

Supplementary Material

Comparison of biomass removal, nutrient manipulation and native seed addition to restore the ground layer of a degraded grassy woodland.

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Section 1: Figures

Fig. S1. Rainfall data.

Fig. S2. Abundance *vs.* time data for species in the fire treatment.

Fig. S3. Abundance *vs.* time for all treatments

Fig. S4. Seeded species richness *vs* time.

Fig. S5. Unseeded species richness *vs* time.

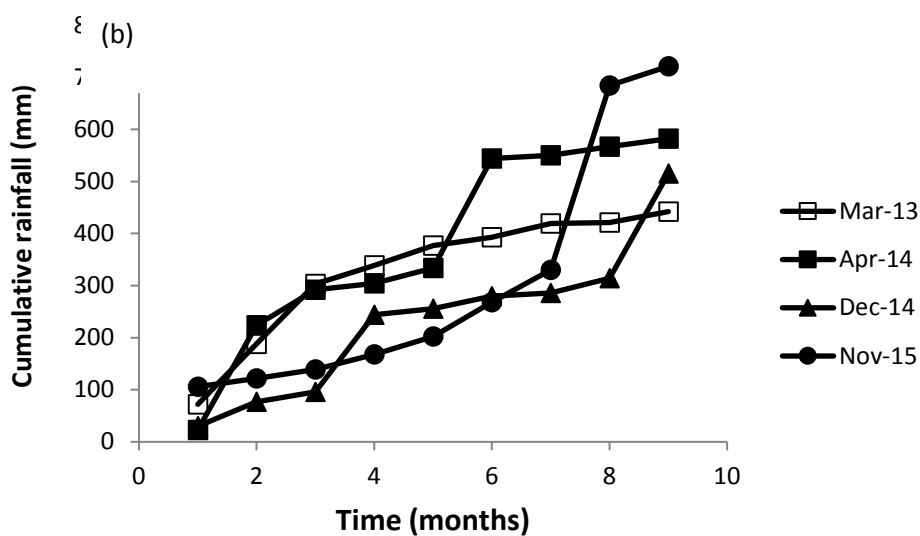
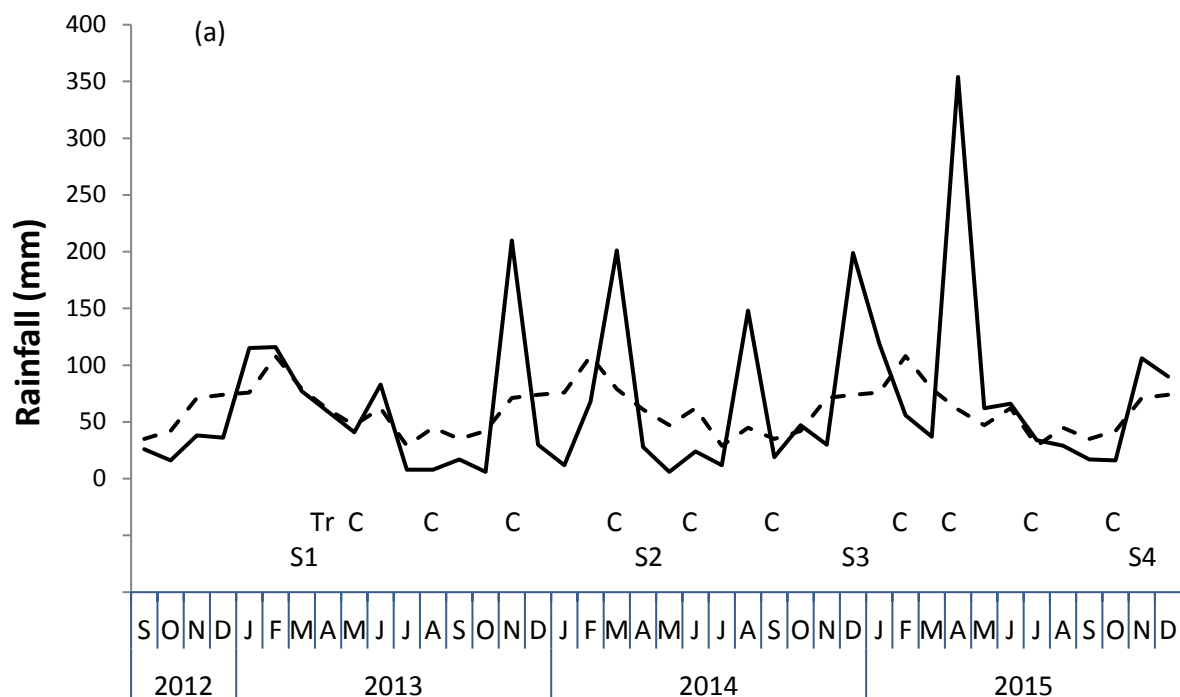


Fig. S1 (a) Monthly rainfall (solid line) and monthly average rainfall (broken line) at Box Hill rainfall station (4.3 kms away, 25 years of records). Time of application of biomass removal treatments (Tr), soil carbon applications (C) and flora surveys (S1 - S4) is shown; (b) cumulative rainfall for 1 – 9 months before each flora survey. Carbon additions totaled $840 \text{ g C m}^{-2} \text{ y}^{-1}$ for each of May to April 2014 and 2015, and 420 g C m^{-2} for April to November 2015 (equivalent to $720 \text{ g m}^{-2} \text{ y}^{-1}$).

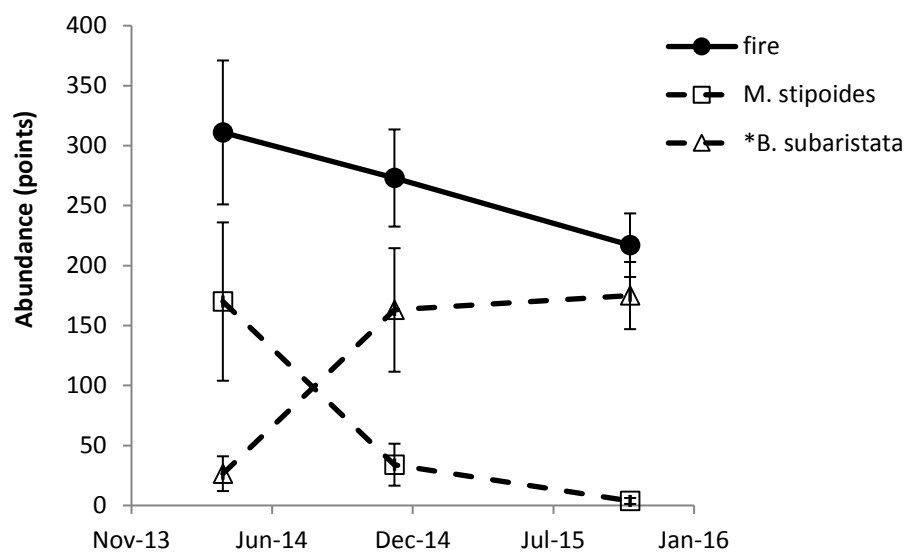


Fig. S2. Total abundance over time for the fire treatment, and for *Microlaena stipoides* and **Briza subaristata*. Raw data means \pm SE.

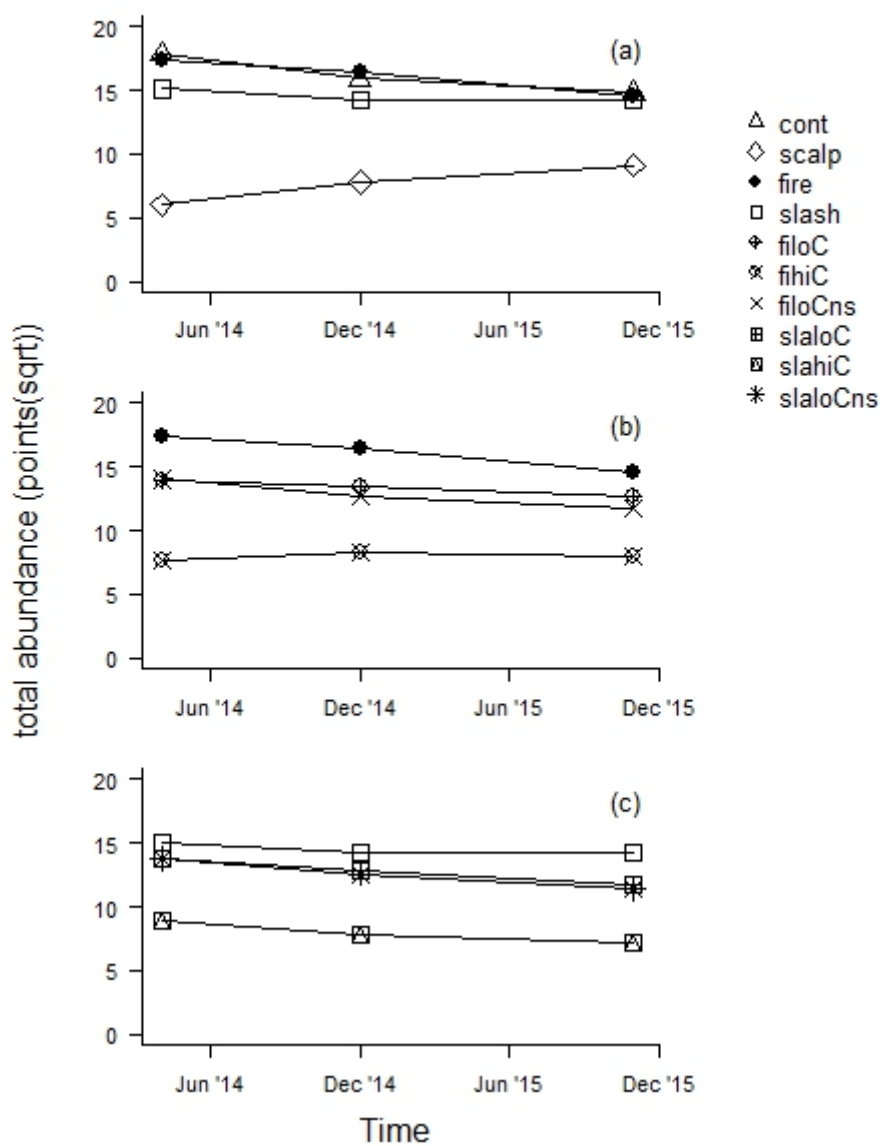


Fig. S3. Total abundance vs time for (a) no carbon treatments; (b) fire treatments (all carbon levels); and (c) slash treatments (all carbon levels). Mean of square root transformed data shown. Legend abbreviations are shown in Table 1 of main text.

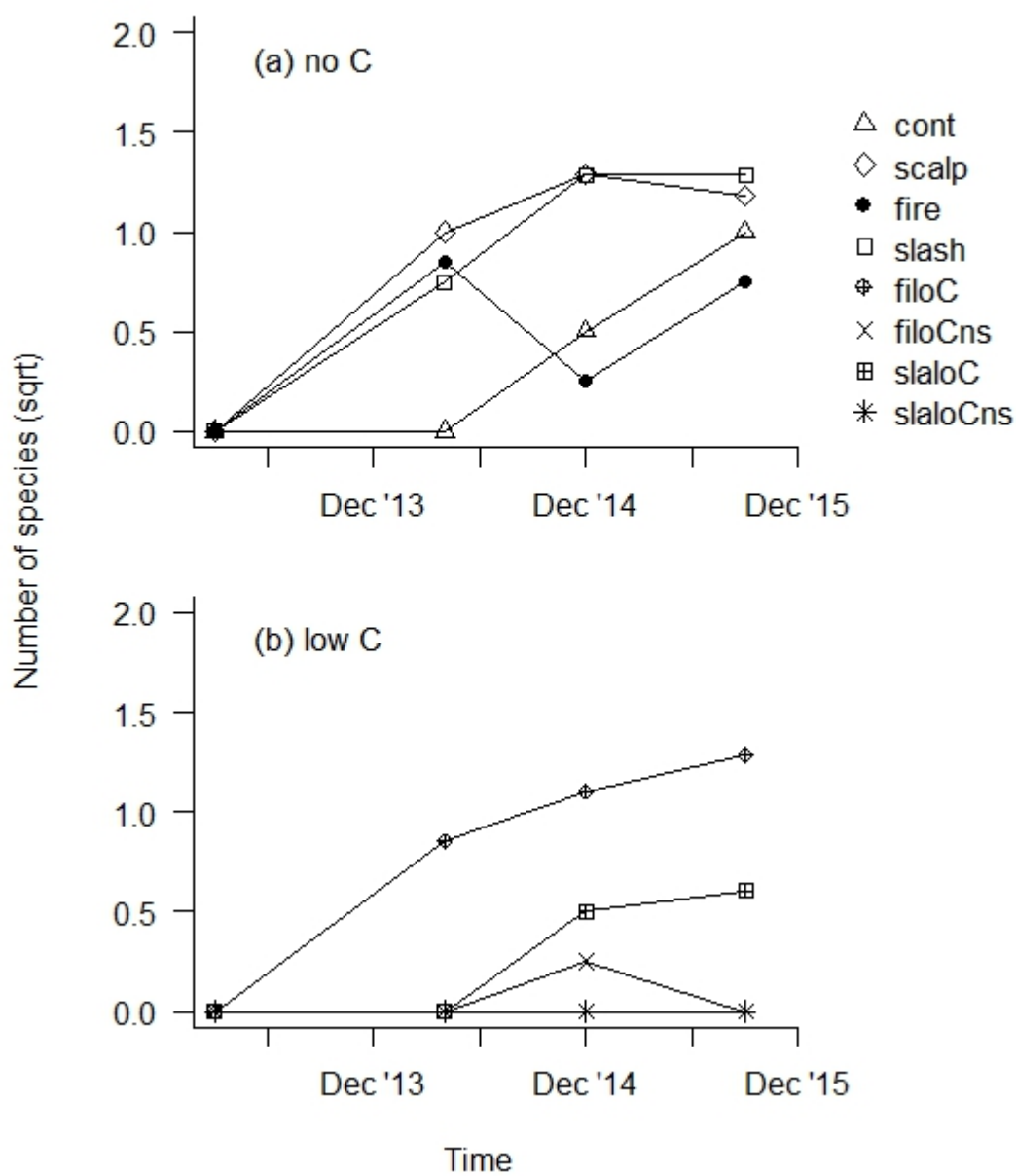


Fig. S4. Seeded species richness vs time for treatments (a) without added soil carbon, and (b) with added carbon at the low level. Mean of square root transformed data is shown. Legend abbreviations are shown in Table 1 of main text. Data for high carbon treatments are not shown; some seeded species established in the high carbon treatments but none survived to November 2015.

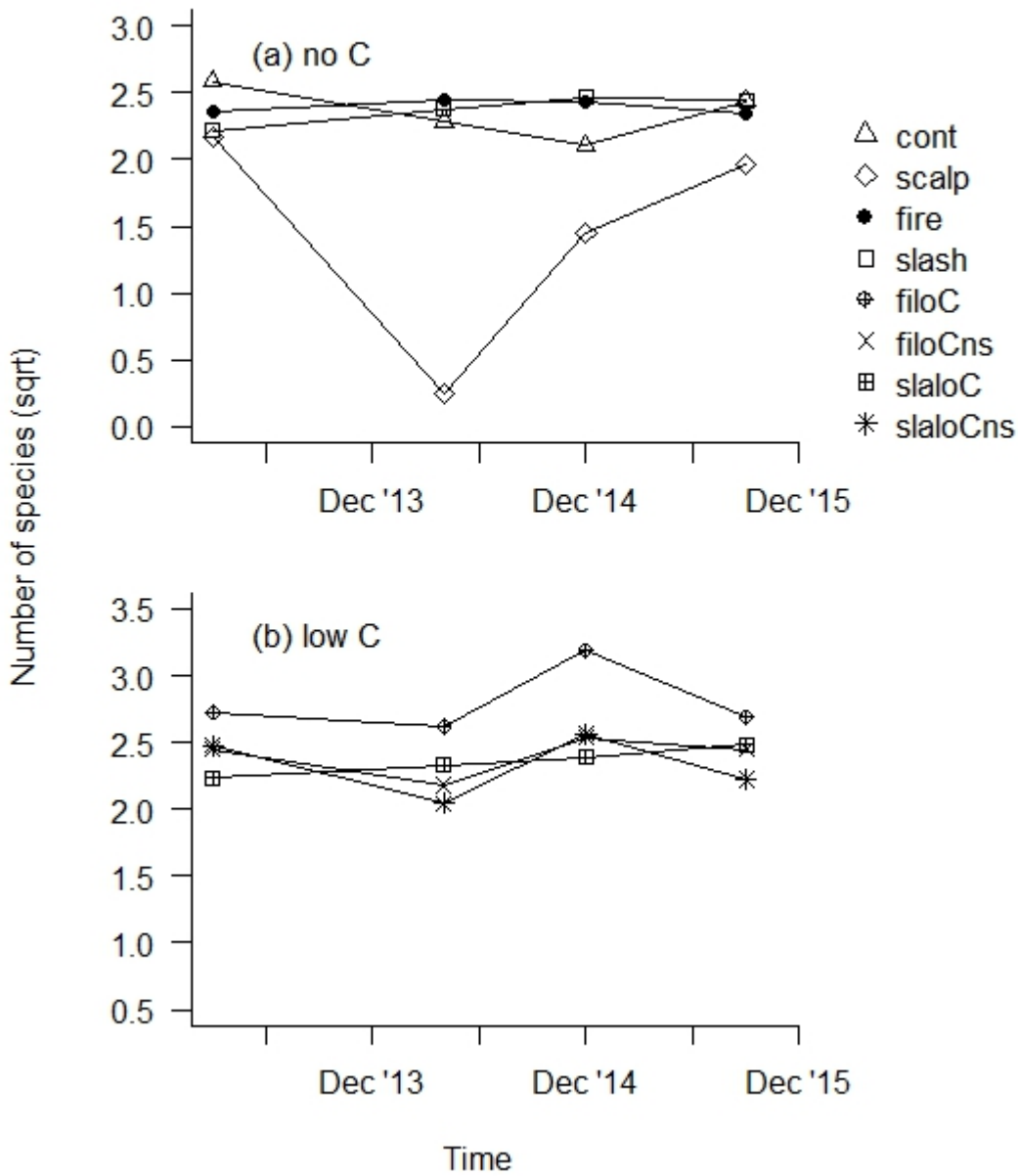


Fig. S5. Unseeded species richness vs time for treatments (a) without added soil carbon, and (b) with added carbon at the low level. Data for high carbon treatments are not shown. Mean of square root transformed data is shown. Legend abbreviations are shown in Table 1 of main text.

Section 2. Species contributing to similarity within treatments or dissimilarity between treatments (SIMPER analysis).

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Table S1. Species contributing to similarity within the control treatment (SIMPER analysis) over the four surveys. Abundance data are 4th square root transformed.

March 2013 Group control

Average similarity: 51.35

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>*Briza subaristata</i>	2.81	10.63	4.05	20.7	20.7
<i>Microlaena stipoides</i>	2.66	9.39	4.44	18.28	38.97
<i>*Axonopus fissifolius</i>	2.25	7.76	5.73	15.12	54.09
<i>Centella asiatica</i>	2.23	5.41	0.91	10.54	64.63
<i>Cynodon dactylon</i>	2.19	5.15	0.89	10.03	74.66
<i>*Paspalum dilatatum</i>	1.97	4.9	0.91	9.55	84.21
<i>Hypoxis hygrometrica</i>	1.31	3.2	0.91	6.23	90.43
<i>Glycine clandestina</i>	1.08	1.3	0.41	2.54	92.97
<i>Tricoryne elatior</i>	0.92	1.25	0.41	2.44	95.41
<i>Brunoniella australis</i>	0.87	1.18	0.41	2.3	97.7
<i>Lomandra filiformis</i>	0.87	1.18	0.41	2.3	100

April 2014 Group control

Average similarity: 51.82

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Microlaena stipoides</i>	3.42	16.6	5.1	32.04	32.04
<i>*Briza subaristata</i>	2.22	10.33	3.77	19.94	51.97
<i>Cynodon dactylon</i>	2.14	7.88	1.75	15.2	67.18
<i>*Axonopus fissifolius</i>	1.57	5.74	0.91	11.07	78.25
<i>*Paspalum dilatatum</i>	1.65	5.65	0.91	10.9	89.14
<i>Centella asiatica</i>	1.05	1.71	0.41	3.3	92.45
<i>*Hypochaeris radicata</i>	0.67	1.06	0.41	2.04	94.49
<i>Fimbristylis dichotoma</i>	0.63	1.06	0.41	2.04	96.53
<i>Brunoniella australis</i>	0.9	0.94	0.41	1.81	98.34
<i>*Cirsium vulgare</i>	0.54	0.86	0.41	1.66	100

December 2014 Group control

Average similarity: 60.42

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Microlaena stipoides</i>	2.94	15.83	6.85	26.2	26.2
* <i>Briza subaristata</i>	2.74	15.43	8.74	25.54	51.74
* <i>Paspalum dilatatum</i>	2.27	11.94	9.41	19.76	71.5
<i>Centella asiatica</i>	1.82	6.61	0.91	10.95	82.45
<i>Cynodon dactylon</i>	1.66	4.98	0.83	8.24	90.68
<i>Capillipedium parviflorum</i>	1.19	2.36	0.41	3.91	94.6
* <i>Axonopus fissifolius</i>	0.97	1.52	0.41	2.51	97.1
* <i>Hypochaeris radicata</i>	0.55	0.87	0.41	1.45	98.55
<i>Aristida vagans</i>	0.8	0.87	0.41	1.45	100

November 2015 Group control

Average similarity: 58.34

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
* <i>Briza subaristata</i>	3.06	15.1	9.88	25.89	25.89
<i>Microlaena stipoides</i>	2.69	13.04	7.31	22.35	48.23
<i>Cynodon dactylon</i>	1.7	8.18	9.87	14.02	62.25
* <i>Paspalum dilatatum</i>	1.91	7.78	2.92	13.34	75.59
* <i>Axonopus fissifolius</i>	1.31	3.74	0.87	6.41	82
<i>Centella asiatica</i>	1.2	3.53	0.91	6.04	88.04
<i>Tricoryne elatior</i>	0.85	2.66	0.91	4.55	92.6
* <i>Hypochaeris radicata</i>	0.9	2.58	0.89	4.43	97.02
<i>Dichelachne micrantha</i>	0.57	0.97	0.41	1.65	98.68
<i>Brunoniella australis</i>	0.51	0.77	0.41	1.32	100

Table S2. Species contributing up to 80% dissimilarity between the control and scalping treatments in A. April 2014; B. December 2014 and C. November 2015. Species unique to the scalped treatment are also shown (seeded native species coded in grey colour). 4th square root abundance data.

A. April 2014

Groups control & scalp

Average dissimilarity = 96.90

$t = 4.721$, $P(\text{perm}) = 0.033$

Species	Group control	Group scalp	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microlaena stipoides</i>	3.42	0	16.49	3.54	17.02	17.02
<i>Rytidosperma monticola</i>	0	2.43	11.57	11.13	11.94	28.96
* <i>Briza subaristata</i>	2.22	0	10.64	3.36	10.98	39.95
<i>Cynodon dactylon</i>	2.14	0	9.97	2.09	10.29	50.24
* <i>Axonopus fissifolius</i>	1.57	0	7.45	1.64	7.69	57.92
* <i>Paspalum dilatatum</i>	1.65	0.21	7.12	1.77	7.35	65.27
<i>Centella asiatica</i>	1.05	0.25	5.02	1.06	5.18	70.45
<i>Brunoniella australis</i>	0.9	0	4.11	0.86	4.24	74.69
* <i>Hypochaeris radicata</i>	0.67	0	3.04	0.94	3.14	77.83
<i>Fimbristylis dichotoma</i>	0.63	0	2.82	0.97	2.91	80.73

species unique to scalped treatment

<i>Rytidosperma monticola</i>	0	2.43
<i>Wahlenbergia spp.</i>	0	0.47

B. December 2014

Groups control & scalp

Average dissimilarity = 83.89

$t = 3.221$, $P(\text{perm}) = 0.029$

Species	Group control	Group scalp	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
* <i>Briza subaristata</i>	2.74	0	11.92	5.39	14.21	14.21
<i>Rytidosperma monticola</i>	0	2.74	11.85	7.1	14.12	28.33
<i>Microlaena stipoides</i>	2.94	0.51	10.83	2.58	12.91	41.24
* <i>Paspalum dilatatum</i>	2.27	0.56	7.53	2.08	8.97	50.21
<i>Centella asiatica</i>	1.82	0.25	7.14	1.61	8.51	58.72
<i>Capillipedium parviflorum</i>	1.19	0	5.61	0.95	6.69	65.41
<i>Cynodon dactylon</i>	1.66	0.79	5.43	1.74	6.47	71.89
* <i>Axonopus fissifolius</i>	0.97	0	3.82	0.95	4.55	76.44
<i>Aristida vagans</i>	0.8	0	3.16	0.85	3.76	80.2

species unique to scalped treatment

<i>Eragrostis brownii</i>	0	0.3
<i>Haloragis heterophylla</i>	0	0.25
<i>Rytidosperma monticola</i>	0	2.74
<i>Sorghum leiocladum</i>	0	0.21
<i>Wahlenbergia gracilis</i>	0	0.21
<i>Wahlenbergia spp.</i>	0	0.33

C. November 2015

Groups control & scalp

Average dissimilarity = 70.67

$t = 2.616$, $P(\text{perm}) = 0.034$

Species	Group control	Group scalp	Av.Diss	Diss/SD
	Av.Abund	Av.Abund		
<i>Rytidosperma monticola</i>	0	2.78	9.41	5.33
* <i>Briza subaristata</i>	3.06	0.37	8.98	3.24
<i>Microlaena stipoides</i>	2.69	0.25	8.43	2.91
* <i>Paspalum dilatatum</i>	1.91	0	6.37	3.01
* <i>Axonopus fissifolius</i>	1.31	0.83	3.18	1.38
<i>Tricoryne elatior</i>	0.85	0	2.86	1.54
<i>Sorghum leiocladum</i>	0.61	0.41	2.57	0.74
* <i>Hypochaeris radicata</i>	0.9	0.54	2.42	1.21
<i>Capillipedium parviflorum</i>	0.51	0.41	2.36	0.74
<i>Centella asiatica</i>	1.2	1.1	2.29	1.34
* <i>Plantago lanceolata</i>	0.3	0.67	2.06	1.44
<i>Dichelachne micrantha</i>	0.57	0	1.91	0.95
<i>Brunoniella australis</i>	0.51	0.51	1.84	1.06
<i>Schoenus apogon</i>	0.25	0.46	1.54	1
<i>Eragrostis brownii</i>	0	0.47	1.51	0.56

Species unique to scalped treatment

* <i>Centaurium erythaea</i>	0	0.21
* <i>Conyza sp.</i>	0	0.21
* <i>Hypochaeris glabra</i>	0	0.21
<i>Rytidosperma monticola</i>	0	2.78
<i>Eragrostis brownii</i>	0	0.47
<i>Paspalidium distans</i>	0	0.37
<i>Wahlenbergia gracilis</i>	0	0.21

Table S3. Species contributing to similarity within the fire treatment (SIMPER analysis) in March 2013, April 2014, December 2014 and November 2015. Abundance data are 4th square root transformed.

March 2013 Sur 1 Group fire

Average similarity: 55.83

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
* <i>Briza subaristata</i>	2.69	10.78	2.66	19.31	19.31
* <i>Paspalum dilatatum</i>	2.56	10.68	5.45	19.13	38.44
<i>Cynodon dactylon</i>	2.55	9.91	5.66	17.75	56.19
<i>Microlaena stipoides</i>	2.23	8.36	4.15	14.97	71.16
<i>Centella asiatica</i>	2.15	6.16	0.84	11.03	82.19
* <i>Axonopus fissifolius</i>	1.6	3.54	0.85	6.33	88.52
* <i>Cirsium vulgare</i>	1.04	1.3	0.41	2.33	90.85
* <i>Sonchus oleraceus</i>	0.79	1.23	0.41	2.21	93.06
<i>Lomandra filiformis</i>	0.99	1.1	0.41	1.97	95.03
<i>Glycine clandestina</i>	1.08	0.92	0.41	1.66	96.69
<i>Hypoxis hygrometrica</i>	0.87	0.92	0.41	1.66	98.34
<i>Tricoryne elatior</i>	0.87	0.92	0.41	1.66	100

April 2014 Sur 2 Group fire

Average similarity: 43.69

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
* <i>Paspalum dilatatum</i>	2.24	9.61	7.17	22	22
* <i>Briza subaristata</i>	2.04	7.42	3.41	16.97	38.98
<i>Microlaena stipoides</i>	2.38	6.45	0.91	14.76	53.74
<i>Centella asiatica</i>	1.58	3.8	0.83	8.7	62.44
<i>Cynodon dactylon</i>	1.46	3.79	0.91	8.67	71.11
* <i>Hypochaeris radicata</i>	1	3.11	0.9	7.11	78.22
* <i>Cirsium vulgare</i>	0.75	2.23	0.91	5.11	83.33
<i>Oxalis exilis</i>	0.87	1.99	0.91	4.55	87.88
* <i>Axonopus fissifolius</i>	0.99	1.29	0.41	2.95	90.83
* <i>Conyza sp.</i>	0.66	1.06	0.41	2.43	93.26
<i>Wahlenbergia spp.</i>	0.77	0.83	0.41	1.9	95.16
<i>Aristida vagans</i>	0.55	0.81	0.41	1.84	97.01
* <i>Anagallis arvensis</i>	0.62	0.7	0.41	1.6	98.61
<i>Tricoryne elatior</i>	0.58	0.61	0.41	1.39	100

December 2014 Sur 3 Group
fire

Average similarity: 61.57

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
* <i>Briza subaristata</i>	3.29	15.37	5.42	24.96	24.96
* <i>Paspalum dilatatum</i>	2.17	10.58	4.71	17.19	42.15
<i>Microlaena stipoides</i>	2.15	8.69	2.8	14.12	56.27
<i>Centella asiatica</i>	1.7	6.14	0.91	9.97	66.24
<i>Cynodon dactylon</i>	1.8	5.71	0.91	9.28	75.52
<i>Oxalis exilis</i>	0.84	4.45	15.15	7.22	82.74
* <i>Axonopus fissifolius</i>	1.33	3.3	0.82	5.35	88.1
<i>Wahlenbergia gracilis</i>	0.97	2.55	0.88	4.14	92.24
* <i>Conyza sp.</i>	0.63	2.3	0.91	3.74	95.97
* <i>Hypochaeris radicata</i>	0.7	1.08	0.41	1.75	97.73
<i>Hypoxis hygrometrica</i>	0.42	0.71	0.41	1.16	98.89
* <i>Anagallis arvensis</i>	0.46	0.68	0.41	1.11	100

November 2015 Sur 4
Group fire

Average similarity: 58.62

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
* <i>Briza subaristata</i>	3.61	22.87	9.25	39.02	39.02
<i>Cynodon dactylon</i>	1.5	8.83	9.08	15.07	54.08
<i>Centella asiatica</i>	1.11	6.37	4.11	10.86	64.95
* <i>Paspalum dilatatum</i>	1.42	6.19	0.91	10.55	75.5
* <i>Hypochaeris radicata</i>	0.92	5.75	6.57	9.81	85.31
* <i>Axonopus fissifolius</i>	1.28	4.03	0.83	6.88	92.19
<i>Microlaena stipoides</i>	0.81	1.46	0.41	2.48	94.67
<i>Tricoryne elatior</i>	0.54	1.09	0.41	1.86	96.53
<i>Dichelachne micrantha</i>	0.46	1.09	0.41	1.86	98.4
<i>Wahlenbergia gracilis</i>	0.6	0.94	0.41	1.6	100

Table S4. Species contributing up to 80% dissimilarity between the control and slash treatments in December 2014. Species unique to the scalped treatment are also shown. 4th square root abundance data.

December 2014

Groups control & slash

Average dissimilarity = 43.16

$t = 1.521$, $P(\text{perm}) = 0.119$

Species	Group control	Group slash	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microlaena stipoides</i>	2.94	1.58	3.52	1.33	8.15	8.15
<i>Capillipedium parviflorum</i>	1.19	0.3	3.28	1.13	7.6	15.75
<i>Centella asiatica</i>	1.82	2.81	2.8	0.86	6.48	22.23
<i>Cynodon dactylon</i>	1.66	2.4	2.68	0.98	6.21	28.44
* <i>Axonopus fissifolius</i>	0.97	1.03	2.67	1.37	6.19	34.63
<i>Lomandra filiformis</i>	0.21	1.09	2.5	1.39	5.79	40.42
<i>Tricoryne elatior</i>	0	0.95	2.44	1.56	5.65	46.07
<i>Dichelachne micrantha</i>	0	0.79	2.14	1.55	4.96	51.03
<i>Aristida vagans</i>	0.8	0.21	2.05	0.97	4.75	55.78
* <i>Coryza sp.</i>	0	0.67	1.75	1.65	4.06	59.84
* <i>Hypochaeris radicata</i>	0.55	0.66	1.71	1.11	3.97	63.81
* <i>Cirsium vulgare</i>	0.21	0.51	1.39	0.99	3.22	67.03
<i>Oxalis exilis</i>	0	0.51	1.33	0.91	3.07	70.1
<i>Hypoxis hygrometrica</i>	0.21	0.5	1.26	1.04	2.92	73.03
* <i>Plantago lanceolata</i>	0	0.43	1.04	0.56	2.4	75.43
<i>Schoenus apogon</i>	0	0.41	1.01	0.56	2.34	77.77
* <i>Paspalum dilatatum</i>	2.27	2.14	1	1.56	2.32	80.08

Species unique to control	Group control	Group slash	Species unique to slash	Group control	Group slash
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
* <i>Anagallis arvensis</i>	0.21	0	* <i>Centaurium erythaea</i>	0	0.21
* <i>Eragrostis curvula</i>	0.25	0	* <i>Coryza sp.</i>	0	0.67
<i>Brunoniella australis</i>	0.21	0	* <i>Plantago lanceolata</i>	0	0.43
<i>Glycine clandestina</i>	0.25	0	<i>Dichelachne micrantha</i>	0	0.79
<i>Phyllanthus virgatus</i>	0.25	0	<i>Dichopogon fimbriatus</i>	0	0.25
<i>Pratia purpurascens</i>	0.25	0	<i>Oxalis exilis</i>	0	0.51
			<i>Rytidospermum spp</i>	0	0.33
			<i>Schoenus apogon</i>	0	0.41
			<i>Tricoryne elatior</i>	0	0.95
			<i>Wahlenbergia gracilis</i>	0	0.3
			<i>Wahlenbergia spp.</i>	0	0.21
			<i>Wurmbea dioica</i>	0	0.25

Table S5. Species contributing up to 80% dissimilarity between the control and fire-low carbon (fire lo C) treatments in A. December 2014 and B. November 2015. 4th square root abundance data.

A. December 2014

Groups control & fire lo C

Average dissimilarity = 49.98

$t = 1.536$, $P(\text{perm}) = 0.021$

Species	Group control	Group fire lo C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microlaena stipoides</i>	2.94	1.44	4.01	1.33	8.02	8.02
<i>Capillipedium parviflorum</i>	1.19	0	3.11	0.95	6.22	14.24
<i>Centella asiatica</i>	1.82	1.53	3.04	1.17	6.08	20.32
<i>Cynodon dactylon</i>	1.66	2.59	2.66	0.94	5.33	25.65
<i>Themeda australis</i>	0	1.12	2.56	0.91	5.13	30.77
* <i>Axonopus fissifolius</i>	0.97	1.08	2.5	1.26	4.99	35.77
<i>Hypoxis hygrometrica</i>	0.21	1.11	2.31	1.87	4.62	40.38
<i>Aristida vagans</i>	0.8	0.42	2.18	1.02	4.36	44.75
* <i>Hypochaeris radicata</i>	0.55	1.19	2.01	1.31	4.02	48.77
<i>Tricoryne elatior</i>	0	0.83	1.99	1.61	3.97	52.74
<i>Wurmbea dioica</i>	0	0.67	1.66	1.57	3.33	56.07
<i>Lomandra filiformis</i>	0.21	0.47	1.43	0.74	2.86	58.94
<i>Dianella longifolia</i>	0	0.59	1.43	0.96	2.86	61.79
<i>Dichelachne micrantha</i>	0	0.5	1.33	0.96	2.66	64.46
<i>Glycine clandestina</i>	0.25	0.51	1.26	1.01	2.53	66.98
<i>Brunoniella australis</i>	0.21	0.5	1.2	1.05	2.4	69.38
<i>Oxalis exilis</i>	0	0.42	1.04	0.96	2.08	71.46
* <i>Anagallis arvensis</i>	0.21	0.42	1.03	0.96	2.05	73.52
* <i>Paspalum dilatatum</i>	2.27	2	0.97	1.57	1.93	75.45
<i>Opercularia diphylla</i>	0	0.39	0.88	0.56	1.75	77.2
* <i>Plantago lanceolata</i>	0	0.35	0.79	0.56	1.59	78.79
* <i>Briza subaristata</i>	2.74	2.45	0.77	1.31	1.53	80.32

Species unique to control	Group control	Group fire lo C	Species unique to fire lo C	Group control	Group fire lo C
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
* <i>Cirsium vulgare</i>	0.21	0	* <i>Centaureum erythaea</i>	0	0.21
* <i>Eragrostis curvula</i>	0.25	0	* <i>Conyza sp.</i>	0	0.21
<i>Capillipedium parviflorum</i>	1.19	0	* <i>Plantago lanceolata</i>	0	0.35
<i>Phyllanthus virgatus</i>	0.25	0	<i>Bossiaea prostrata</i>	0	0.21
<i>Pratia purpurascens</i>	0.25	0	<i>Caesia calliantha</i>	0	0.21
			<i>Desmodium varians</i>	0	0.25
			<i>Dianella caerulea</i>	0	0.25
			<i>Dianella longifolia</i>	0	0.59
			<i>Dichelachne micrantha</i>	0	0.5
			<i>Eragrostis brownii</i>	0	0.25

<i>Glycine microphylla</i>	0	0.3
<i>Opercularia diphylla</i>	0	0.39
<i>Opercularia varia</i>	0	0.21
<i>Oxalis exilis</i>	0	0.42
<i>Poa sp</i>	0	0.21
<i>Sporobolus creber</i>	0	0.21
<i>Themeda australis</i>	0	1.12
<i>Tricoryne elatior</i>	0	0.83
<i>Wahlenbergia gracilis</i>	0	0.25
<i>Wurmbea dioica</i>	0	0.67

B. November 2015

Groups control & fire lo C
 Average dissimilarity = 55.83
 $t = 1.419$, $P(\text{perm}) = 0.031$

Species	Group control		Group fire lo C		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>Microlaena stipoides</i>	2.69	0.39	6.1	2.45	10.93	10.93
<i>Cynodon dactylon</i>	1.7	1.35	3.53	2.64	6.32	17.25
* <i>Axonopus fissifolius</i>	1.31	1.23	2.55	1.31	4.56	21.81
<i>Centella asiatica</i>	1.2	0.85	2.47	1.2	4.42	26.22
* <i>Hypochaeris radicata</i>	0.9	1.79	2.3	1.46	4.13	30.35
<i>Dianella caerulea</i>	0	0.82	2.21	0.74	3.95	34.3
<i>Sorghum leiocladum</i>	0.61	0.42	2.11	0.79	3.78	38.09
<i>Aristida ramosa</i>	0.42	0.75	2	1.65	3.59	41.68
<i>Tricoryne elatior</i>	0.85	0.3	1.97	1.34	3.53	45.2
<i>Hypoxis hygrometrica</i>	0.21	0.85	1.89	1.39	3.39	48.59
<i>Entolasia stricta</i>	0	0.66	1.73	0.56	3.09	51.68
<i>Bossiaea prostrata</i>	0	0.59	1.68	0.56	3	54.69
* <i>Paspalum dilatatum</i>	1.91	1.65	1.57	1.8	2.82	57.5
<i>Themeda australis</i>	0	0.72	1.54	0.56	2.76	60.26
* <i>Briza subaristata</i>	3.06	2.51	1.52	1.6	2.72	62.99
<i>Dichelachne micrantha</i>	0.57	0.5	1.48	1.1	2.65	65.63
<i>Lomandra filiformis</i>	0.3	0.54	1.46	1.05	2.62	68.25
<i>Capillipedium parviflorum</i>	0.51	0	1.38	0.55	2.47	70.72
<i>Wahlenbergia gracilis</i>	0	0.5	1.32	0.97	2.36	73.08
<i>Brunoniella australis</i>	0.51	0.42	1.32	1.05	2.36	75.44
<i>Wurmbea dioica</i>	0	0.43	1.24	0.56	2.22	77.66
<i>Arthropodium sp.</i>	0	0.5	1.21	0.96	2.16	79.82
* <i>Anagallis arvensis</i>	0.21	0.3	1.05	0.79	1.87	81.7

Species unique to control	Group control Av.Abund	Group fire lo C Av.Abund	Species unique to fire lo C	Group control Av.Abund	Group fire lo C Av.Abund
<i>*Sporobolus fertilis</i>	0.25	0	<i>*Briza maxima</i>	0	0.21
<i>Capillipedium parviflorum</i>	0.51	0	<i>Arthropodium sp.</i>	0	0.5
<i>Carex breviculmis</i>	0.21	0	<i>Rytidosperma monticola</i>	0	0.25
<i>Oxalis perennans</i>	0.21	0	<i>Bossiaea prostrata</i>	0	0.59
<i>Phyllanthus virgatus</i>	0.25	0	<i>Dianella caerulea</i>	0	0.82
<i>Schoenus apogon</i>	0.25	0	<i>Entolasia stricta</i>	0	0.66
			<i>Glycine tabacina</i>	0	0.25
			<i>Lomandra filiformis sp coriacea</i>	0	0.39
			<i>Opercularia diphylla</i>	0	0.35
			<i>Paspalidium distans</i>	0	0.33
			<i>Poa sp</i>	0	0.33
			<i>Themeda australis</i>	0	0.72
			<i>Wahlenbergia gracilis</i>	0	0.5

Table S6. Species contributing to dissimilarity between the control and slash-low carbon (slash lo C) treatments in December 2014. 4th square root abundance data.

December 2014

Groups control & slash lo C

Average dissimilarity = 45.95

$t = 1.397$, $P(\text{perm}) = 0.054$

Species	Group control Av.Abund	Group slash lo C Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
<i>Microlaena stipoides</i>	2.94	1.24	5.07	1.31	11.02	11.02
<i>Capillipedium parviflorum</i>	1.19	0.3	3.55	1.07	7.72	18.75
<i>Lomandra filiformis</i>	0.21	1.26	3.27	1.49	7.11	25.85
<i>Centella asiatica</i>	1.82	1.85	3.11	0.91	6.77	32.63
* <i>Axonopus fissifolius</i>	0.97	1.19	3.1	1.32	6.75	39.38
<i>Cynodon dactylon</i>	1.66	2.34	3.04	1.07	6.61	45.99
* <i>Conyza sp.</i>	0	0.84	2.33	1.61	5.07	51.05
* <i>Briza subaristata</i>	2.74	1.96	2.23	3.29	4.84	55.9
* <i>Hypochaeris radicata</i>	0.55	0.98	2.16	1.14	4.7	60.59
<i>Aristida vagans</i>	0.8	0	2.15	0.86	4.69	65.28
* <i>Centaurium erythaea</i>	0	0.46	1.24	0.96	2.71	67.99
<i>Oxalis exilis</i>	0	0.42	1.21	0.96	2.63	70.61
<i>Brunoniella australis</i>	0.21	0.42	1.2	0.96	2.61	73.22
<i>Hypoxis hygrometrica</i>	0.21	0.3	1.11	0.78	2.41	75.63
* <i>Paspalum dilatatum</i>	2.27	2.49	1.02	1.24	2.22	77.85
<i>Tricoryne elatior</i>	0	0.35	0.95	0.56	2.07	79.92
* <i>Anagallis arvensis</i>	0.21	0.21	0.9	0.74	1.96	81.88
Species unique to control	Group control Av.Abund	Group slash lo C Av.Abund	Species unique to slash lo C	Group control Av.Abund	Group slash lo C Av.Abund	
* <i>Cirsium vulgare</i>	0.21	0	* <i>Centaurium erythaea</i>	0	0.46	
* <i>Eragrostis curvula</i>	0.25	0	* <i>Conyza sp.</i>	0	0.84	
<i>Aristida vagans</i>	0.8	0	* <i>Senecio madagascariensis</i>	0	0.25	
<i>Glycine clandestina</i>	0.25	0	<i>Aristida ramosa</i>	0	0.3	
<i>Phyllanthus virgatus</i>	0.25	0	<i>Dichelachne micrantha</i>	0	0.21	
<i>Pratia purpurascens</i>	0.25	0	<i>Glycine microphylla</i>	0	0.21	
			<i>Haloragis heterophylla</i>	0	0.21	
			<i>Oxalis exilis</i>	0	0.42	
			<i>Tricoryne elatior</i>	0	0.35	
			<i>Wahlenbergia gracilis</i>	0	0.21	
			<i>Wurmbea dioica</i>	0	0.25	

Table S7. Species contributing up to 80% dissimilarity between the control and the fire-high carbon (fire hi C) treatments at A. April 2014, B. December 2014 and C. November 2015. 4th square root abundance data.

A. April 2014

Groups control & fire hi C

Average dissimilarity = 64.76

$t = 1.870$, $P(\text{perm}) = 0.039$

Species	Group control	Group fire hi C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microlaena stipoides</i>	3.42	1.19	9.52	1.62	14.69	14.69
* <i>Briza subaristata</i>	2.22	0	9.06	3.19	14	28.69
* <i>Paspalum dilatatum</i>	1.65	0.67	5.27	1.57	8.14	36.83
* <i>Axonopus fissifolius</i>	1.57	1.01	4.46	1.37	6.89	43.71
<i>Centella asiatica</i>	1.05	0.25	4.28	1.05	6.6	50.32
<i>Cynodon dactylon</i>	2.14	2.39	4.21	1.43	6.5	56.81
<i>Brunoniella australis</i>	0.9	0	3.53	0.85	5.44	62.26
<i>Lomandra filiformis</i>	0	0.72	2.7	0.95	4.17	66.43
* <i>Hypochaeris radicata</i>	0.67	0	2.61	0.93	4.04	70.47
<i>Fimbristylis dichotoma</i>	0.63	0	2.42	0.96	3.74	74.21
* <i>Cirsium vulgare</i>	0.54	0	2.29	0.92	3.53	77.74
<i>Tricoryne elatior</i>	0.25	0.55	2.19	0.99	3.37	81.11

Species unique to control	Group control	Group fire hi C	Species unique to fire hi C	Group control	Group fire hi C
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
* <i>Anagallis arvensis</i>	0.21	0	<i>Dianella longifolia</i>	0	0.3
* <i>Briza subaristata</i>	2.22	0	<i>Lomandra filiformis</i>	0	0.72
* <i>Cirsium vulgare</i>	0.54	0			
* <i>Conyza bonariensis</i>	0.21	0			
* <i>Conyza sp.</i>	0.3	0			
* <i>Hypochaeris radicata</i>	0.67	0			
* <i>Setaria parviflora</i>	0.25	0			
<i>Brunoniella australis</i>	0.9	0			
<i>Fimbristylis dichotoma</i>	0.63	0			
<i>Glycine clandestina</i>	0.25	0			
<i>Glycine tabacina</i>	0.25	0			
<i>Opecularia diphylla</i>	0.21	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Sporobolus creber</i>	0.33	0			

B. December 2014

Groups control & fire hi C

Average dissimilarity = 57.78

$t = 1.998$, $P(\text{perm}) = 0.025$

Species	Group control	Group fire hi C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microlaena stipoides</i>	2.94	0.84	7.99	1.89	13.83	13.83
* <i>Briza subaristata</i>	2.74	0.79	7.18	3.5	12.43	26.26
<i>Centella asiatica</i>	1.82	0.58	5.56	1.74	9.63	35.88
<i>Capillipedium parviflorum</i>	1.19	0	4.72	0.96	8.16	44.05
<i>Lomandra filiformis</i>	0.21	1.37	4.29	1.6	7.43	51.48
<i>Cynodon dactylon</i>	1.66	2.39	3.93	0.98	6.8	58.27
* <i>Axonopus fissifolius</i>	0.97	0.9	3.64	1.06	6.31	64.58
* <i>Paspalum dilatatum</i>	2.27	1.33	3.4	1.11	5.88	70.46
<i>Aristida vagans</i>	0.8	0	2.73	0.86	4.73	75.19
<i>Tricoryne elatior</i>	0	0.54	2.03	0.93	3.52	78.71
<i>Hypoxis hygrometrica</i>	0.21	0.63	1.98	1.23	3.42	82.13

Species unique to control	Group control	Group fire hi C	Species unique to fire hi C	Group control	Group fire hi C
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
* <i>Anagallis arvensis</i>	0.21	0	<i>Dianella longifolia</i>	0	0.3
* <i>Cirsium vulgare</i>	0.21	0	<i>Tricoryne elatior</i>	0	0.54
* <i>Eragrostis curvula</i>	0.25	0	<i>Wurmbea dioica</i>	0	0.21
<i>Aristida vagans</i>	0.8	0			
<i>Brunoniella australis</i>	0.21	0			
<i>Capillipedium parviflorum</i>	1.19	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Pratia purpurascens</i>	0.25	0			

C. November 2014

Groups control & fire hi C

Average dissimilarity = 66.62

$t = 2.209$, $P(\text{perm}) = 0.036$

Species	Group control	Group fire hi C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>*Briza subaristata</i>	3.06	0.42	10.62	2.68	15.95	15.95
<i>Microlaena stipoides</i>	2.69	0.42	9.25	2.25	13.88	29.83
<i>*Paspalum dilatatum</i>	1.91	0.66	5.24	1.55	7.86	37.69
<i>Centella asiatica</i>	1.2	0.21	4.33	1.43	6.49	44.18
<i>*Axonopus fissifolius</i>	1.31	0.89	4.25	1.16	6.37	50.55
<i>*Hypochaeris radicata</i>	0.9	0	3.57	1.47	5.35	55.91
<i>Cynodon dactylon</i>	1.7	2.56	3.48	1.57	5.23	61.13
<i>Lomandra filiformis</i>	0.3	0.93	3.06	1.36	4.59	65.72
<i>Tricoryne elatior</i>	0.85	0.3	2.98	1.33	4.47	70.19
<i>Sorghum leiocladum</i>	0.61	0	2.35	0.55	3.52	73.72
<i>Dichelachne micrantha</i>	0.57	0	2.23	0.95	3.35	77.06
<i>Capillipedium parviflorum</i>	0.51	0	2.16	0.55	3.24	80.3

Species unique to control	Group control	Group fire hi C	Species unique to fire hi C	Group control	Group fire hi C
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
<i>*Anagallis arvensis</i>	0.21	0			
<i>*Hypochaeris radicata</i>	0.9	0			
<i>*Plantago lanceolata</i>	0.3	0			
<i>*Sporobolus fertilis</i>	0.25	0			
<i>Aristida ramosa</i>	0.42	0			
<i>Brunoniella australis</i>	0.51	0			
<i>Capillipedium parviflorum</i>	0.51	0			
<i>Carex breviculmis</i>	0.21	0			
<i>Dichelachne micrantha</i>	0.57	0			
<i>Glycine clandestina</i>	0.21	0			
<i>Oxalis perennans</i>	0.21	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Sorghum leiocladum</i>	0.61	0			

Table S8. Species contributing to up to 80% dissimilarity between the control and the slash-high carbon (slash hi C) treatments at A. April 2014, B. December 2014 and C. November 2015. 4th square root abundance data.

A. April 2014

Groups control & slash hi C

Average dissimilarity = 57.40

$t = 1.898$, $P(\text{perm}) = 0.032$

Species	Group control	Group slash hi C		Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss			
<i>Microlaena stipoides</i>	3.42	0.86	9.73	1.83	16.95	16.95
* <i>Briza subaristata</i>	2.22	0.25	7.32	2.3	12.76	29.7
<i>Centella asiatica</i>	1.05	0.98	3.95	1.08	6.89	36.59
<i>Cynodon dactylon</i>	2.14	2.32	3.71	1.81	6.46	43.05
<i>Brunoniella australis</i>	0.9	0	3.16	0.84	5.5	48.56
* <i>Axonopus fissifolius</i>	1.57	1.5	2.99	1.41	5.21	53.77
* <i>Paspalum dilatatum</i>	1.65	2.08	2.74	0.84	4.77	58.53
<i>Hypoxis hygrometrica</i>	0.25	0.67	2.4	0.98	4.18	62.71
* <i>Hypochaeris radicata</i>	0.67	0	2.34	0.94	4.08	66.79
<i>Lomandra filiformis</i>	0	0.68	2.25	0.91	3.91	70.7
<i>Fimbristylis dichotoma</i>	0.63	0	2.17	0.96	3.78	74.49
* <i>Cirsium vulgare</i>	0.54	0	2.03	0.92	3.54	78.02
* <i>Setaria parviflora</i>	0.25	0.3	1.47	0.77	2.56	80.58

Species unique to control	Group control	Group slash hi C		Group control	Group slash hi C
	Av.Abund	Av.Abund	Species unique to slash hi C	Av.Abund	Av.Abund
* <i>Anagallis arvensis</i>	0.21	0	<i>Aristida vagans</i>	0	0.21
* <i>Cirsium vulgare</i>	0.54	0	<i>Dianella longifolia</i>	0	0.21
* <i>Conyza bonariensis</i>	0.21	0	<i>Dichopogon fimbriatus</i>	0	0.21
* <i>Conyza sp.</i>	0.3	0	<i>Lomandra filiformis</i>	0	0.68
* <i>Hypochaeris radicata</i>	0.67	0	<i>Rytidosperma monticola</i>	0	0.21
<i>Brunoniella australis</i>	0.9	0			
<i>Fimbristylis dichotoma</i>	0.63	0			
<i>Glycine clandestina</i>	0.25	0			
<i>Glycine tabacina</i>	0.25	0			
<i>Opercularia diphylla</i>	0.21	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Sporobolus creber</i>	0.33	0			
<i>Tricoryne elatior</i>	0.25	0			

B. December 2014

Groups control & slash hi C

Average dissimilarity = 57.92

 $t = 1.962$, $P(\text{perm}) = 0.023$

Species	Group control	Group slash hi C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>*Briza subaristata</i>	2.74	0.21	9.73	4.34	16.79	16.79
<i>Microlaena stipoides</i>	2.94	0.63	9.07	2.39	15.66	32.45
<i>Centella asiatica</i>	1.82	0.74	5.45	1.59	9.4	41.85
<i>Capillipedium parviflorum</i>	1.19	0	4.89	0.96	8.44	50.29
<i>*Axonopus fissifolius</i>	0.97	1.19	4.11	1.39	7.1	57.39
<i>Cynodon dactylon</i>	1.66	2.26	3.87	1.04	6.67	64.06
<i>Lomandra filiformis</i>	0.21	0.93	3.26	1.28	5.64	69.7
<i>Aristida vagans</i>	0.8	0.3	3	1	5.18	74.88
<i>*Hypochaeris radicata</i>	0.55	0.21	1.98	1.05	3.42	78.3
<i>*Paspalum dilatatum</i>	2.27	1.88	1.96	1.55	3.38	81.68

Species unique to control	Group control	Group slash hi C		Group control	Group slash hi C
	Av.Abund	Av.Abund	Species unique to slash hi C	Av.Abund	Av.Abund
<i>*Anagallis arvensis</i>	0.21	0	<i>*Plantago lanceolata</i>	0	0.25
<i>*Cirsium vulgare</i>	0.21	0	<i>Dianella longifolia</i>	0	0.21
<i>*Eragrostis curvula</i>	0.25	0	<i>Wurmbea dioica</i>	0	0.21
<i>Brunoniella australis</i>	0.21	0			
<i>Capillipedium parviflorum</i>	1.19	0			
<i>Glycine clandestina</i>	0.25	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Pratia purpurascens</i>	0.25	0			

C. November 2015

Groups control & slash hi C

Average dissimilarity = 66.32

 $t = 3.440$, $P(\text{perm}) = 0.03$

Species	Group control	Group slash hi C	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>*Briza subaristata</i>	3.06	0	12.22	8.88	18.43	18.43
<i>Microlaena stipoides</i>	2.69	0	10.83	5.31	16.33	34.76
<i>Centella asiatica</i>	1.2	0.25	4.29	1.44	6.47	41.22
<i>*Paspalum dilatatum</i>	1.91	1.27	3.92	1.29	5.91	47.13
<i>*Hypochaeris radicata</i>	0.9	0	3.62	1.5	5.45	52.59
<i>Tricoryne elatior</i>	0.85	0	3.39	1.59	5.11	57.7
<i>Hypoxis hygrometrica</i>	0.21	0.86	3.04	1.38	4.58	62.28
<i>*Axonopus fissifolius</i>	1.31	1.6	2.97	1.3	4.47	66.75
<i>Cynodon dactylon</i>	1.7	2.41	2.87	2.24	4.33	71.08
<i>Sorghum leiocladum</i>	0.61	0	2.38	0.56	3.59	74.67
<i>Dichelachne micrantha</i>	0.57	0	2.26	0.96	3.41	78.08
<i>Capillipedium parviflorum</i>	0.51	0	2.19	0.56	3.3	81.38

Species unique to control	Group control	Group slash hi C	Species unique to slash hi C	Group control	Group slash hi C
	Av.Abund	Av.Abund		Av.Abund	Av.Abund
<i>*Anagallis arvensis</i>	0.21	0			
<i>*Briza subaristata</i>	3.06	0			
<i>*Hypochaeris radicata</i>	0.9	0			
<i>*Plantago lanceolata</i>	0.3	0			
<i>*Sporobolus fertilis</i>	0.25	0			
<i>Aristida ramosa</i>	0.42	0			
<i>Brunoniella australis</i>	0.51	0			
<i>Capillipedium parviflorum</i>	0.51	0			
<i>Carex breviculmis</i>	0.21	0			
<i>Dichelachne micrantha</i>	0.57	0			
<i>Glycine clandestina</i>	0.21	0			
<i>Lomandra filiformis</i>	0.3	0			
<i>Microlaena stipoides</i>	2.69	0			
<i>Oxalis perennans</i>	0.21	0			
<i>Phyllanthus virgatus</i>	0.25	0			
<i>Schoenus apogon</i>	0.25	0			
<i>Sorghum leiocladum</i>	0.61	0			
<i>Tricoryne elatior</i>	0.85	0			