# Critically Endangered WA Flora - monitoring and weed control research

by

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## ESP Project Number: 564

## Progress Report

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**Introduction** – Preliminary fieldwork was carried out at several sites (mainly agricultural regions) during the winter/spring of 1996. Both the procedures for monitoring sites and the weed control techniques are described in appendix 1 of this report. Most of the weed control sites are located on narrow linear reserves (ie road or rail) and most were invaded by exotic grasses hence the application of Fusilade (a grass selective herbicide). This was carried out in matched plots (control and treatment) on: *Eremophila nivea, Conostylis micrantha, Verticordia fimbrilepis ssp fimbrilepis, Orthrosanthus muelleri.* Spot control (including barrier-fenced enclosure sites) also occurred on: *Verticordia spicata ssp squamosa, Eremophila veneta, Grevillea pythara, Grevillea calliantha, Daviesia euphorbioides.* Broadleaf or other non-grass weeds were controlled by wicking with Roundup herbicide or by manual methods such as hand pulling etc.

Unfortunately, there was a ten month break before funds were available to recommence work on this project. The October 1997 restart date (ie late spring) did not allow for any significant field trial work to occur that year, although existing sites were monitored and potential new sites surveyed over summer 1997/1998 and autumn 1998. During this lead up period, as well as site selection, a comprehensive database was developed with current information recorded.

It has been recognised that reinvasion of weeds on these narrow linear reserves is problematic. It therefore seems likely that site rehabilitation in conjunction with ongoing weed control would be beneficial, particularly if this work enhances the possible regeneration of critically endangered plants on the site. Initially, rehabilitation may have a twofold effect. Firstly, more native species cover on site will equate to less room for weeds to invade, and secondly, any new critically endangered plants that may regenerate will provide for better population viability and longevity since many are already showing signs of senescence. Other longer-term benefits could include increased pollinator activity and habitat protection.

However, there are numerous problems associated with the re establishment of a complex native vegetation on degraded narrow linear reserves and because of this the project will try to attempt the latter only. For each of several critically endangered species to be studied an extra trial plot has been implemented. These extra plots will be controlled for weeds and then undergo a subsequent treatment to try to enhance regeneration of critically endangered plants (ie racking, smoking, burning of dead plants etc). Hence each species worked on will have matching control, weed-treated and weed-treated/regeneration-treated plots.

**Scope Item 97.1** – Develop and refine protocols for the control of weeds on populations of critically endangered flora.

**Actions:**

1) *Eremophila nivea* – Previous work on this species has been expanded to include 9 trial plots (3 replicates as described above). The 7 extra plots were established during December 1997 and January 1998. All plots have had partially pre-treatment monitoring. This monitoring will be completed in late June/early July prior to any herbicide spraying etc. Assessment of weed control and post treatment monitoring will occur some weeks later followed by the relevant regeneration technique on the 3 allocated plots.

2) *Verticordia fimbrilepis ssp fimbrilepis* - Previous work on this species has been expanded to include 9 trial plots (3 replicates as described above). The 7 extra plots were established during December 1997 and Feburary 1998. All plots have had pre-treatment monitoring. Herbicide spraying of treatment plots will follow shortly. Assessment of weed control and post treatment monitoring will occur some weeks later followed by the relevant regeneration technique on 3 plots.

3) *Orthrosanthus muellerii* – Previous work on this species has been expanded to include 3 trial plots (1 replicate as described above). The extra plot was established during March 1998. Pre-treatment monitoring is planned for early/mid August with treatment and post-treatment work following at an appropriate time thereafter.

4) *Grevillea elongata* – This species has not had any prior weed control or monitoring. The 3 plots (1 replicate as described above) were all established during March/April 1998. Pre-treatment monitoring is planned for mid/late June with treatment and post-treatment work following at an appropriate time thereafter.

5) *Adenanthos pungens ssp effusus* - This species has not had any prior weed control or monitoring. The 3 plots (1 replicate as described above) were all established during March 1998. Partial pre-treatment monitoring was completed in early June. Plot treatment and post-treatment monitoring/regeneration etc are planned for late June/early August or at an appropriate time thereafter.

6) *Eremophila scaberula* - This species has not had any prior weed control or monitoring. The 3 plots (1 replicate as described above) were all established during January 1998. Pre-treatment monitoring is planned for mid August with treatment and post-treatment work following at an appropriate time thereafter. Work on this site is provisional on time constraints and other planned spot control programs.

**Scope Item 97.2** – Implement appropriate weed control strategies for all populations of critically endangered.

**Actions:**

1) *Daviesia euphorbioides* – Previous work on this species at the barrier-fenced site will be followed through to see whether the enclosure is effective at reducing weed invasion. Unfortunately, the enclosure partially collapsed during that period when the project was non-operational and allowed weed access. Enclosure was reconstructed November 1997 and was monitored and sprayed to control weeds in late May 1998. Post-treatment monitoring and any additional treatments are planned in the near future.

2) *Grevillea pythara* - Previous work on this species at the barrier-fenced site will be followed through to see whether the enclosure is effective at reducing weed invasion. The enclosure was inspected in early May 1998 and had no weeds, however, native cover had increased including the cover of *Grevillea pythara*. Significant rain has occurred since and enclosure will be checked again in early/mid July.

3) *Daviesia cunderdin* - This species has not had any prior weed control or monitoring. An enclosure was erected around one of the four live plants including the remains of two dead plants. Spot control work was completed within the enclosure and around individual plants during late May. Post-treatment monitoring and some regeneration technique (racking and possible burning of dead enclosure plants) is planned for the site soon.

4) *Grevillea calliantha* – Spot weed control for translocation program may not be required as the site chosen appears weed free at this stage.

5) *Grevillea mccutcheonii* – Spot weed control for proposed translocation program postponed till 1999/2000 when more cuttings will be available for that program.

6) *Acacia aprica* – Spot weed control for translocation program may be required around mid August. Population 1 on narrow MRD reserve will possibly get some spot control work done this season if time permits. This species has had no prior weed control work.

7) *Caladenia viridescens* – Consulting with CALM, Busselton District regarding spot control and monitoring of recent rehabilitation work at one population. Site visit planned late June or soon thereafter. This species has had no prior weed control work.

8) *Calytrix breviseta ssp breviseta* – Consulting with CALM, Perth District regarding spot weed control etc. No response from district staff as to when this will occur. This species has had no prior weed control work.

9) Other potential spot control sites – There are numerous populations in need of some spot weed control (apart from those used in 1996) including *Daviesia bursarioides, Hemiandra gardneri, Caladenia bryceana ssp bryceana, Pterostylis sp* Northampton etc etc. Work on these species will be dependent on District commitment and on the resources and time available to complete the main objectives stated above.

**Scope Item 97.3** – Monitor the effectiveness of initial weed control measures, update procedures where appropriate and carry out ongoing weed control over a two year period.

**Actions:**

As stated in the introduction a comprehensive database has been developed to help the monitoring program and to assess the effectiveness of weed control. All future information and data will be entered into this database as a permanent record of ongoing work. This should be an invaluable tool in analysing the monitoring data and identifying which procedures work effectively. Samples of the database output may be seen in appendix 2. For more information see under Scope Items 97.1 and 97.2.

# APPENDIX 1

## Methodology

There were two different aspects to the methodology used in this project. Firstly, that associated with the implementation of permanent monitoring sites (control, treatment, general plots). Second, were the methods used to undertake weed control (eg equipment, equipment parameters, herbicides, safety procedures etc). In each case the procedures used aimed for simplicity, however, some complexity developed in the endeavours at overcoming a diverse number of problems regarding site, DRF lifeform, herbicide factors etc

### Monitoring procedures

*General*
Plots are the most recognised and repeatable forms for monitoring native vegetation. A number of plot sizes were used for this project because of the need to incorporate a sizeable (and representative) sample of threatened flora within any plot boundary and because of the geometry of plant locations at each site. Recommended for this initial pilot project were 3 quadrats sizes (5x5m, 10x10m or 20x20m) and 3 transect sizes (2x20m, 3x30m or 4x40m). In several instances, where critically endangered plant numbers were minimal or too widely spaced, plots for monitoring could not be accommodated. However, spot weed control occurred at some of these sites as recommended within the relevant IRP's even though the degree of control was not empirically assessed.

*Installing plots*
Plots were designated using steel star pickets (corner posts were marked 1, 2, 3 and 4 sequentially with white paint). For transects, posts 1-2 and 3-4 represented the two narrower ends. Additionally, steel fence droppers were used to mark out permanent intercept transects through each plot for assessment of plot vegetation cover (point intercept method). For quadrats 5 intercept lines were installed, while 3 were installed for transect plots. Figure 1 illustrates these plot setups.

*Photopoints*
For each quadrat, either posts 1-2, 2-3, 3-4 or 4-1 were selected as the permanent photopoints with the field of view top centred on the diagonally opposite posts (fig 1). At every monitoring period two photographs were taken, one from each of the two nominated posts (preferably those that give the best vantage points over the plot). For transect plots, a photograph was taken from the centre between posts 1-2 and then posts 3-4, being the respective photopoints (fig 1). Again, the field of view should be top centred on the two opposite posts of the transect. If this arrangement was not possible due to some site factor then a close alternative was devised and clearly explained on the data sheets. For example, a 20x20m plot at Elphin, Wongan Hills was best accommodated by using all four corner posts as photopoints because all adjacent individual combinations revealed little about the plot. Other general photography was used extensively to record sites and plot treatment effects.

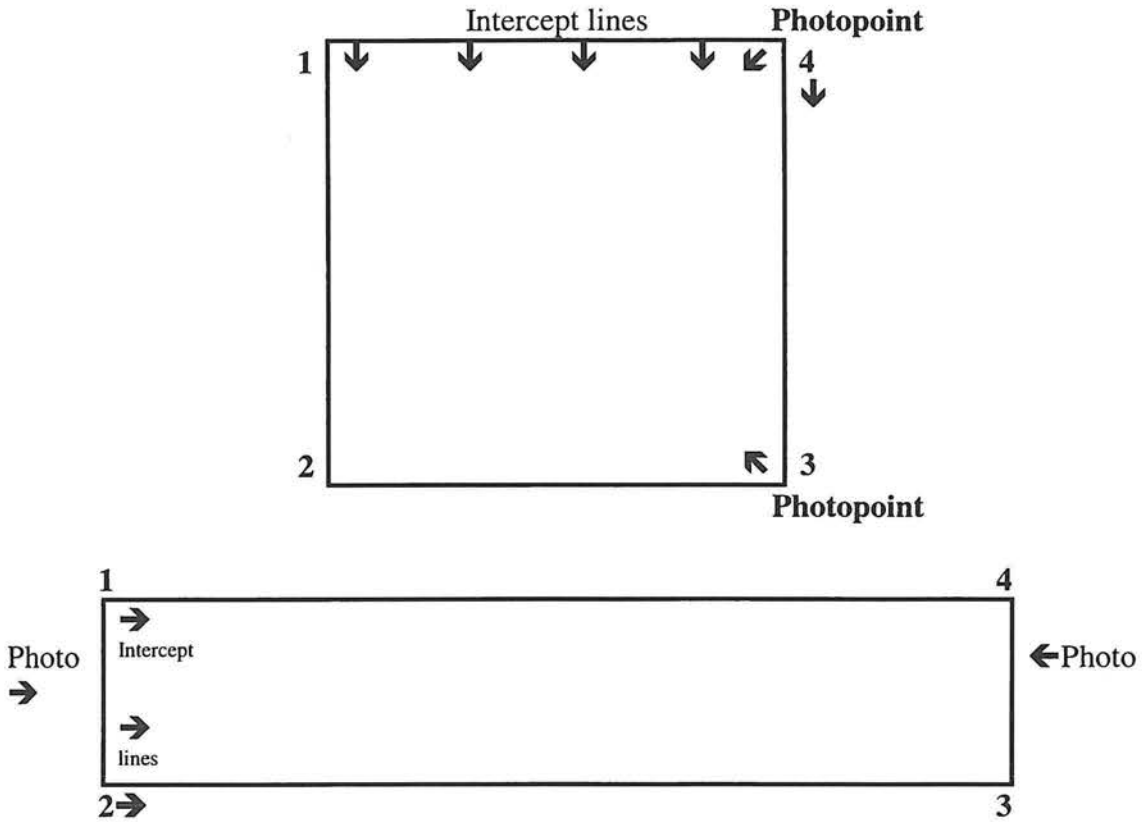


Figure 1 - Schematic diagram of installation features of quadrat and transect plots used for this project. Note that the orientation of numbered posts, photopoints and intercept lines may vary from plot to plot.

Ideally, photographs should be taken at 3 to 6 month intervals to detect gross changes at any one site (eg seasonal biomass changes of weeds), while changes to DRF and other site factors may be detected over longer intervals of up to 3-4 years. Photopoints are only useful if operators maintain consistency and attention to minor details. For example, ensuring the camera is facing exactly square to the opposite post or posts. A compass may be useful initially to get square on for this exercise. Next, place the opposite post's top (or two posts if it is a transect) in the middle and upper half segment of the view-finder's field of view. Bright coloured tape tied to the top of these posts should make this operation easier to achieve. For future photographs it would be desirable to compare the image seen in the view-finder to the original photograph (Brown, A. 1994). If possible, photographs should be taken at about the same time of day and in similar conditions as the original.

*Data recording*

Several field data forms were developed for this project. Two similar monitoring forms (see appendix) record data about individual DRF plants within either a quadrat or a transect. Generalised information on these datasheets includes: site location, taxon, date, recorder, quadrat / transect dimensions and also whether the plot is a treatment or control site. An explanation of the other more specific data required on these forms is outlined in the following paragraphs.

In every plot the DRF were recorded as plant numbers 1,2,3,4,5,6,.....etc (a marked tag was loosely tied to each plant and concealed). The location of each DRF plant in a quadrat was achieved by measuring the distance to the plant's centre and it's bearing in degrees (using a compass) from post 1. It appeared best to start recording these data from the DRF plant nearest post 1 and then spreading out in sequence to others further away until all plants had been recorded.

For a transect, each plant was located within a nested quadrat of the whole (fig. 2). This means, that for a 2x20m transect there are 10 off 2x2m nested quadrats, while a 3x30m transect has 10 off 3x3m nested quadrats. Nested quadrats began at the 1-2 post end of transects and were designated permanently as 1,2,3,4,.....10. Where 2 or more DRF plants were located in the same nested quadrat then the marked tags should identified each individual. If a large shrub significantly covers more than one nested quadrat, say for example nested quads. 2 and 3, then 2/3 was recorded. However, in most cases, a shrub's main trunk usually indicated the nested quadrat it belonged to.

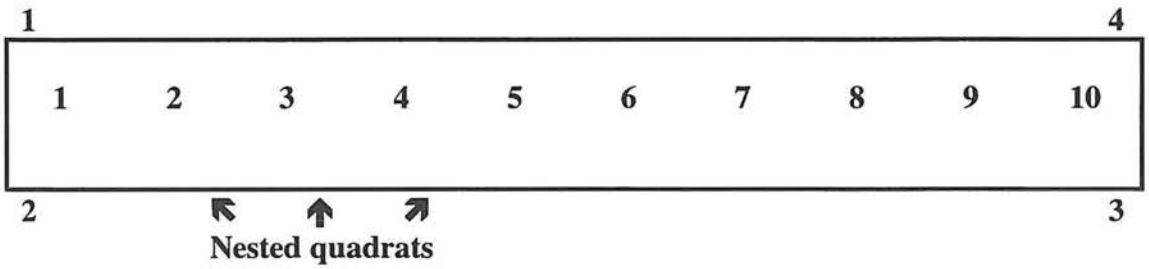


Figure 2 - Transect plot displaying the arrangement of nested quadrats.

Alive or dead DRF plants were recorded on the datasheets. If the plant had some living canopy or was resprouting then it was considered alive. Each DRF plant was recorded as adult, juvenile or seedling. New seedlings in a plot should be recorded as new plant numbers on the form. A resprout from an existing or presumed dead plant should retain it's usual plant number although a comment would be in order, especially if the resprout comes from a presumed dead plant of long standing. There is difficulty in allocating plant numbers to suspected clonal species because sproutings may be from rootstocks or seed, so some discretion is needed. Record new plant numbers only where these resprouts are a good distance away from potential parent plants such that these will eventually develop their own localised clumps.

Percentage health is a subjective estimate of each plants appearance. It was based on how much canopy was alive and it's appearance in respect to other healthier plants of similar size at that particular locality. However, factors such as insect, fungal or physical damage should also be noted and assessed for overall plant condition. Comments are useful regarding this criteria.

Plant height is a straight forward measurement from ground level to the top of the canopy (in metres). Measuring plant width requires a little more explanation. W1 is the widest point across the canopy, while W2 is the widest measured distance perpendicular to the first (in metres). If these measurements are taken carefully and consistently then a reliable indication of canopy size changes may be monitored. Plant species with tangled canopies (eg *Calytrix breviseta, Verticordia fimbrilepis etc*)

proved difficult to measure in many instances. Canopy measurements will detect growth increases of new seedlings or juveniles rather than slower growing adults, however, seasonal canopy growth might also be recorded.

For data on buds, flowers, fruit or new growth it was simply a matter of recording yes or no in the appropriate column of the datasheet. Comments may be useful if things appear out of the ordinary (eg exceptional or very poor shoot growth, aborted buds, seedless or insect damaged fruits etc). When life cycles were in transition (eg between flowers and fruit) the forthcoming morphological state was indicated.

A third field monitoring form was devised so that a comprehensive sketch of the plot and it's immediate surrounds could be made (see appendix). These sketches included roads, tracks, fencelines, approximate north etc. The diagram of the plot, itself, should include the numbered posts, photopoint locations, intercept line locations and any additional information (eg a distinctive tree, feature or DRF location).

The last two forms were used for recording plot vegetation cover (see appendix). As already stated, the percentage cover for dominant associated species (ie native and weed species) and the critically endangered flora within each plot was obtained by using the line-intercept method. The plot vegetation cover data sheet was used to record all the plant species at each interval along the intercept lines. The last form was used to record the assessment of percentage cover of DRF, native and weed species within each plot. This method is explained in the paragraph below, however, this pilot project only dealt with shrub/herb species so there was little need to record dominant tree cover unless this was of similar height to the shrub/herb community being monitored (eg juvenile trees or if the DRF is a tree species).

The line-intercept method for evaluating percentage cover relies upon recording each plant species noted at points spread evenly along intercepts which dissect any plot. The number of times an individual species is recorded (at point intervals) compared to the total number of points tested gives a quite respectable evaluation for the cover of that particular species within any plot. To test the cover at each point a thin rod is place vertically upright through the vegetation and to the ground. Each plant species touched by the rod is recorded, hence one point may have more than one species recorded, if say, two shrubs and an underlying herb layer exist there. Because most plots have shrubs and herbs throughout the resulting cover will be higher than 100%. When the rod only touched soil then bare ground was recorded for that point.

This method is more accurate when used in larger sized plots (ie 10x10m plus), but was modified for use with smaller sized plots. Different sized plots have a different number and pattern of sampling points, nominally one point per every 0.5 sq m of plot if possible (eg a 10x10m plot has 195 sampling points at 25 cm intervals along 5 separate transects, while a 2x20m transect plot has 78 sampling points at 75 cm intervals along 3 intercept lines). Although the resulting measure of vegetation cover for these smaller plots is slightly erroneous the project aim is to detect long-term changes within plots and this method should do so. Subsequently, the line intercept method avoids those subjective measures of vegetation cover which change dramatically with every new recorder at any one site.

*Conclusion*
The procedures and design outlined above ensure that monitoring from site to site is reasonably comparable and should detect DRF and community structure changes over a significant period. Obviously, modifications to these procedures may be required when individual monitoring problems arise or unusual site conditions prevail. In the long run the success or failure of this project relies on the detection of processes that threaten many of these populations and to recommend management which will ameliorate these threats. In order to achieve these goals a sufficient number of well-trained people are required to undertake monitoring at diverse locations.

**Weed control procedures**

*Spraying equipment parameters*
The prescription guidelines for spraying were as follows. Spraying of Fusilade was accomplished using a Hardi K15 backpack with a Spray Management Valve (SMV). This valve equalises pressure output and hence gives better control over spraying. Setup A-Using the Hardi K15 backpack with valve pressure set low at 15psi and in combination with a no. 12, $110^0$ flat fan nozzle, droplet size will be 300-400μm (medium to coarse range). A Hardi C8 compression sprayer with a spray shroud would be used when spraying Roundup (glyphosate) to ensure only targeted plants are controlled. Setup B-When using this equipment a no. 13e, ~$80^0$ even fan nozzle will deliver droplets sized in the medium plus range (~300μm). Separate equipment for use with each of these herbicides eliminated any chance of cross contamination Other equipment used included a commercial-sized weeding wand (using Roundup) and some hand tools (eg racks, trowels) for small hand weeding areas.

*Herbicides*
The project used two herbicides, Fusilade and Roundup (glyphosate). Fusilade is a post-emergent, grass selective herbicide which is absorbed by leaves and green stems. It translocates throughout the plant accumulating at apical meristems eventually killing plants after 3-5 weeks. Roundup is a general purpose (grasses and broad leaf weeds) herbicide which absorbs through leaves and green stems translocating to the plant's root system causing death within 7 days (for most annuals) to 2-3 weeks (perennials). This herbicide is non selective and has the potential to kill any plant native or non-natives. Both herbicides have no residual effect in the soil.

*Spraying conditions*
(i)Dependent upon site conditions spraying was carried out within wind speeds of 3-6 km/hr which the Dept. of Agriculture recommends as ideal for sensitive spraying (Peirce, J.R. *et al* 1993). In all instances when using backpack sprayers the herbicide was applied just prior to the point of foilage runoff. Redye dye marker was used for all spraying so that the area sprayed would be clearly marked (sometimes it does not work that well with Fusilade). Unpredicted drift was detectable using dye marker and stopped any substantial damage occurring to non-target areas.
(ii) Backpack spraying of Fusilade occurred over (DRF, weeds and other native species) several of the treatment plots including a 1m to 2m sprayed buffer to effect control of grassy weeds (Setup A).
(iii) All critically endangered monocots (eg *Conostylis micrantha, Orthrosanthus muelleri*) were covered with plastic containers prior to spraying with Fusilade. This

procedure was implemented because Wildlife branch perceived a risk to DRF monocot species from this herbicide (Setup A).
(iv) Treatment monitoring plots which have or develop broadleaf weeds (or tough perennial weed species such as Lovegrass clumps or Guildford grass) may be controlled with Roundup. A glyphosate wick weeding wand will be applied carefully to these weeds within plots. In fact, some hand weeding may be required immediately around (ie < 0.5m) some critically endangered plants because herbicide wicking appears too difficult or dangerous.
(v) Backpack spot spraying of Roundup was intended away from critically endangered plants, for example, on firebreaks, road verges or severely degraded open patches (rarely occurred, but generally Setup B).
(vi) Roundup was not intended to be sprayed over any healthy native vegetation. If it appeared likely that adjacent native vegetation might be affected than these plants were to be covered with plastic sheeting prior to spraying. This situation did not arise.
(vii) Hand weeding was done as carefully as possible to minimise soil disturbance (especially nearer critically endangered plants).

*Assessing weed control of (treatment) monitoring plots and spot weeding sites*
At all monitoring sites (ie both treatment and control), plots were assessed and photographed prior to weed control treatments. This included the data on DRF and on plot vegetation cover. These sites were assessed again sometime after weed control had been effected (or not effected as the case may have been). For spot control sites, photographs (before and after weed control) and descriptive assessments were made.

*Safety*
The weed control work complied with the safety guidelines set out in CALM's Safety and Chemical User's Manual. All necessary safety gear was acquired and chemical handling and disposal procedures were strictly adhered to.

*Conclusion*
The herbicides and techniques used for this preliminary weed control program have been selected carefully to avoid damage to any DRF or other native plant species. Selection was also designed to accommodate to best possible control of weed species at trail sites. In catering to these opposing needs of safety for DRF verses the need for adequate weed control, some compromise must arise.

# APPENDIX 2

| | | | |
|---|---|---|---|
| Field Study: | CBB | LandStatus: | Ministry of Planning |
| Plot Numbe | 1 | PopulationN | 1 |
| CALM District | Perth | PlotSize: | T10 x 10m |
| Plot Type: | Control | Replicate N | |

Close

| Date: | Actions - Comments: |
|---|---|
| 21/05/96 | Plot established and first monitoring |
| 4/10/96 | Second monitoring |
| 15/10/97 | Third monitoring |

| Rese | PlotN | Date | PlantNo | Distar | Beari | Nest | PlantSt | Type | Health | PlantH | PlantWi | PlantWi | Buds | Fowers | Fruit | NewSh | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CBB | 1 | 21/05/96 | 1 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.12 | 0.005 | 0.04 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 2 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.04 | 0.01 | 0.01 | No | No | No | No | Plant nos. 2, 3 & 4 are clustered t |
| CBB | 1 | 21/05/96 | 3 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.09 | 0.03 | 0.02 | No | No | No | No | Plant nos. 2, 3 & 4 are clustered t |
| CBB | 1 | 21/05/96 | 4 | 0 | 0 | 1 | Alive | Seedlin | 90% | 0.075 | 0.01 | 0.01 | No | No | No | No | Plant nos. 2, 3 & 4 are clustered t |
| CBB | 1 | 21/05/96 | 5 | 0 | 0 | 1 | Alive | Seedlin | 90% | 0.08 | 0.015 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 6 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.08 | 0.03 | 0.025 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 7 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.115 | 0.05 | 0.04 | No | No | No | No | Plant nos. 7 & 8 are clustered tog |
| CBB | 1 | 21/05/96 | 8 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.14 | 0.05 | 0.03 | No | No | No | No | Plant nos. 7 & 8 are clustered tog |
| CBB | 1 | 21/05/96 | 9 | 0 | 0 | 1 | Alive | Seedlin | 50% | 0.08 | 0.02 | 0.01 | No | No | No | No | Plant nos. 9 & 10 are clustered to |
| CBB | 1 | 21/05/96 | 10 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.115 | 0.05 | 0.03 | No | No | No | No | Plant nos. 9 & 10 are clustered to |
| CBB | 1 | 21/05/96 | 11 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.14 | 0.06 | 0.05 | No | No | No | No | Plant nos. 11 & 12 are clustered t |
| CBB | 1 | 21/05/96 | 12 | 0 | 0 | 1 | Alive | Seedlin | 50% | 0.035 | 0.03 | 0.015 | No | No | No | No | Plant nos. 11 & 12 are clustered t |
| CBB | 1 | 21/05/96 | 13 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.14 | 0.03 | 0.02 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 14 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.14 | 0.055 | 0.045 | No | No | No | No | Most of canopy outside transect |
| CBB | 1 | 21/05/96 | 15 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.11 | 0.045 | 0.02 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 16 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.15 | 0.06 | 0.045 | No | No | No | No | Plant nos. 16 & 17 clustered toge |
| CBB | 1 | 21/05/96 | 17 | 0 | 0 | 1 | Alive | Seedlin | 100% | 0.14 | 0.08 | 0.055 | No | No | No | No | Plant nos. 16 & 17 clustered toge |
| CBB | 1 | 21/05/96 | 18 | 0 | 0 | 2 | Alive | Seedlin | 100% | 0.12 | 0.03 | 0.02 | No | No | No | No | Plant nos. 18 & 19 clustered toge |
| CBB | 1 | 21/05/96 | 19 | 0 | 0 | 2 | Alive | Seedlin | 100% | 0.1 | 0.02 | 0.01 | No | No | No | No | Plant nos. 18 & 19 clustered toge |
| CBB | 1 | 21/05/96 | 20 | 0 | 0 | 2 | Alive | Seedlin | 100% | 0.07 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 21 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.17 | 0.09 | 0.05 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 22 | 0 | 0 | 3 | Alive | Seedlin | 50% | 0.06 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 23 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.11 | 0.025 | 0.025 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 24 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.14 | 0.03 | 0.025 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 25 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.09 | 0.035 | 0.02 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 26 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.07 | 0.01 | 0.01 | No | No | No | No | Plant nos. 26 & 27 clustered toge |
| CBB | 1 | 21/05/96 | 27 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.07 | 0.03 | 0.01 | No | No | No | No | Plant nos. 26 & 27 clustered toge |
| CBB | 1 | 21/05/96 | 28 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.1 | 0.02 | 0.015 | No | No | No | No | Plant nos. 28 & 29 clustered toge |
| CBB | 1 | 21/05/96 | 29 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.12 | 0.04 | 0.015 | No | No | No | No | Plant nos. 28 & 29 clustered toge |
| CBB | 1 | 21/05/96 | 30 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.13 | 0.04 | 0.025 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 31 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.12 | 0.05 | 0.025 | No | No | No | No | Near transect boundary |
| CBB | 1 | 21/05/96 | 32 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.06 | 0.015 | 0.01 | No | No | No | No | Near transect boundary |

| Rese | PlotN | Date | PlantNo | Distar | Beari | Nest | PlantSt | Type | Health | PlantH | PlantWi | PlantWi | Buds | Fowers | Fruit | NewSh | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CBB | 1 | 21/05/96 | 33 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.145 | 0.05 | 0.045 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 34 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.11 | 0.01 | 0.01 | No | No | No | No | On border line of nested quad 3 |
| CBB | 1 | 21/05/96 | 35 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.08 | 0.01 | 0.01 | No | No | No | No | Clustered around Scavola plant |
| CBB | 1 | 21/05/96 | 36 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.08 | 0.01 | 0.01 | No | No | No | No | Clustered around Scavola plant |
| CBB | 1 | 21/05/96 | 37 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.13 | 0.035 | 0.025 | No | No | No | No | Clustered around Scavola plant |
| CBB | 1 | 21/05/96 | 38 | 0 | 0 | 3 | Alive | Seedlin | 100% | 0.1 | 0.015 | 0.01 | No | No | No | No | Close to plant no. 30 near nested |
| CBB | 1 | 21/05/96 | 39 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.11 | 0.015 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 40 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.12 | 0.03 | 0.02 | No | No | No | No | Plant nos. 40 & 41 are clustered t |
| CBB | 1 | 21/05/96 | 41 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.115 | 0.02 | 0.01 | No | No | No | No | Plant nos. 40 & 41 are clustered t |
| CBB | 1 | 21/05/96 | 42 | 0 | 0 | 4 | Alive | Seedlin | 50% | 0.06 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 43 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.13 | 0.035 | 0.03 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 44 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.07 | 0.015 | 0.015 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 45 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.05 | 0.01 | 0.01 | No | No | No | No | Plant nos. 45 & 46 are clustered t |
| CBB | 1 | 21/05/96 | 46 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.045 | 0.009 | 0.009 | No | No | No | No | Plant nos. 45 & 46 are clustered t |
| CBB | 1 | 21/05/96 | 47 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.1 | 0.015 | 0.01 | No | No | No | No | Plant nos. 47 & 48 are clustered t |
| CBB | 1 | 21/05/96 | 48 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.11 | 0.02 | 0.01 | No | No | No | No | Plant nos. 47 & 48 are clustered t |
| CBB | 1 | 21/05/96 | 49 | 0 | 0 | 4 | Alive | Seedlin | 50% | 0.095 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 50 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.11 | 0.03 | 0.025 | No | No | No | No | Near transect boundary |
| CBB | 1 | 21/05/96 | 51 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.1 | 0.04 | 0.03 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 52 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.11 | 0.03 | 0.015 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 53 | 0 | 0 | 4 | Alive | Seedlin | 90% | 0.11 | 0.035 | 0.015 | No | No | No | No | Plant nos. 53, 54 & 55 clustered |
| CBB | 1 | 21/05/96 | 54 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.095 | 0.01 | 0.01 | No | No | No | No | Plant nos. 53, 54 & 55 clustered |
| CBB | 1 | 21/05/96 | 55 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.08 | 0.01 | 0.01 | No | No | No | No | Plant nos. 53, 54 & 55 clustered |
| CBB | 1 | 21/05/96 | 56 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.09 | 0.01 | 0.01 | No | No | No | No | Plant nos. 56, 57 & 58 clustered |
| CBB | 1 | 21/05/96 | 57 | 0 | 0 | 4 | Alive | Seedlin | 75% | 0.1 | 0.01 | 0.01 | No | No | No | No | Plant nos. 56, 57 & 58 clustered |
| CBB | 1 | 21/05/96 | 58 | 0 | 0 | 4 | Alive | Seedlin | 100% | 0.12 | 0.025 | 0.015 | No | No | No | No | Plant nos. 56, 57 & 58 clustered |
| CBB | 1 | 21/05/96 | 59 | 0 | 0 | 5 | Alive | Seedlin | 100% | 0.06 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 60 | 0 | 0 | 5 | Alive | Seedlin | 100% | 0.065 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 61 | 0 | 0 | 5 | Alive | Seedlin | 100% | 0.09 | 0.01 | 0.01 | No | No | No | No | Plant nos. 61 & 62 quite close |
| CBB | 1 | 21/05/96 | 62 | 0 | 0 | 5 | Alive | Seedlin | 100% | 0.1 | 0.01 | 0.01 | No | No | No | No | Plant nos. 61 & 62 quite close |
| CBB | 1 | 21/05/96 | 63 | 0 | 0 | 5 | Alive | Seedlin | 75% | 0.105 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 64 | 0 | 0 | 5 | Alive | Seedlin | 100% | 0.14 | 0.04 | 0.025 | No | No | No | No | On border line of transect |

| Rese | PlotN | Date | PlantNo | Distar | Beari | Nest | PlantS | Type | Health | PlantH | PlantWi | PlantWi | Buds | Fowers | Fruit | NewSh | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CBB | 1 | 21/05/96 | 65 | 0 | 0 | 6 | Alive | Seedlin | 100% | 0.05 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 66 | 0 | 0 | 6 | Alive | Seedlin | 100% | 0.05 | 0.015 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 67 | 0 | 0 | 8 | Alive | Seedlin | 100% | 0.06 | 0.02 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 68 | 0 | 0 | 8 | Alive | Seedlin | 75% | 0.06 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 69 | 0 | 0 | 8 | Alive | Seedlin | 100% | 0.075 | 0.01 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 70 | 0 | 0 | 8 | Alive | Seedlin | 100% | 0.1 | 0.015 | 0.01 | No | No | No | No | |
| CBB | 1 | 21/05/96 | 71 | 0 | 0 | 4 | Alive | Seedlin | 90% | 0.09 | 0.008 | 0.008 | No | No | No | No | |

**Plot:** CBB1 **Plot Size:** T10 x 10m

**Treatment Stage:** N/A **Date:** 21/05/96

## 1. General Information

| | |
|---|---|
| Number of plants alive in plot: | 71 |
| Number of plants dead in plot: | 0 |
| | 71 |

| | Alive | Dead | % Alive | % Dead | |
|---|---|---|---|---|---|
| Seedlings in plot | 71 | 0 | 100.00% | 0.00% | |
| Juveniles in plot | 0 | 0 | 0.00% | 0.00% | |
| Adults in plot | 0 | 0 | 0.00% | 0.00% | |
| | **71** | **0** | **100.00%** | **0.00%** | **71** |

## 2. Plant Health

| | No. of Pls | % (of total alive) | |
|---|---|---|---|
| 1 - 20% | 0 | 0.00% | |
| 21 - 40% | 0 | 0.00% | |
| 41 - 60% | 5 | 7.04% | |
| 61 - 80% | 3 | 4.23% | |
| 81 - 100% | 63 | 88.73% | 71 |

## 3. Plant Dimensions

| | | | |
|---|---|---|---|
| Mean plant ht. (m) | 0.098 | ± | 0.03 |
| Mean canopy area (sq.m) | 0.001 | ± | 0.00 |
| Mean canopy vol. (cu.m) | 0.000 | ± | 0.00 |

## 4. Phenology and Growth

| | No. | % (of total alive) |
|---|---|---|
| Plants with buds | 0 | 0.00% |
| Plants with fls. | 0 | 0.00% |
| Plants with fruits | 0 | 0.00% |
| Plants with new shoots | 0 | 0.00% |

**Plot:** CBB1 **Plot Size:** T10 x 10m

**Treatment Stage:** N/A **Date:** 4/10/96

## 1. General Information

| | |
|---|---|
| Number of plants alive in plot: | 62 |
| Number of plants dead in plot: | 9 |
| | 71 |

| | Alive | Dead | % Alive | % Dead | |
|---|---|---|---|---|---|
| Seedlings in plot | 36 | 9 | 50.70% | 12.68% | |
| Juveniles in plot | 26 | 0 | 36.62% | 0.00% | |
| Adults in plot | 0 | 0 | 0.00% | 0.00% | |
| | **62** | **9** | **87.32%** | **12.68%** | **71** |

## 2. Plant Health

| | No. of Pls | % (of total alive) | |
|---|---|---|---|
| 1 - 20% | 0 | 0.00% | |
| 21 - 40% | 0 | 0.00% | |
| 41 - 60% | 0 | 0.00% | |
| 61 - 80% | 1 | 1.61% | |
| 81 - 100% | 61 | 98.39% | **62** |

## 3. Plant Dimensions

| | | | |
|---|---|---|---|
| Mean plant ht. (m) | 0.135 | ± | 0.03 |
| Mean canopy area (sq.m) | 0.002 | ± | 0.00 |
| Mean canopy vol. (cu.m) | 0.000 | ± | 0.00 |

## 4. Phenology and Growth

| | No. | % (of total alive) |
|---|---|---|
| Plants with buds | 31 | 50.00% |
| Plants with fls. | 26 | 41.94% |
| Plants with fruits | 0 | 0.00% |
| Plants with new shoots | 62 | 100.00% |

**Plot:** CBB1 **Plot Size:** T10 x 10m

**Treatment Stage:** N/A **Date:** 15/10/97

## 1. General Information

| | |
|---|---|
| Number of plants alive in plot: | 57 |
| Number of plants dead in plot: | 14 |
| | 71 |

| | Alive | Dead | % Alive | % Dead | |
|---|---|---|---|---|---|
| Seedlings in plot | 0 | 12 | 0.00% | 16.90% | |
| Juveniles in plot | 57 | 2 | 80.28% | 2.82% | |
| Adults in plot | 0 | 0 | 0.00% | 0.00% | |
| | **57** | **14** | **80.28%** | **19.72%** | 71 |

## 2. Plant Health

| | No. of Pls | % (of total alive) | |
|---|---|---|---|
| 1 - 20% | 0 | 0.00% | |
| 21 - 40% | 0 | 0.00% | |
| 41 - 60% | 0 | 0.00% | |
| 61 - 80% | 0 | 0.00% | |
| 81 - 100% | 57 | 100.00% | 57 |

## 3. Plant Dimensions

| | | | |
|---|---|---|---|
| Mean plant ht. (m) | 0.193 | ± | 0.04 |
| Mean canopy area (sq.m) | 0.013 | ± | 0.01 |
| Mean canopy vol. (cu.m) | 0.002 | ± | 0.00 |

## 4. Phenology and Growth

| | No. | % (of total alive) |
|---|---|---|
| Plants with buds | 36 | 63.16% |
| Plants with fls. | 33 | 57.89% |
| Plants with fruits | 16 | 28.07% |
| Plants with new shoots | 57 | 100.00% |

**Plot:** CBB1 **Plot Size:** T10 x 10m

**Treatment Stage:** N/A

---

## Mortality and Recruitment

### Generation 0

| | |
|---|---|
| Total alive at establishment: | 71 |
| Total dead at establishment: | 0 |
| Total alive at 21/05/96 | 71 |
| Number died between 21/05/96 and 4/10/96 | 9 |
| Cumulative dead since establishment: | 9 |
| % Annual mortality: | 12.68% |
| % Cumulative mortality: | 12.68% |

### Generation 1

| | |
|---|---|
| Total alive at 21/05/96 | 0 |
| New seedlings between 21/05/96 and 4/10/96 | 0 |
| Cumulative new plants: | 0 |
| % Annual recruitment: | 0.00% |

| | |
|---|---|
| Number died between 21/05/96 and 4/10/96 | 0 |
| Cumulative dead: | 0 |
| % Annual mortality: | 0.00% |
| % Cumulative mortality: | 0.00% |

**Plot:** CBB1 **Plot Size:** T10 x 10m

**Treatment Stage:** N/A

---

## Mortality and Recruitment

### Generation 0

| | |
|---|---|
| Total alive at establishment: | 71 |
| Total dead at establishment: | 0 |
| Total alive at 4/10/96 | 62 |
| Number died between 4/10/96 and 15/10/97 | 5 |
| Cumulative dead since establishment: | 14 |
| % Annual mortality: | 8.06% |
| % Cumulative mortality: | 19.72% |

### Generation 1

| | |
|---|---|
| Total alive at 4/10/96 | 0 |
| New seedlings between 4/10/96 and 15/10/97 | 0 |
| Cumulative new plants: | 0 |
| % Annual recruitment: | 0.00% |

| | |
|---|---|
| Number died between 4/10/96 and 15/10/97 | 0 |
| Cumulative dead: | 0 |
| % Annual mortality: | 0.00% |
| % Cumulative mortality: | 0.00% |

| | | | |
|---|---|---|---|
| Field Study: | OM | LandStatus: | Shire Road Reserve |
| Plot Numbe | 2 | PopulationN | 1 |
| CALM District | Albany | PlotSize: | Q5 x 5 metres |
| Plot Type: | Treatment | Replicate N | 1 |

Close

| Date: | Actions - Comments: |
|---|---|
| 13/06/96 | Plot established and first monitoring (pre-treatment) |
| 17/10/96 | Plot sprayed with Fusilade, 1:75 solution. Plastic containers placed over DRF before spraying occurred. |
| 17/10/96 | Second monitoring just prior to herbicide treatment (pre-treatment) |
| 6/11/96 | Third monitoring (post-treatment) |

Plot: OM 2 Date: 17/10/96

Plot Type: Treatment Recorder: FO

Plot Size: Q5 x 5 metres Treatment Stage: Pre-treatment

| IntersectX: | IntersectY: | Species: | PlantStatus: |
|---|---|---|---|
| 1 | 1 | Leaf litter | |
| 1 | 2 | Ehrharta longiflora | Alive |
| 1 | 2 | Lolium rigidum | Alive |
| 1 | 3 | Ehrharta longiflora | Alive |
| 1 | 4 | Ehrharta longiflora | Alive |
| 1 | 5 | Austrostipa elegantissima | Alive |
| 1 | 5 | Ehrharta longiflora | Alive |
| 1 | 5 | Lolium rigidum | Alive |
| 1 | 6 | Ehrharta longiflora | Alive |
| 1 | 6 | Neurachne alopecuroida | Alive |
| 1 | 6 | Acacia glaucophera | Alive |
| 1 | 7 | Lolium rigidum | Alive |
| 1 | 7 | Bromus diandrus | Alive |
| 1 | 7 | Acacia glaucophera | Alive |
| 1 | 8 | Orthrosanthus muelleri | Alive |
| 1 | 8 | Lepidosperma gracile | Alive |
| 1 | 8 | Desmocladus flexuosus | Alive |
| 1 | 9 | Lolium rigidum | Alive |
| 1 | 9 | Neurachne alopecuroida | Alive |
| 1 | 9 | Austrostipa sp | Alive |
| 1 | 9 | Lepidosperma gracile | Alive |
| 1 | 10 | Lolium rigidum | Alive |
| 1 | 10 | Lepidosperma costale | Alive |
| 2 | 1 | Ehrharta longiflora | Alive |
| 2 | 2 | Ehrharta longiflora | Alive |
| 2 | 2 | Lomandra sp | Alive |
| 2 | 3 | Lolium rigidum | Alive |

Add New Species to List

Add New Plot Cover Type to

Close

| IntersectX: | IntersectY: | Species: | PlantStatus: |
|---|---|---|---|
| 2 | 3 | Neurachne alopecuroida | Alive |
| 2 | 3 | Bromus diandrus | Alive |
| 2 | 4 | Astroloma epacridis | Alive |
| 2 | 4 | Ehrharta longiflora | Alive |
| 2 | 5 | Lolium rigidum | Alive |
| 2 | 5 | Neurachne alopecuroida | Alive |
| 2 | 5 | Austrostipa elegantissima | Alive |
| 2 | 6 | Neurachne alopecuroida | Alive |
| 2 | 6 | Lepidosperma costale | Alive |
| 2 | 6 | Acacia glaucophera | Alive |
| 2 | 6 | Ehrharta longiflora | Alive |
| 2 | 7 | Lepidosperma aff tenue | Alive |
| 2 | 7 | Lolium rigidum | Alive |
| 2 | 8 | Lepidosperma gracile | Alive |
| 2 | 8 | Neurachne alopecuroida | Alive |
| 2 | 8 | Bromus diandrus | Alive |
| 2 | 9 | Lepidosperma gracile | Alive |
| 2 | 9 | Lolium rigidum | Alive |
| 2 | 10 | Lolium rigidum | Alive |
| 3 | 1 | Lepidosperma aff tenue | Alive |
| 3 | 2 | Hakea lissocarpha | Alive |
| 3 | 2 | Ehrharta longiflora | Alive |
| 3 | 3 | Bromus diandrus | Alive |
| 3 | 4 | Lolium rigidum | Alive |
| 3 | 4 | Gahnia aff ancistrophylla | Alive |
| 3 | 5 | Neurachne alopecuroida | Alive |
| 3 | 5 | Lepidosperma aff tenue | Alive |
| 3 | 6 | Lolium rigidum | Alive |
| 3 | 6 | Lomandra sp | Alive |
| 3 | 7 | Lolium rigidum | Alive |
| 3 | 7 | Lepidosperma gracile | Alive |
| 3 | 8 | Orthrosanthus muelleri | Alive |

| IntersectX: | IntersectY: | Species: | PlantStatus: |
|---|---|---|---|
| 3 | 8 | Lolium rigidum | Alive |
| 3 | 8 | Bromus diandrus | Alive |
| 3 | 9 | Gahnia aff ancistrophylla | Alive |
| 3 | 9 | Neurachne alopecuroida | Alive |
| 3 | 10 | Neurachne alopecuroida | Alive |
| 3 | 10 | Lepidosperma gracile | Alive |
| 3 | 10 | Lolium rigidum | Alive |
| 4 | 1 | Eucalyptus wandoo | Alive |
| 4 | 2 | Leaf litter | |
| 4 | 3 | Leaf litter | |
| 4 | 4 | Leaf litter | |
| 4 | 5 | Lolium rigidum | Alive |
| 4 | 5 | Gomphlobium knightnum | Alive |
| 4 | 6 | Lolium rigidum | Alive |
| 4 | 6 | Lepidosperma gracile | Alive |
| 4 | 7 | Lolium rigidum | Alive |
| 4 | 7 | Lepidosperma gracile | Alive |
| 4 | 8 | Lolium rigidum | Alive |
| 4 | 8 | Lepidosperma gracile | Alive |
| 4 | 9 | Astroloma epacridis | Alive |
| 4 | 9 | Lepidosperma aff tenue | Alive |
| 4 | 9 | Lolium rigidum | Alive |
| 4 | 9 | Bromus diandrus | Alive |
| 4 | 10 | Lolium rigidum | Alive |
| 4 | 10 | Lepidosperma gracile | Alive |
| 5 | 1 | Bromus diandrus | Alive |
| 5 | 2 | Gahnia aff ancistrophylla | Alive |
| 5 | 3 | Lepidosperma aff tenue | Alive |
| 5 | 4 | Lolium rigidum | Alive |
| 5 | 5 | Lolium rigidum | Alive |
| 5 | 6 | Eriachne sp | Alive |
| 5 | 6 | Bromus diandrus | Alive |

| IntersectX: | IntersectY: | Species: | PlantStatus: |
|---|---|---|---|
| 5 | 7 | Lolium rigidum | Alive |
| 5 | 7 | Lepidosperma gracile | Alive |
| 5 | 8 | Gahnia aff ancistrophylla | Alive |
| 5 | 8 | Lolium rigidum | Alive |
| 5 | 8 | Neurachne alopecuroida | Alive |
| 5 | 9 | Lolium rigidum | Alive |
| 5 | 9 | Bromus diandrus | Alive |
| 5 | 9 | Lepidosperma gracile | Alive |
| 5 | 10 | Lepidosperma gracile | Alive |
| 5 | 10 | Lolium rigidum | Alive |

**Plot:** OM2 **Plot Size:** Q5 x 5 metres

**Treatment Stage:** Pre-treatment **Date:** 17/10/96

| Species: | Alive: | Dead: | % Alive: | % Dead: | |
|---|---|---|---|---|---|
| **Native** | | | | | |
| Acacia glaucophera | 3 | 0 | 6.00% | 0.00% | |
| Astroloma epacridis | 2 | 0 | 4.00% | 0.00% | |
| Austrostipa elegantissima | 2 | 0 | 4.00% | 0.00% | |
| Austrostipa sp | 1 | 0 | 2.00% | 0.00% | |
| Desmocladus flexuosus | 1 | 0 | 2.00% | 0.00% | |
| Eriachne sp | 1 | 0 | 2.00% | 0.00% | |
| Eucalyptus wandoo | 1 | 0 | 2.00% | 0.00% | |
| Gahnia aff ancistrophylla | 4 | 0 | 8.00% | 0.00% | |
| Gomphlobium polymorphum | 1 | 0 | 2.00% | 0.00% | |
| Hakea lissocarpha | 1 | 0 | 2.00% | 0.00% | |
| Lepidosperma aff tenue | 5 | 0 | 10.00% | 0.00% | |
| Lepidosperma costale | 2 | 0 | 4.00% | 0.00% | |
| Lepidosperma gracile | 13 | 0 | 26.00% | 0.00% | |
| Lomandra sp | 2 | 0 | 4.00% | 0.00% | |
| Neurachne alopecuroida | 10 | 0 | 20.00% | 0.00% | |
| Orthrosanthus muelleri | 2 | 0 | 4.00% | 0.00% | |
| **Sub Total** | **51** | **0** | **02.00%** | **0.00%** | **102.00%** |
| **Weed - grass** | | | | | |
| Bromus diandrus | 9 | 0 | 18.00% | 0.00% | |
| Ehrharta longiflora | 10 | 0 | 20.00% | 0.00% | |
| Lolium rigidum | 27 | 0 | 54.00% | 0.00% | |
| **Sub Total** | **46** | **0** | **92.00%** | **0.00%** | **92.00%** |
| **Other Cover** | | | | | |
| Leaf litter | | | | | |
| **Sub Total** | | | | | **8.00%** |

**Plot:** OM2 **Plot Size:** Q5 x 5 metres

**Treatment Stage:** Post-treatment **Date:** 6/11/96

| Species: | Alive: | Dead: | % Alive: | % Dead: | |
|---|---|---|---|---|---|
| **Native** | | | | | |
| Acacia glaucophera | 3 | 0 | 6.00% | 0.00% | |
| Astroloma epacridis | 2 | 0 | 4.00% | 0.00% | |
| Austrodanthonia caespitosa | 1 | 0 | 2.00% | 0.00% | |
| Austrostipa elegantissima | 2 | 0 | 4.00% | 0.00% | |
| Austrostipa sp | 2 | 0 | 4.00% | 0.00% | |
| Comesperma calymega | 1 | 0 | 2.00% | 0.00% | |
| Desmocladus flexuosus | 1 | 0 | 2.00% | 0.00% | |
| Eriachne sp | 1 | 0 | 2.00% | 0.00% | |
| Eucalyptus wandoo | 1 | 0 | 2.00% | 0.00% | |
| Gahnia aff ancistrophylla | 4 | 0 | 8.00% | 0.00% | |
| Gomphlobium polymorphum | 1 | 0 | 2.00% | 0.00% | |
| Hakea lissocarpha | 1 | 0 | 2.00% | 0.00% | |
| Hibbertia sp | 1 | 0 | 2.00% | 0.00% | |
| Lepidosperma aff tenue | 6 | 0 | 12.00% | 0.00% | |
| Lepidosperma costale | 2 | 0 | 4.00% | 0.00% | |
| Lepidosperma gracile | 12 | 0 | 24.00% | 0.00% | |
| Lomandra sp | 2 | 0 | 4.00% | 0.00% | |
| Neurachne alopecuroida | 11 | 0 | 22.00% | 0.00% | |
| Orthrosanthus muelleri | 2 | 0 | 4.00% | 0.00% | |
| **Sub Total** | **56** | **0** | **12.00%** | **0.00%** | **112.00%** |
| **Weed - grass** | | | | | |
| Bromus diandrus | 0 | 16 | 0.00% | 32.00% | |
| Ehrharta longiflora | 0 | 8 | 0.00% | 16.00% | |
| Lolium rigidum | 0 | 29 | 0.00% | 58.00% | |
| **Sub Total** | **0** | **53** | **0.00%** | **06.00%** | **106.00%** |
| **Other Cover** | | | | | |
| Leaf litter | | | | | |
| **Sub Total** | | | | | **10.00%** |