

## Supplementary Material

### Restoration of eucalypt grassy woodland: effects of experimental interventions on ground-layer vegetation

S. McIntyre<sup>A,B,C</sup>, R. B. Cunningham<sup>B</sup>, C. F. Donnelly<sup>B</sup> and A. D. Manning<sup>B</sup>

<sup>A</sup>CSIRO Ecosystem Sciences, GPO Box 1700, Canberra, ACT 2601, Australia.

<sup>B</sup>Fenner School of Environment and Society, ANU College of Medicine, Biology and Environment, Frank Fenner Building, Building no. 141, The Australian National University, Canberra, ACT 0200, Australia.

<sup>C</sup>Corresponding author. Email: sue.mcintyre@csiro.au

**Table S1. Average biomass (kg.ha<sup>-1</sup>) of species within different life forms from Mulligans Flat (MF) and Goorooyarroo Nature Reserves (GO) in 2007 and 2011**

Species are listed in order of descending total biomass within their groups. Names follow the Australian Plant Census (<http://www.cpbr.gov.au/chah/apc/about-APC.html>).

|  | 2007<br>MF | 2011<br>MF | 2007<br>GO | 2011<br>GO | 2007<br>All<br>sites | 2011<br>All<br>sites | All sites<br>both<br>dates |
|--|------------|------------|------------|------------|----------------------|----------------------|----------------------------|
| <b>Native annual forbs (all species)</b>     |            |            |            |            |                      |                      |                            |
| <i>Triptilodiscus pygmaeus</i>               | 1.7        | 0.3        | 0.2        | 0.4        | 1.0                  | 0.2                  | 0.6                        |
| <i>Isoetopsis graminifolia</i>               | 0.0        | 1.5        | 0          | 0          | 0.0                  | 0.8                  | 0.4                        |
| <i>Crassula sieberiana</i>                   | 0.3        | 0.1        | 0.4        | 0.1        | 0.2                  | 0.1                  | 0.2                        |
| <i>Daucus glochidiatus</i>                   | 0.2        | 0.03       | 0.2        | 0.1        | 0.2                  | 0                    | 0.1                        |
| <i>Erodium crinitum</i>                      | 0.0        | 0.0        | 0.3        | 0.3        | 0.1                  | 0.2                  | 0.1                        |
| <i>Euchiton sphaericus</i>                   | 0.1        | 0.4        | 0.1        | 0.2        | 0.1                  | 0.1                  | 0.1                        |
| <i>Ranunculus sessiliflorus</i>              | 0.3        | 0.0        | 0.0        | 0          | 0.1                  | 0                    | 0.1                        |
| <i>Centipeda</i> sp.                         | 0          | 0.1        | 0.0        | 0.1        | 0.0                  | 0.1                  | 0.3                        |
| <i>Lythrum hyssopifolia</i>                  | 0.3        | 0.0        | 0.1        | 0.5        | 0.2                  | 0.2                  | 0.2                        |
| <i>Cotula australis</i>                      | 0.0        | 0.1        | 0.2        | 0.0        | 0.1                  | 0.1                  | 0.1                        |
| <i>Stuartina muelleri</i>                    | 0.0        | 0.0        | 0.1        | 0.2        | 0.1                  | 0.1                  | 0.1                        |
| <i>Poranthera microphylla</i>                | 0.0        | 0.2        | 0.0        | 0.1        | 0.0                  | 0.1                  | 0.1                        |
| <i>Sebaea ovata</i>                          | 0          | 0          | 0          | 0.01       | 0                    | 0.01                 | 0                          |
| <b>Native annual graminoid (all species)</b> |            |            |            |            |                      |                      |                            |
| <i>Schoenus apogon</i>                       | 0.1        | 50.3       | 0.2        | 32.2       | 0.1                  | 41.2                 | 20.7                       |
| <i>Lachnagrostis filiformis</i>              | 0          | 0          | 0          | 0.7        | 0                    | 0.4                  | 0.2                        |
| <b>Native fern (all species)</b>             |            |            |            |            |                      |                      |                            |
| <i>Cheilanthes</i> spp.                      | 0.2        | 1.1        | 0          | 3.2        | 0.1                  | 2.2                  | 1.1                        |
| <i>Cheilanthes austrotenuifolia</i>          | 0.1        | 0          | 0.5        | 0          | 0.3                  | 0                    | 0.1                        |
| <i>Ophioglossum lusitanicum</i>              | 0          | 0.1        | 0          | 0          | 0                    | 0.1                  | 0                          |

| <b>Native perennial forb (species with overall biomass &gt;0.3 kg.ha<sup>-1</sup>)</b> |       |       |       |       |       |       |       |
|--|-------|-------|-------|-------|-------|-------|-------|
| <i>Haloragis heterophylla</i>  | 1.2   | 19.7  | 0.2   | 15.2  | 0.7   | 17.5  | 9.1   |
| <i>Gonocarpus tetragynus</i>   | 3.6   | 19.4  | 1.1   | 9.8   | 2.4   | 14.6  | 8.5   |
| <i>Vittadinia muelleri</i>   | 3.3   | 14.4  | 1.0   | 4.1   | 2.1   | 9.2   | 5.7   |
| <i>Hydrocotyle laxiflora</i>   | 2.9   | 4.4   | 0.9   | 2.4   | 1.9   | 3.4   | 2.7   |
| <i>Acaena ovina</i>  | 2.4   | 1.2   | 1.9   | 4.7   | 2.1   | 2.9   | 2.5   |
| <i>Leptorhynchus squamatus</i>   | 1.7   | 1.7   | 2.5   | 3.4   | 2.1   | 2.6   | 2.3   |
| <i>Hypericum gramineum</i>   | 1.0   | 6.7   | 0.1   | 1.2   | 0.6   | 4.0   | 2.3   |
| <i>Einadia nutans</i>  | 0.8   | 0.7   | 2.2   | 4.3   | 1.5   | 2.5   | 2.0   |
| <i>Euchiton japonicus</i>  | 0     | 6.7   | 0     | 1.1   | 0     | 3.9   | 2.0   |
| <i>Solenogyne dominii</i>  | 2.6   | 1.8   | 1.0   | 0.3   | 1.8   | 1.0   | 1.4   |
| <i>Wahlenbergia</i> sp.  | 0.4   | 1.3   | 0.6   | 2.2   | 0.5   | 1.7   | 1.1   |
| <i>Goodenia hederacea</i>  | 1.5   | 1.5   | 0.2   | 0.6   | 0.9   | 1.0   | 1.0   |
| <i>Oxalis perennans</i>  | 0.4   | 0.3   | 0.5   | 2.0   | 0.4   | 1.1   | 0.8   |
| <i>Desmodium varians</i>   | 0.2   | 0.1   | 0.8   | 1.9   | 0.5   | 1.0   | 0.7   |
| <i>Vittadinia gracilis</i>   | 0.1   | 2.2   | 0     | 0.3   | 0     | 1.3   | 0.6   |
| <i>Asperula conferta</i>   | 0.7   | 0.8   | 0.1   | 0.9   | 0.4   | 0.9   | 0.6   |
| <i>Glycine tabacina</i>  | 0.1   | 0.1   | 0.2   | 2.0   | 0.2   | 1.0   | 0.6   |
| <i>Plantago varia</i>  | 0     | 0     | 1.2   | 1.1   | 0.6   | 0.6   | 0.6   |
| <i>Myriophyllum</i> sp.  | 0     | 1.9   | 0     | 0     | 0     | 0.9   | 0.5   |
| <i>Chrysocephalum apiculatum</i>   | 0.6   | 0.2   | 0.6   | 0.3   | 0.6   | 0.2   | 0.4   |
| <i>Geranium solanderi</i>  | 0.5   | 0.8   | 0.1   | 0     | 0.3   | 0.4   | 0.4   |
| <i>Hydrocotyle peduncularis</i>  | 0     | 1.3   | 0     | 0     | 0     | 0.7   | 0.3   |
| <i>Convolvulus erubescens</i>  | 0     | 0     | 0.6   | 0.6   | 0.3   | 0.3   | 0.3   |
| <b>Native geophyte (all species)</b>   |       |       |       |       |       |       |       |
| <i>Tricoryne elatior</i>   | 2.3   | 0.2   | 2.5   | 2.1   | 2.4   | 1.2   | 1.8   |
| <i>Dichopogon fimbriatus</i>   | 0.1   | 0     | 0.2   | 0.3   | 0.1   | 0.2   | 0.2   |
| <i>Arthropodium</i> spp.   | 0     | 0.5   | 0.1   | 0     | 0     | 0.2   | 0.1   |
| <i>Arthropodium minus</i>  | 0.2   | 0.3   | 0     | 0     | 0.1   | 0.2   | 0.1   |
| <i>Bulbine bulbosa</i>   | 0.3   | 0.1   | 0     | 0     | 0.2   | 0     | 0.1   |
| <i>Wurmbea dioica</i>  | 0.2   | 0     | 0.1   | 0     | 0.2   | 0     | 0.1   |
| <i>Diuris sulphurea</i>  | 0.2   | 0     | 0     | 0     | 0.1   | 0     | 0.1   |
| <i>Drosera peltata</i>   | 0     | 0.2   | 0     | 0     | 0     | 0.1   | 0.1   |
| <i>Thysanotus patersonii</i>   | 0     | 0.1   | 0     | 0     | 0     | 0     | 0     |
| <i>Orchidaceae</i>   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| <i>Thelymitra</i> spp.   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| <b>Native perennial graminoid (all species)</b>  |       |       |       |       |       |       |       |
| <i>Rytidosperma</i> spp.   | 97.3  | 213.1 | 124.8 | 180.7 | 111.1 | 196.9 | 154.0 |
| <i>Joycea pallida</i>  | 240.5 | 182.6 | 45.3  | 19.2  | 142.9 | 100.9 | 121.9 |
| <i>Themeda triandra</i>  | 62.6  | 251.3 | 38.5  | 87.4  | 50.6  | 169.4 | 110   |
| <i>Aristida ramosa</i>   | 28.5  | 58.0  | 41.7  | 28.7  | 35.1  | 43.3  | 39.2  |
| <i>Bothriochloa macra</i>  | 7.1   | 35.5  | 27.7  | 76.1  | 17.4  | 55.8  | 36.6  |
| <i>Austrostipa densiflora</i>  | 0.2   | 2.6   | 34.1  | 56.5  | 17.2  | 29.5  | 23.4  |
| <i>Lomandra filiformis</i>   | 18.1  | 19.4  | 21.7  | 20.5  | 19.9  | 20    | 19.9  |
| <i>Austrostipa scabra</i>  | 5.1   | 12.9  | 23.8  | 35.6  | 14.4  | 24.2  | 19.3  |
| <i>Microlaena stipoides</i>  | 6.5   | 21.9  | 7.5   | 13.3  | 7.0   | 17.6  | 12.3  |
| <i>Poa sieberiana</i>  | 4.7   | 11.2  | 4.2   | 23.4  | 4.4   | 17.3  | 10.9  |
| <i>Austrostipa bigeniculata</i>  | 0.1   | 0.3   | 13.4  | 29.2  | 6.7   | 14.8  | 10.8  |
| <i>Elymus scaber</i>   | 4.9   | 2.8   | 15.7  | 5.7   | 10.3  | 4.2   | 7.3   |
| <i>Panicum effusum</i>   | 2.4   | 10    | 2.7   | 13.7  | 2.5   | 11.8  | 7.2   |
| <i>Eragrostis brownii</i>  | 0.1   | 5.4   | 0     | 6.7   | 0.1   | 6.1   | 3.1   |
| <i>Juncus</i> subgenus <i>Genuini</i>  | 4.0   | 3.1   | 1.9   | 3.2   | 2.9   | 3.1   | 3.0   |
| <i>Chloris truncata</i>  | 1.2   | 2.9   | 1.2   | 1.2   | 1.2   | 2.1   | 1.6   |
| <i>Lomandra multiflora</i>   | 1.3   | 3.8   | 0     | 1.4   | 0.6   | 2.6   | 1.6   |

|   |      |      |      |     |             |            |     |
|---|------|------|------|-----|-------------|------------|-----|
| <i>Carex inversa</i>  | 0    | 2.2  | 0.5  | 0.7 | 0.2         | 1.4        | 0.8 |
| <i>Enneapogon nigricans</i>   | 1.8  | 0    | 0.4  | 0.2 | 1.1         | 0.1        | 0.6 |
| <i>Eleocharis acuta</i>   | 0    | 0.4  | 0.1  | 1.8 | 0           | 1.1        | 0.6 |
| <i>Dichelachne</i> spp.   | 0    | 1.6  | 0    | 0.1 | 0           | 0.9        | 0.4 |
| <i>Carex</i> spp.   | 0.3  | 0.1  | 0.3  | 0   | 0.3         | 0.1        | 0.2 |
| <i>Luzula</i> spp.  | 0    | 0.3  | 0.1  | 0.1 | 0.1         | 0.2        | 0.1 |
| <i>Carex breviculmis</i>  | 0    | 0    | 0    | 0.2 | 0           | 0.1        | 0.1 |
| <i>Dichelachne rara</i>   | 0    | 0    | 0    | 0.1 | 0           | 0          | 0   |
| <i>Cynodon dactylon</i>   | 0    | 0    | 0    | 0   | 0           | 0          | 0   |
| <b>Native shrub (all species)</b>   |      |      |      |     |             |            |     |
| <i>Melichrus urceolatus</i>   | 13.7 | 16.0 | 4.7  | 5.6 | 9.2         | 10.8       | 10  |
| <i>Lissanthe strigosa</i>   | 10.1 | 6.6  | 3.7  | 4.3 | 6.9         | 5.5        | 6.2 |
| <i>Dillwynia sericea</i>  | 1.0  | 5.4  | 1.0  | 5.6 | 1.0         | 5.5        | 3.3 |
| <i>Daviesia genistifolia</i>  | 6.3  | 1.5  | 0    | 0.2 | 3.1         | 0.8        | 2.0 |
| <i>Acacia dealbata</i>  | 0.3  | 2.6  | 0    | 0   | 0.1         | 1.3        | 0.7 |
| <i>Pultenaea procumbens</i>   | 0.1  | 2.1  | 0    | 0   | 0.1         | 1.1        | 0.6 |
| <i>Acacia parramattensis</i>  | 0    | 1.2  | 0.1  | 0.7 | 0.1         | 1.0        | 0.5 |
| <i>Brachyloma daphnoides</i>  | 1.8  | 0.1  | 0    | 0   | 0.9         | 0          | 0.5 |
| <i>Hibbertia obtusifolia</i>  | 0.1  | 0.6  | 0.8  | 0.3 | 0.4         | 0.5        | 0.5 |
| <i>Bossiaea buxifolia</i>   | 0.3  | 0.6  | 0.2  | 0.4 | 0.2         | 0.5        | 0.4 |
| <i>Bossiaea prostrata</i>   | 0.3  | 0.1  | 0    | 0.9 | 0.2         | 0.5        | 0.3 |
| <i>Hibbertia</i> sp.  | 0    | 0    | 0    | 1.1 | 0           | 0.6        | 0.3 |
| <i>Daviesia leptophylla</i>   | 0    | 0.8  | 0    | 0   | 0           | 0.4        | 0.2 |
| <i>Astroloma humifusum</i>  | 0.1  | 0.3  | 0.3  | 0   | 0.2         | 0.2        | 0.2 |
| <i>Indigofera australis</i>   | 0    | 0.5  | 0    | 0   | 0           | 0.2        | 0.1 |
| <i>Acacia gunni</i>   | 0    | 0.2  | 0    | 0   | 0           | 0.1        | 0.1 |
| <i>Clematis microphylla</i>   | 0    | 0.2  | 0    | 0   | 0           | 0.1        | 0   |
| <i>Hovea heterophylla</i>   | 0.1  | 0    | 0    | 0   | 0.1         | 0          | 0   |
| <i>Pimelea linifolia</i>  | 0    | 0    | 0    | 0   | 0           | 0          | 0   |
| <b>Exotic annual forb (species with overall biomass &gt;0.3 kg.ha-1)</b>      |      |      |      |     |             |            |     |
| <i>Trifolium subterraneum</i>   | 4.3  | 2.9  | 16.6 | 3.8 | <b>10.5</b> | <b>3.3</b> | 6.9 |
| <i>Hypochaeris glabra</i>   | 2.2  | 0.5  | 2.0  | 3.2 | 2.1         | 1.8        | 2.0 |
| <i>Arctotheca calendula</i>   | 0.6  | 0    | 6.3  | 0.4 | 3.5         | 0.2        | 1.8 |
| <i>Centaurium erythraea</i>   | 0    | 5.1  | 0    | 0.5 | 0           | 2.8        | 1.4 |
| <i>Trifolium striatum</i>   | 1.4  | 0    | 1.6  | 0.1 | 1.5         | 0.1        | 0.8 |
| <i>Trifolium glomeratum</i>   | 1.0  | 0.1  | 1.6  | 0.1 | 1.3         | 0.1        | 0.7 |
| <i>Trifolium arvense</i>  | 0.4  | 0.3  | 0.7  | 0.2 | 0.5         | 0.2        | 0.4 |
| <i>Conyza</i> sp.   | 0    | 0.2  | 0    | 1.2 | 0           | 0.7        | 0.4 |
| <i>Tolpis barbata</i>   | 0.7  | 0.3  | 0.1  | 0.2 | 0.4         | 0.3        | 0.3 |
| <i>Cirsium vulgare</i>  | 0    | 1.0  | 0    | 0.1 | 0           | 0.5        | 0.3 |
| <b>Exotic annual graminoid (species with overall biomass &gt;0.3 kg.ha-1)</b> |      |      |      |     |             |            |     |
| <i>Lolium</i> spp.  | 2.1  | 1.5  | 18.2 | 4.6 | 10.2        | 3.1        | 6.6 |
| <i>Bromus hordeaceus/molliformis</i>  | 0.3  | 4.1  | 3.4  | 5.6 | 1.9         | 4.9        | 3.4 |
| <i>Vulpia</i> spp.  | 1.1  | 1.1  | 1.0  | 4.2 | 1.1         | 2.6        | 1.8 |
| <i>Bromus diandrus</i>  | 0.3  | 0.7  | 2.1  | 1.9 | 1.2         | 1.3        | 1.2 |
| <i>Aira</i> spp.  | 0.9  | 0.2  | 0.6  | 0   | 0.8         | 0.1        | 0.5 |
| <i>Hordeum</i> sp.  | 0    | 0    | 1.2  | 0.3 | 0.6         | 0.2        | 0.4 |
| <i>Briza maxima</i>   | 0.3  | 0.9  | 0.1  | 0   | 0.2         | 0.5        | 0.3 |
| <b>Exotic perennial forb (species with overall biomass &gt;0.3 kg.ha-1)</b>   |      |      |      |     |             |            |     |
| <i>Hypochaeris radicata</i>   | 2.3  | 4.1  | 2.5  | 9.3 | 2.4         | 6.7        | 4.6 |
| <i>Acetosella vulgaris</i>  | 1.1  | 1.2  | 0.6  | 7.0 | 0.8         | 4.1        | 2.5 |
| <i>Plantago lanceolata</i>  | 0    | 1.8  | 0    | 2.5 | 0           | 2.2        | 1.1 |

|   |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|
| <i>Chondrilla juncea</i>                        | 0    | 0    | 0.8  | 0.3  | 0.4  | 0.1  | 0.3  |
| <b>Exotic geophyte (all species)</b>            |      |      |      |      |      |      |      |
| <i>Romulea rosea</i>                            | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| <b>Exotic perennial graminoid (all species)</b> |      |      |      |      |      |      |      |
| <i>Phalaris aquatica</i>                        | 11.2 | 35.2 | 36.5 | 28.8 | 23.8 | 32.0 | 27.9 |
| <i>Holcus lanatus</i>                           | 0    | 3.0  | 0    | 4.5  | 0    | 3.8  | 1.9  |
| <i>Poa bulbosa</i>                              | 0.7  | 0.1  | 2.8  | 0.3  | 1.8  | 0.2  | 1.0  |
| <i>Nassella trichotoma</i>                      | 0.2  | 0.1  | 0.2  | 0.6  | 0.2  | 0.4  | 0.3  |
| <i>Paspalum dilatatum</i>                       | 0    | 0    | 0    | 0.1  | 0    | 0    | 0    |
| <b>Exotic shrub (all species)</b>               |      |      |      |      |      |      |      |
| <i>Rosa rubiginosa</i>                          | 0.2  | 0.3  | 0.1  | 0    | 0.1  | 0.2  | 0.2  |
| <i>Hypericum perforatum</i>                     | 0    | 0    | 0.1  | 0    | 0    | 0    | 0    |