken at each end of the transect line.
- Aerial photo images from a proprietary supplier were before management began and at the time of the monitoring in May and November 2014.

## Changes in presence of priority weeds

Transect 1 shows that between May and November the priority weeds *Oxalis obtusa*, *Agrostis stolonifera* and *Dactylis glomerata* have ceased to be detected from the transect while *Pennisetum clandestinum* and *Paspalum dilatatum* and *Phalaris aquatica* were all detected at single sample points.

In Transect 2 *Anthoxanthum odoratum* and *Cynodon dactylon* increased in prevalence within the transect, with the *Cynodon* prevalent in 3 to 6 metres of the fence and *Anthoxanthum* 15 to 20 metres from the fence. *Dactylis glomerata* appears to have been successfully treated while a few points recorded the previously un-detected *Nassella neesiana* 7 to 11 metres from the fence.

In Transect 3 *Anthoxanthum odoratum*, *Dactylis glomerata*, *Oxalis pes-caprae* and *Pennisetum clandestinum* appear to have been eliminated from the transect however *Phalaris aquatica* remains widespread through the transect at approximately similar prevalence.

### Proportion of indigenous, priority and non-priority weeds

Transect 1 appears to show a steady prevalence of indigenous vegetation but an increase in non-priority weed species. This was mostly due to much increased detection rate of *Briza maxima*.

Transect 2 shows a steady presence of indigenous vegetation but an increased rate of detection non-priority weed due mainly to *Briza maxima*. The higher detection of priority weeds due to appearance of *Nassella neesiana*, and increases in *Anthoxanthum odoratum* and *Cynodon dactylon* detection rate.

Transect 3 shows an increase in extent of indigenous vegetation to areas closer to the fence, due to detection of recently plantings. A number of sample points without vegetation are still evident with these points generally covered by jumat. Substantial reduction in priority and non-priority weeds in the zone closer to the gravel is evident where broadscale herbicide application and revegetation has taken place. The regrowth of *Phalaris aquatica* tussocks has maintained a low level of priority weeds across much of the transect.

## Discussion

Transects show the gravel has remained almost entirely free of weeds in the first six months following installation with benefits of ease of improved fire risk reduction and reduced weed propagule pressure on adjoining vegetation and ease of management.

Seasonal effects are likely to be at least partly responsible for some of the observed changes in the vegetation transects including;

- the greatly increased non-priority weed detection due to the growth of annual weeds such as *Briza maxima* from small seedlings in May to maximum size in November.
- Reduction in detection of some winter active priority weeds such as *Oxalis obtusa* from their maximum size in winter to their dormant phase in the second survey.
- Increased detection in summer active weed species such as *Cynodon dactylon* and *Pennisetum clandestinum* due to increased rapid growth in early summer.
- Increased detection in some species such as *Nassella neesiana* that may have been present but indistinguishable from indigenous *Austrostipa* species during the first survey period.

Some vegetation change is attributable to weed control that occurred during the six months including reduction in detection rate of Cock's foot (*Dactylis glomerata*) and the broadscale removal of the weed band at Transect 3.

There are a number of reasons for the continued presence of some weeds within the interface despite increased weed control resources;

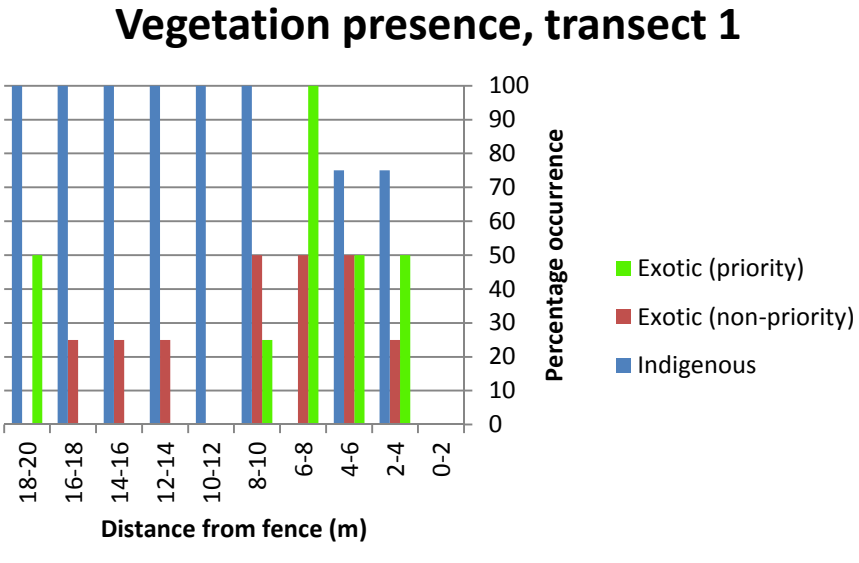


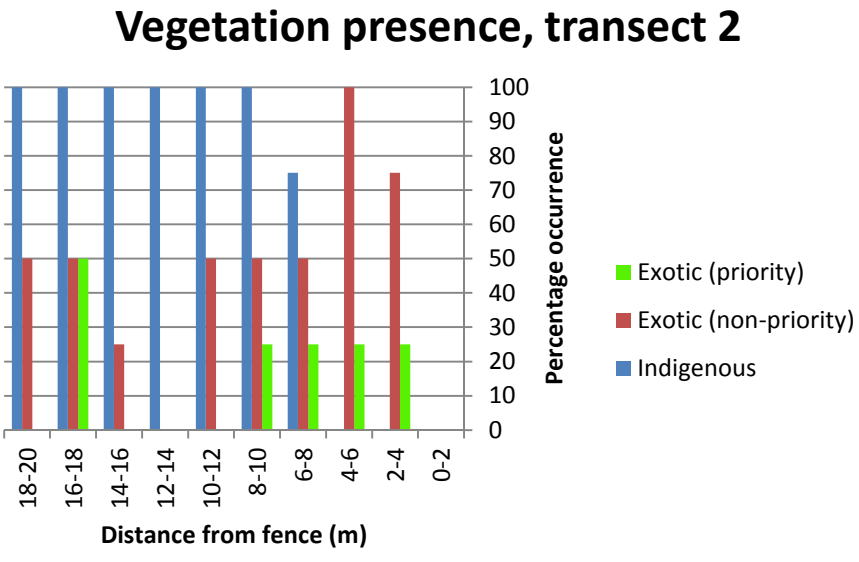

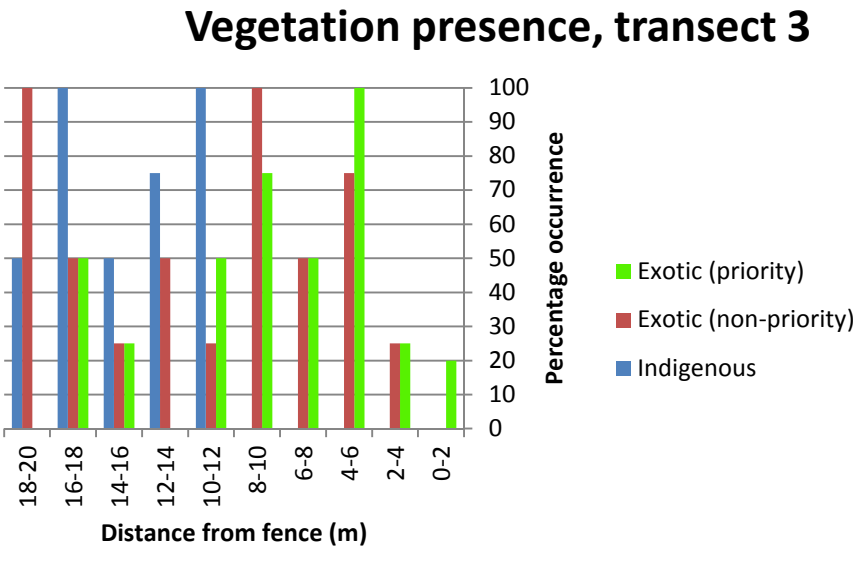

- At the time of the second survey, some weed species had only recently attained a state of maximum detectability and susceptibility to treatment and would be treated as a part of summer weed control rounds.
- Some weed control is customarily carried out in the aftermath of biomass reduction to avoid off-target damage to intermingled indigenous vegetation.
- Specialised timing of fire may be used to reduce the prevalence of the priority weed *Anthoxanthum odoratum*.

The data from this survey is at a scale that is useful for helping field staff target weed control in this segment of the grassland.

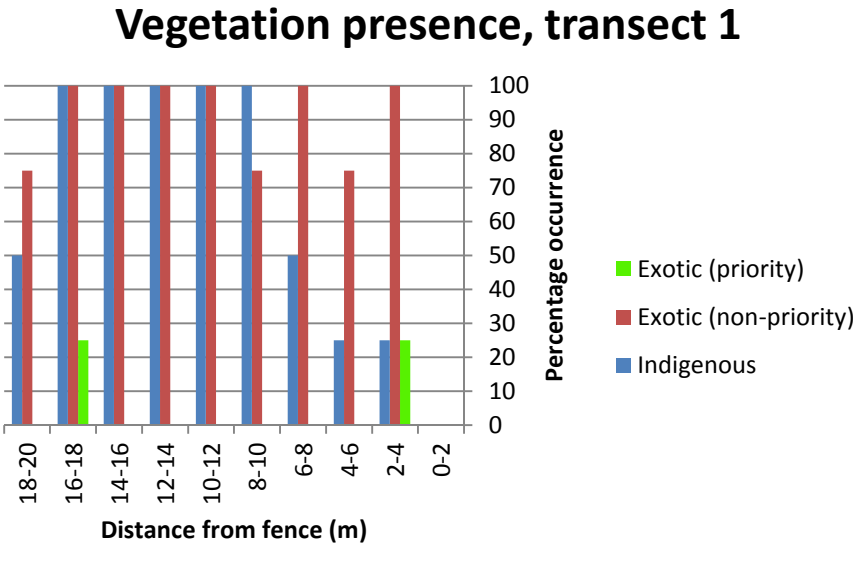


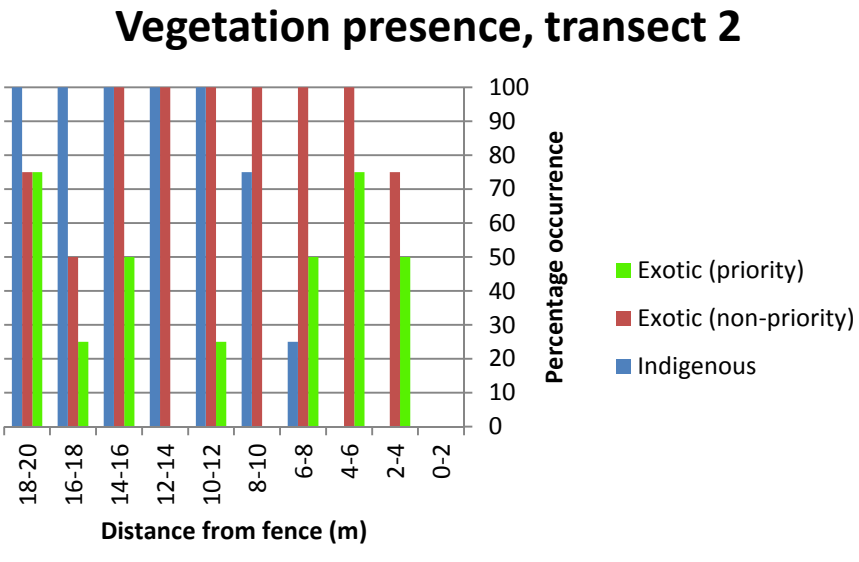

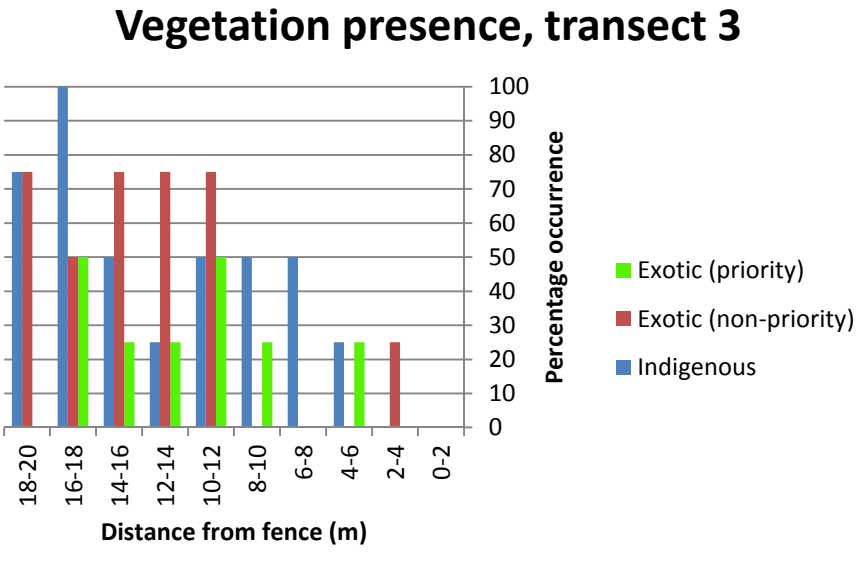

## Conclusion

In the six months since installation, the gravel track is maintaining a superior level of fuel reduction and reduction in weed propagule pressure on adjoining grassland environment. Associated increased weed control measures have succeeded in reducing some priority weed issues and increasing indigenous plant extent. However the success in consolidating the indigenous cover along the interface will only be apparent after two years when seasonal factors can be accounted for and the incorporation of post-ecological burn weed control have been applied. The monitoring method used provides valuable data for improved targeting of weed control for field staff.



| Description   | Pre-treatment transect results (19/5/14)   | Photopoints 19/5/14   | Map 4 <sup>th</sup> March 2014   |
|---|--|---|--|
| <b>Priority weeds:</b><br><i>Agrostis stolonifera</i><br><i>Dactylis glomerata</i><br><i>Oxalis obtusa</i>  | <p><b>Vegetation presence, transect 1</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p>   |    |  |
| <b>Priority weeds:</b><br><i>Agrostis stolonifera</i><br><i>Anthoxanthum odoratum</i><br><i>Cynodon dactylon</i><br><i>Dactylis glomerata</i>                                 | <p><b>Vegetation presence, transect 2</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p>  |   |  |
| <b>Priority weeds:</b><br><i>Anthoxanthum odoratum</i><br><i>Dactylis glomerata</i><br><i>Oxalis pes-caprae</i><br><i>Pennisetum clandestinum</i><br><i>Phalaris aquatica</i> | <p><b>Vegetation presence, transect 3</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p> |  |  |



| Description   | Post-treatment transect results (24/11/14)   | Post-treatment Photopoints 24/11/14   | Map 29 <sup>th</sup> November 2014 (Nearmap)   |
|---|--|---|--|
| <b>Priority weeds:</b><br><i>Paspalum dilatatum</i> ,<br><i>Pennisetum clandestinum</i>                       | <p><b>Vegetation presence, transect 1</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p>   |    |  |
| <b>Priority weeds:</b><br><i>Anthoxanthum odoratum</i><br><i>Cynodon dactylon</i><br><i>Nassella neesiana</i> | <p><b>Vegetation presence, transect 2</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p>  |   |  |
| <b>Priority weeds:</b><br><i>Phalaris aquatica</i>  | <p><b>Vegetation presence, transect 3</b></p>  <p>Percentage occurrence</p> <p>Distance from fence (m)</p> <p> <span style="color: green;">■</span> Exotic (priority)<br/> <span style="color: red;">■</span> Exotic (non-priority)<br/> <span style="color: blue;">■</span> Indigenous         </p> |  |  |